

RE-Powering America's Land: Siting Renewable Energy on Potentially Contaminated Land and Mine Sites

Apache Powder Superfund Site, Rio Cochise County, AZ Success Story

Solar and Wind Energy Used to Power Cleanup of Contaminated Ground Water at Apache Powder

EPA is encouraging the development of renewable energy facilities on potentially contaminated land and mine sites. This series of stories highlights successful projects and the benefits of siting renewable energy facilities on potentially contaminated land and mine sites.

Site Description

The Apache Powder Superfund Site encompasses nine square miles (approximately 1,100 acres of land) and is located seven miles southeast of the incorporated town of Benson, Arizona, and two and a half miles southwest of the unincorporated town of St. David, Arizona. The San Pedro River bounds the eastern side of the site, running from the southeast corner of the property north towards the northwest.

Property History

Apache Powder (now Apache Nitrogen Products, Inc. or ANP) began manufacturing dynamite in 1922 for mining and construction projects throughout the southwest. Later, ANP broadened its product line to include ammonium nitrate, nitrogen-based fertilizer products, blasting agents, and nitric acid. Today, ANP manufactures various forms of ammonium nitrate and nitric acid.

In August 1990, the U.S. Environmental Protection Agency (EPA) placed the site on the National Priorities List of Superfund sites because of ground water and soil contamination. During the intervening years, ANP has cleaned up the soil contaminated with lead, dinitrotoluene (DNT) and trinitrotoluene (TNT) by a combination of onsite treatment and off-site removal and disposal. The remaining soil and sediment contaminated with heavy metals in the onsite ponds have been capped with native soil materials.

In September 2008, EPA signed a Preliminary Closeout Report stating that all construction activities related to site cleanup are complete. Currently, the only cleanup requirements remaining are for long-term cleanup and monitoring of ground water. ANP is monitoring the southern area ground water until the cleanup standards for nitrate and perchlorate (the primary contaminants) are met. For the northern area ground water, ANP is treating the nitrate-contaminated ground water in constructed wetlands.

Renewable Energy Development

Different forms of renewable energy are being used to help clean up the ground water in both the northern and southern areas. In 1997, ANP constructed the 4.5-acre tiered hydraulically-driven wetland system on the northern portion of the site. It treats approximately 150 gallons per minute (80 million gallons/year) of contaminated water. For the first five years of start-up, a 1.4 kilowatt (kW) photovoltaic (PV) panel provided solar power for a centrifugal pump to recirculate (at 5 gallons/minute) the contaminated water through the wetlands cells until the treated water reached the discharge cleanup standards. Now that the wetlands are removing the nitrate to well below the drinking water standard for nitrate, the PV system is no longer needed. However, a mini-solar PV panel is used on the flow meter to measure the volume of water moving through the wetlands system. In the southern area, a windmill pumps water to de-water a perched system under the formerly-used evaporation ponds that now are capped.



QUICK FACTS:

Location:	EPA Region 9, Rio Cochise County, AZ
Property Size:	1,100 acres
Site Ownership:	Private - Apache Nitrogen Products, Inc., formerly Apache Powder
Former Use:	Chemicals and explosives manufacturing
Cleanup Type:	Superfund
Contaminants:	Nitrate and perchlorate
Type of RE:	Solar PV; wind (non-grid)
RE Capacity:	1.4 kW (solar PV system only)
Project Cost:	Estimated at \$2.5 million, including equipment, construction and long-term monitoring of both pumping systems
Key Partners:	ANP; EPA Region 9; Arizona Department of Environmental Quality
Current Status:	Construction Complete

PROJECT HIGHLIGHTS:

- 1.4 kW PV panel re-circulated contaminated water through 4.5-acre wetland treatment system.
- Windmill pumps water to de-water a system under the capped evaporation ponds.
- Superfund site cleanup requires long-term monitoring and treatment of ground water at 1,100-acre site.
- Cost of solar PV system and windmill pump three times less expensive than the cost to run power lines and pay for electricity at remote areas of the site.
- Use of solar and wind energy to power cleanup reduces 30-year ground water cleanup cost from \$25 million to approximately \$2.5 million.