

Pantex

Background

The Pantex Plant was originally built by the U.S. Army in 1942 on 16,000 acres in the Texas Panhandle, 17 miles northeast of Amarillo in Carson County, Texas. The Army used the site to load and pack conventional artillery shells and bombs in support of World War II. Today, the Pantex plant is the nation's primary facility for the final assembly, dismantlement and maintenance of nuclear weapons. The National Nuclear Security Administration (NNSA) also selected Pantex as the High Explosive Center of Excellence for developing, testing and fabricating high explosives components.¹³⁴

Operations at Pantex are primarily conducted on 2,000 acres of the 18,000-acre site. There are approximately 650 buildings, and Pantex maintains its own water treatment, sewage and steam generating plants. Five wind turbines on the site generate enough power to support more than 60 percent of the plant's annual energy needs.¹³⁵ In April 2018, a new administrative and support facility named the John C. Drummond Center opened at Pantex. The three-wing complex accommodates approximately 1,100 administrative, technical and management staff who have been relocated from the aging 1950s-era facilities at Pantex as part of the modernization of the nuclear security infrastructure.¹³⁶ Eventually, the vacated buildings on the plant's site will be deactivated and demolished.

Historical operations at Pantex resulted in contamination of the soil and a perched aquifer beneath the site. A Record of Decision (ROD) was issued in 2008 with concurrence of the U.S. Environmental Protection Agency (EPA) and the Texas Commission on Environmental Quality (TCEQ) to address cleanup of the legacy contamination. The remedial action established in the ROD and the compliance plan in the hazardous waste permit include pump-and-treat and in situ bioremediation (ISB) technology for the cleanup of perched groundwater as well as soil vapor extraction for cleanup of nonaqueous phase liquids in soils. Results of the remedial actions are evaluated quarterly and annually and documented in progress reports to EPA and TCEQ. Pantex also conducts five-year reviews to evaluate the remedies and determine whether changes are needed to meet the cleanup goals and protect people and the environment.¹³⁷

The agreement in principle between the state of Texas and the U.S. Department of Energy (DOE) supports the cleanup of the Pantex Plant and provides environmental oversight to protect human health and safety and the environment around the plant.¹³⁸

¹³⁴ Pantex. (2019). Pantex history. Retrieved from <https://pantex.energy.gov/about/history>.

¹³⁵ Pantex. (2019). About. Retrieved from <https://pantex.energy.gov/about>.

¹³⁶ Farris, J. (2018, April 6). Pantex unveils new administrative building. *Amarillo Globe-News*. Retrieved from <https://www.amarillo.com/news/20180406/pantex-unveils-new-administrative-building>.

¹³⁷ Babcock & Wilcox, Technical Services Pantex, LLC, & Sapere Consulting, Inc. (2008, September). *Record of decision for groundwater, soil and associated media. Pantex plant, Carson County, Texas*. Retrieved from <https://pantex.energy.gov/sites/default/files/016005.pdf>.

¹³⁸ Further information about the agreement in principle is available at Office of the Texas Comptroller of Public Accounts. (n.d.). Pantex: Agreement in principle. Retrieved from <https://comptroller.texas.gov/programs/seco/programs/pantex/aip.php>.

Major Accomplishments

All soil remedies are performing as designed. Interim actions included removal of more than 25,000 cubic yards of contaminated soil, construction of landfill covers, deactivation and demolition of facilities at major release areas, lining ditches near a major release area in Zone 12, and construction and operation of soil vapor extraction systems in Zone 11 and the burning grounds.¹³⁹ Only the burning ground soil vapor extraction was carried forward into the final remedial action established in the ROD. The soil vapor extraction systems have removed more than 19,000 pounds of volatile organic compounds since startup. Data indicate that the burning ground soil vapor extraction is nearing the end of remediation. Pantex is currently developing information to move toward shutdown of the remedial action system.

Pantex operates two pump-and-treat systems, with 72 extraction wells and two injection wells that are capable of treating at least 550 gallons per minute of contaminated perched groundwater. These systems are designed to remove and treat groundwater to reduce the saturated thickness of the perched aquifer and remove contaminant mass. The reduction in thickness will significantly reduce the migration of contaminants both vertically and horizontally to prevent them from migrating to the Ogallala Aquifer.¹⁴⁰

The pump-and-treat systems at Pantex have treated more than 2.5 billion gallons of affected perched water, with about 14,000 pounds of contaminants removed by 2018. In addition, Pantex has beneficially used about 71 percent of the treated water. Saturated thickness is declining by about 1 foot per year in areas under the influence of the pump-and-treat systems.¹⁴¹

Three ISB systems have been installed at Pantex in locations where the confining layer of the perched aquifer is more permeable, the saturated thickness is too low (less than 15 feet) to be pumped efficiently or where ISB is effective in treating multiple contaminants of concern. The two oldest systems have treated high explosives, trichloroethene, hexavalent chromium and perchlorate near or below safe drinking levels throughout the systems. Pantex is continuing to refine injection to fully treat areas that have demonstrated only partial treatment. The third system will be injected for the first time in 2018.¹⁴²

Site-Specific Issues

Since issuance of the Record of Decision, Pantex has evaluated the effectiveness of the remedial actions and found the plume of high explosive compounds in the perched groundwater continued to move to the southeast. In 2008, approximately 2.5 sections of land (i.e. 1,526 acres) were purchased from former Pantex neighbors to provide Pantex with ready access for perched groundwater monitoring and remedial action, as needed. To better control the continued southeast movement, Pantex installed wells to conduct pump testing in an area of sufficient saturated thickness and then installed an additional line of extraction wells on the purchased property in 2015 and 2016 to limit further movement to the southeast. Additionally, to better understand the extent of contamination, monitor wells were installed in 2016 and 2017 in the southeast portion of the purchased property. Results indicated the plume had moved through a

¹³⁹ U.S. Environmental Protection Agency. (2018, October 23). Superfund site: Pantex plant (USDOE), Pantex Village, TX, cleanup activities. Retrieved from <https://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.cleanup&cid=0604060>.

¹⁴⁰ Pantex. (2017, August). *Pantex environmental restoration: Perched groundwater pump and treat systems*. Retrieved from https://pantex.energy.gov/sites/default/files/P&Tfactsheet_2018.pdf.

¹⁴¹ Consolidated Nuclear Security. (2018, June). *Pantex quarterly progress report: Remedial action progress*. Retrieved from https://pantex.energy.gov/sites/default/files/1Q2018_pantex_progress_report.pdf.

¹⁴² Pantex. (2018, October). *Pantex environmental restoration: In situ groundwater bioremediation systems*. Retrieved from https://pantex.energy.gov/sites/default/files/ISBfactsheet_2018.pdf.

channel, or buried stream feature, to offsite property. Due to the limited saturated thickness, a new line of ISB injection wells was also installed at the property boundary to halt further movement of the plume to offsite property.¹⁴³

Pantex is continuing to install wells on off-site property and use innovative technology to help identify the channel feature and the extent of contamination. Further well drilling is expected to occur in 2019 to attempt to delineate the plume. Pantex will continue to evaluate the contamination extent and viable options for cleanup of the plume that has extended off-site. Funding for this additional work will continue to be requested through the NNSA long-term stewardship program to address the issues southeast of the site.

Relationship to Other Sites in the Complex

Consolidated Nuclear Security, LLC, manages and operates the Pantex plant and the Y-12 National Security Complex in Tennessee under a single contract from DOE-NNSA.

¹⁴³ Pantex. (2018, October). *Pantex environmental restoration: Groundwater monitoring*. Retrieved from https://pantex.energy.gov/sites/default/files/GWMonitoring_FactSheet_2018.pdf.