

# NMED

New  
Mexico  
Environment  
Department



## CHROMIUM PROJECT UPDATE LOS ALAMOS NATIONAL LABORATORY

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# Summary of Radioactive & Hazardous Materials Committee Meeting Held on November 3, 2017

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- The New Mexico Environment Department (NMED) will continue to critically evaluate migration of chromium (Cr) in the regional aquifer at Los Alamos National Laboratory (LANL), assuring that CrIN-6 work is protective of supply well PM-3.
- NMED will use the Resource Conservation and Recovery Act (RCRA) regulatory process to investigate extent of Cr contamination.
- NMED will evaluate Interim Measure (IM) operational testing of aquifer investigation, including hydraulic control of plume migration and chemical amendments.
- NMED will continue working with the Department of Energy (DOE) and their contractors to evaluate pilot scale testing of biological and chemical amendments to transform toxic Cr(VI) to nontoxic Cr(III).



# Topics of Interest

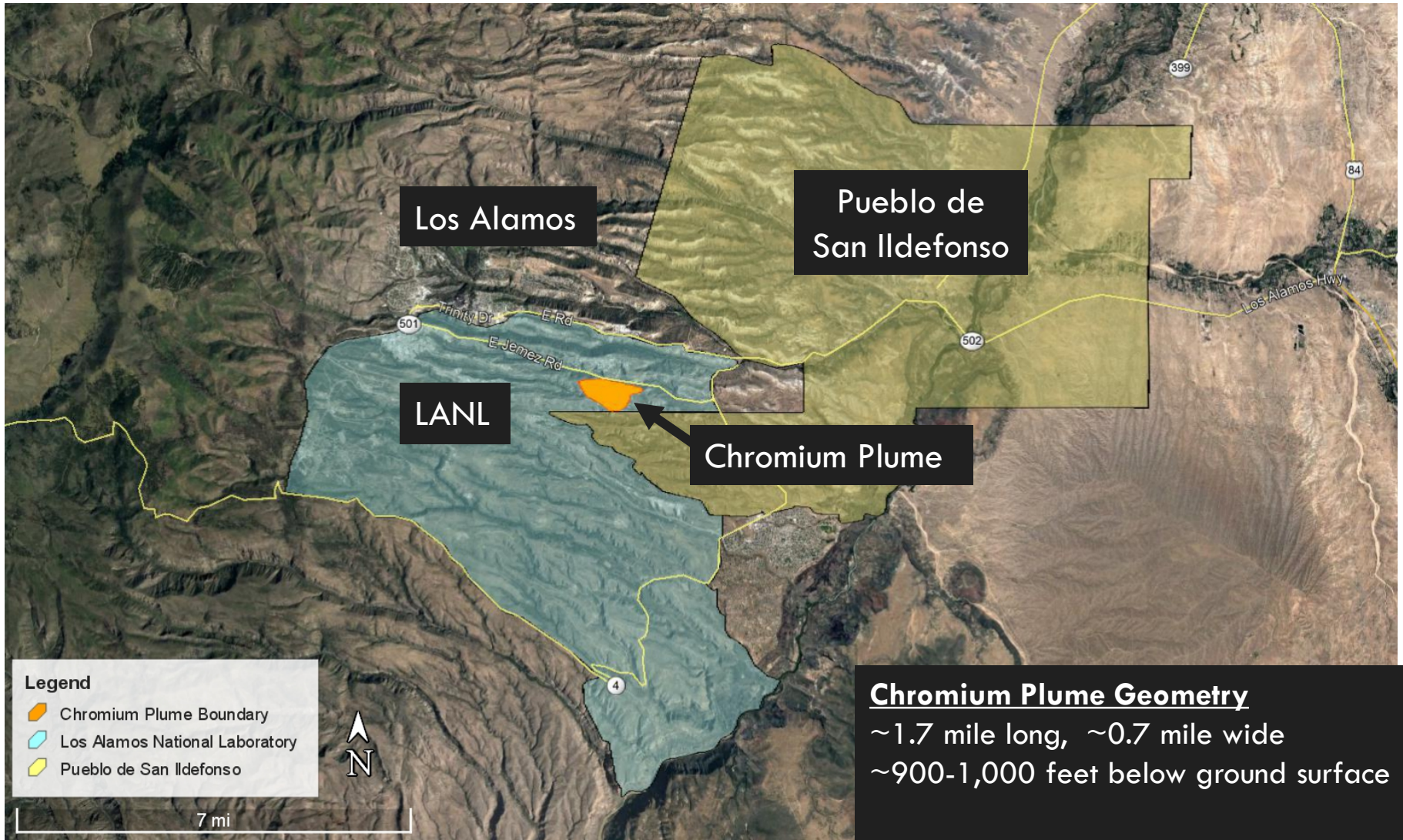
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- Site Location
- Conversion of Injection Well CrIN-6 to Extraction Well CrEX-5
- Update on the Interim Measures to Control Chromium Plume Migration
- *In-Situ* Chromium Remediation Testing – Pilot-Scale Tests Currently Being Performed
- Remaining Uncertainties Relevant to the Corrective Measures Evaluation (CME)



# Site Location

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# Conversion of CrIN-6 to Extraction Well CrEX-5

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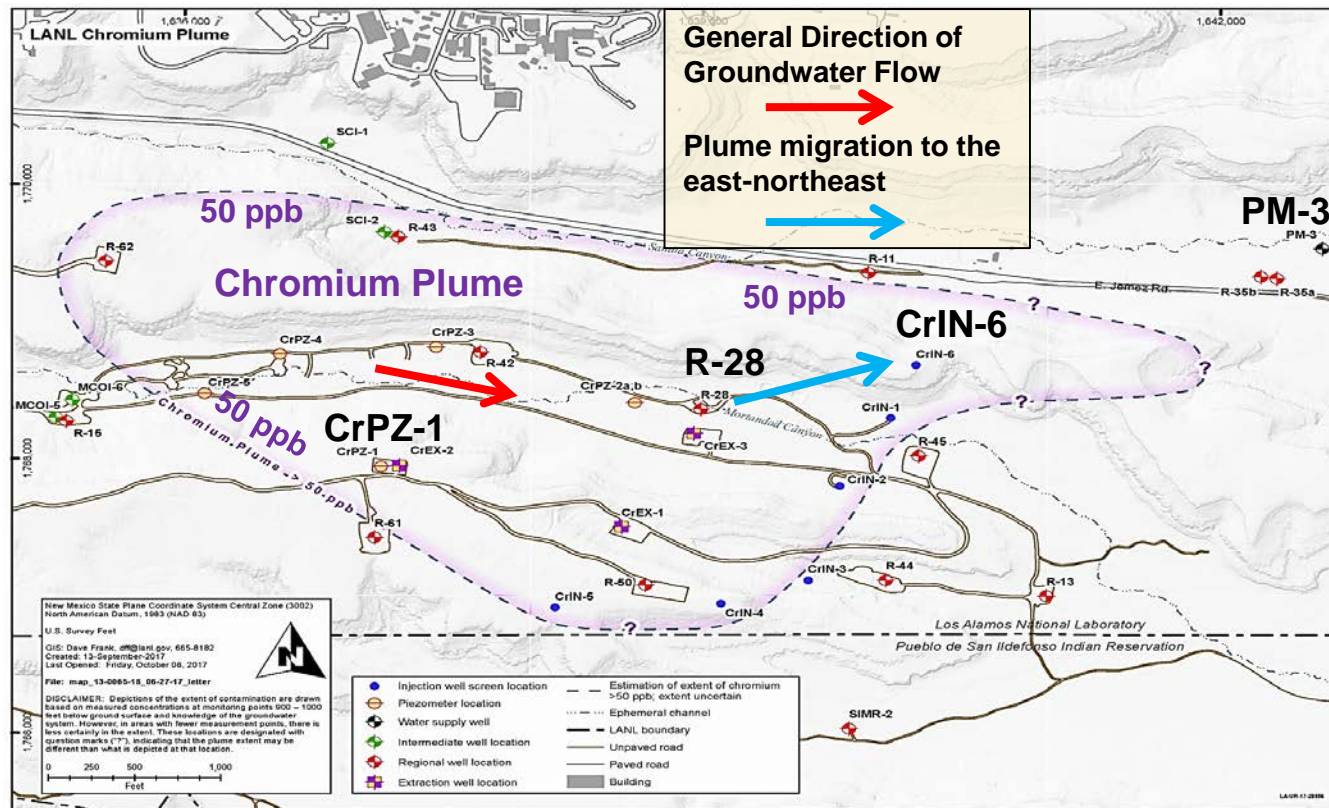
- April 26, 2018 - NMED received CrIN-6 Evaluation Report
  - Report recommends **extraction** at CrIN-6 as best method for meeting Interim Measures objectives (controlling plume migration)
  - Recommendation based on LANL's numerical groundwater model
  
- June 6, 2018 - NMED approved **CrIN-6** conversion into **CrEX-5**
  - NMED approval based on *“Interim Measures objective of controlling plume migration and reducing the potential to increase chromium mass migration towards downgradient Los Alamos County production well PM-3.”*
  - Hydrogeologic characterization and groundwater geochemistry support the decision to extract Cr at CrEX-5
  - Ultimate fate of chromium mass downgradient of CrIN-6 (now CrEX-5) uncertain under injection scenario



# Chromium Occurrence at CrIN-6

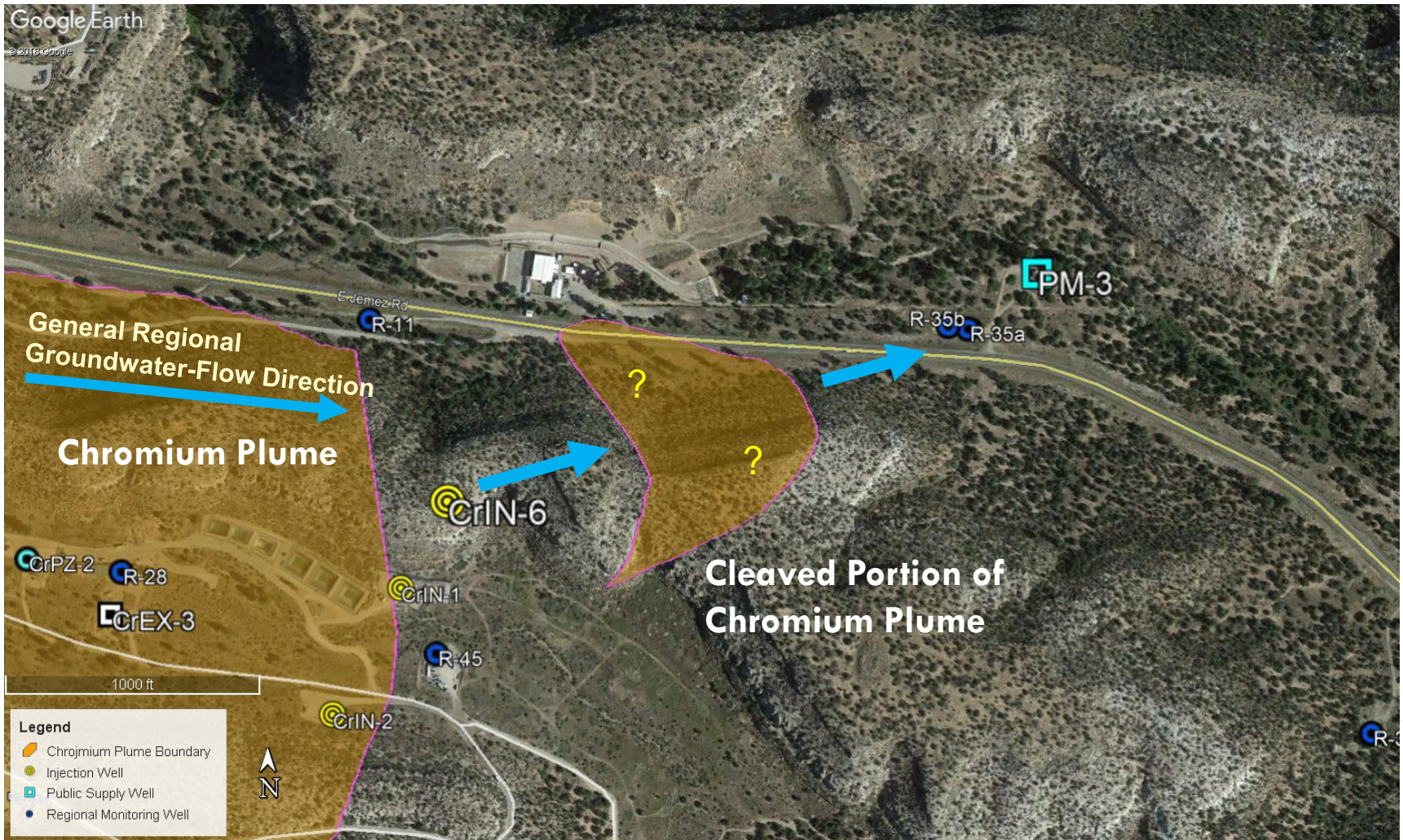
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- CrIN-6 has a very similar geochemical signature (chromium/sulfate ratios and nitrate concentrations) to the center of the plume, including wells R-28, CrEX-2, and CrPZ-1. This relationship supports Cr plume migration to the east and northeast and significantly emphasizes protection of Los Alamos County supply well PM-3.

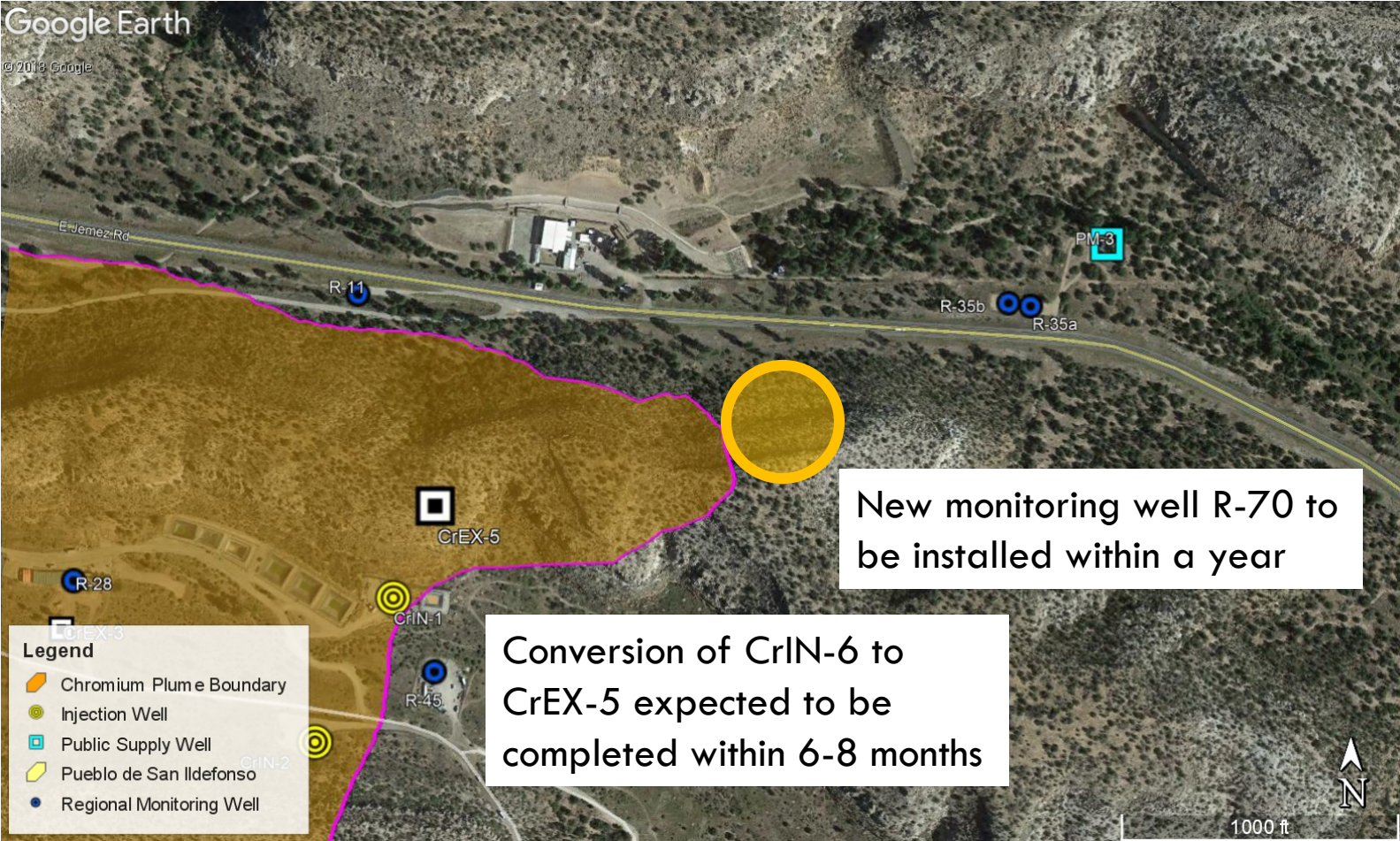


# CrIN-6 Injection Scenario

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# CrEX-5 and New Monitoring Well R-70

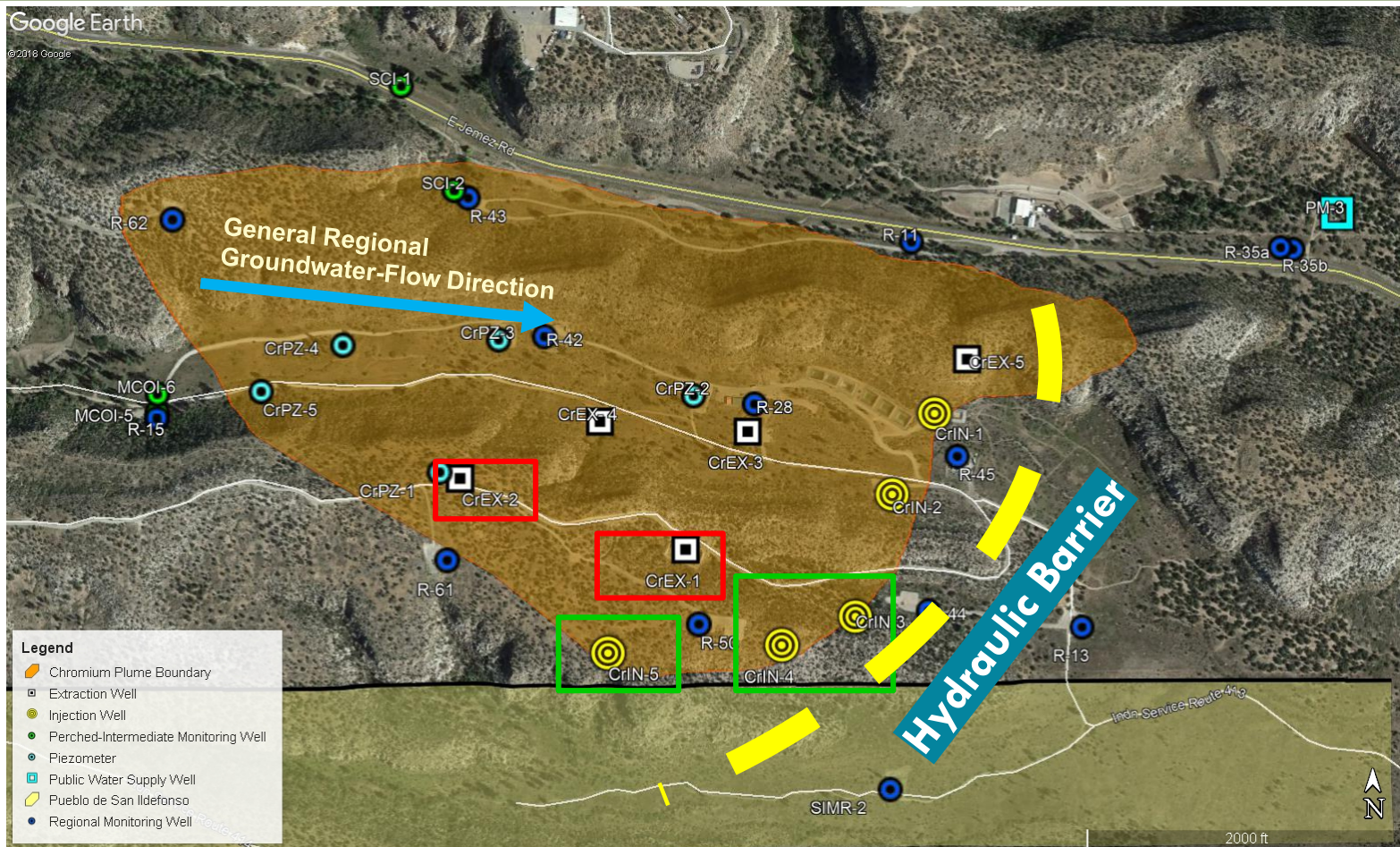




# Interim Measures— Controlling the Migration of the Chromium Plume

## Interim Measures Strategy and Current Operational Status

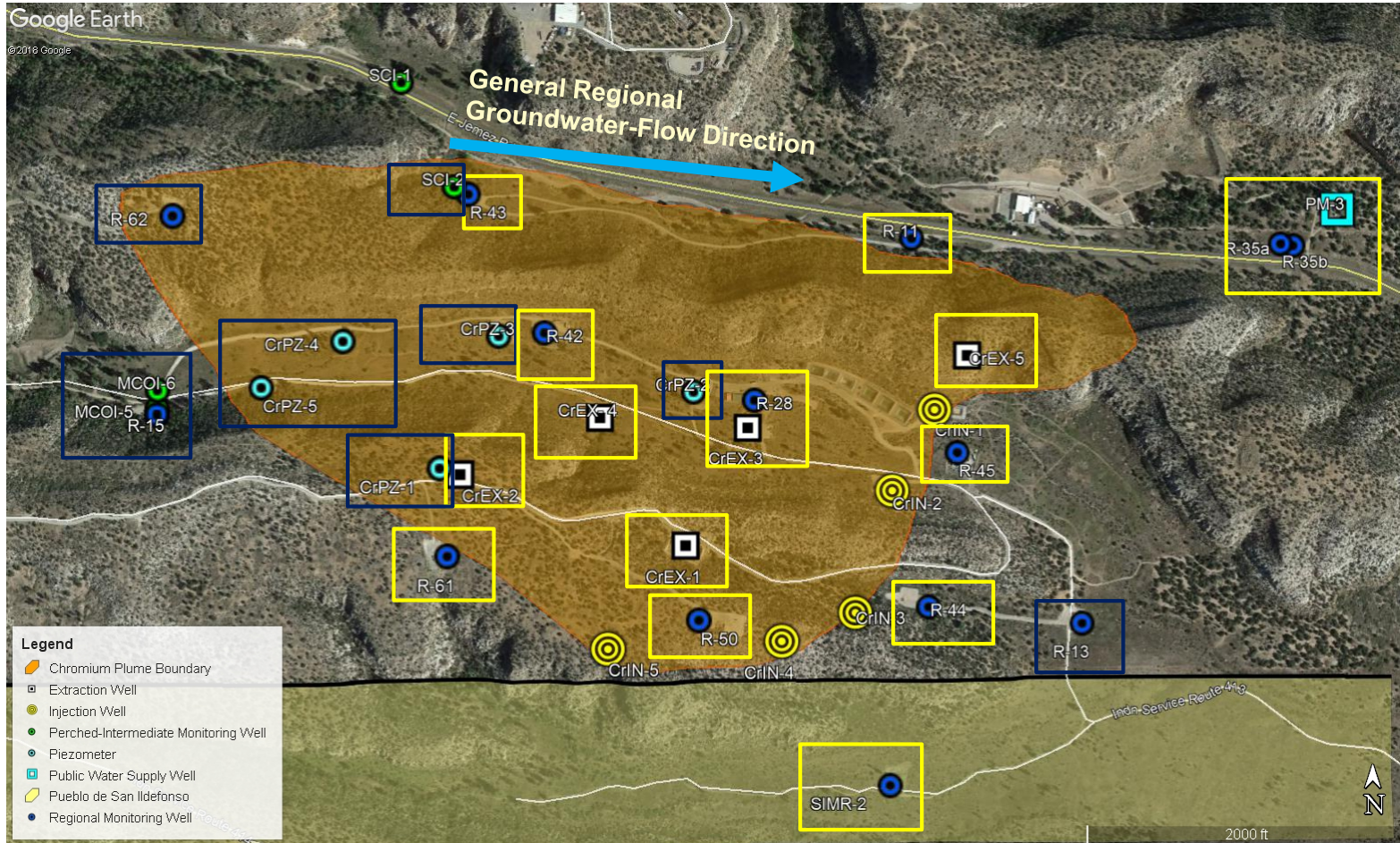
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# Interim Measures – Controlling the Migration of the Chromium Plume

## Performance Monitoring – Sampling Frequency

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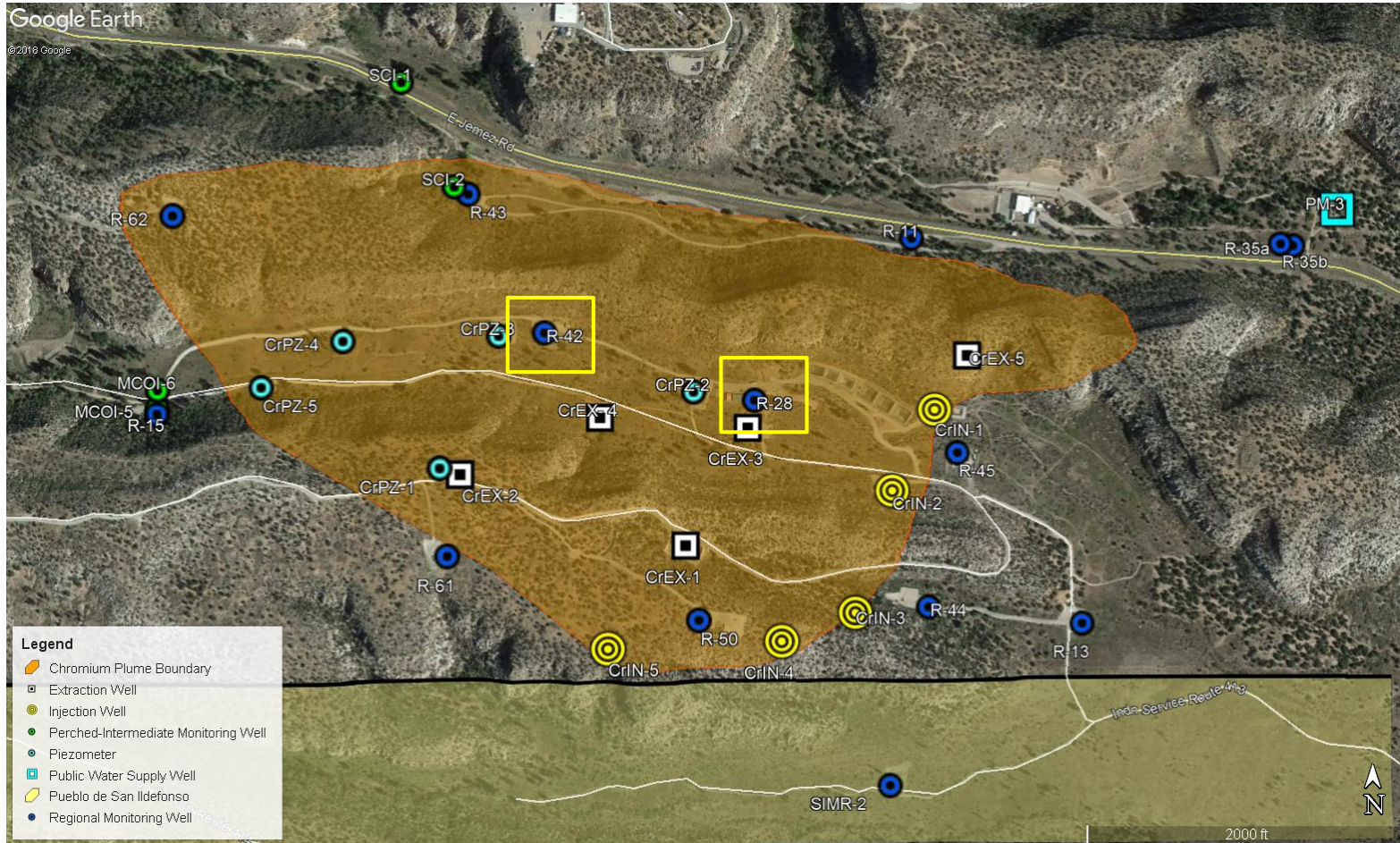
	Monthly Cr monitoring
	Quarterly Cr monitoring



# In-Situ Chromium Remediation Tests

## Pilot-Scale Amendments Testing at R-28 and R-42

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# *In-Situ* Chromium Remediation Tests

## Pilot-Scale Amendments Testing at R-28 and R-42

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- Amendments create a chemically reducing environment in the aquifer which transforms Cr(VI) into Cr(III)
  - Cr(III) strongly immobile and much less hazardous than Cr(VI)
  - 2 amendments being tested – sodium dithionite and molasses
  
- R-42 – Sodium Dithionite Testing (August 24 – 25, 2017)
  - 720 ppb = Pre-injection chromium concentrations
  - <2 ppb of Cr(III) = Post-injection (8 months) chromium concentrations, no Cr(VI) measured
  
- R-28 – Molasses Testing (September 9, 2017)
  - 293 ppb = Pre-injection chromium concentrations
  - <80 ppb of Cr(III) = Post-injection (8 months) chromium concentrations, no Cr(VI) measured
  
- Long-term viability of these amendments currently being evaluated by DOE, N3B, and NMED



# Remaining Uncertainties and Data Gaps

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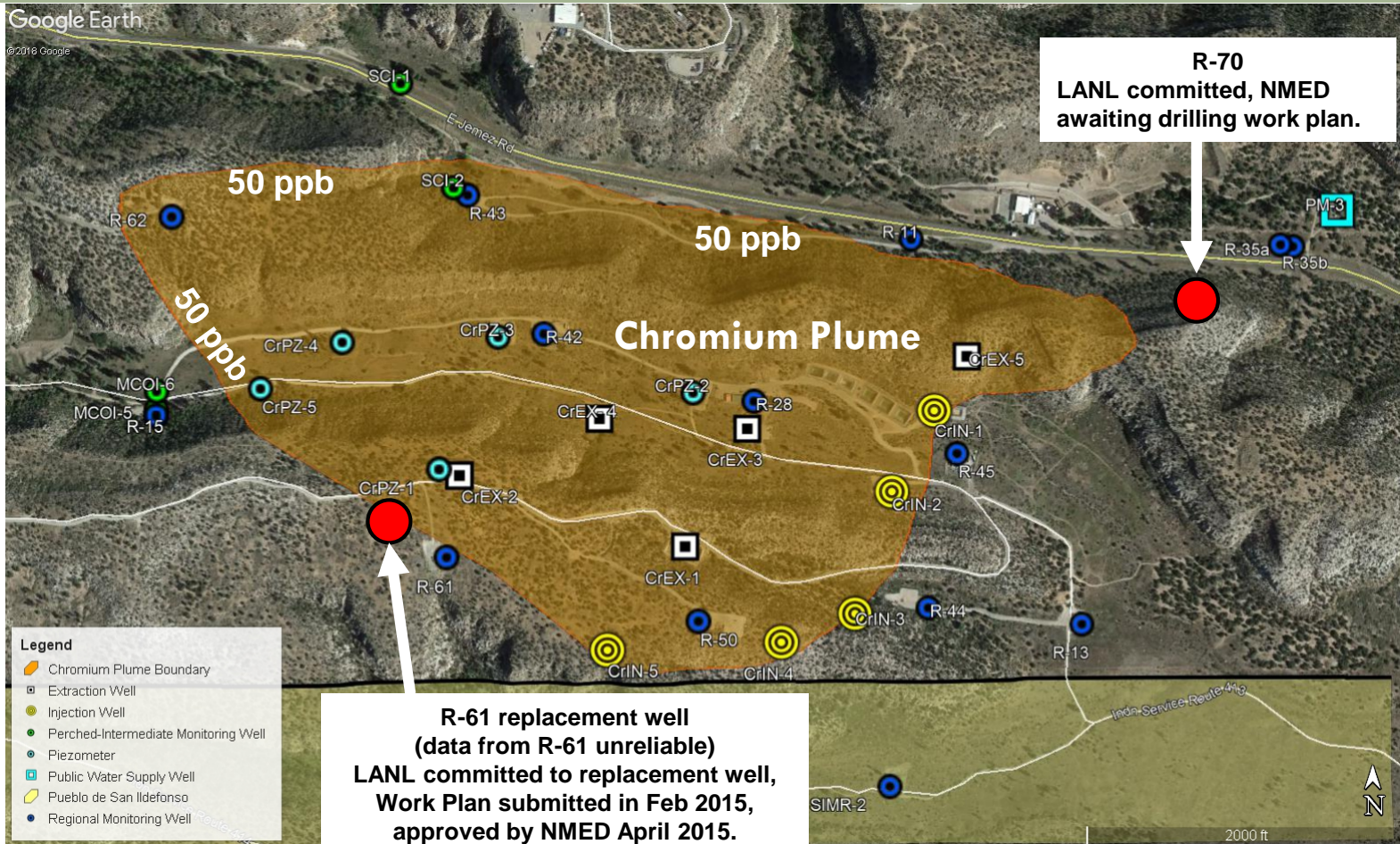
- Chromium plume extent is not completely defined
  - ▣ New monitoring wells are needed to further define entry points and plume extent
  - ▣ DOE has committed to drilling two wells (R-70 and R-61 replacement)
  
- Aquifer heterogeneity poorly understood/not characterized
  - ▣ Vertical extent of Cr(VI) is not completely defined
  - ▣ Preferential flow paths for Cr(VI) are not completely defined
  - ▣ Fluvial aquifers (Puye Formation) – very complex with preferred fast paths of groundwater flow and contaminant transport



# Defining the Plume Boundary

## Additional Monitoring Wells Needed

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# Questions?

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