NATIONAL PRIORITIES LIST

ARIZONA STATUS REPORT • APRIL 1998

OVERVIEW

The Apache Powder Superfund site is geographically situated in Cochise County, Arizona, approximately seven miles southeast of the incorporated town of Benson and 2.5 miles southwest of the unincorporated town of St. David *(see figure this page)*. The site study area covers approximately nine square miles and is inclusive of 945 acres of land owned by Apache Nitrogen Products, Inc. (ANP), formerly known as the Apache Powder Company. The San Pedro River bounds the eastern side of the site, running from the southeast corner of the property north towards the northwest. There are eight privately owned residences located just north of ANP, with the nearest residence less than a quarter mile from the facility. Approximately 1,100 people depend on wells for drinking water within three miles of the site. The San Pedro River National Conservation Area, owned by the U.S. Bureau of Land Management, is located approximately two miles south of the site along the San Pedro River.

APACHE POWDER
St. David, Arizona
5th Congressional District

EPA ID# AZD008399263
NPL Proposed Listing: 06/10/86
NPL Final Listing: 08/30/90

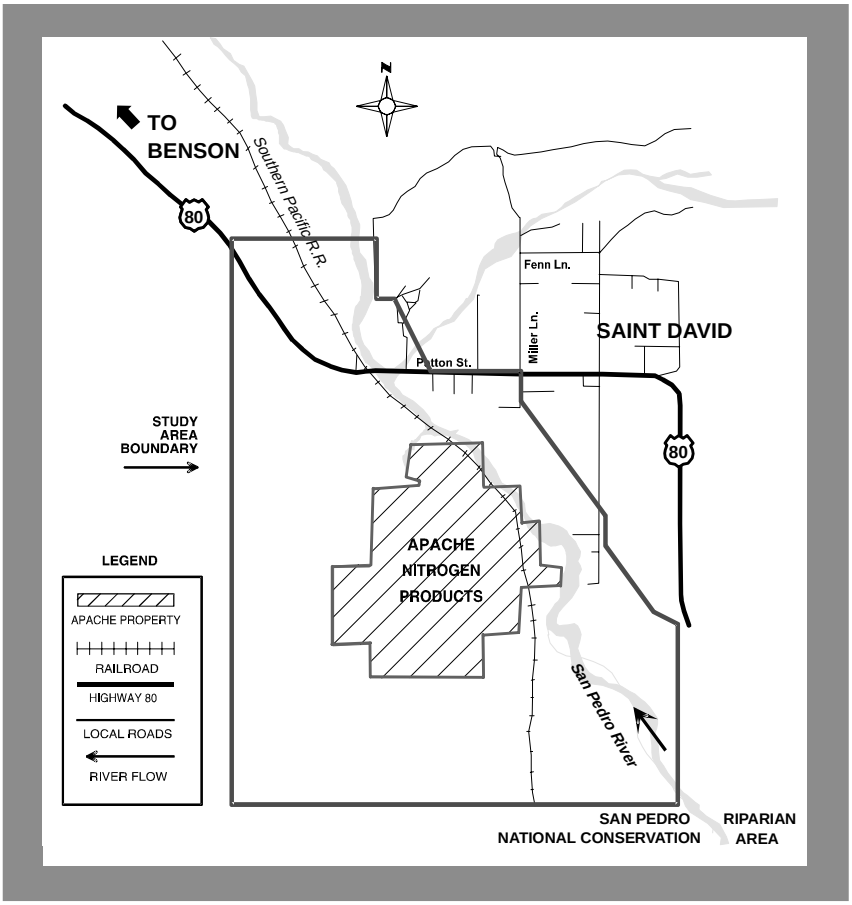

Figure 1: Location map of Apache Powder Superfund site

SITE HISTORY

Since 1922, ANP has manufactured industrial chemicals and explosives, including nitroglycerin, nitric acid, ammonium nitrates, dinitrotoluene (DNT), and blasting agents. Currently, ANP is manufacturing nitric acid, solid and liquid ammonium nitrate, and blasting agents, in addition to nitrogenenous fertilizer solutions. ANP also distributes detonating and explosives materials to mining companies. These operations have produced both solid and liquid wastes which were historically disposed of on the property owned and operated by ANP.

Prior to 1971, ANP wastewater, composed of wash-down and blow-down waters from its power house cooling tower, nitric acid plant, and from the loading, unloading, and storage of raw materials and products, was discharged on site into dry washes which flow directly into the San Pedro River. After 1971, ANP wastewater was discharged into unlined evaporation ponds on site, resulting in the contamination of a perched groundwater zone. The ongoing discharge of process waste waters to the perched groundwater underneath the evaporation ponds has resulted in continual contamination of the shallow aquifer as well as the surface waters of the San Pedro River. DNT was also used at the site during the 1950s and 1960s, and drums which contained DNT were disposed of in a concentrated disposal area as well as throughout Wash 3, located in the northern part of the Site *(see Figure 2)*.

Figure 2: A total of 262 drums of waste were removed

NATURE AND EXTENT OF THE PROBLEM

Potential groundwater contamination problems were first identified by the Arizona Department of Health Services (ADHS) in 1979 during the course of a surface impoundment assessment. Both ADHS as well as the Southeast Arizona Governments Organization (SEAGO) conducted groundwater and surface water contamination sampling during the early 1980s to assess the level of nitrate contamination associated with ANP. In 1980, the U.S. Environmental Protection Agency (EPA) found high levels of heavy metals (such as lead, chromium, zinc, and strontium) in some of the on-site ponds. Ten shallow wells down gradient from the facility were found to contain nitrate. Most notably, the sampling detected 470 micrograms per liter (mg/L) nitrate in a domestic drinking well located northwest of the site. Additional site inspections were conducted by ADHS in early 1986 to confirm these findings, whereupon ADHS instructed ANP to obtain a state groundwater protection permit to address source discharges.

In response to contamination concerns raised by the State, EPA proposed listing the Apache Powder Site on the National Priorities List (NPL) in 1986. EPA then conducted a Preliminary Investigation (PI) of the ANP site which was completed in June 1988. The PI confirmed the State's earlier findings of nitrate contamination. Additionally, the PI detected

elevated levels of heavy metals in the sediments of on-site evaporation ponds as well as other soils contamination in the drum and storage area and in Wash 3. Apache Powder was placed on the NPL in 1990.

Response activities were initiated by the State of Arizona in 1980, and various response activities have been undertaken by both EPA and the State of Arizona since that time. In a June 1992 coordination meeting, EPA and the Arizona Department of Environmental Quality (ADEQ) agreed to split each agency's respective roles to ensure that the cleanup activities performed by ANP were comprehensive and did not duplicate company or agency effort. It was agreed that ADEQ would be responsible for ensuring ANP's compliance with State requirements for aquifer protection, air quality and hazardous waste management. EPA, in turn, would be responsible for overseeing ANP's cleanup of historical contamination at the site.

Health Risks

A Baseline Public Health Evaluation and Ecological Assessment was completed by EPA for the Apache Powder site on September 22, 1992. The health evaluation process included: (1) the identification of contaminants from historical operations that were then present in groundwater, surface water, soils, and sediments; (2) characterizing the population potentially exposed to these contaminants; and (3) evaluating the potential health effects resulting from exposure to contaminated groundwater, surface water, soil and sediments. EPA evaluated how individuals might be exposed to these contaminants under both current and future conditions as well as evaluating potential contaminant risks to natural resources.

Contaminants of Concern (COCs)

COCs identified at the Apache Superfund Site included: arsenic, fluoride, and nitrate in the perched groundwater; nitrate in the shallow groundwater aquifer; arsenic, antimony, barium, beryllium, chromium, lead, manganese, and nitrate in the Inactive Pond soils and sediments; as well as 2,4-DNT, 2,6-DNT, and lead in Wash Area 3. Additionally, the waste materials vanadium pentoxide and paraffins were also found on site.

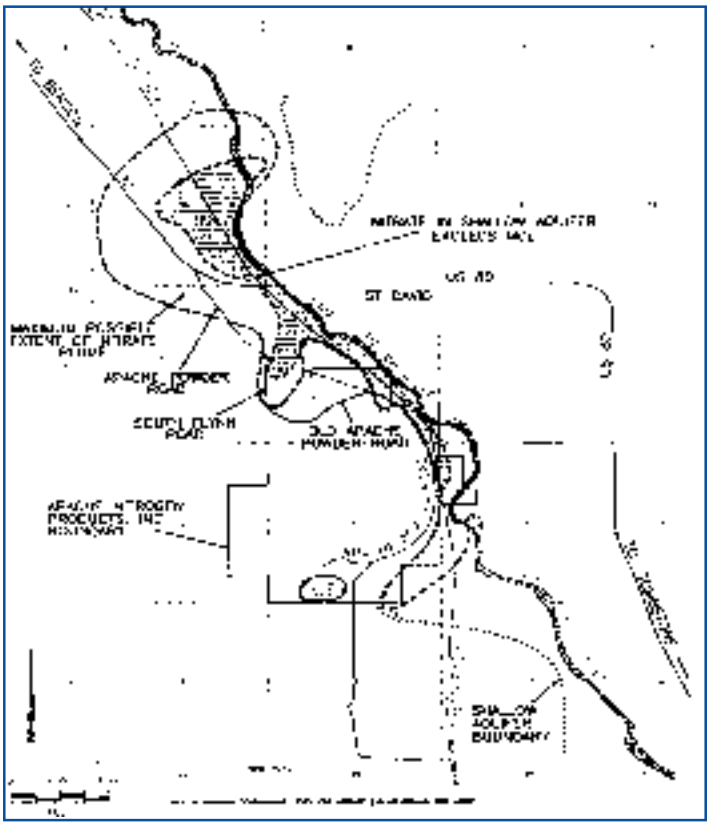

Figure 3: Map showing approximate areas where nitrate has been detected at levels both above and below federal standards.

The primary human health risk posed by the Apache Powder Site is the potential for direct ingestion of shallow aquifer groundwater contaminated by nitrate. Nitrate is the primary contaminant of concern due to the potential ingestion risk to infants which could result in methemoglobinemia. This condition, commonly referred to as "blue baby syndrome," occurs when nitrate is absorbed into the bloodstream, resulting in the formation of methemoglobin

which is not capable of carrying oxygen to the same extent that hemoglobin is. Because of a higher pH in their intestinal tracts, infants tend to be much more susceptible to this condition. Most cases of infant methemoglobinemia are associated with exposure to nitrate in drinking water used to prepare infants' formula at concentrations greater than 20 parts per million (ppm).

Residents living near the Apache Powder site have historically used the shallow groundwater aquifer as a source for drinking water. Sampling of the aquifer has shown nitrate-N levels consistently exceeding the federal Maximum Contaminant Level (MCL) of 10 ppm. Sampling has also revealed an extensive nitrate-N contaminated plume in the groundwater/surface water system within the site. The plume *(see Figure 3)* extends from the perched groundwater area directly under the on-site evaporation ponds in the southern portion of the Site, through the shallow aquifer to the northern extent of the site where it moves in a northwesterly direction, with the exception of the northeastern edge of the plume, which is discharging nitrate-N directly into the San Pedro River.

Figure 3: Apache Powder wetlands treatment system treats 80 million gallons annually.

CLEANUP ACTIONS

While investigations proceeded and alternatives were reviewed for cleanup of the site, interim actions were taken to address potential threats to public health. In 1989, ANP began supplying bottled water to nearby residents with nitrate-contaminated drinking water wells exceeding the federal drinking water standard. In November 1993, EPA requested that ANP submit a revised plan to install permanent replacement drinking water wells for those households. In February 1994, the contaminated shallow aquifer wells were resampled by ANP to establish more current water quality data; by October 1994, ANP had completed drilling for eight deep aquifer replacement wells. In March 1995, as required by the Record of Decision (ROD), eight households that had been on bottled water since 1989 were hooked up to deep aquifer replacement wells.

In June 1994, EPA released the Proposed Plan for five areas with groundwater and soils contamination due to historical practices at the facility. Concurrently, ADEQ addressed the company's on-going manufacturing processes to reduce or eliminate the threat of future contamination.EPA's selected remedy addresses the following five media areas: (1) Perched Groundwater, 2) Shallow Aquifer, (3) Inactive Pond Soils and Sediments, (4) White Waste Materials and Drum Storage Area, and (5) the Wash 3 area (excluding the Ash and Burn Area).

EPA signed the ROD for the Apache Powder site in September 1994. It identified two separate groundwater areas for treatment -- the perched groundwater zone and the shallow aquifer. The selected groundwater remedy components of the ROD consist of: (1) Pumping and treating the perched ground-water zone by forced evaporation (brine concentrator)

in conjunction with treatment of the company's waste waters (ANP completed construction of the brine concentrator in January 1995); and (2) Pumping and treating the shallow aquifer by use of constructed wetlands *(see Figure 4)* and then recharging the treated water back into the shallow aquifer.

During the period of March - September 1995, extensive effort was expended by EPA and ADEQ to coordinate the priorities for implementing activities on the State's Consent Decree and EPA's Unilateral Administrative Order. This coordination was instigated by ANP's notification in April 1995 that the company had only sufficient resources to expend $1 million annually to conduct environmental investigation and cleanup activities. After lengthy discussions with ANP, and after taking into consideration all environmental cleanup requirements, a phased three-year cleanup schedule was developed by ANP and agreed to by EPA and ADEQ. The agencies continue to coordinate cleanup activities and conduct technical meetings on a regular basis.

Evaluation of Cleanup Process

Based upon evaluation of the CERCLA requirements, the detailed analysis of the alternatives using the nine criteria, and public comments, EPA determined in 1994 that the five preferred alternatives were the most appropriate remedies for the Apache Powder site. The selected remedies identified were the cleanup of the nitrate contamination in the perched groundwater zone and the shallow aquifer and several different cleanup measures for the soils contamination. A total of 262 drums (110 gallons each) and 45 cubic yards of soil were excavated from the wash and stored on the site in a secured storage area. The selected remedy for the contaminated soils and drummed material selected for off-site treatment and disposal will permanently remove the contamination from the site and treat and dispose of the contamination at a permitted facility. Construction of an innovative 4.5 acre constructed wetlands treatment system, which treats 150 gallons per minute (80 million gallons per year) of contaminated water, was completed in November 1997. This innovative technology has been well received both by the State and ANP for several reasons including: the realization of significant cost savings over the use of other engineering technologies; lower long-term operations and maintenance costs; lower energy demands; and the enhancement of habitat for species in the vicinity of the San Pedro River, a valued state resource.

The selected remedy is protective, meets Applicable and/or Relevant and Appropriate Requirements, is effective for the long-term, and is permanent. The State of Arizona concurred with EPA's selected remedies. Furthermore, due to several factors, including new technical data, more detailed analysis of design alternatives and suggested revised approaches proposed in 1996, the projected costs of cleanup have been reduced considerably from the estimated $21 million dollars presented in EPA's July 1994 Proposed Plan. The current cost estimate is in the range of $10 million. This change is a result of greater-than-anticipated physical changes in the perched zone, development of the wetlands design alternative to combine treatment of the perched and shallow aquifer groundwater in the southeast corner of the facility, and the development of a phased implementation schedule which spreads EPA and ADEQ's cleanup requirements over several years.

Recent discussions with ANP concerning future cleanup efforts have resulted in several proposals by the company to EPA. These include expediting the soils cleanup and streamlining the cleanup of groundwater contamination in the southern area of the facility in order to accomplish com-pletion of remedial construction activities in 1999. ■

Questions & Concerns

If you have any questions or concerns about cleanup activities at the Apache Powder site, please contact

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or leave a toll-free message at (800) 231-3075, and your call will be returned.

Information Repository

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

Benson Library

302 South Huachuca
Benson, AZ 85602
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