



# Addressing Chromium in Groundwater

## Background

From 1956 to 1972, a non-nuclear power plant at Los Alamos National Laboratory periodically flushed water out of its cooling towers into Sandia Canyon. The water contained chromium, which was commonly used throughout the industry as a corrosion inhibitor in cooling tower systems.

The chromium-contaminated water flowed down Sandia Canyon as surface water and and penetrated the underlying rock layers. The contaminated water ultimately infiltrated into the regional aquifer beneath Sandia and Mortandad Canyons, the present location of the plume.

The Laboratory discovered chromium in the regional aquifer during the installation of a groundwater monitoring well in late 2005. Since then, detailed scientific characterization of the nature and extent of the plume has been conducted. This characterization provides the foundation for the next phase of work.

One of the Laboratory's highest environmental priorities is addressing the chromium plume in the regional aquifer beneath Mortandad Canyon and Sandia Canyon.

## Interim Measure

Because of evidence of downgradient plume expansion The Laboratory installed a pilot pumping well, CrEX-1, in 2014 and conducted short-term pilot-scale pumping in late 2014. The purpose of pumping was to evaluate the feasibility of hydraulically controlling migration of the plume. The well pumped water at approximately 80 gallons per minute from late October through mid-December 2014.



*A crew drilled CrEx-1, the project's first extraction well for hydraulic control.*



*Chromium-contaminated groundwater was stored in tanks prior to treatment.*

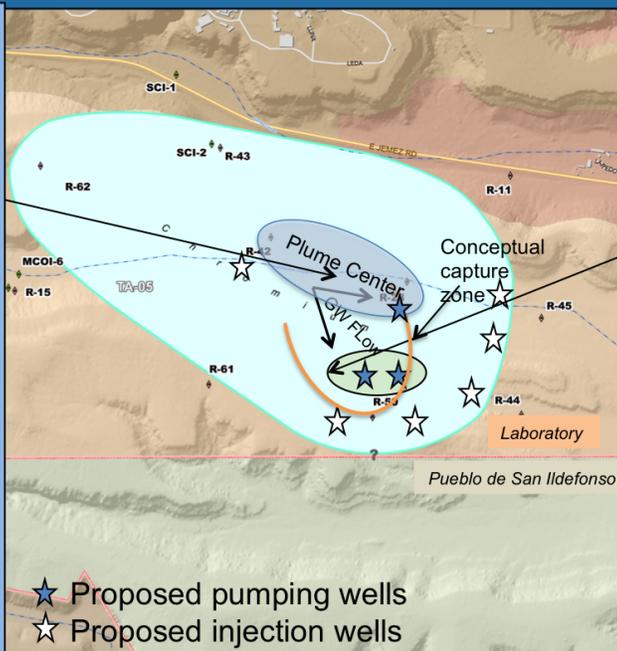


*Crews drilled sonic coreholes, using high-frequency vibration to collect subsurface material for testing in support of potential Chromium remediation strategies.*

## Chromium Plume Center Characterization

The goal is to evaluate potential for targeted mass removal as a component of a final remediation strategy.

- Evaluate removal of chromium-contaminated groundwater by pumping groundwater in the area with highest chromium concentrations.
- Two-year test phase pumping is expected to involve pumping at varying rates to evaluate chromium trends.
- Environmental Protection Agency guidance is to locate extraction wells just down-gradient of the source and establish a capture zone in the center of the plume.
- Contaminated groundwater will be treated at the surface and largely returned to the aquifer through injection wells.
- In situ remediation approaches are also being evaluated.



## Interim Measures

- The goal is to achieve and maintain a regulatory-compliant plume edge of less than 50 parts per billion within the Laboratory boundary.
- The strategy is to hydraulically control chromium migration toward boundary.
- Pumping is proposed at one or two wells to capture contaminated groundwater and control the plume migration.
  - Pumping for one year will provide extensive new input for hydrology and model updates and inform a need for a second well.
- The existing well, CrEX-1, pumps up to about 100 gallons per minute.
- Contaminated groundwater will be treated at the surface and returned to the aquifer through injection wells.
- Some portion of treated water may be land applied.

## Plume-Control Interim Measure

Work for the next few years, under an Interim Measure proposed to the NMED, is intended to hydraulically control plume expansion while a final remediation strategy is identified. The proposed Interim Measure will include installation and operation of up to 2 extraction wells and 6 injection wells.

## Plume Center Characterization

The Laboratory also plans to continue exploring additional technologies for application toward a final remediation approach. This work includes installation and operation of an extraction well near the center of the plume to test feasibility and operational efficiency for source removal, as well as bench-scale and field-scale studies to identify additional technologies that may be applied to remediation. The Laboratory is also actively engaging external subject matter experts on the studies.

## The NEPA Process

An assessment of the impacts of the proposed actions are being evaluated in an environmental assessment pursuant to the National Environmental Policy Act Process. Any final remedy must first be proposed by the Laboratory and be approved by the New Mexico Environment Department.

## For More Information

All of the reports, investigations and data on the chromium contamination are publicly available on the LANL Electronic Public Reading Room website located at <http://epr.lanl.gov/oppie/service>.

## About Los Alamos National Laboratory

([www.lanl.gov](http://www.lanl.gov))

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