



REMEDIAL DESIGN FACT SHEET MINOR MODIFICATION TO THE RECORD OF DECISION FOR GROUNDWATER REMEDIATION NAVAL INDUSTRIAL RESERVE ORDNANCE PLANT (NIROP) FRIDLEY, MINNESOTA

On September 28, 1990, a Record of Decision (ROD) for Groundwater Remediation was issued to address

contaminated groundwater at the Naval Industrial Reserve Ordnance Plant (NIROP) Fridley, Minnesota. The ROD for Groundwater Remediation explained that a groundwater recovery well system would be installed to extract contaminated groundwater and to provide hydraulic containment. The groundwater is

primarily contaminated with trichloroethene (TCE), but with lesser concentrations of other volatile organic compounds (VOCs). The treatment process for contaminated groundwater was to be installed in two phases. Phase I of the groundwater treatment process used a local wastewater treatment plant to treat contaminated groundwater. If contaminated groundwater was too concentrated for local wastewater treatment, an on-site pretreatment system was to be installed to treat the water to acceptable levels before discharge to the local wastewater treatment plant. Under the subsequent Phase II groundwater treatment process, contaminated groundwater was to be treated entirely onsite and discharged to the Mississippi River. Phase I of the ROD was implemented in September 1992 and upgrades were implemented in 1995. The Phase II onsite treatment portion of the ROD was implemented in November 1998. Since the initial system start-up, 1.7 million gallons of contaminated groundwater have been extracted and 24,994 pounds

of TCE have been removed from the aquifer beneath NIROP.



Since system start-up, groundwater monitoring has been implemented, and Annual Monitoring Reports (AMRs) have been issued to document that monitoring (1992 to the present). Based on the information presented in the AMRs, suggestions and modifications to the monitoring well system have been implemented,

including the addition of 43 new groundwater monitoring wells. Recent groundwater monitoring events indicate that this Minor Modification to the ROD is necessary to address functional specifications, performance optimization, new technical information, support agency and community concerns, and cost minimization. This Minor Modification, described below, addresses the type of materials, equipment, facilities, services, and supplies that are used to optimally implement the ROD and does not have a significant impact on the scope, performance, or cost of the remedy as presented in the ROD for Groundwater Remediation. The Minor Modification has been reviewed and agreed upon by the NIROP Partnering Team, which includes representatives from the U.S. Navy, the Minnesota Pollution Control Agency (MPCA), and the United States Environmental Protection Agency (U.S.EPA).

The Minor Modification presented in this Remedial Design (RD) Fact Sheet includes the following aspects:

- Discontinue operation and abandonment of extraction wells AT-1A and AT-2.
- Install new extraction well AT-9, adjacent to AT2.
- Discontinue operation and abandon extraction well AT-4.
- Reposition the mechanical packer in extraction well AT-3A.
- Increase pumping rates at AT-5A.
- Decrease pumping rates at AT-5B.
- Install three new extraction wells (AT-7, AT-8, and AT-10) at locations between monitoring wells 12-IS and 13-IS. (See Figure 1.)

In addition to abandoning extraction wells AT-1A and AT-2, the abandonment of the two service water wells NIROP-2 and NIROP-3, which are located outside the NIROP ordnance manufacturing building, is being completed.

The rationale behind the decision to make this modification is documented in the 1999 AMR, the 2000 report entitled Field Investigation at the NIROP and Anoka County Park, the updated groundwater model, and minutes from technical subcommittee meetings. The AMR and Anoka County Park Report are available in the Public Information Repository.

This Minor Modification to the groundwater extraction well system at NIROP has been recorded in the post-ROD site file, also located in the Public Information Repository. The modification documented in this RD Fact Sheet serves as a written statement describing the change to the system, as recommended in U.S. EPA Guidance (Answers to Comments Submitted After the Superfund ROD is Signed, U.S. EPA memorandum, October 11, 1995 (<http://es.epa.gov/oeca/osre/951011.html>)). This RD Fact Sheet was distributed to the mailing list, found in the recently updated Community Relations Plan (September 1999).

FACILITY DESCRIPTION

The Naval Industrial Reserve Ordnance Plant, Fridley (NIROP) is located in the northwestern portion of the Minneapolis/St. Paul Metropolitan area, in the city of Fridley, Minnesota. (See Figure 2.) Advanced Naval weapons systems (i.e., gun mounts and missile launching systems) have been designed and manufactured at the NIROP facility since 1941. The

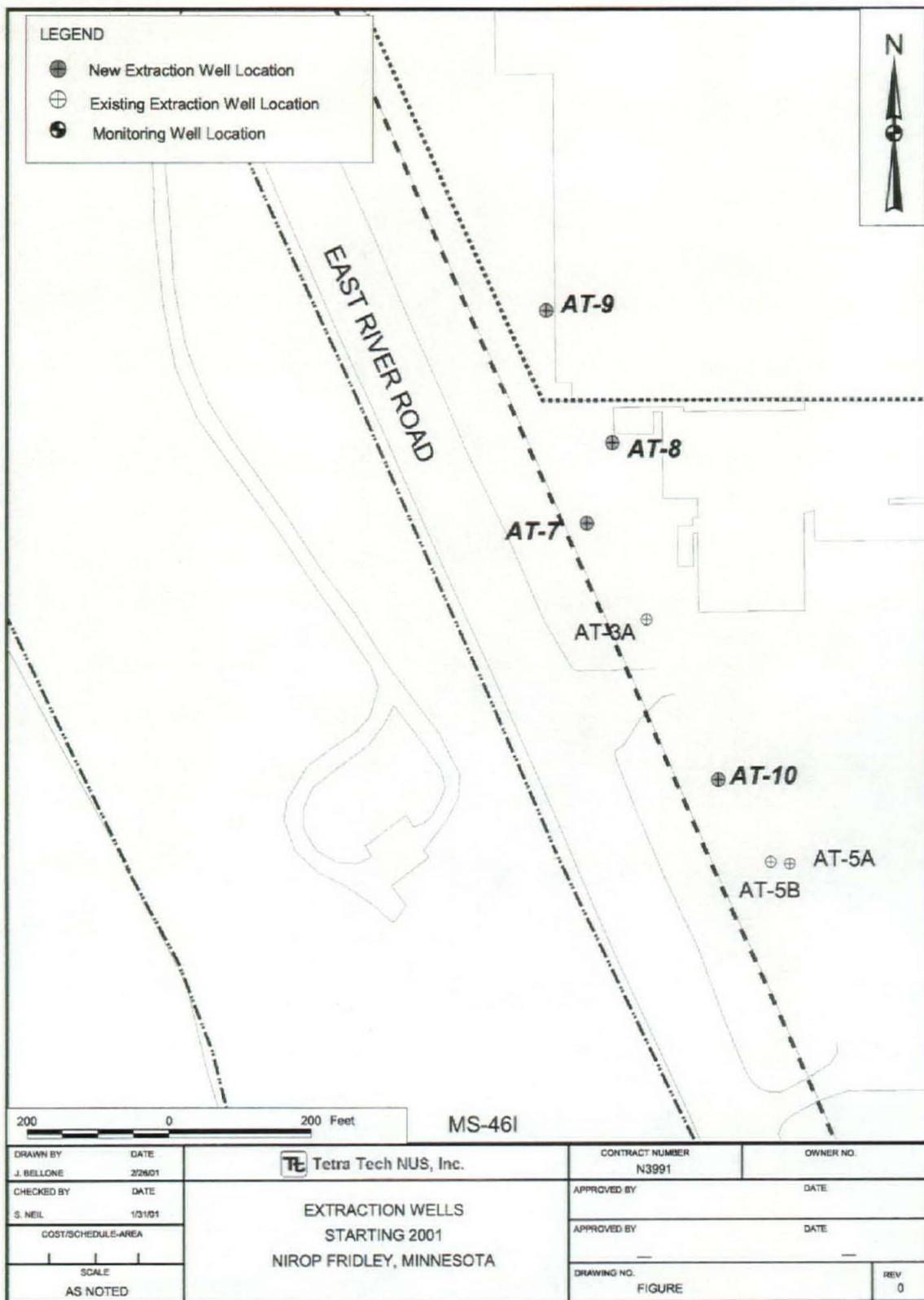


NIROP Site consists of 50 acres of a 57-acre ordnance manufacturing building and of the property north of the NIROP ordnance manufacturing building, known as the "North 40." The southernmost portion of the NIROP ordnance

manufacturing building (7 acres) and the property south of the NIROP ordnance manufacturing building are owned and operated by United Defense Limited Partnership. Contamination present in the southernmost portion (7 acres) of the NIROP ordnance manufacturing building and the property south of the NIROP ordnance manufacturing building are being addressed under a separate Superfund cleanup action. The NIROP site is situated 30 feet above and 700 feet east of the Mississippi River. Anoka County Park is located between the NIROP site and the Mississippi River. This 60 acre park is a recreational facility located on the river's edge.

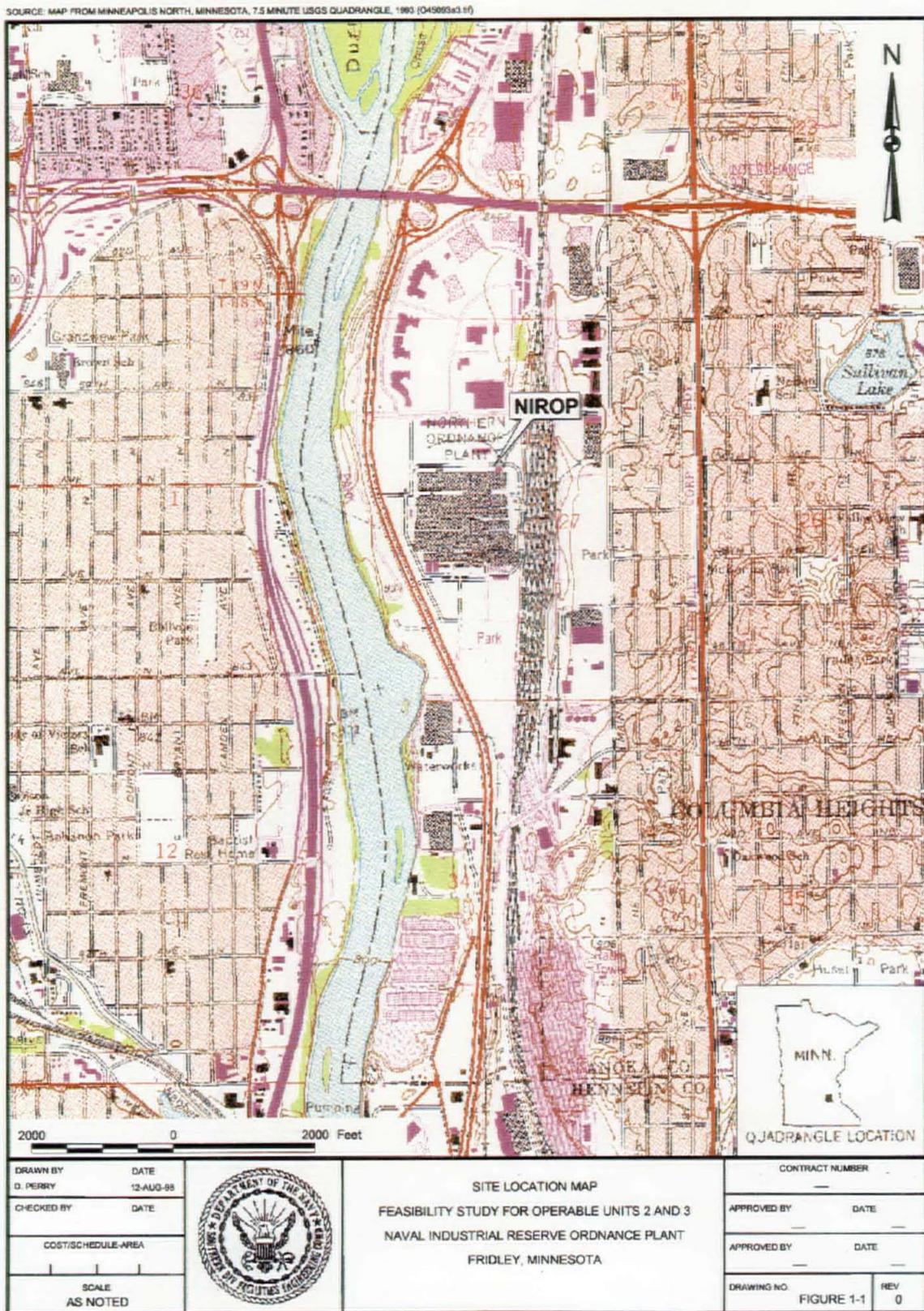
During past activities, hazardous wastes containing TCE were buried and subsequently leaked into the groundwater at the NIROP Site. The resulting groundwater contamination plume was the focus of a

Figure 1

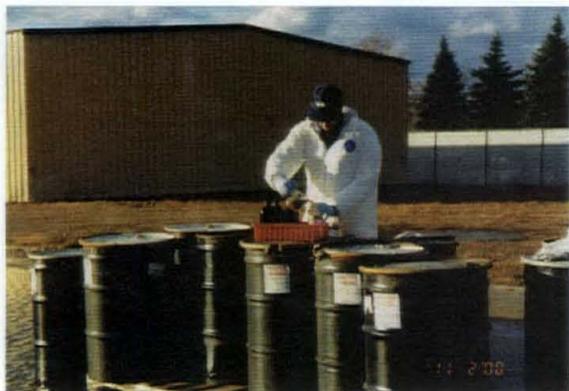


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Figure 2



remedial investigation feasibility study (RI/FS) in 1989. In September 1990, the Regional Administrator of the U.S. EPA signed a ROD for Groundwater Remediation at the NIROP Site. The ROD required installation of groundwater extraction wells, with a two-phase treatment process. This remedial, or cleanup, action was conducted to address contaminated groundwater on site as operable unit one (OU1).



There are two other OUs at the facility. The RI/FS for OU2 as initiated in September 1993 to investigate potential on-site sources still remaining in soils outside the NIROP ordnance manufacturing building and included the North 40. OU2 required a determination as to whether residual contamination remaining in soils in the North 40 presented an unacceptable impact (loading) to underlying groundwater. As part of the investigation a drum pit was discovered in April 1996. Twenty-three drums and 12 smaller containers were removed.

The RI/FS for OU3 was initiated to address source areas beneath the NIROP ordnance manufacturing building and saturated (groundwater) source areas throughout the NIROP Site. Due to plant reconfiguration operations in November 1995, a preliminary investigation of sources beneath the East Plating Shop Line was conducted. Results indicated that a potentially large on-site source area may exist beneath the East Plating Shop area and this may be one of the more contaminated source areas discovered at this site. The U.S. Navy, MPCA, and U.S. EPA decided to address remedy selection for both OU2 and OU3 concurrently, but independent of OU1.

In 1999, results from the RI for OU3 confirmed that a groundwater plume containing mostly TCE and other VOCs originated underneath the NIROP ordnance manufacturing building and that high levels of TCE existed under the building. The groundwater plume has migrated in a southwestward direction across Anoka County Park and discharges into the Mississippi River. TCE contamination in groundwater was further defined during the 1999 AMR. Recommendations presented in the 1999 AMR included installation of additional extraction wells to enhance plume capture. These are the extraction wells described in this fact sheet.

SITE HISTORY AND CONTAMINATION

In 1940, Northern Pump Company, under contract with the U.S. Navy, constructed the NIROP facility to manufacture gun mounts. The arrangement between the U.S. Navy and Northern Pump Company was unique because the plant was partially owned by the



government and partially owned by Northern Pump Company. The NIROP facility was the first government-owned, contractor-operated (GOCO) facility. In June 1942, Northern Pump Company established Northern Ordnance, Inc. to conduct the government portion of Northern Pump Company's business. The facility in Fridley, Minnesota was referred to as Northern Ordnance, Inc. and later as Northern Ordnance Division (NOD). In January 1964, Northern Ordnance was acquired from Northern Pump Company by FMC Corporation and was operated by FMC until 1994 when the Haesco Corporation formed United Defense Limited Partnership (UDLP). In 1997, the Carlisle Group purchased UDLP. The Armament Systems Division of UDLP currently operates the

NIROP facility. Process areas located within the NIROP ordnance manufacturing building have included painting, foundry, welding, heat treating, plating, machine shop, testing, and shipping and receiving. NIROP is currently used to design and manufacture advanced naval weapons systems.

During the early 1970s, paint sludges and chlorinated solvents generated from ordnance manufacturing processes were disposed in pits and trenches in the North 40. Contaminant sources buried in the North 40 and found beneath the NIROP ordnance manufacturing building went undiscovered until December 1980. At that time, the MPCA received information regarding past waste disposal practices at the NIROP facility. Results from groundwater sampling in March and April 1981 indicated that TCE was present in the NIROP facility service water wells (NIROP-2 and NIROP-3). In December 1981, TCE was found in the Mississippi River at the City of Minneapolis water treatment plant intake, approximately 3,000 feet downstream from the point where the center of the groundwater plume flows into the surface water of the Mississippi River. In April 1981, the NIROP facility water service wells, NIROP-2 and NIROP-3, were shut down and a municipal water supply was connected. Following an Initial Assessment Study (IAS) in May 1983, approximately 1,200 cubic yards of contaminated soil and 43 drums of hazardous waste solvents were excavated from the North 40 and disposed. An RI/FS for OU1 was completed in May 1989. The NIROP site was listed on the National Priorities List (NPL) in November 1989. The ROD was issued on September 28, 1990 to address groundwater contamination.

FIVE-YEAR REVIEW

In September 1998, a Five-Year Review Report for OU1 was issued. The purpose of the Five-Year Review Report, initiated 5 years after system startup, was to evaluate whether the remedial action detailed in the 1990 ROD remains protective of human health and the environment. Also evaluated was whether cleanup goals documented in the 1990 ROD have changed and are more restrictive than original cleanup goals. The conclusions in the Five-Year Review Report indicated that the remedial action for OU1 continues to be protective of human health and the environment.

Recommendations in the Five-Year Review Report required confirmation of whether the present groundwater extraction well system has achieved substantial hydraulic containment. If substantial hydraulic containment was not present, enhancement of the groundwater extraction well system was recommended in the Five-Year Review Report. The information-gathering activities recommended in the



Five-Year Review Report contributed to the Minor Modification presented in this RD Fact Sheet.

MINOR MODIFICATION TO THE SELECTED REMEDY

As specified in the ROD, the selected remedy included a groundwater extraction and treatment system. The objective was to address the principal threat by providing hydraulic containment to prevent further migration of contaminated groundwater off the NIROP facility and by recovering, to the extent feasible, contaminated groundwater beneath the Anoka County Park. The treatment process called for in the ROD was to be implemented in two phases. Phase I required on-site pretreatment (if necessary) prior to discharge and final treatment by a local wastewater treatment facility. Phase II required on-site treatment with discharge through a National Pollutant Discharge Elimination System (NPDES) to the Mississippi River. Contaminated groundwater not influenced by the hydraulic containment system was expected to naturally dissipate. A secondary goal of the ROD was to restore groundwater quality at the NIROP Site to the federal Clean Water Act Maximum Contaminant Levels (MCLs) for TCE.

The verification of hydraulic containment of contaminated groundwater has been the focus of many investigations. Recently, 43 additional monitoring wells were installed. Information from these wells and from existing wells was used to evaluate hydraulic containment. Interpretation of the information and consensus of that interpretation by members of the NIROP Partnering led to the following Minor Modifications:

- Discontinuation and abandonment of extraction well AT-1A. The well is operating below acceptable performance levels and is not cost effective under current conditions.
- Discontinuation and abandonment of extraction well AT-2. AT-2 is screened in a part of the aquifer where groundwater flow is limited. A new extraction well (AT-9) is planned that will be located adjacent to the old AT-2 but screened in a more desirable portion of the aquifer.
- Discontinuation and abandonment of extraction well AT-4. The well is operating below acceptable performance levels and is not cost effective under current conditions.
- Repositioning of the mechanical packer in extraction well AT-3A. Through repositioning of the mechanical packer, the effective well screen will be shortened and more groundwater will be extracted from areas of higher contamination.
- An increase in pumping rate at the existing extraction well AT-5A. The shallow and intermediate zones of the aquifer are the most contaminated. It is expected that an increase in the pumping rates at AT-5A will result in a more efficient removal rate and a reduction in downward gradients due to pumping.
- A decrease in pumping rates at the existing extraction well AT-5B. The deep zone of the aquifer is less contaminated than the shallow and intermediate zones. It is expected that a decrease in the pumping rates at AT-5B and an increase in pumping rates at AT-5A will result in a more efficient removal rate.

- Two extraction wells, AT-8 and AT-9, are being installed to address areas of non-capture between pumping wells AT-2 and AT-3. One extraction well (AT-10) is being installed to address areas of non-capture between monitoring wells 12-IS and 13-IS.
- Two service water wells, NIROP-2 and NIROP-3, are being abandoned. The service water wells are located outside the NIROP ordnance manufacturing building. Abandonment includes grouting the wells from bottom to top and removal of surface features. The service water wells were installed in the 1940s and were used to supply the NIROP facility with potable and industrial water. The service water wells were shut down in 1981 after TCE was found in groundwater pumped from these wells. Although the wells are not currently in service and the NIROP facility obtains all water from the city of Fridley, the potential exists for the service water wells to act as conduits for migration of contamination.

Groundwater monitoring related to the Minor Modifications presented in this fact sheet will continue. Further evaluation of the effectiveness of the Minor Modifications presented in this fact sheet will be conducted annually and reported in future AMRs.

ADDITIONAL INFORMATION ON
ENVIRONMENTAL INFORMATION
AT NIROP, FRIDLEY, MN

On July 31, 1989, the U.S. Navy established a Public Information Repository for documents relating to all cleanup activities at the NIROP, Fridley, MN. The Public Information Repository was originally located at the NIROP facility at 5001 East River Road, Minneapolis, MN but is now located at the following address:

Minnesota Pollution Control
Agency
Groundwater and Solid Waste
Division
520 Lafayette Road
St. Paul, MN 55155



In the future, additional information on the remedial action plan for groundwater cleanup can be found in the Public Information Repository at the Minnesota Pollution Control Agency.

A Restoration Advisory Board (RAB) has been established to explain and receive feedback on cleanup activities at the NIROP. Community members are encouraged to participate in the RAB. For more information on RAB activities or the Public Information Repository, contact Rich Hanson at the NIROP. Mr. Hanson can be reached during normal business hours at (612) 572-6450.

For more information regarding this RD Fact Sheet, please contact

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