

## **Explanation of Significant Differences #3 for the Record of Decision for the Apache Powder Superfund Site St. David, Arizona**

### **1. Introduction**

This Explanation of Significant Differences (ESD) #3 applies to the remedial actions performed under the Record of Decision (ROD) for the Apache Powder Superfund Site (Site) signed on September 30, 1994. The Environmental Protection Agency (EPA) is the lead regulatory agency and the Arizona Department of Environmental Quality (ADEQ) is the support agency for the Site.

This ESD #3 is provided in accordance with Section 117(c) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), 42 U.S.C. § 9617(c), and Section 300.435(c)(2)(i) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), and documents a significant change to a portion of the remedy selected in the ROD for the Site. The remedy change is summarized below:

The new groundwater remedy for the leading edge of the Northern Area Groundwater (NAG) nitrate plume, and all other portions of the groundwater where the NAG nitrate plume is not being captured by the extraction well, is Monitored Natural Attenuation (MNA) with Institutional Controls (ICs) (see Section 3 below for more details).

This ESD #3 will become part of the Administrative Record for the Site. The complete Administrative Record for the Site is available at the following locations:

Superfund Records Center  
95 Hawthorne Street  
San Francisco, CA 94105

Benson Public Library  
300 S. Huachuca St.  
Benson, AZ 85602

In addition, many Site documents are also available at the following locations:

ADEQ  
Southern Regional Office  
400 W. Congress, Suite 433  
Tucson, AZ 85701

ADEQ  
Phoenix Main Office  
1110 W. Washington St.  
Phoenix, AZ 85007

### **2. Site History, Contamination, and Original Selected Remedy**

#### **2.1 Site History**

Apache Nitrogen Products, Inc. (ANP), has continuously operated at the Site since 1922, and is currently running a fully operational facility. Historical operations of ANP include manufacturing of industrial chemicals and explosives including nitroglycerin, nitric acid,

ammonium nitrates and blasting agents. ANP has historically pumped groundwater from the regional deep aquifer for industrial uses, landscape irrigation and drinking water supply.

## **2.2 Contamination**

The following historical discharges are the source of groundwater contamination at the Site. Prior to 1971, industrial wastewater was discharged into unlined ditches and dry wash tributaries of the adjacent San Pedro River. From 1971 to 1995, ANP discharged wastewater into six unlined evaporation ponds located throughout the Site. Discharge of wastewater was terminated in 1995 when a brine concentrator became operational. All wastewater is now processed by the brine concentrator and recycled for industrial use.

ANP conducted extensive investigations to characterize groundwater contamination at the Site. The investigations identified a shallow and a deep aquifer which are separated by a thick clay aquitard. Contamination was found in the shallow aquifer but no contamination was found in the deep aquifer. Two separate contamination plumes were detected in the shallow aquifer, one each in the northern and southern portions of the Site. The southern area groundwater (SAG) plume has nitrate and perchlorate contamination in the shallow aquifer. In the NAG, the shallow aquifer is contaminated with nitrate, but perchlorate has not been detected.

## **2.3 Original Selected Remedy**

EPA's original remedy for the Site is described in the following documents:

ROD for cleanup of soil and groundwater.	September 30, 1994
ESD #1 to allow treatment of contamination in the perched aquifer and the SAG shallow aquifer in a southern area wetlands, additional extraction well installation, and additional soil characterization, treatment and removal.	April 16, 1997
ESD #2 to further modify the soils cleanup remedy.	September 29, 2000
ROD Amendment to change remedy to MNA for the nitrate and perchlorate-contaminated groundwater in the SAG, and selecting a cleanup standard for perchlorate.	September 30, 2005

The ROD selected the following remedies for the shallow aquifer:

- Completing additional groundwater investigations to determine the extent of nitrate contamination and to determine the appropriate rates and locations for groundwater withdrawal and recharge;
- Extracting and treating the perched groundwater by forced evaporation (brine concentrator), in conjunction with treatment of ANP's process wastewaters, to

meet the federal and state drinking water standard of 10 parts per million (ppm) for nitrate.

- Extracting and treating the shallow aquifer by use of constructed wetlands to meet the federal and state drinking water standard of 10 ppm for nitrate, and recharging the treated water through wetlands, agricultural irrigation, discharge or some combination of these methods as determined during Remedial Design;
- Replacement of contaminated shallow aquifer domestic wells with deep aquifer wells;
- Implementing institutional controls so that future use of the Site is compatible with the remedial goals and maintaining the protection provided by the soil caps over inactive evaporation ponds;
- Groundwater monitoring.

The ROD Amendment included the following ICs and control measures:

ICs and other protective measures will continue to be used to avoid use of contaminated shallow aquifer groundwater as drinking water until cleanup levels are reached, as follows:

- A Declaration of Environmental Use Restriction (DEUR) in accordance with Arizona Revised Statutes, ARS Section 49.152.C, will be filed, prohibiting residential use of the property, installation of wells in the contaminated shallow aquifer groundwater underlying the ANP facility until groundwater cleanup standards are met, and requiring notification to EPA if the property owner seeks a variance or termination of the DEUR;
- Access restriction, such as fencing and/or signage on ANP's property, for areas with potential access to contaminated shallow aquifer groundwater or surface water;
- Education and out-reach practices, including but not limited to semi-annual reporting to all property owners and households within the known footprint of the contaminated groundwater both in the Southern and Northern Areas, to inform potentially affected community members about the extent of contamination and the risks of using the contaminated shallow aquifer for drinking water purposes; and
- Reporting to EPA on the status of all wells in both the shallow and deeper aquifer within and near the footprint of the contaminated groundwater both in the Southern and Northern Area, including detailed descriptions of the type of well, depth of well, use of well, construction details, and the ownership information (including property transfers and/or lot-splits), so that any potential exposure pathways can be identified in advance to notify and protect individuals living over the contaminated groundwater plume from inadvertently drinking contaminated water.

## **2.4 Current Status of Site Remedial Actions**

All of the remedial actions required for the NAG have been fully implemented. The extraction well in the NAG and the constructed wetlands treatment system are fully operational. All of the contaminated shallow aquifer drinking water wells have been replaced by new deep aquifer wells, or bottled water has been provided. Institutional controls and physical measures are in place to restrict use of the shallow aquifer beneath Apache's property. ANP has implemented an Alternative Domestic Water Supply Plan and a Community Outreach Plan which are updated annually. ANP has an on-going site wide monitoring program.

### **3. Description and Basis of the Significant Difference**

The new groundwater remedy for the leading edge of the NAG nitrate plume, and all other portions of the groundwater where the NAG nitrate plume is not being captured by the extraction well, is MNA with ICs. The ROD originally selected extraction and treatment for groundwater contamination in the shallow aquifer, and an extraction well was installed in 1997 to capture the NAG nitrate plume. Monitoring data shows that a portion of the NAG plume is beyond the extraction well's capture zone, but the plume is shrinking and nitrate levels are generally declining in this portion of the plume. The new MNA remedy applies to the leading edge of the NAG nitrate plume, and all other portions of the NAG nitrate plume not captured by the extraction well. The remedial action for the entire NAG plume now includes the following three components:

- 1) Ongoing extraction and treatment with the existing extraction well (described in the ROD);
- 2) The new MNA remedy for the leading edge of the NAG nitrate plume, and all other nitrate-contaminated portions of the NAG which are beyond the extraction well's capture zone (described in this ESD #3);
- 3) Institutional controls and physical measures for the entire plume (described in the 2005 ROD Amendment).

The new MNA remedy will follow EPA's guidance document entitled "Performance Monitoring of MNA Remedies for VOCs in Groundwater" dated April, 2004. As described in Table 4 and 5 of the guidance document, this will include the preparation of a Performance Monitoring Plan (PMP) and a Performance Monitoring Report (PMR). The NAG nitrate plume will be monitored in accordance with the PMP, and there will be an evaluation of the effectiveness of MNA in the annual PMR. The remedial objective for the NAG is to cleanup groundwater to drinking water standards (10 ppm nitrate) and to achieve unrestricted use of the groundwater. EPA has determined that the new MNA remedy, together with the extraction well and treatment wetland, and the ICs, is protective of human health and the environment.

ANP assessed MNA and prepared the report entitled "*Northern Area, Monitored Natural Attenuation Assessment, Revision 1.0, Apache Powder Superfund Site, Cochise County, Arizona*" (MNA Assessment Report), dated July 14, 2008. The major conclusions of the MNA Assessment Report are summarized below:

- Recent Site characterization studies refined the conceptual model of nitrate contamination in the NAG shallow aquifer and the extent of nitrate contamination.
- Decreasing nitrate concentrations in the NAG shallow aquifer show that the plume is shrinking.
- Model simulations support the presence of a natural attenuation mechanism. Cleanup time frames range from 5 to 10 years.
- MNA is more cost effective than installing additional extraction wells.
- Groundwater pumping should be minimized because the groundwater table has dropped due to recent drought conditions, and groundwater is an important resource for the San Pedro River and nearby agricultural areas.

#### **4. Support Agency Comments**

The support agency, ADEQ, participated in, and has been adequately informed during the development of this ESD #3. ADEQ supports its conclusions.

#### **5. Affirmation of Statutory Determinations**

EPA believes the remedy for the Site, as modified by this ESD #3, satisfies Section 121 of CERCLA, 42 U.S.C. § 9621, and remains protective of human health and the environment, complies with federal and state requirements identified in the ROD as applicable or relevant and appropriate to the remedial action at the time of issuance of the ROD, is cost effective, and utilizes permanent solutions and alternative treatment technologies to the maximum extent possible.

#### **6. Public Participation Compliance**

In accordance with requirements set forth by the Section 300.435(c)(2)(i) of the NCP, EPA will publish a notice of this ESD #3 in the local newspaper and have the ESD #3 available at the Benson Public Library.

#### **Authorizing Signature**



---

Michael Montgomery  
Chief, Federal Facility and Site Cleanup Branch  
U.S. EPA, Region 9

7/31/08

---

Date