

TEXAS

Pantex Plant

Background

The Pantex Plant was originally built by the U.S. Army in 1942 on 18,000 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 NNSA also selected Pantex as the High Explosive (HE) Center of Excellence to develop, test, and fabricate high explosives components.¹

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 Pantex Plant's annual energy needs.² In April 2018, a new administrative and support facility named the John C. Drummond Center was opened at Pantex. The three-wing complex accommodates approximately 1,100 administrative, technical and management staff who have been relocated from the aging 1950's era facilities at the Pantex Plant as part of the modernization of the nuclear security infrastructure.³ Eventually the vacated buildings on the plant site will be deactivated and demolished.

Historical operations at the Pantex Plant resulted in contamination of the soil and a perched aquifer beneath the site. A Record of Decision was issued in 2008 with concurrence of the 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 includes pump and treat and in situ bioremediation technology for the cleanup of perched groundwater, as well as soil vapor extraction (SVE) for cleanup of non-aqueous phase liquids in soils. Results of the remedial actions are evaluated quarterly and annually and documented in progress reports to the EPA and TCEQ. Pantex also conducts five-year reviews to evaluate the remedies and determine if changes are needed to meet the cleanup goals and protectiveness of people and the environment.⁴ The Agreement in Principle between the State of Texas and DOE supports the cleanup of the Pantex Plant and provides environmental oversight to protect human health and safety, and the environment around the Pantex Plant.⁵

¹ Pantex. (2019). Pantex history. Retrieved from <https://pantex.energy.gov/about/history>.

² Pantex. (2019). About. Retrieved from <https://pantex.energy.gov/about>.

³ 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>.

⁴ 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>.

⁵ 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>.

Accomplishments

All soil remedies are performing as designed. Interim early actions included removal of more than 25,000 cubic yards of contaminated soil, construction of landfill covers, deactivation and decommissioning 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.⁶ Only the Burning Ground SVE was carried forward into the final remedial action established in the ROD. The SVE systems have removed more than 21,200 pounds of volatile organic compounds (VOCs) since startup. Data indicates that the Burning Ground SVE is nearing the end of remediation. Pantex is currently developing information to move towards shutdown of the remedial action system.

Pantex operates 76 extraction wells and one injection well from two pump and treat systems that are capable of treating at least 550 gallons per minute of perched groundwater contaminated with Hexahydro-1,3,5-Trinitro-1,3,5-Triazine and chromium. These systems are designed to remove and treat groundwater to reduce the saturated thickness (the distance between the water table and the base of the aquifer) of the perched aquifer and to 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, which provides significant groundwater for agricultural, municipal and industrial development across the Great Plains.⁷ The pump and treat systems at Pantex have treated over 3.1 billion gallons of impacted perched water with about 14,200 pounds of contaminants removed by 2021. In addition, since 2005, Pantex has beneficially used about 1.7 billion gallons of the treated water. Saturated thickness is declining by about 1 ft/year in areas under the influence of the pump and treat systems.⁸ Four in-situ bioremediation (ISB) systems have been installed for the Pantex Remedial Action in locations where the confining layer of the perched aquifer is more permeable, the saturated thickness is too low (<15 ft) to be pumped efficiently, or where ISB is effective in treating multiple contaminants of concern. The two oldest systems have treated high explosives, trichloroethene (TCE), hexavalent chromium and perchlorate where they are 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 is located at the southeast edge of USDOE/NNSA-owned property to prevent further offsite migration of high explosive contaminants.⁹

Site-Specific Issues

Since issuance of the ROD, 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 channel, or buried stream feature, to offsite property. Due to the limited saturated thickness, a new line of ISB injection

⁶ 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&id=0604060>.

⁷ Pantex. (2017, August). Pantex environmental restoration: *Perched groundwater pump and treat systems*. Retrieved from https://pantex.energy.gov/sites/default/files/P&T-factsheet_2018.pdf.

⁸ 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.

⁹ Pantex. (2018, October). *Pantex environmental restoration: In situ groundwater bioremediation systems*. Retrieved from https://pantex.energy.gov/sites/default/files/ISB-factsheet_2018.pdf.

wells was also installed at the property boundary to halt further movement of the plume to offsite property. Nutrients and other chemicals are injected to stimulate microbe growth, which breaks down the contaminants.¹⁰

Further well drilling in 2019 delineated the plume extent. A new offsite ISB system was designed to address the contamination found on the neighboring properties. Installation of infrastructure for Phase 1 and 2 of the Offsite ISB is complete and the 1st injection into the system was completed in October 2021. Phase 3 construction will begin in 2022, with Phase 4 beginning in 2023. Funding for this additional work will continue to be requested through the NNSA Long-Term Stewardship program to address the issues to the southeast of the site.

Relationship to Other Sites in the Complex

Consolidated Nuclear Security, LLC (CNS) manages and operates the Pantex Plant and the Y-12 National Security Complex in Tennessee under a single contract from the U.S. Department of Energy/NNSA. DOE ships low-level waste from Pantex to the Nevada National Security Sites.

¹⁰ Pantex. (2018, October). *Pantex environmental restoration: Groundwater monitoring*. Retrieved from https://pantex.energy.gov/sites/default/files/GWMonitoring_Fact-Sheet_2018.pdf.