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 (505) 257-7690



Environmental Management
 Los Alamos Field Office
 1200 Trinity Drive, Suite 400
 Los Alamos, New Mexico 87545
 (240) 562-1122

Date: February 28, 2022
Refer To: N3B-2022-0006

Jack Richardson, Deputy Utility Manager
 Gas, Water, and Sewer Services
 Los Alamos County
 1000 Central Avenue, Suite 130
 Los Alamos, NM 87544

Subject: Los Alamos National Laboratory Site-Wide Monitoring Program, Los Alamos County Water Supply Wells, 2022 Sampling and Analysis Plan

Dear Mr. Richardson:

Water supply wells in Los Alamos County (the County) are routinely sampled for both general characterization and specific constituents of interest under Los Alamos National Laboratory's Site-Wide Monitoring Program. These wells include G-2A, G-3A, G-4A, G-5A, O-1, O-4, PM-1, PM-2, PM-3, PM-4, and PM-5.

The U.S. Department of Energy (DOE) Environmental Management Los Alamos Field Office (EM-LA) and Newport News Nuclear BWXT-Los Alamos, LLC (N3B) continue to coordinate with the County to conduct an annual review of the sampling and analysis plan (SAP) to ensure it is dynamic, strategic, and mutually beneficial.

The enclosed 2022 SAP represents the sampling and analysis commitment for the next four quarters of the County sampling calendar (January 1, 2022, to December 31, 2022). The sampling suites and methods in this SAP are the same as those applied to the sampling of groundwater monitoring wells under the New Mexico Environment Department-approved Interim Facility-Wide Groundwater Monitoring Plan.

N3B will continue to implement the following practices associated with groundwater sampling and evaluation of data collected from County water supply wells.

1. N3B will follow the SAP included herein to conduct sampling of the water supply wells using the N3B groundwater sampling standard operating procedure (N3B-SOP-ER-3003, R1) for water supply wells, which incorporates best industry practices.
2. N3B will provide to the County an automated report of the data upon receipt from the analytical laboratory. Sixty days after the automated report is provided, the data will be posted to the publicly accessible website Intellus (<http://www.intellusnm.com>).

3. If a new contaminant is detected in a County production well, EM-LA and N3B will (1) work with County Water Utilities to evaluate the data and (2) review the need to modify the SAP and/or to collect additional samples to address questions raised by the potential contaminant as deemed necessary.

The enclosed 2022 SAP is consistent with the previous SAP regarding requirements to sample for toxic pollutants under 20.6.2 New Mexico Administrative Code with the following exception: the previous two SAPs (2020 and 2021) included sampling for three per- and polyfluoroalkyl substances (PFAS) at all locations. No detections of these compounds were found during these two rounds of sampling. Therefore, PFAS sampling will be removed from this SAP.

Additionally, sampling for the individual analytes of molybdenum, chromium, nitrate-nitrite as nitrogen, and perchlorate will be included in the broader analyses of metals (molybdenum and chromium) and general inorganics (nitrate-nitrite as nitrogen and perchlorate).

Furthermore, based on a review of 10 years of data, polychlorinated biphenyls (PCBs) have been removed from this SAP. No detections of these compounds were found at any locations.

If you have any questions, please contact Steve Veenis at (505) 309-1362 (steve.veenis@em-la.doe.gov) or Cheryl Rodriguez at (505) 414-0450 (cheryl.rodriguez@em.doe.gov).

Sincerely,



Joseph Murdock
Program Manager
Environment, Safety and Health
N3B-Los Alamos

Sincerely,


M Lee Bishop

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Bishop
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M. Lee Bishop, Director
Office of Quality and Regulatory Compliance
U.S. Department of Energy
Environmental Management
Los Alamos Field Office

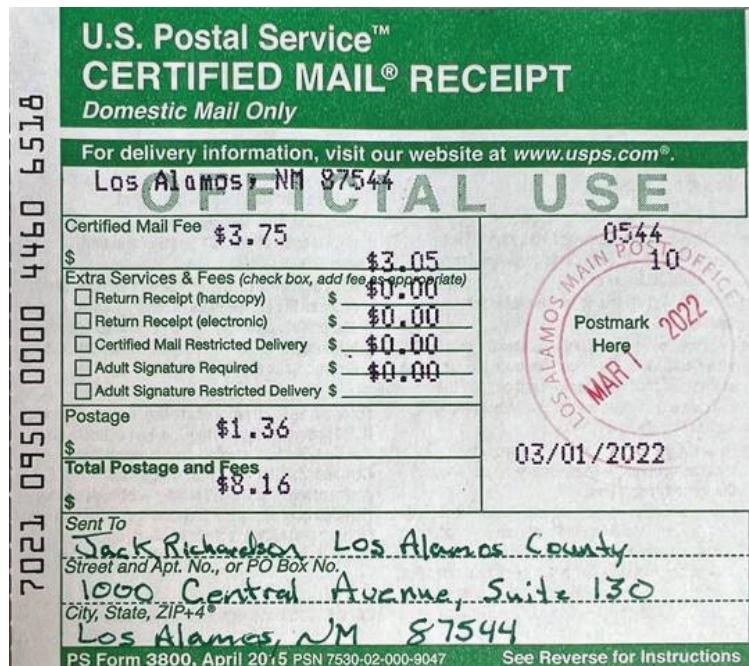
Enclosure(s):

1. Los Alamos National Laboratory Site-Wide Monitoring Program, Los Alamos County Water Supply Wells, 2022 Sampling and Analysis Plan (EM2022-0016)

cc (letter and enclosure[s] emailed):

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**LOS ALAMOS NATIONAL LABORATORY SITE-WIDE MONITORING PROGRAM,
LOS ALAMOS COUNTY WATER SUPPLY WELLS, 2022 SAMPLING AND ANALYSIS PLAN**

**Table 1
Sampling and Analysis Plan for Los Alamos County
Water Supply Wells for the Period of January 1, 2022, to December 31, 2022**

Location	Analytical Suites ^a						
	Metals	Organics			Radionuclides		Inorganics
	Metals	VOCs ^b	SVOCs ^c	HEXP ^d	Radionuclides	Low-Level Tritium	General Inorganics
G-2A	Q2	Q2	Q2	Q2	Q2	Q2	Q2
G-3A	Q2	Q2	Q2	Q2	Q2	Q2	Q2
G-4A	Q2	Q2	Q2	Q2	Q2	Q2	Q2
G-5A	Q2	Q2	Q2	Q2	Q2	Q2	Q2
O-1	Q2, Q4	Q2	Q2	Q2	Q2	Q2	Q2, Q4
O-4	Q2, Q4	Q2	Q2	Q2	Q2	Q2	Q2, Q4
PM-1	Q2, Q4	Q2	Q2	Q2, Q4	Q2	Q2, Q4	Q2, Q4
PM-2	Q2, Q4	Q2	Q2	Q2, Q4	Q2	Q2, Q4	Q2, Q4
PM-3	Q1, Q2, Q3, Q4	Q2	Q2	Q2	Q2	Q2, Q4	Q1, Q2, Q3, Q4
PM-4	Q2, Q4	Q2	Q2	Q2, Q4	Q2	Q2, Q4	Q2, Q4
PM-5	Q2, Q4	Q2	Q2	Q2, Q4	Q2	Q2, Q4	Q2, Q4

Notes: Sampling schedule: Q1 = Jan–Mar 2022; Q2 = Apr–Jun 2022; Q3 = Jul–Sep 2022; Q4 = Oct–Dec 2022.

Quality control samples will be collected in accordance with Appendix D of the Interim Facility-Wide Groundwater Monitoring Plan for the associated monitoring year. Figure 1 shows locations of the Los Alamos County wells.

^a Table 2 of this sampling and analysis plan presents the analytical suites, sample field preparation, analytical methods, and analytes for the analytical suites specified in Table 1.

^b VOCs = Volatile organic compounds.

^c SVOCs = Semivolatile organic compounds.

^d HEXP = High explosives.

Table 2
Analytes, Field Preparation, and Analytical Methods
Used by EPA Contract Laboratory Program Laboratories for
Samples Collected under the SAP for Los Alamos County Water Supply Wells

Analytical Suite	Field Preparation	Analytical Method	Analytes
Metals ^a	Unfiltered	SW-846:6010	Aluminum
		SW-846:7470 series	Mercury
		SW-846:6020	Selenium
	Filtered	SM:A2340	Hardness
		SW-846:6010	Aluminum, barium, beryllium, boron, calcium, cobalt, copper, iron, magnesium, manganese, potassium, silicon dioxide, sodium, strontium, tin, vanadium, zinc
		SW-846:6020	Antimony, arsenic, cadmium, chromium, lead, molybdenum, nickel, selenium, silver, thallium, uranium
		SW-846:7470 series	Mercury
	Unfiltered	SW-846:7470 series	Mercury
VOCs ^a	Unfiltered	SW-846:8260 series	See Table 3
SVOCs ^b	Unfiltered	SW-846:8270 series	See Table 3, includes prometon (pesticide) and sulfolane (solvent)
HEXP ^c	Unfiltered	SW-846:8330 series	See Table 3
Radionuclides	Unfiltered	EPA:900	Gross alpha, gross beta
		EPA:901.1	Cesium-137, cobalt-60, neptunium-237, potassium-40, sodium-22
		EPA:905.0	Strontium-90
		HASL-300:AM-241	Americium-241
		HASL-300:ISOPU	Plutonium-238, plutonium-239/240
		HASL-300:ISOU	Uranium-234, uranium-235/236, uranium-238
		EPA:903.1	Radium-226
		EPA:904	Radium-228
Low-level tritium	Unfiltered	Generic: radium by calculation	Radium-226+228
		Generic: Low-Level Tritium	Tritium

Table 2 (continued)

Analytical Suite	Field Preparation	Analytical Method	Analytes
General inorganics	Filtered	EPA:120.1	Specific conductance
		EPA:150.1	Acidity or alkalinity of a solution
		EPA:160.1	Total dissolved solids
		EPA:300.0	Bromide, chloride, fluoride, sulfate
		EPA:310.1	Alkalinity-CO ₃ , alkalinity-CO ₃ +HCO ₃
		SW-846:6850	Perchlorate
	Filtered	EPA:350.1	Ammonia as nitrogen
		EPA:353.2	Nitrate-nitrite as nitrogen
		EPA:365.4	Total phosphate as phosphorus
	Unfiltered	EPA:351.2	Total Kjeldahl nitrogen
		SW-846:9060	Total organic carbon
		EPA:335.4	Cyanide (Total)

^a VOCs = Volatile organic compounds.^b SVOCs = Semivolatile organic compounds.^c HEXP = High explosives.

Table 3
Analytical Methods Used by Contract Laboratories for
Samples Collected under the SAP for Los Alamos County Water Supply Wells

Symbol or CAS ^a No.	Analyte
Analytical Suite: VOCs^b	
Analytical Method: SW-846:8260	
67-64-1	Acetone
75-05-8	Acetonitrile
107-02-8	Acrolein
107-13-1	Acrylonitrile
71-43-2	Benzene
108-86-1	Bromobenzene
74-97-5	Bromochloromethane
75-27-4	Bromodichloromethane
75-25-2	Bromoform
74-83-9	Bromomethane
71-36-3	Butanol[1-]
78-93-3	Butanone[2-]
104-51-8	Butylbenzene[n-]
135-98-8	Butylbenzene[sec-]
98-06-6	Butylbenzene[tert-]
75-15-0	Carbon Disulfide
56-23-5	Carbon Tetrachloride

Table 3 (continued)

Symbol or CAS ^a No.	Analyte
126-99-8	Chloro-1,3-butadiene[2-]
107-05-1	Chloro-1-propene[3-]
108-90-7	Chlorobenzene
124-48-1	Chlorodibromomethane
75-00-3	Chloroethane
67-66-3	Chloroform
74-87-3	Chloromethane
95-49-8	Chlorotoluene[2-]
106-43-4	Chlorotoluene[4-]
96-12-8	Dibromo-3-Chloropropane[1,2-]
106-93-4	Dibromoethane[1,2-]
74-95-3	Dibromomethane
95-50-1	Dichlorobenzene[1,2-]
541-73-1	Dichlorobenzene[1,3-]
106-46-7	Dichlorobenzene[1,4-]
75-71-8	Dichlorodifluoromethane
75-34-3	Dichloroethane[1,1-]
107-06-2	Dichloroethane[1,2-]
75-35-4	Dichloroethene[1,1-]
540-59-0	Dichloroethene[cis/trans-1,2-]
156-59-2	Dichloroethene[cis-1,2-]
156-60-5	Dichloroethene[trans-1,2-]
78-87-5	Dichloropropane[1,2-]
142-28-9	Dichloropropane[1,3-]
594-20-7	Dichloropropane[2,2-]
563-58-6	Dichloropropene[1,1-]
10061-01-5	Dichloropropene[cis-1,3-]
10061-02-6	Dichloropropene[trans-1,3-]
60-29-7	Diethyl Ether
123-91-1	Dioxane[1,4-]
97-63-2	Ethyl Methacrylate
100-41-4	Ethylbenzene
87-68-3	Hexachlorobutadiene
591-78-6	Hexanone[2-]
74-88-4	Iodomethane
78-83-1	Isobutyl alcohol
98-82-8	Isopropylbenzene
99-87-6	Isopropyltoluene[4-]
126-98-7	Methacrylonitrile

Table 3 (continued)

Symbol or CAS ^a No.	Analyte
80-62-6	Methyl Methacrylate
1634-04-4	Methyl tert-Butyl Ether
108-10-1	Methyl-2-pentanone[4-]
75-09-2	Methylene Chloride
91-20-3	Naphthalene
107-12-0	Propionitrile
103-65-1	Propylbenzene[1-]
100-42-5	Styrene
630-20-6	Tetrachloroethane[1,1,1,2-]
79-34-5	Tetrachloroethane[1,1,2,2-]
127-18-4	Tetrachloroethene
108-88-3	Toluene
76-13-1	Trichloro-1,2,2-trifluoroethane[1,1,2-]
87-61-6	Trichlorobenzene[1,2,3-]
120-82-1	Trichlorobenzene[1,2,4-]
71-55-6	Trichloroethane[1,1,1-]
79-00-5	Trichloroethane[1,1,2-]
79-01-6	Trichloroethene
75-69-4	Trichlorofluoromethane
96-18-4	Trichloropropane[1,2,3-]
95-63-6	Trimethylbenzene[1,2,4-]
108-67-8	Trimethylbenzene[1,3,5-]
108-05-4	Vinyl acetate
75-01-4	Vinyl Chloride
95-47-6	Xylene[1,2-]
Xylene[m+p]	Xylene[1,3-]+Xylene[1,4-]

Analytical Suite: SVOCs^c**Analytical Method: SW-846:8270**

83-32-9	Acenaphthene
208-96-8	Acenaphthylene
62-53-3	Aniline
120-12-7	Anthracene
1912-24-9	Atrazine
92-87-5	Benzidine
56-55-3	Benzo(a)anthracene
50-32-8	Benzo(a)pyrene
205-99-2	Benzo(b)fluoranthene
191-24-2	Benzo(g,h,i)perylene
207-08-9	Benzo(k)fluoranthene

Table 3 (continued)

Symbol or CAS ^a No.	Analyte
65-85-0	Benzoic Acid
100-51-6	Benzyl Alcohol
111-91-1	Bis(2-chloroethoxy)methane
111-44-4	Bis(2-chloroethyl)ether
117-81-7	Bis(2-ethylhexyl)phthalate
101-55-3	Bromophenyl-phenylether[4-]
85-68-7	Butylbenzylphthalate
59-50-7	Chloro-3-methylphenol[4-]
106-47-8	Chloroaniline[4-]
91-58-7	Chloronaphthalene[2-]
95-57-8	Chlorophenol[2-]
7005-72-3	Chlorophenyl-phenyl[4-] Ether
218-01-9	Chrysene
53-70-3	Dibenz(a,h)anthracene
132-64-9	Dibenzofuran
95-50-1	Dichlorobenzene[1,2-]
541-73-1	Dichlorobenzene[1,3-]
106-46-7	Dichlorobenzene[1,4-]
91-94-1	Dichlorobenzidine[3,3'-]
120-83-2	Dichlorophenol[2,4-]
84-66-2	Diethylphthalate
131-11-3	Dimethyl Phthalate
105-67-9	Dimethylphenol[2,4-]
84-74-2	Di-n-butylphthalate
534-52-1	Dinitro-2-methylphenol[4,6-]
51-28-5	Dinitrophenol[2,4-]
121-14-2	Dinitrotoluene[2,4-]
606-20-2	Dinitrotoluene[2,6-]
117-84-0	Di-n-octylphthalate
88-85-7	Dinoseb
123-91-1	Dioxane[1,4-]
122-66-7	Diphenylhydrazine[1,2]
122-39-4	Diphenylamine
206-44-0	Fluoranthene
86-73-7	Fluorene
118-74-1	Hexachlorobenzene
87-68-3	Hexachlorobutadiene
77-47-4	Hexachlorocyclopentadiene
67-72-1	Hexachloroethane

Table 3 (continued)

Symbol or CAS ^a No.	Analyte
193-39-5	Indeno(1,2,3-cd)pyrene
78-59-1	Isophorone
90-12-0	Methylnaphthalene[1-]
91-57-6	Methylnaphthalene[2-]
95-48-7	Methylphenol[2-]
65794-96-9	Methylphenol[3-,4-]
91-20-3	Naphthalene
88-74-4	Nitroaniline[2-]
99-09-2	Nitroaniline[3-]
100-01-6	Nitroaniline[4-]
98-95-3	Nitrobenzene
88-75-5	Nitrophenol[2-]
100-02-7	Nitrophenol[4-]
55-18-5	Nitrosodiethylamine[N-]
62-75-9	Nitrosodimethylamine[N-]
924-16-3	Nitroso-di-n-butylamine[N-]
621-64-7	Nitroso-di-n-propylamine[N-]
930-55-2	Nitrosopyrrolidine[N-]
108-60-1	Oxybis(1-chloropropane)[2,2'-]
608-93-5	Pentachlorobenzene
87-86-5	Pentachlorophenol
85-01-8	Phenanthrene
108-95-2	Phenol
1610-18-0	Prometon
129-00-0	Pyrene
110-86-1	Pyridine
126-33-0	Sulfolane
95-94-3	Tetrachlorobenzene[1,2,4,5]
58-90-2	Tetrachlorophenol[2,3,4,6-]
120-82-1	Trichlorobenzene[1,2,4-]
95-95-4	Trichlorophenol[2,4,5-]
88-06-2	Trichlorophenol[2,4,6-]
Analytical Suite: HEXP^d	
Analytical Method: SW-846:8330	
6629-29-4	2,4-Diamino-6-nitrotoluene
59229-75-3	2,6-Diamino-4-nitrotoluene
618-87-1	3,5-Dinitroaniline
19406-51-0	Amino-2,6-dinitrotoluene[4-]
35572-78-2	Amino-4,6-dinitrotoluene[2-]

Table 3 (continued)

Symbol or CAS ^a No.	Analyte
99-65-0	Dinitrobenzene[1,3-]
121-14-2	Dinitrotoluene[2,4-]
606-20-2	Dinitrotoluene[2,6-]
2691-41-0	HMX ^e
98-95-3	Nitrobenzene
88-72-2	Nitrotoluene[2-]
99-08-1	Nitrotoluene[3-]
99-99-0	Nitrotoluene[4-]
78-11-5	PETN ^f
121-82-4	RDX ^g
3058-38-6	TATB ^h
479-45-8	Tetryl
99-35-4	Trinitrobenzene[1,3,5-]
118-96-7	Trinitrotoluene[2,4,6-]
78-30-8	Tris (o-cresyl) phosphate

Note: Table 3 is referenced in Table 2 and serves to complete the analyte lists in Table 2.

^a CAS = Chemical Abstracts Service.

^b VOCs = Volatile organic compounds.

^c SVOCs = Semivolatile organic compounds.

^d HEXP = High explosives.

^e HMX = Her Majesty's Explosive.

^f PETN = Pentaerythritol tetranitrate.

^g RDX = Royal Demolition Explosive.

^h TATB = Triaminotnitrobenzene.

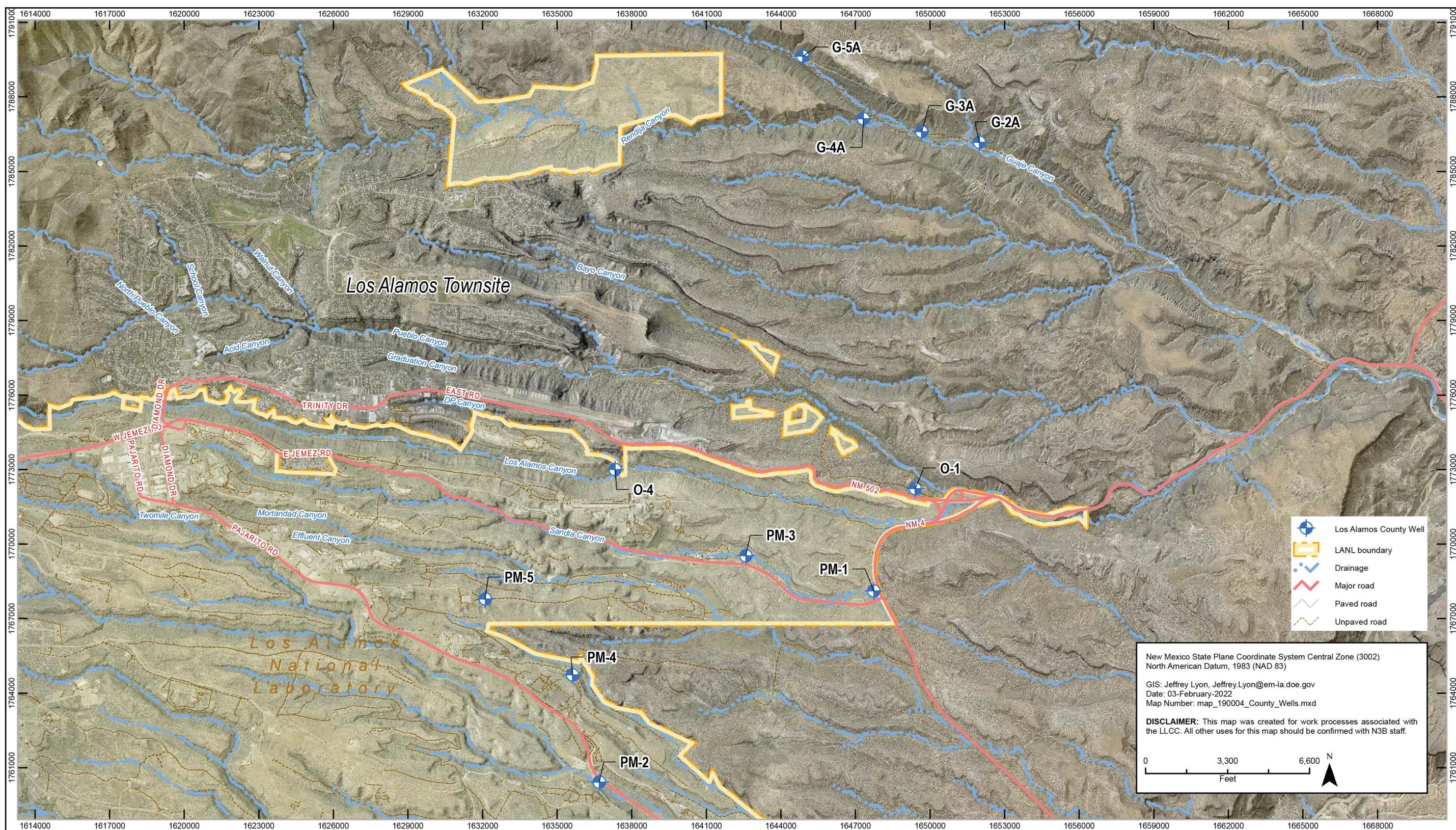


Figure 1 Locations of Los Alamos County wells

