



Apache Powder Superfund Site



U.S. Environmental Protection Agency • Region 9 • San Francisco, CA

St. David, Arizona

March 2004

UPDATE ON CLEANUP AT APACHE

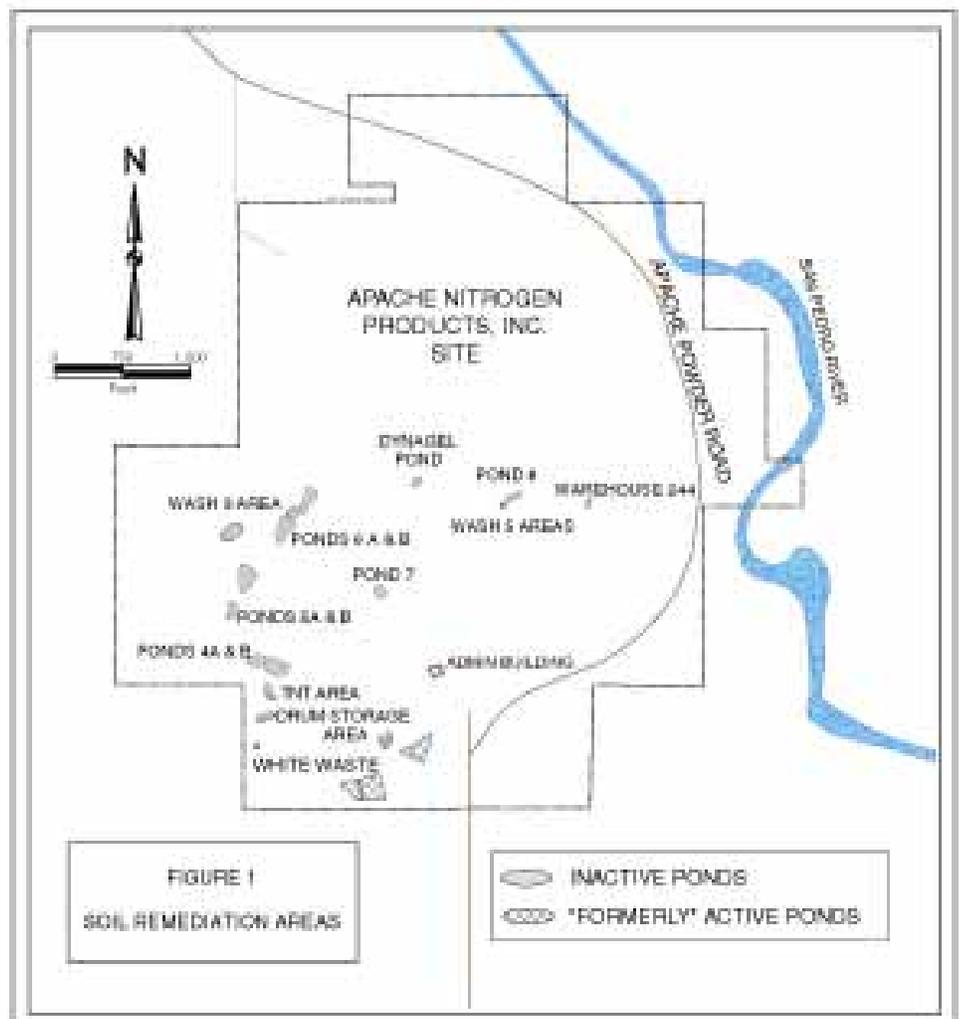
This fact sheet is being sent to residents near the Apache Powder Superfund Site (Site) and other interested parties to provide information on how the cleanup is progressing and what is planned for remaining cleanup decisions at the Site. The U.S. Environmental Protection Agency (EPA) and the Arizona Department of Environmental Quality (ADEQ) have been involved in investigation and cleanup activities at this federal Superfund site since 1990.

Fact Sheet Highlights:

- Large quantity of contaminated soils removed from Site in 2000
- Remaining steps including ecological risk screen underway to complete soils cleanup
- Northern Area groundwater contamination being treated by constructed wetlands
- Additional hydrogeological studies completed 2000 through 2003
- Southern Area groundwater remedy options evaluated in Summer 2004



The Apache Powder Superfund site is located in Cochise County, Arizona, approximately seven miles southeast of Benson and 2.5 miles southwest of St. David. The site study area covers approximately nine square miles and includes 945 acres of land owned by Apache Nitrogen Products, Inc. (ANP), formerly known as the Apache Powder Company. The San Pedro River is located along the eastern side of the site (see Figure 1).



SITE HISTORY

In 1922, ANP began manufacturing industrial chemicals and explosives including nitroglycerin, nitric acid, ammonium nitrates, and blasting agents. Presently, ANP manufactures solid and liquid ammonium nitrate, ammonium nitrate-based fertilizers, nitric acid and aqua ammonia primarily for agricultural and mining customers. Historically, these operations produced both liquid and solid wastes that were disposed of on ANP property. These past-use and disposal practices resulted in contamination of soils on the facility and groundwater contamination in a perched system underneath the plant's operations area, in the nearby shallow aquifer and in the San Pedro River. In the early 1990s, ANP undertook a program to replace affected domestic supply wells by constructing new wells tapping the uncontaminated deeper aquifer.

The Apache Powder Site was placed on the National Priorities List (the NPL or Superfund list) in 1990. In September 1994, EPA signed a Record of Decision (ROD) which selected various remedial alternatives for cleanup of the soils and groundwater contamination at the Site. Since then, many cleanup actions as well as additional investigative studies have been completed to either remove or reduce the amount of contamination in both soils and groundwater at the Site.

SOIL CLEANUP ACTIVITIES

In late 1999 through 2000, contaminated soil was removed from the ANP facility to meet EPA's soil cleanup levels that were selected to protect human health. The contaminated soils were removed from three separate areas identified in the 1994 ROD: (1) Inactive Ponds; (2) White Waste Material and Drum Storage Area; and (3) Wash 3 Area (see Figure 1). In addition, a Removal Action (an expedited cleanup action) was conducted at the TNT Area, an area contaminated with trinitrotoluene (TNT) waste that was not discovered until the late 1990s (see November 1999 EPA fact sheet). Further cleanup of contaminated wastes or soils identified during investigations of the site, but not identified in the ROD, were also accomplished during that time.

TNT Removal Action

During the period of December 1999 through July 2000, ANP removed approximately 85 cubic feet of TNT-contaminated soils that were discovered in a small arroyo (after being exposed during a heavy rainstorm) near the operations area of the facility (see Figure 1). The high concentration TNT-contaminated soils were excavated and burned (pre-treated) at the ANP facility. After sampling to confirm that all contaminated soils exceeding EPA's cleanup standard had been removed, residual ash from the pre-burn treatment and low-concentration TNT-contaminated soils were removed from the Site.

Removal of Other Contaminated Soils and Non-Hazardous Materials

During the same time period as the TNT Removal Action, a large quantity of contaminated soils and non-hazardous waste materials were removed and disposed of at EPA-approved disposal facilities. The total quantity of materials removed were:

- 869 tons of TNT-contaminated soils and residual ash
- 727 tons of arsenic-contaminated soils
- 303 tons of dinitrotoluene (DNT)-contaminated soils
- 53 tons of spent vanadium pentoxide catalyst
- 1.5 tons of naphthalene-contaminated soils
- 11 drums of contaminated materials (naphthalene and DNT)
- 164 tons of non-hazardous demolition debris and ceramic packing materials
- 11.2 tons of investigation derived wastes

Remaining Steps to Close Out Soils Cleanup

Contaminated soils that exceed EPA's cleanup standards for protecting human health have been removed from all areas of the Site with the exception of two inactive ponds (Pond 7 and Dynagel Pond) and the formerly active ponds. The residual contamination in these ponds is primarily located at deeper depths in the inactive ponds and at shallower depths in the formerly active ponds. However, because the concentrations still exceed the State of Arizona Soil Remediation Levels, a final remedy will be required. If contamination were to be left in place, deed restrictions would be placed on these areas at the facility (see Figure 1), in accordance with State law.

The other remaining soils activity is completing a Screening Level Ecological Risk Assessment (SLERA), a review process to make sure no residual soil contamination is left at the Site that could pose a potential risk to wildlife or plants. Representatives from the State and Federal agencies responsible for the protection of natural resources, Bureau of Land Management, U.S. Fish & Wildlife Service, and State of Arizona Game and Fish, coordinated with EPA in 2003 to survey the facility for its potential use as habitat by endangered or threatened species. The survey results are that most of the Site does not provide suitable habitat for plants and animals. The SLERA is currently being completed to determine if any additional excavation or removal of contaminated soils may be necessary to protect any species.

GROUNDWATER CLEANUP ACTIVITIES

The 1984 ROD originally identified cleanup alternatives for two areas of groundwater contamination: (1) a perched system underneath the operations area at the southern end of the facility; and (2) the shallow aquifer underneath a larger portion of the Site. Construction of a brine concentrator, completed in 1995, was selected as the remedy for cleanup of the perched groundwater. A constructed wetlands, completed in 1997, was the remedy selected for the shallow aquifer.

Discovery of perchlorate contamination in 1998 at the southern end of the facility in the perched zone and shallow aquifer created the need to re-evaluate the groundwater remedy for the southern area. Because the contaminants are different in the southern area, the shallow aquifer remedy at the Site now has been divided into two sub-areas: (1) the Northern Area and (2) the Southern Area.

The groundwater contaminants of concern in the Southern Area, including the perched zone, are nitrate and perchlorate. Perchlorate is a chemical used in explosives manufacturing that is a potential thyroid function inhibitor. Nitrate has contaminated the shallow aquifer in the Northern and Southern Area as well as portions of the nearby San Pedro River. Nitrate is a chemical that can be harmful, if not fatal, to infants if ingested at high levels.

NORTHERN AREA - - WETLANDS TREATMENT

The Northern Area Remediation System (NARS) is a wetlands treatment system consisting of an extraction well, five treatment ponds, and a pipeline to bring the nitrate contaminated water to the wetlands for treatment. The treated water is then piped to a point closer to the San Pedro River for discharge. The NARS is located at the northern end of ANP's property (see Figure 2 on page 4) and is designed to remove nitrate from the shallow aquifer groundwater. The period of 1997 through 2000 was spent planting and establishing aquatic plants within the wetlands ("establishment phase"). The growth and decay of the plants created an environment on the bottom of the ponds suitable for microbial degradation of the nitrate in the water. During the last few years, limited scale start-up tests were conducted to prepare for full-scale treatment operations. During these start-up tests, carbon amendments (such as molasses and sucrose) were added to enhance biological treatment.

Operating Efficiency

As expected with a natural biological system, the NARS wetlands operate at a higher capacity in the warm months than during the winter months. The peak operational period for removal of nitrate is June through November of each year, after the water temperature increases and plants start to grow following the winter "dormancy." It is expected that discharge of treated groundwater from the wetlands will continue to occur primarily during these warmer months once the nitrate levels are significantly reduced through denitrification. EPA's cleanup level for nitrate in the shallow aquifer is 10 parts per million (ppm), the federal drinking water standard. As of the end of 2003, approximately 150 million gallons of nitrate-contaminated groundwater had been pumped and treated by the wetlands, and over 187,000 pounds of nitrate had been removed.

Capture Efficiency

Although the NARS wetlands are not yet operating at full-scale (the wetlands are designed to treat 150 gallons of groundwater per minute), it is expected that the wetlands will be able to handle full-scale operation

within the next few years when the biological denitrification process has fully matured. Currently, the groundwater extraction well that pumps nitrate-contaminated water to the wetlands has been operating at about one-third of its capacity during the limited scale testing. At this reduced rate, the existing, single extraction well (SEW-01) does not appear to be fully capturing the nitrate contamination in the shallow aquifer. Therefore, nitrate may be migrating further northward in the shallow aquifer. During the last quarterly sampling event, increasing concentrations of nitrate were detected in

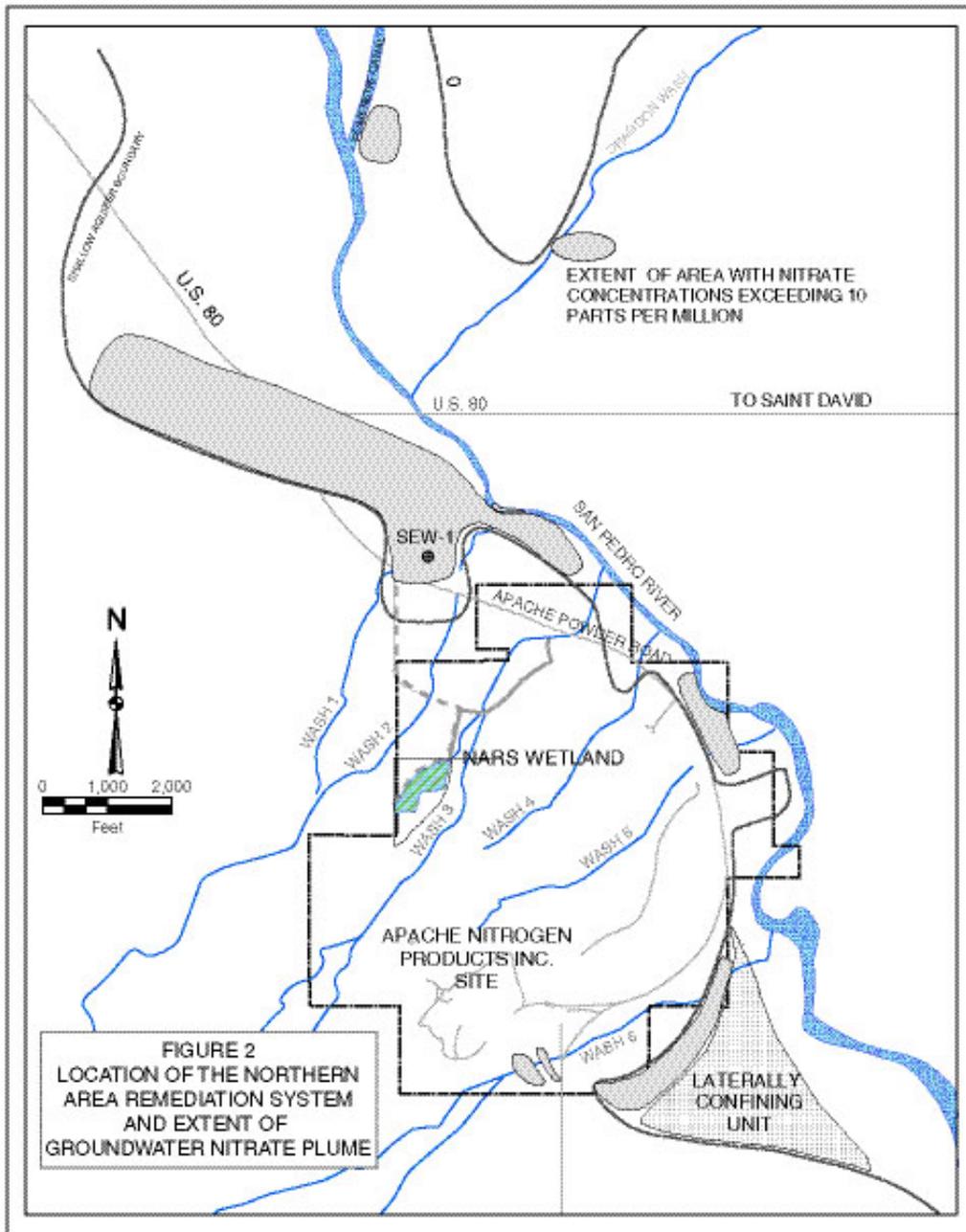
samples collected from several private irrigation wells north of SEW-01 (see Figure 2).

Northern Area Groundwater Model

A hydrogeological study, including development of a model, is currently underway to evaluate various pumping strategies. Options under consideration include adding an additional extraction well(s) or changing the pumping rates to more effectively capture the contamination. The study is also evaluating potential adverse effects of increased pumping on the San Pedro River. In the future, the time frame to remove the nitrate contamination in the shallow aquifer may be greater than the previously estimated 15 - 20 years, if the NARS wetlands is not operating as originally projected or if increased pumping is determined to adversely impact flow in the San Pedro River.

SOUTHERN AREA - - CLEANUP PROPOSAL PLANNED FOR SUMMER 2004

Since the 1998 discovery of perchlorate, extensive investigations have focused on determining the extent of perchlorate contamination. While perchlorate has been detected within the perched zone and shallow aquifer groundwater, it has never been detected in the San Pedro River. The extent of perchlorate contamination



appears to generally coincide and be limited to the extent of nitrate contamination in the Southern Area. The extent of both nitrate and perchlorate plumes within the Southern Area is limited to the perched zone, a portion of the shallow aquifer adjacent to the western aquifer boundary, and has been detected mostly underneath ANP property.

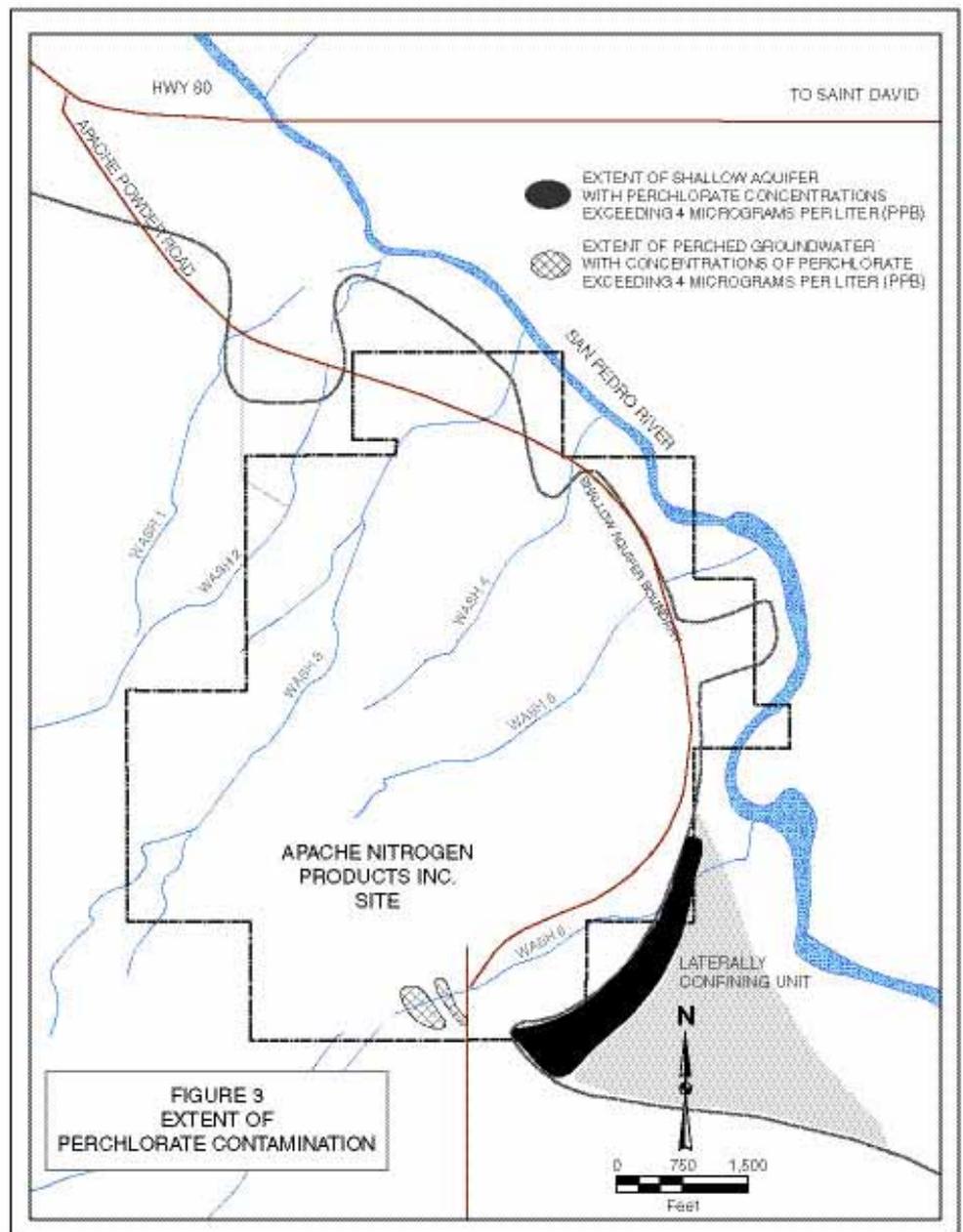
Extent of Perchlorate Contamination

Perchlorate contamination has been detected up to 670 parts per billion (ppb) in the perched system and up to 300 ppb in the shallow aquifer in the Southern Area. The source of this perchlorate has been traced to impurities in Chilean sodium nitrate, a raw material historically brought on-site for manufacturing processes. These processes were discontinued in the 1980s, and the product is no longer used or stored at the facility. This perchlorate contamination does NOT affect the deep aquifer that is a source for drinking water. Beginning in the late 1990s with the detection of perchlorate in the Southern Area, quarterly groundwater monitoring for perchlorate, as well as nitrate, has continued. Figure 3 presents a map showing the extent of known perchlorate contamination and illustrates that the contamination is confined to the perched system and the southern area of the shallow aquifer.

Southern Area Shallow Aquifer Characterization Studies

Beginning in 2000 through 2003, additional aquifer characterization studies were conducted to gather additional data to evaluate potential remedial

alternatives for the Southern Area. Likely historical and current pathways for nitrate and perchlorate migration in the Southern Area were evaluated. Laboratory studies were conducted to determine if there were chemical reasons why the perchlorate had not migrated to the north. Several reports based on studies of the Southern Area, including the *Southern Area Groundwater Characterization Report* and the *Monitored Natural Attenuation Study*, were completed by ANP and approved by EPA in 2003. Copies of these reports are available at the Benson Library, the information repository for the Apache Powder Superfund Site (see Information Repository, page 7).



San Pedro River Investigations

The entire reach of the San Pedro River adjacent to the ANP property was re-investigated to determine whether perchlorate could have reached the river (See Figure 3). During 2001-2002, well points (temporary probes for collecting water samples from river sediments) were installed and water samples collected. During this investigation, perchlorate was not detected in the river. However, consistent with a similar investigation performed in 1990, high concentrations of nitrate

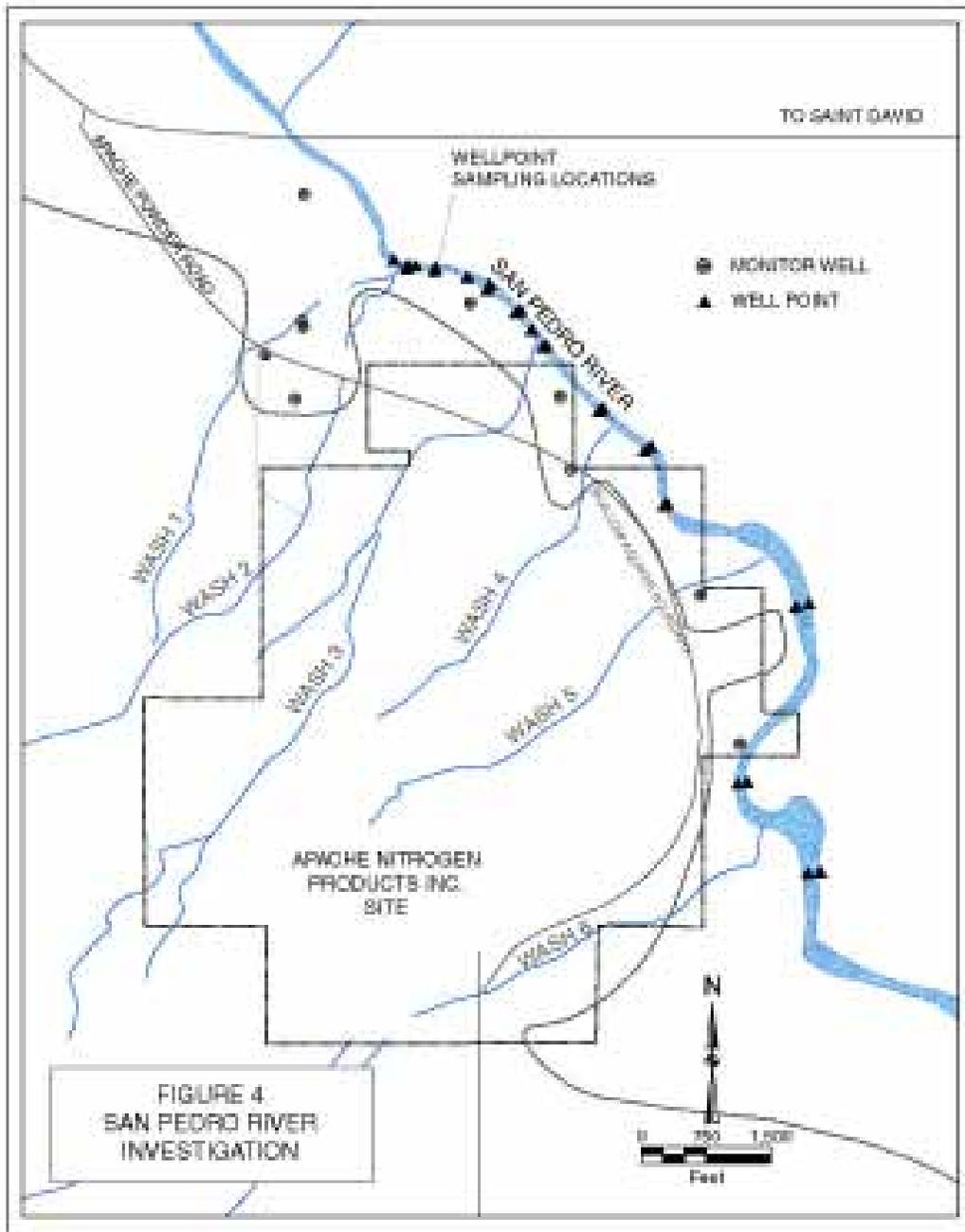
were detected in the surface water (up to 52 parts per million or ppm) and in the subflow, or sediments beneath the river bed, (up to 460 ppm). In 2002-2003, additional monitor wells were installed near the river in the Northern Area which showed the source of this nitrate to be discharge from the shallow confined aquifer to the river downstream in the vicinity of Wash 3 on the ANP property (see Figure 4). Methods for capturing this contamination are being evaluated in conjunction with development of the Northern Area Groundwater Model discussed above.

Supplemental Feasibility Study

A Supplemental Feasibility Study (SFS) to evaluate potential remedial alternatives for the Southern Area has been completed. The SFS, in combination with the findings from the various studies and reports completed in the last few years, will be used as a basis for developing a recommended cleanup proposal for the Southern Area.

WHAT HAPPENS NEXT?

In spring 2004, EPA plans to issue a Proposed Plan for the Southern Area remedy. The community will be invited to provide comments on all cleanup options considered, including EPA's proposed cleanup alternative, for the perchlorate and nitrate contamination in the shallow aquifer in the Southern Area.



INFORMATION REPOSITORY

The Administrative Record, including all documents pertinent to the Apache Powder Superfund Site, are available for review at:

Benson Library

302 South Huachuca

Benson, AZ 85602

(520) 586-9535

Hours:

Monday-Thursday 9 a.m. to 7 p.m.

Friday 9 a.m. to 5 p.m.

Saturday 9 a.m. to 12 noon



Superfund Records Center

95 Hawthorne St., Suite 4035

San Francisco, CA 94105

(415) 536-2000

Hours:

Monday-Friday 8 a.m. to 5 p.m.



MAILING COUPON

If you would like to be included on EPA's mailing list for the Apache Powder Superfund Site, please fill out this coupon and return it to Vicki Rosen, U.S.EPA (SFD-3), 75 Hawthorne Street, San Francisco, CA 94105

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CITY, STATE, ZIP: _____

FOR MORE INFORMATION

If you have questions or concerns about the Apache Powder Superfund Site, please contact any of the people listed below:

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You may also reach either Andria or Vicki toll-free at (800) 231-3075.
Please leave a message and your call will be returned.