

MONITORING OF SUPPLY WELLS, LOS ALAMOS, NEW MEXICO

BY

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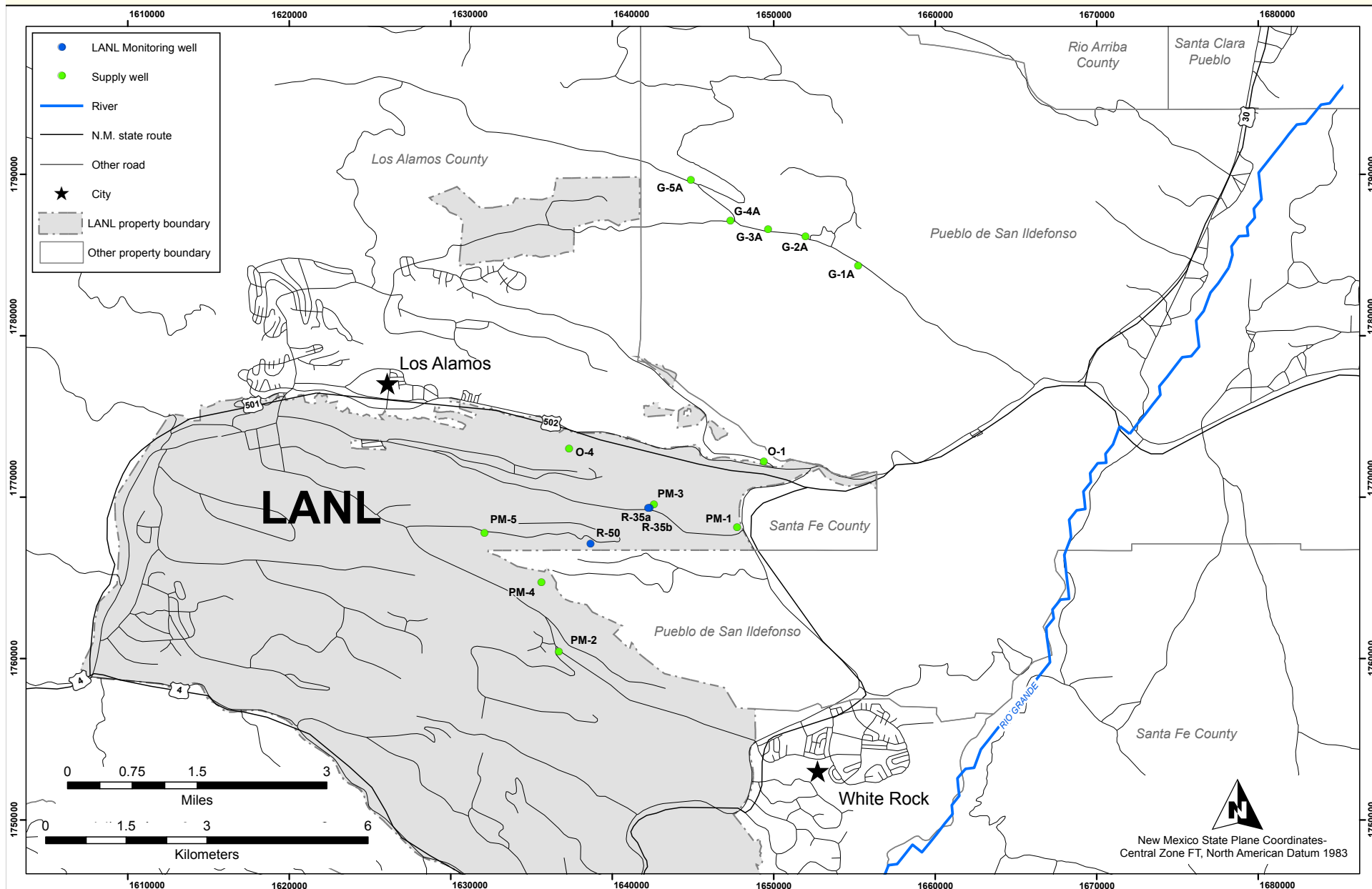
Monitoring of Los Alamos County Supply Wells

- **Introduction**
- **Purpose and scope of groundwater monitoring**
- **Chemicals analyzed during monitoring**
- **Examples**
- **Summary and conclusions**

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Location Map of Los Alamos County Supply Wells



Purpose and Scope of Monitoring of Los Alamos County Supply Wells by the NMED

- **Sustainability for water supply**
- **Vulnerability to mobile contaminants**
- **Sampled on quarterly basis since 1993**
- **Supply wells include: O-1, O-4, G-1A, G-2A, G-3A, G-4A, G-5A, PM-1, PM-2, PM-3, PM-4, and PM-5**
- **NMED (DOE Oversight Bureau) uses most advanced analytical methods for chemical and radiochemical analyses**

Analytical Methods Used by NMED

Trace Elements (42 analytes)

High-resolution inductively coupled plasma-mass spectrometry

Major-minor Ions (10 analytes)

Ion chromatography, titration, and inductively coupled plasma-optical emission spectroscopy

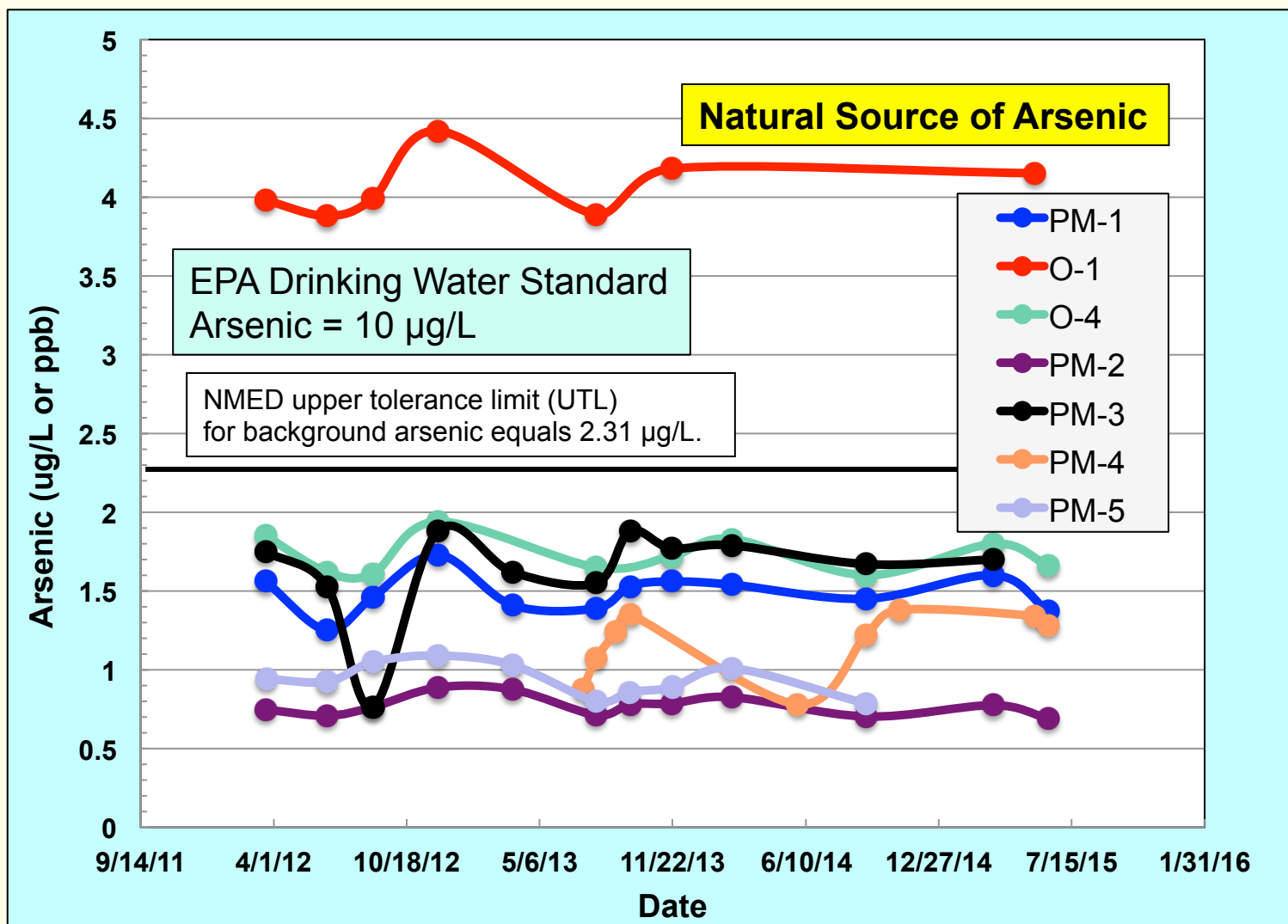
Pharmaceuticals and Personal Care Products (32 analytes)

High pressure liquid chromatography-tandem mass spectrometry-mass spectrometry

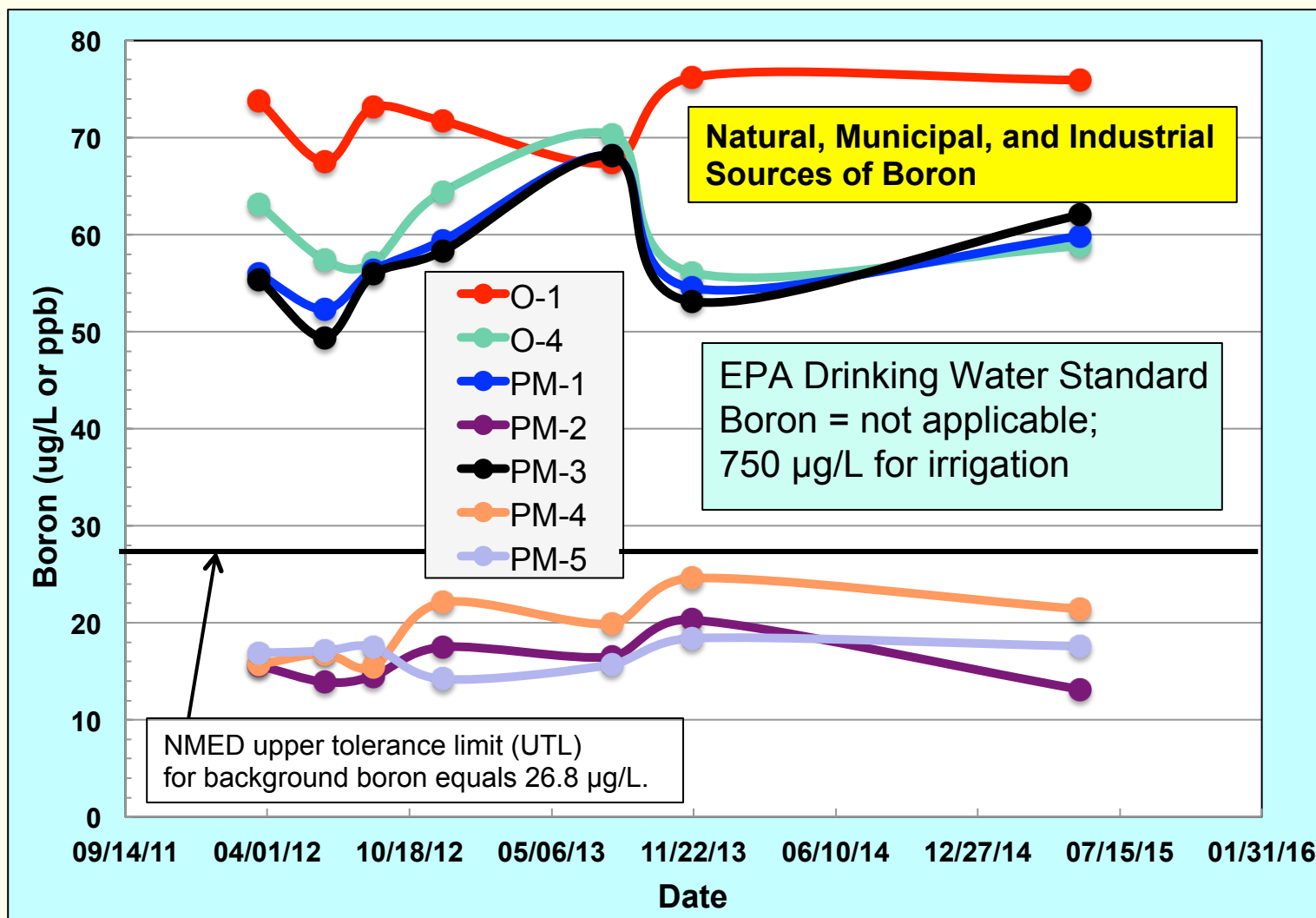
Low-level Tritium and Selected Radionuclides

Electrolytic enrichment, alpha, beta, and gamma spectroscopy

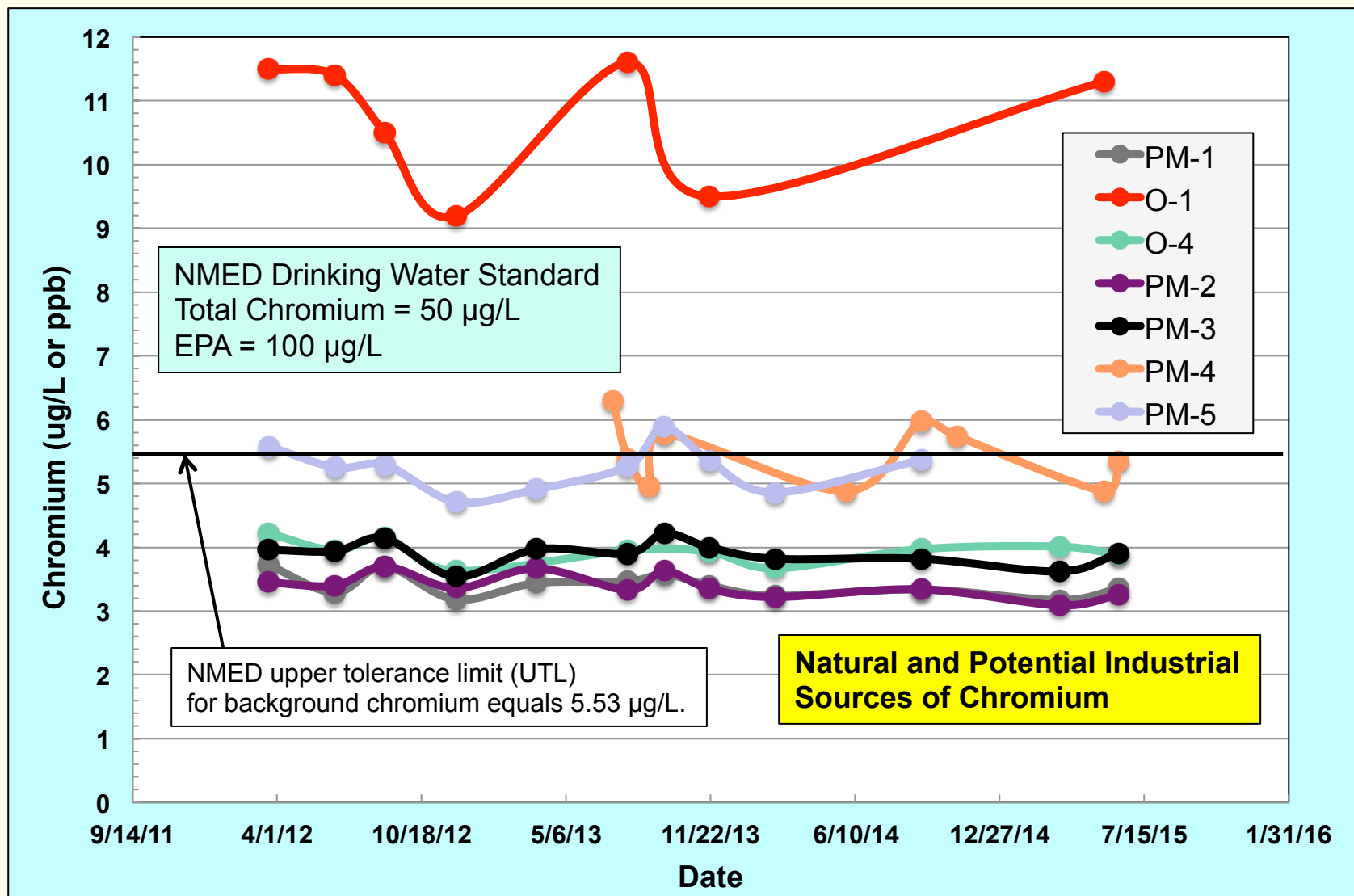
Concentrations of Arsenic in Los Alamos County Supply Wells



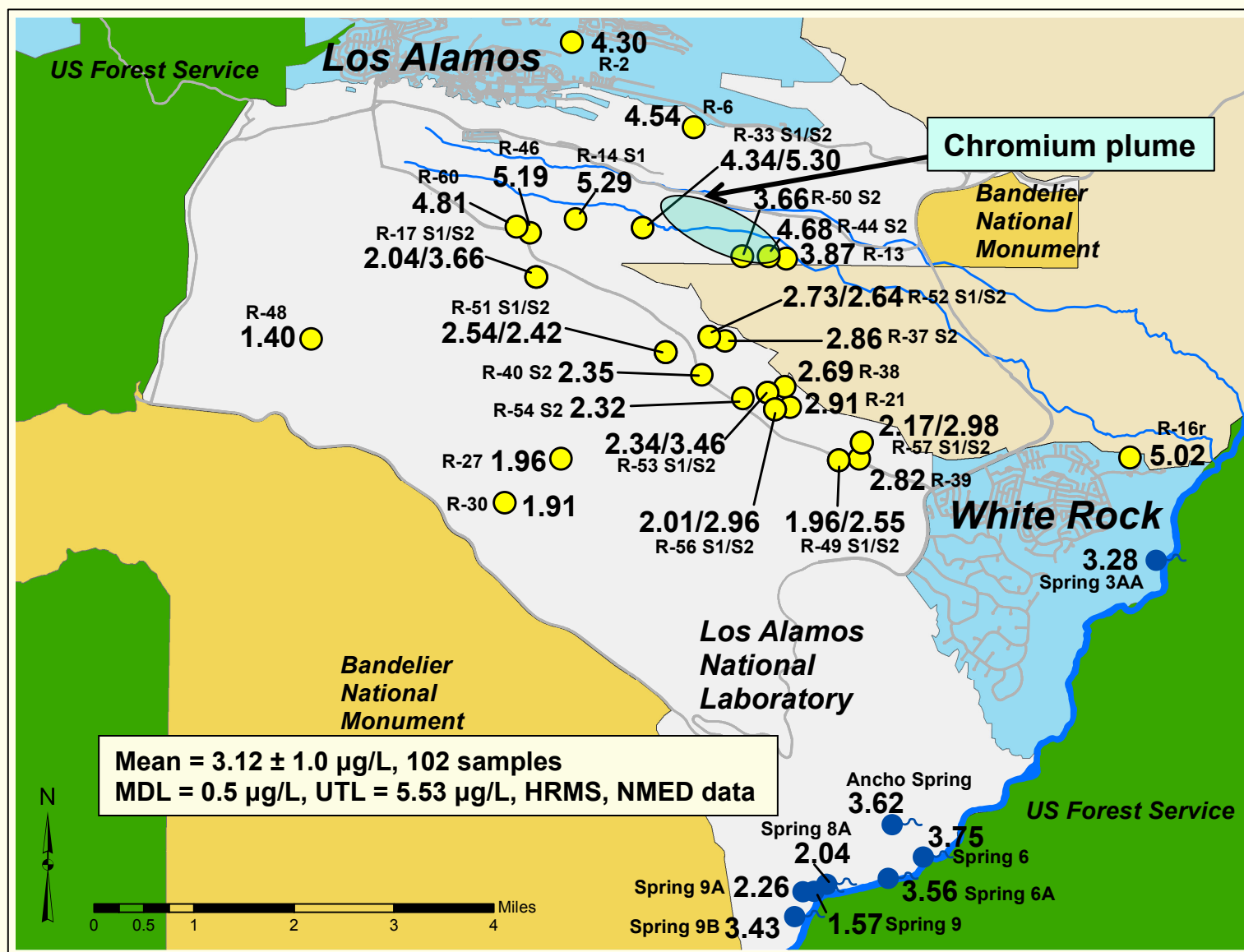
Concentrations of Boron in Los Alamos County Supply Wells



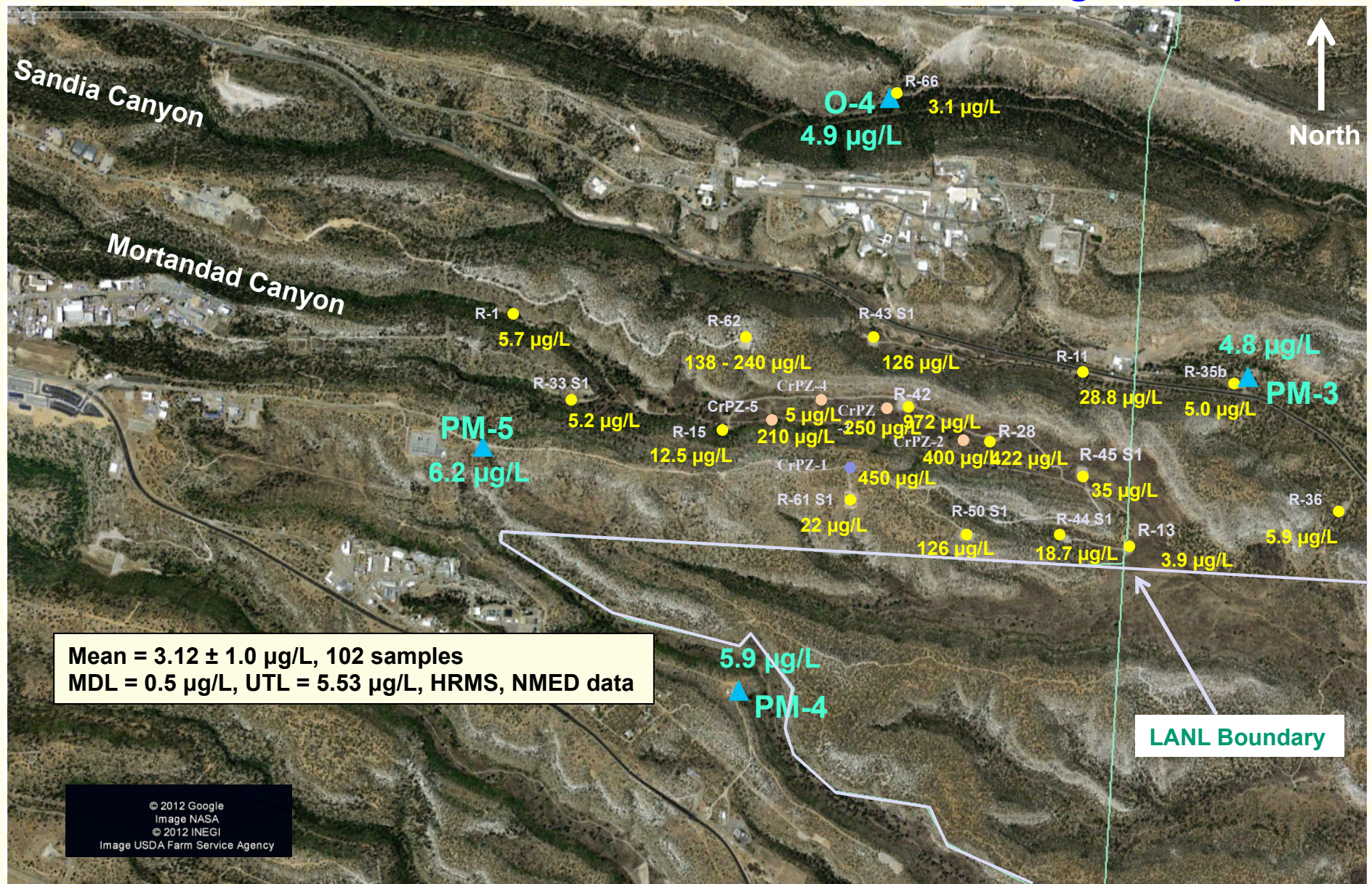
Concentrations of Chromium in Los Alamos County Supply Wells



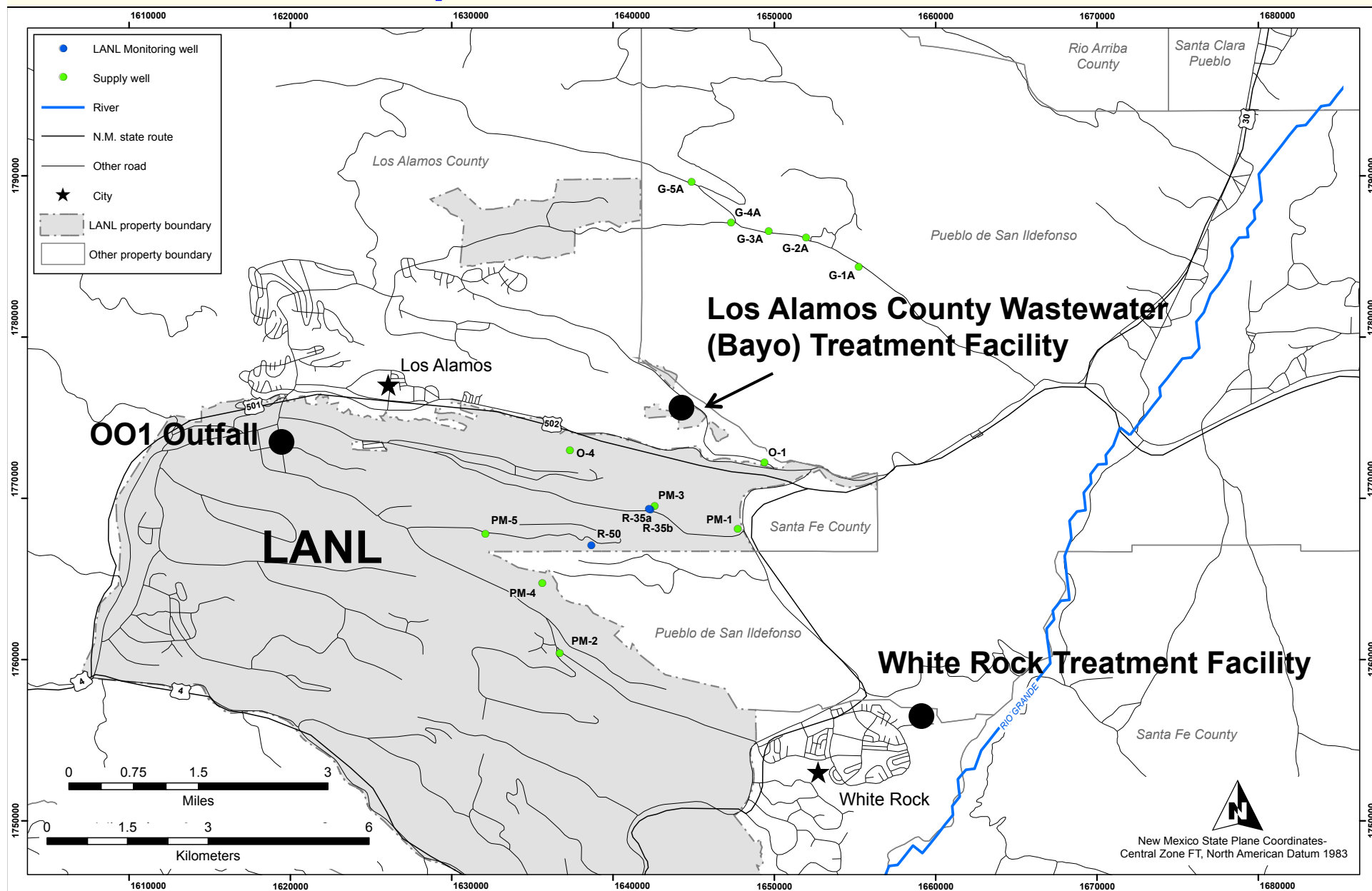
Background Concentrations of Dissolved Chromium ($\mu\text{g/L}$) in the Regional Aquifer, Los Alamos National Laboratory



Concentrations of Total Dissolved Chromium in the Regional Aquifer



Location Map of Wastewater Treatment Facilities



Pharmaceuticals of Interest Commonly Detected in Los Alamos Outfalls and Groundwater

Compound	Common Name(s)	Use	Date First Available
Acetaminophen	Tylenol	Pain reliever/fever reducer	1950; 1959 (OTC)
Bisphenol-A	Bisphenol A	BPA is employed to make certain plastics and epoxy resins	1957
Caffeine	NA	Stimulant	NA
DEET	NA	Insect repellent	1957 commercial use
Diazepam	Valium	Anxiety, alcohol withdrawal syndrome, and trouble sleeping	1963
Fluoxetine	Prozac	Antidepressant	1986
Ibuprofen	Advil/ Motrin	Pain reliever/fever reducer, nonsteroidal anti-inflammatory drug (NSAID)	1974; 1984(OTC)
Salicylic Acid	Aspirin	Pain reliever/fever reducer; skin care products	1915 (asprin);
Sulfamethoxazole	Bactrim, Septrin	Antibiotic	1961

OTC means over the counter. NA means not applicable.

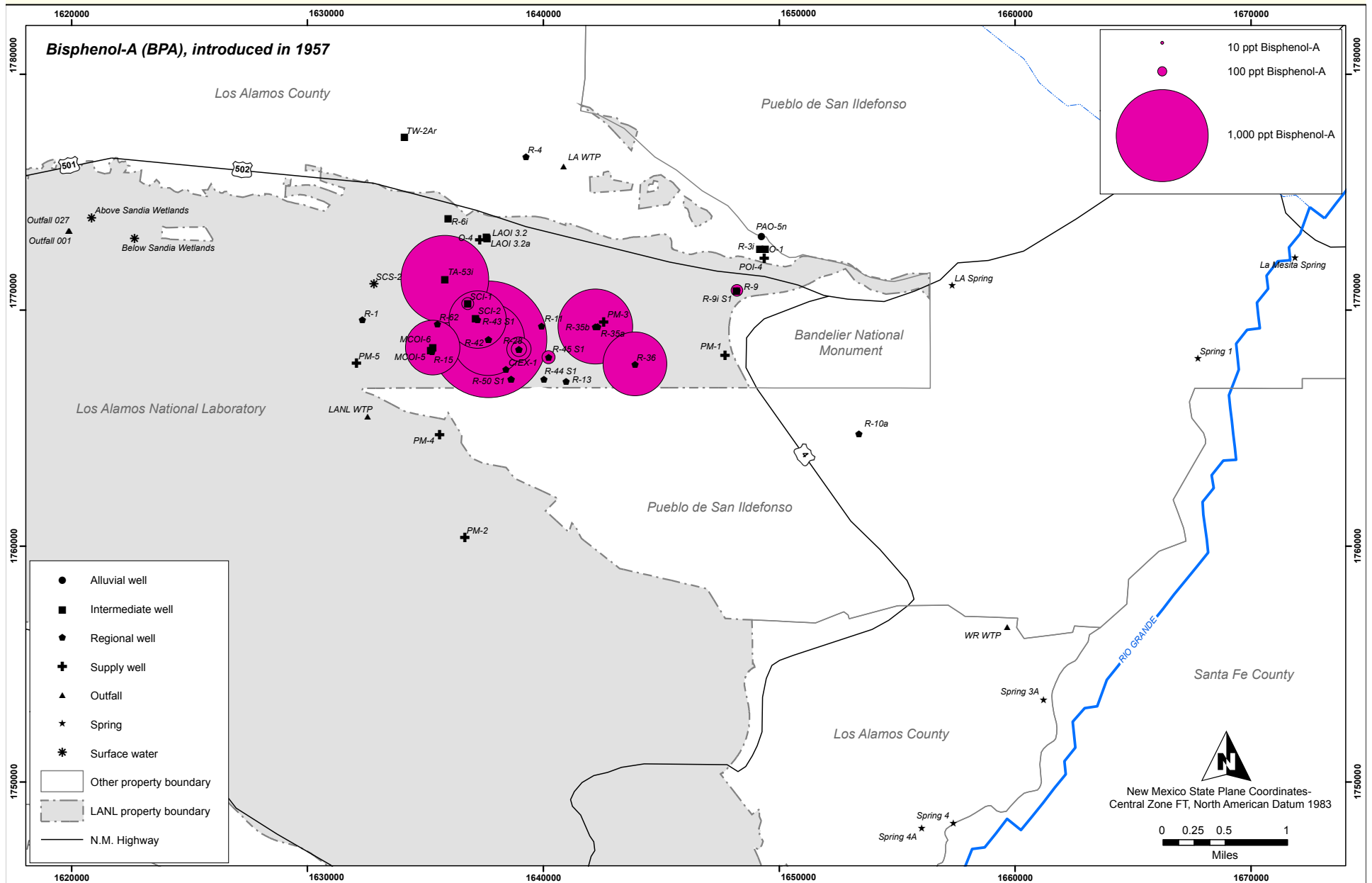
Pharmaceuticals Detected in Treated Sewage Effluent at Los Alamos County (Bayo) WWTP and at Inactive Well O-1

Chemical (ng/L)	LA County WWTP (04/21/15)	O-1 (05/20/15)	O-1 (12/09/15)
Acetaminophen	18, J	1.1, J	1.8, J
Bisphenol-A	<40, U	<4, U	5.0, J
Caffeine	40	<1, U	1.6, J
Carbamazepine	130	<0.4, U	<1.0, U
DEET	68	<0.72, U	<0.70, U
Dilantin	150	<1, U	<2.0, U
Ibuprofen	12	<0.4, U	<0.70, U
Sulfamethoxazole	1,000	<0.6, U	<1.0, U

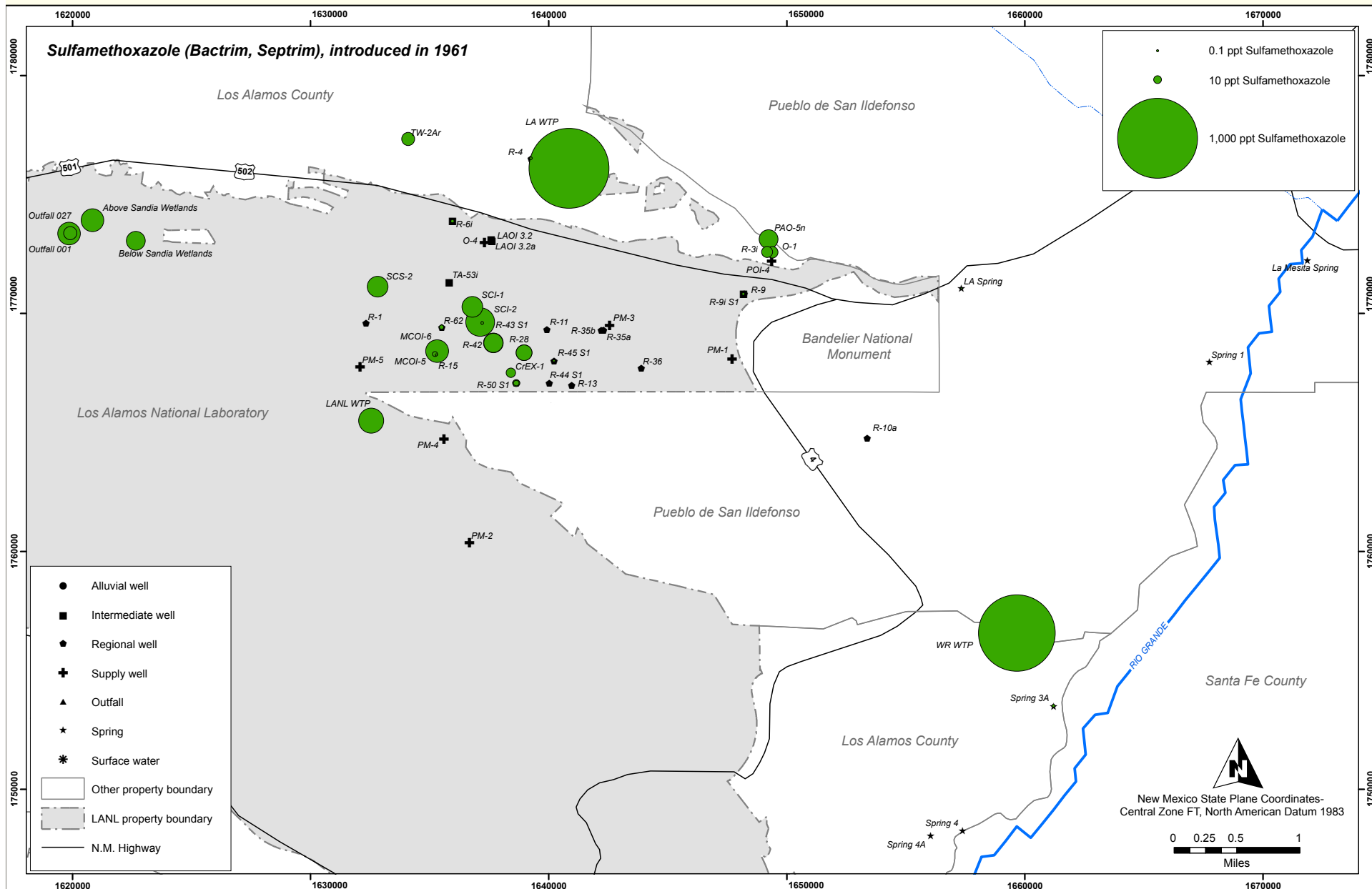
Note: ng/L means nanogram/liter; U means not detected; J means detected above method detection limit but below quantitation limit (approximate value).

One nanogram/liter (part per trillion) is equivalent to one second in 31,688 years!

Bisphenol-A Detected in the Regional Aquifer



Sulfamethoxazole Detected in the Regional Aquifer



Summary and Conclusions

- **NMED and LANL regularly and extensively monitor the Los Alamos County supply wells for numerous chemicals.**
- **Los Alamos County supply wells continue provide high quality drinking water to the community and LANL.**
- **Several mobile chemical tracers (chloride, chromium, boron, nitrate, and pharmaceuticals) are present at low concentrations at well O-1 at concentrations below EPA and NMED drinking water standards.**
- **Monitoring of the chromium plume is the highest priority for NMED (DOE Oversight Bureau). Concentrations of chromium are less than NMED and EPA drinking water standards in the supply wells.**