ENVIRONMENTAL PROJECTS

PANTEX ENVIRONMENTAL RESTORATION



High Explosives Detection Monitoring in the High Plains Aquifer

The Pantex Groundwater Resource Conservation and Recovery Act Facility Investigation Report identified impacts to perched groundwater that require corrective action. The Pantex Site Wide Human Health Risk Assessment predicted that perched groundwater underneath the Pantex Plant containing high explosives (HEs) and other constituents could migrate over time to the Ogallala/High Plains Aquifer, the main drinking water source for the area.

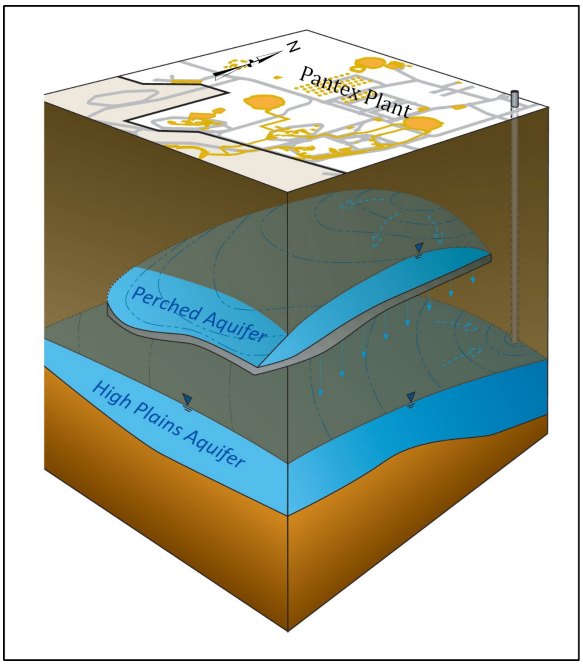


Fig. 1. Groundwater Beneath Pantex

Historically, Pantex has denoted monitoring wells drilled in the drinking water aquifer as Ogallala Aquifer monitoring wells. Recent investigation and drilling activities in the drinking water aquifer have determined that almost all water in the current investigation occurs beneath the Ogallala Formation, in the Dockum Group, which includes the Trujillo and Tecovas formations. Together, these formations make up the High Plains Aquifer. Pantex is currently aligning data and terminology to distinguish screen placement within these geologic formations. This will enable clear communication of contamination within geologic strata that comprise the High Plains Aquifer. High Plains Aquifer terminology will be used in this factsheet and in future materials produced by Pantex.

The area of primary concern is in the southeast corner of the main Plant and offsite, adjacent to this area. The fine-grained zone that created the perched aquifer prevents vertical migration in most areas but becomes thinner and more permeable in the southeast where migration to the High Plains Aquifer was predicted in the 2008 Record of Decision and is now being investigated. Pantex monitors 37 High Plains Aquifer wells to evaluate the continued protectiveness of remedial actions for the drinking water aquifer.

The High Plains Aquifer network monitors for breakthrough of legacy constituents from the overlying perched aquifer. One High Plains Aquifer monitoring well (PTX06-1056) continues to demonstrate detections of legacy 4-amino-2,6-dinitrotoluene (DNT4A), a breakdown product of TNT, first detected in April 2014. Further detections of DNT4A and other HE compounds, including RDX, prompted Pantex to begin planning expansion of the well network to help evaluate potential sources and extent of the contamination. Pantex installed three High Plains Aquifer monitor wells in 2023 and collected samples to initiate preliminary investigation.

Based on the data gathered in 2023, Pantex received special funding to implement measures to begin

evaluating extent of the detections by installing three additional High Plains Aquifer monitor wells in 2024. Fate and transport modeling was utilized in 2024 to plan new drilling locations and to evaluate potential sources for the detections at PTX06-1229. Based on results from those locations, eight more High Plains Aquifer wells were drilled in 2025 to continue investigation.

As observed in Fig. 2, Pantex drilled High Plains Aquifer wells PTX06-1223, -1224, and -1229 in 2023 to begin investigating HE detections in PTX06-1056. High HE concentrations (RDX > 100 µg/L) were measured in PTX06-1229. To better understand the extent of the plume, three more wells were drilled in 2024 (PTX06-1231, 1232, and 1233). Results from 2024 monitor wells helped define the heart of the HE plume at locations PTX06-1229 and PTX06-1231. Results at downgradient well PTX06-1233 and other wells in and north of this area have remained non detect, indicating that production wells to the north of this region and offsite water wells are under no immediate danger of becoming contaminated by HE. These results prompted Pantex to focus investigation efforts in areas surrounding PTX06-1229 and -1231.

In 2025, Pantex installed eight High Plains Aquifer wells, depicted in Fig. 2 as purple hexagons. Results from 2025 monitor wells further defined the plume both downgradient and vertically. Another well, PTX06-1247 (pink star on map) was drilled in October 2026 to define the plume to the north, with sampling results expected to be available in December. Pantex is pursuing an early action to control plume movement from areas of higher concentration in the heart of the plume. This action will control downgradient migration of the plume as the investigation is completed and the final remedy is selected for the High Plains Aquifer. The early action will be implemented after considering regulatory and public feedback and as funding allows.

RDX data from the most recent sampling event for the 2025 High Plains Aquifer wells nearest and downgradient of PTX06-1229 are depicted on Fig. 2 along with observed RDX concentration ranges in 2026 at all other High Plains Aquifer wells. HE detections above the groundwater protection standard (GWPS) from newly drilled 2025 wells are outlined in the following table.

Summary of 2026 HE Detections above GWPS at Newly Drilled High Plains Aquifer Wells

Well ID	Analyte	Measured Value (µg/L)	GWPS (µg/L)
PTX06-1231-2	RDX	9.22	2
PTX06-1232-2	No detections near or above GWPS		
PTX06-1242	RDX	74.1	2
	DNT4A	4.47	1.2
PTX06-1243	No detections near or above GWPS		
PTX06-1243-2	No detections near or above GWPS		
PTX06-1244	No detections near or above GWPS		
PTX06-1245	No detections near or above GWPS		
PTX06-1246	RDX	63.5	2
	DNT4A	2.51	1.2

Presently, there is no impact or imminent threat to existing drinking, irrigation, or livestock water wells in the High Plains Aquifer. Samples collected from wells located upgradient of onsite and offsite water supplies (see wells in pink boxes in Fig. 2) indicate that there are no HEs at those locations. Pantex obtains water for plant processes, personnel use, and consumption from High Plains Aquifer production wells located in the northeast corner of the Plant property. Pantex has tested the High Plains Aquifer monitoring wells in that region and no detections of HEs have been observed. These results indicate there is no impact to Pantex or neighboring water supplies.

Pantex continues to complete full investigation of nature and extent of the newly discovered plume in the High Plains Aquifer. The investigation is planned for completion in 2028, as agreed with regulatory agencies. To achieve this goal, Pantex contracted for the completion of the investigation which includes development of an investigation work plan, in accordance with a recommendation provided in the Third Five-Year Review (HGL and Pantex, 2023 located at pantex.energy.gov on the Environmental Cleanup Documents web page). The investigation work plan has been completed and reviewed by regulatory agencies, including the Texas Commission on Environmental Quality (TCEQ) and Environmental Protection Agency (EPA). The workplan is currently being implemented as Pantex works to complete the investigation. Sampling will continue to ensure that the High Plains Aquifer is appropriately monitored.

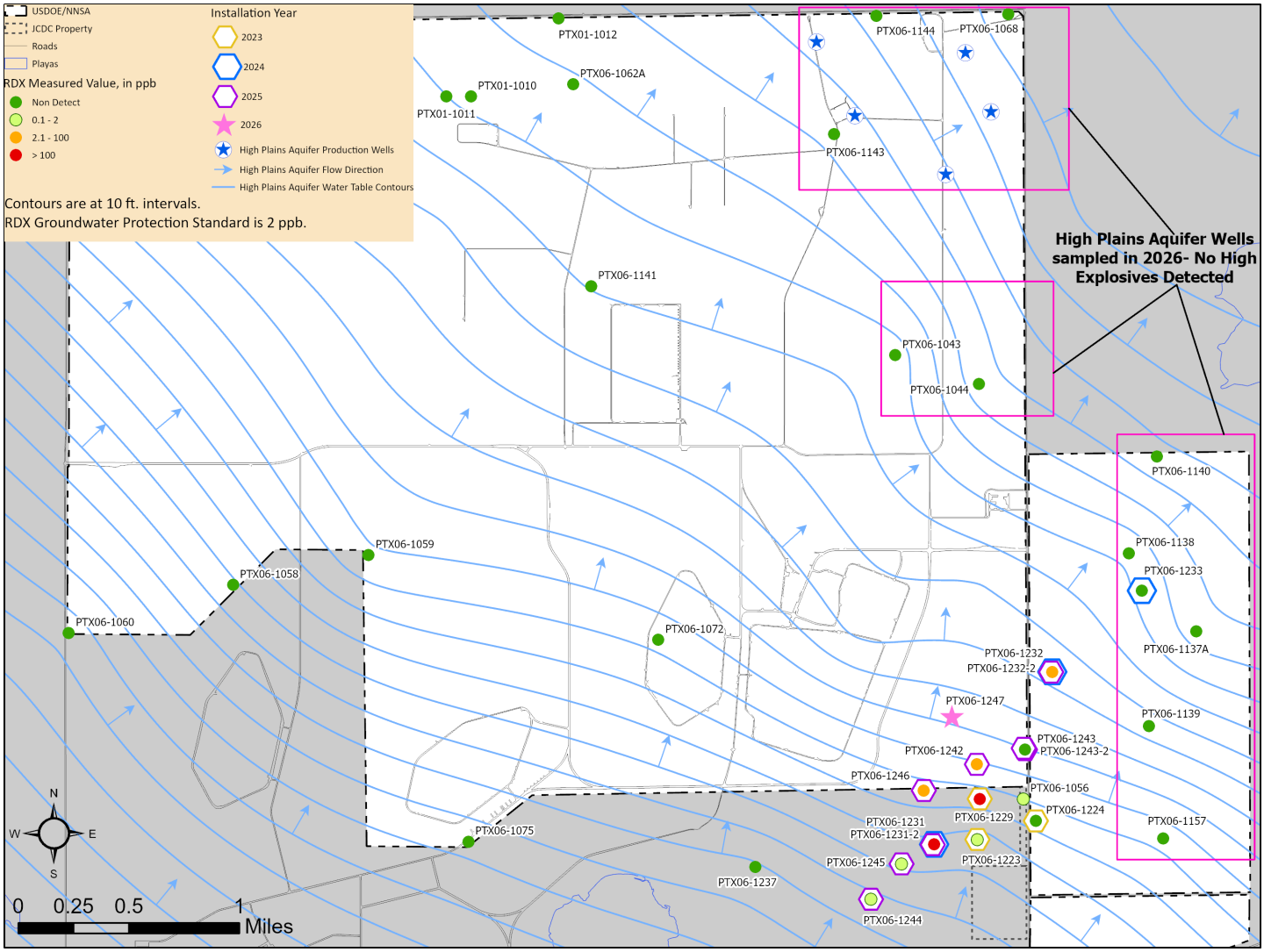


Fig. 2. High Plains Aquifer Wells RDX Results