



CORNHUSKER ARMY AMMUNITION PLANT GRAND ISLAND, NEBRASKA

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OPERABLE UNIT 1 FACT SHEET

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Operable Unit 1 (OU1) at the Cornhusker Army Ammunition Plant (CHAAP) (Figure 1) is being addressed through Department of Defense (DoD) Federal Facility actions with oversight by the U.S. Environmental Protection Agency (EPA) and the Nebraska Department of Environment and Energy, or NDEE (formerly known as the Nebraska Department of Environmental Quality, or NDEQ). The EPA, the NDEQ, and DoD signed an Interagency Agreement in 1990 that describes how the Army will perform work to investigate and clean up the site. The EPA has conducted several five-year reviews of the OU1 remedy. These reviews evaluate whether the remedy put in place protect public health and the environment, and function as intended by site decision documents. The most recent review concluded that response actions at OU1 are in accordance with the remedy and that the remedy continues to be protective of human health and the environment in the short term. Continued protectiveness of the OU1 remedy requires continued groundwater monitoring and implementation of land use controls (LUCs).



Figure 1. CHAAP Location Map

Site Background

The former CHAAP was located on an 11,936-acre tract approximately 2 miles west of Grand Island, Nebraska. CHAAP operated periodically for 18 years and was laid away in 1974 until January 1989 when the plant was declared in excess. CHAAP includes five former load lines (LL), LL1 through LL5 that were primarily used to load, assemble, and pack bombs, projectiles, rockets, micro-gravel mines, and supplementary charges in support of World War II, Vietnam Conflict and Korean War. Improper disposal of wastewater in unlined leach pits and cesspools resulted in explosives contaminated groundwater plumes and source areas.

CHAAP became a Superfund Site in 1990 and cleanup is being completed under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Cleanup is managed and funded by the U.S. Army Corps of Engineers and U.S. Army Environmental Command, with oversight by the USEPA and NDEE.

OU1 consists of explosives-contaminated groundwater plumes exceeding action levels. Action Levels were established in the 1994 Record of Decision (ROD) and the Subsequent 2001 ROD Amendment and approved by the Army, USEPA and NDEE. USEPA Health Advisory Levels (HALs) were established as action levels for RDX, TNT, HMX. The HALs for RDX and TNT are two (2) micrograms per liter ($\mu\text{g/L}$) and 400 $\mu\text{g/L}$ for HMX.

History of Past Actions

Emergency Response – Supply Drinking Water. The Army began provided bottled water to 250 homes with contaminated wells until residences were connected to the city's water supply in 1996. In 2001 to 2002, the Army provided bottled water to additional homes with contaminated wells until residences were connected to the city's water supply.

Contaminated Soil Removal. From 1987 to 1988, the U.S. Army completed an incineration project designed to excavate and treat soils beneath the unlined leach pits and cesspools at the CHAAP load lines. Only half of the 58 excavations removed explosives to action levels. Some locations may represent continuous source areas to groundwater. From 2006 to 2007, soils under and adjacent to former LL buildings and foundations were excavated and disposed at a permitted landfill off-site. Soils were removed to eliminate potential exposure to contaminated soils and to remove potential source areas to groundwater.

Annual Groundwater Monitoring (On- and Off-Post Plume). Initiated in 1994, includes measuring of site wide water levels and sampling of monitoring wells throughout the explosives plumes. Results of the groundwater monitoring efforts are presented in annual reports and presented at annual stakeholder meetings.

Groundwater Extraction and Treatment (On-Post Plume). Operation began in December 1998. The groundwater

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extraction system included extraction well (EW) 1 through EW6, with a total extraction rate of 750 gallons per minute (gpm). An additional extraction well (EW7) was installed in March 2000. Groundwater is pumped from the ground, run through the treatment system, and discharged to the ground. Discharge water is sampled to verify adequate treatment.

Implementation of Monitored Natural Attenuation (Off-Post Plume). Monitored Natural Attenuation (MNA) remedy for the Off-Post plumes was proposed by the Army in the OU1 ROD document published in 2000 and was approved by the Regulators. MNA is a passive treatment which includes a variety of natural processes that degrade the explosives without any human interaction.

Implement Land Use Controls (On- and Off-Post Plumes). To eliminate the possibility of the contamination affecting human health, land use controls (LUCs) were also required by the OU1 ROD document. Controls will remain in place until groundwater cleanup is completed. On-Post controls include well restrictions to prevent the consumption of groundwater within and surrounding the explosives plume and deed restrictions to prevent the property's use for non-industrial purposes. Off-Post controls include well restrictions to prevent the consumption of groundwater within and surrounding the explosives plume and prevent the installation and use of new private drinking water wells within and surrounding the explosives plume.

Subsurface Injection. Began in the spring of 2007 and was performed through 2016; and again in 2019 and 2020 as part of a Rebound Study. Research has shown that certain natural microorganisms will feed off certain contaminants and cleanup [remediate] contaminated groundwater. By injecting an amendment in the aquifer, the microorganisms flourish and consume the contamination. Based on several studies, the Army injected a molasses-based food grade amendment. These injections remediated the explosive plumes 5 to 10 times faster than the pump and treatment system. This saved time and taxpayer dollars and resulted in the shutdown of the treatment system.



Subsurface injection of amendments into the aquifer.

Rebound Study. Decreasing explosives concentration trends and numerical modeling simulations suggested that On-Post groundwater extraction/treatment was no longer needed to prevent Off-Post plume migration. A common issue when you

stop pumping is plume concentrations increase over time and the plume begins to migrate. To ensure these things did not occur, a Rebound Study was initiated in Oct 2019. It included eight (8) quarterly Groundwater Monitoring Events. Baseline event was completed in October 2019 and final quarter 8 event was completed in February/March 2022. Temporary shutdown of all extraction wells and the pump and treatment system occurred in Nov 2019 and remains in standby status. Rebound Study results indicated the plume core is shrinking, statistical analysis (Mann-Kendall Test) show concentrations are declining, and there has been no further plume migration downgradient (further Off-Post). All permanent Off-Post wells sampled as part of the OU1 Rebound Study remain below the USEPA HALs of 2 µg/L. Quarter 8 Technical Memorandum recommended discontinuation of the Rebound Study, continued annual groundwater monitoring, and proceed to the next phase of the cleanup process.

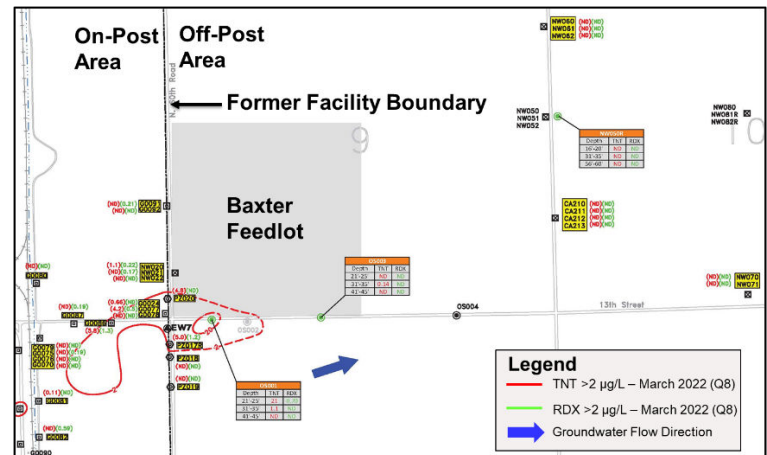


Figure 2. March 2022 Quarter 8 Rebound Study results showing the OU1 Off-Post Explosives Plume is stable and not migrating.

OU1 Path Forward

The path forward for OU1 includes continued annual groundwater monitoring at both On- and Off-Post permanent monitoring wells. Results will be presented in Annual Groundwater Monitoring Reports. The annual reports will evaluate the effectiveness of the MNA and LUCs remedy to verify the remedies continue to be protective of human health and the environment. The annual reports will also provide conclusions and recommendations for the following year's groundwater monitoring activities. The annual reports and the recommendations will be reviewed and approved annually by the USEPA and NDEE prior to implementation. Results of the annual monitoring and the recommendations will also be presented during annual stakeholder and public meetings.

Next Phase of CERCLA Process for OU1 On-Post Explosives Plumes

The next phase of the CERCLA process included the preparation of a Focused Feasibility Study to evaluate the potential of alternative remedies. An alternative remedy for OU1 was selected by USACE, in consultation with USEPA and NDEE. That alternative remedy (In-situ Bioremediation, Groundwater Monitoring, and LUCs) was presented in a Proposed Plan prepared by USACE and approved by USEPA and NDEE. USACE is currently working on a Record of Decision Amendment to document the decision process.

A list of key documents can be found at:

<https://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.scs&id=0702020&doc=Y&colid=70080®ion=07&type=SC>