

# RETURN TO USE INITIATIVE

## 2009 Demonstration Project

### APACHE POWDER: Saint David, Arizona

**THE SITE:** The Apache Powder Superfund site covers over 9 square miles near the towns of Benson and Saint David in Cochise County, Arizona. The site includes 945 acres currently owned and used by Apache Nitrogen Products (ANP), formerly Apache Powder Company. Since 1922, ANP has produced nitric acid, solid and liquid ammonium nitrate, and nitrogenous fertilizer solutions. Prior to 1971, wastewater from these processes was discharged directly into the San Pedro River, which runs across a portion of the site. Subsequent to 1971, waste was stored in unlined evaporation ponds. In response to ground water and soil contamination concerns raised by the State, EPA investigated the site and added it to the National Priorities List in 1990.

**THE OPPORTUNITY:** A range of cleanup options were considered in the 1990s by EPA and the Arizona Department of Environmental Quality (ADEQ) for ground water contamination at the entire site. EPA's 1994 remedy selected a constructed wetlands system instead of a waste water treatment plant. A later remedy modification limited the wetlands for treatment of the nitrate-contaminated ground water in the northern area of the site. Long-term remediation of the ground water was estimated to be costly, approximately \$25 million. The wetlands could decrease this estimate. In addition, the large amount of acreage at the site could provide future opportunities for the generation of renewable solar energy.

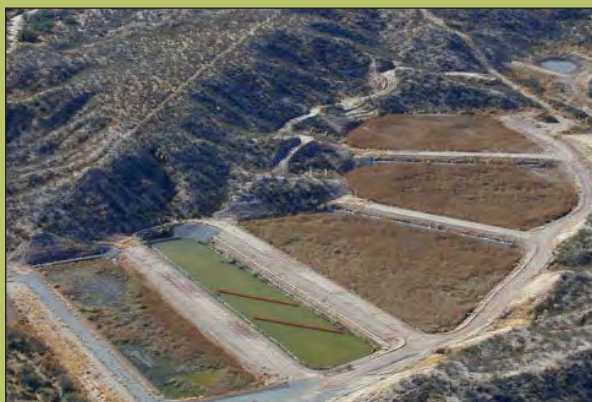
**THE BARRIERS:** In the 1990s, stakeholders were concerned that the wetlands system would waste water through evaporation-transpiration loss. Outreach was needed to explain the energy-saving and ecological benefits of the wetlands for the regional area. A barrier to future use was the need to integrate potential development with the on-going operations of the ANP facility.



**PICTURED:** Apache Nitrogen Products buildings at Apache Powder Superfund site. (source: EPA)

**BARRIER:** Need to integrate future land use options with on-going ANP operations.


**SOLUTION:** Collaboration between EPA, State, and facility owner and operator.



**PICTURED:** Wetlands at the Apache Powder Superfund site. (source: EPA)

**BEFORE:** Site facing expensive, long-term remediation.

**AFTER:** Innovative, renewable energy cleanup in place that saves energy, greatly reduces costs, and provides ecological habitat and environmental education resources.



**THE SOLUTION:** Subsequent to community meetings and outreach, the wetlands system was constructed in 1997 and became fully operational in 2005. The sun provides the solar energy for the growth of the wetlands vegetation where microorganisms residing on the roots remove the nitrate. Use of alternative green remediation technologies at the site has achieved significant cost savings by reducing overall costs to less than half of the original estimate. Other auxiliary environmental benefits are the remedy's low carbon footprint and energy demand, and its ecological habitat. The wetlands provide additional natural resource habitat for the nearby San Pedro River, as well as an environmental education resource for local schools and community groups.

**THE SITE NOW:** To date, the constructed wetland system has treated over 408 million gallons of ground water and removed over 497,000 pounds of nitrate-nitrogen. In addition, ANP has used solar photovoltaics (PV) and wind-energy to enhance aspects of the ground water cleanup operations. For the first five years of the wetlands start-up, contaminated water was re-circulated through the wetlands cells for further treatment by using a 1.4 kilowatt (kW) PV panel to provide solar power. The PV panel powered a centrifugal pump that re-circulated the water at 5 gallons per minute. Now that the wetlands are continually removing the nitrate to well below the drinking water standard for nitrate, this PV system is no longer needed. However, a mini-solar PV panel is still being used on the flow meter to measure the volume of water moving through the wetlands system. In the southern area, a windmill was used to de-water a perched system underneath formerly-used evaporation ponds. In November 2008, ANP, EPA, and ADEQ celebrated the 10 year anniversary of the water treatment wetlands with a community celebration.

**FOR MORE INFORMATION, PLEASE CONTACT:** Andria Benner, Remedial Project Manager, at (415) 972-3189 or [benner.andria@epa.gov](mailto:benner.andria@epa.gov); or Gary Riley, Region 9 Superfund Redevelopment Coordinator, at (415) 972-3002 or [riley.gary@epa.gov](mailto:riley.gary@epa.gov).