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APR 30 2019

Date: APR 30 2019
Refer To: N3B-19-0113

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 Sitewide Monitoring Program, Los Alamos County Water Supply Wells, 2019–2020 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 Sitewide 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 attached 2019–2020 SAP represents the sampling and analysis commitment for the next four quarters (April 1, 2019, to March 31, 2020). The sampling suites and methods in this SAP are the same as those used for 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 data collected from County water supply wells.

1. N3B will provide an automated report of the data upon receipt from the analytical laboratory. Sixty days after the automated report is provided to the County, the data will be posted to the publicly accessible website, Intellus (<http://www.intellusnm.com>).
2. If a new contaminant is detected in a County production well, N3B will work with Los Alamos County Water Utilities to evaluate the data and 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 attached 2019–2020 SAP is consistent with the previous SAP, with the exceptions of the following updates to Tables 1 and 2:

1. Per- and polyfluoroalkyl substances (PFAS) analyses have been added to Table 1 for Quarter 3 to reflect requirements for new toxic pollutants under 20.6.2 New Mexico Administrative Code (NMAC). PFAS sampling comprises perfluorooctanoic acid, perfluorooctane sulfate, and perfluorohexane sulfonic acid.
2. Table 2 has been revised to include the following information for PFAS analysis: analytical suite, analytical group, field preparation, analytical method, and analytes.
3. Sulfolane and prometon sampling is included in Table 3 as part of the semivolatile organic compound analytical suite (subject to change based on analytical laboratory contracts). Sampling for these analytes will occur at the water supply wells to reflect requirements for new toxic pollutants under 20.6.2 NMAC.

N3B will continue to follow the historical practice of providing the County with a 60-day review period before water supply well data are released to the public or posted to the publicly accessible website, Intellus (<http://www.intellusnm.com>).

If you have any questions, please contact Steve Veenis at (505) 309-1362 (steve.veenis@em-la.doe.gov) or David Rhodes at (505) 665-5325 (david.rhodes@em.doe.gov).

Sincerely,



Frazer Lockhart
Program Manager
Regulatory and Stakeholder Interface
N3B-Los Alamos

Sincerely,



David S. Rhodes, Director
Office of Quality and Regulatory Compliance
Environmental Management
Los Alamos Field Office

Enclosure(s): Los Alamos National Laboratory Sitewide Monitoring Program, Los Alamos County Water Supply Wells, 2019–2020 Sampling and Analysis Plan (EM2019-0144)

Cy: (letter and enclosure[s] emailed)
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Los Alamos National Laboratory Sitewide Monitoring Program, Los Alamos County Water Supply Wells, 2019–2020 Sampling and Analysis Plan

Table 1
Sampling and Analysis Plan for Los Alamos County
Water Supply Wells for the Period of April 1, 2019, to March 31, 2020

Location	Analytical Suites ^a													
	Metals			Organics					Radionuclides		Inorganics			
	Metals	Molybdenum	Chromium	VOCs ^b	SVOCs ^c	PCBs ^d	HEXP ^e	TPH-DRO ^f	Radionuclides	Low-Level Tritium	General Inorganics	Nitrate+nitrite	Perchlorate	PFAS ^g
G-2A	Q3	— ^h	—	Q3	Q3	Q3	Q3	—	Q3	Q3	Q3	—	—	Q3
G-3A	Q3	—	—	Q3	Q3	Q3	Q3	—	Q3	Q3	Q3	—	—	Q3
G-4A	Q3	—	—	Q3	Q3	Q3	Q3	—	Q3	Q3	Q3	—	—	Q3
G-5A	Q3	—	—	Q3	Q3	Q3	Q3	—	Q3	Q3	Q3	—	—	Q3
O-1	Q3	—	—	Q3	Q3	Q3	Q3	—	Q3	Q3, Q1	Q3	—	Q1	Q3
O-4	Q3	Q4, Q1, Q2	—	Q3	Q3	Q3	Q3	Q3, Q1	Q3	Q3, Q4, Q1, Q2	Q3, Q1	—	—	Q3
PM-1	Q3	—	Q4, Q1, Q2	Q3	Q3	Q3	Q3	—	Q3	Q3, Q1	Q3, Q1	—	—	Q3
PM-2	Q3	—	—	Q3, Q4, Q1, Q2	Q3	Q3	Q3, Q1	—	Q3	Q3, Q1	Q3	—	—	Q3
PM-3	Q3	—	Q4, Q1, Q2	Q3	Q3	Q3	Q3	—	Q3	Q3, Q1	Q3, Q1	—	—	Q3
PM-4	Q3	—	Q4, Q1, Q2	Q3	Q3	Q3	Q3, Q1	—	Q3	Q3, Q4, Q1, Q2	Q3, Q1	Q4, Q2	—	Q3
PM-5	Q3	—	Q4, Q1, Q2	Q3	Q3	Q3	Q3, Q1	—	Q3	Q3, Q4, Q1, Q2	Q3, Q1	Q4, Q2	—	Q3

Notes: Sampling schedule: Quarter 3 (Q3) = Apr–Jun 2019; Q4 = Jul–Sep 2019; Q1 = Oct–Dec 2019; Q2 = Jan–Mar 2020. Quality control samples will be collected in accordance with Appendix D of the Interim Facility-Wide Groundwater Monitoring Plan for the associated monitoring year.

^a Table 2 of this sampling and analysis plan presents the analytical groups, 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 PCBs = Polychlorinated biphenyls.

^e HEXP = High explosives.

^f TPH-DRO = Total petroleum hydrocarbons–diesel range organics.

^g PFAS = Per- and polyfluoroalkyl substances. PFAS sampling comprises perfluorooctanoic acid, perfluorooctane sulfate, and perfluorohexane sulfonic acid.

^h This analytical suite is not scheduled to be collected for this location.

Table 2
Analytes, Field Preparation, and Analytical Methods Used by the
U.S. Environmental Protection Agency Contract Laboratory Program Laboratories for
Samples Collected under the Sampling and Analysis Plan for Los Alamos County Water Supply Wells

Analytical Suite	Analytical Group	Field Preparation	Analytical Method	Analytes	
Metals	WSP-All Metals	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	
	EPA:245.2	Mercury			
	MSGP-Hg	Unfiltered	EPA:245.2	Mercury	
VOCs ^a	WSP-8260B-VOA	Unfiltered	SW-846:8260	See Table 3	
SVOCs ^b	WSP-8270C-SVOA	Unfiltered	SW-846:8270	See Table 3	
PCBs ^c	WSP-8082-PCB	Unfiltered	SW-846:8082	See Table 3	
HEXP ^d	WSP-8330B-NMED HEXP	Unfiltered	SW-846:8330B	See Table 3	
TPH-DRO ^e	WSP-DRO	Unfiltered	SW-846:8015M-Extractable	Total petroleum hydrocarbons	
Radionuclides	WSP-GrossA/B	Unfiltered	EPA:900	Gross alpha, gross beta	
	WSP-RAD	Unfiltered	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
	Ra226+228	Unfiltered	EPA:903.1	Radium-226	
EPA:904			Radium-228		
Low-Level Tritium	WSP-LL-H-3	Unfiltered	Generic:Low Level Tritium	Tritium	
General Inorganics	WSP-GENINORG+ Perchlorate	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	
	WSP-GENINORG+ Perchlorate	Filtered	EPA:310.1	Alkalinity-CO ₃ , alkalinity-CO ₃ +HCO ₃	
			SW-846:6010	Silicon dioxide	
			SW-846:6850	Perchlorate	

Table 2 (continued)

Analytical Suite	Analytical Group	Field Preparation	Analytical Method	Analytes
General Inorganics (cont.)	WSP-NH3+NO3/NO2+PO4	Filtered	EPA:350.1	Ammonia as nitrogen
			EPA:353.2	Nitrate-nitrite as nitrogen
			EPA:365.4	Total phosphate as phosphorus
	WSP-TKN+TOC	Unfiltered	EPA:351.2	Total Kjeldahl nitrogen
	WSP-TKN+TOC	Unfiltered	SW-846:9060	Total organic carbon
WSP-CN(T)	Unfiltered	EPA:335.4	Cyanide (Total)	
PFAS ^f	PFAS subset	Unfiltered	EPA 537.1 Modified ^g	Perfluorooctanoic acid.
	PFAS subset	Unfiltered	EPA 537.1 Modified ^g	Perfluorooctane sulfate
	PFAS subset	Unfiltered	EPA 537.1 Modified ^g	Perfluorohexane sulfonic acid

^a VOCs = Volatile organic compounds.

^b SVOCs = Semivolatile organic compounds.

^c PCBs = Polychlorinated biphenyls.

^d HEXP = High explosives.

^e TPH-DRO = Total petroleum hydrocarbons–diesel range organics.

^f PFAS = Per- and polyfluoroalkyl substances.

^g Will be determined when contract with analytical laboratory has been established.

Table 3
Analytical Methods Used by
Contract Laboratories for Samples Collected under
the Sampling and Analysis Plan for Los Alamos County Water Supply Wells

Symbol or CAS ^a No.	Analyte
Analytical Suite: VOCs^b	
Analytical Group: WSP-8260B-VOA	
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-]

Table 3 (continued)

Symbol or CAS No.	Analyte
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
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

Table 3 (continued)

Symbol or CAS No.	Analyte
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
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-]

Table 3 (continued)

Symbol or CAS No.	Analyte
Analytical Suite: SVOCs^c	
Analytical Group: WSP-8270C-SVOA	
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
103-33-3	Azobenzene
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
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-]

Table 3 (continued)

Symbol or CAS No.	Analyte
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-]
122-39-4	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
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-]
106-44-5	Methylphenol[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-]
86-30-6	Nitrosodiphenylamine[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
129-00-0	Pyrene
110-86-1	Pyridine

Table 3 (continued)

Symbol or CAS No.	Analyte
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-]
TBD ^d	Prometon
TBD	Sulfolane (tholane 1,1-dioxide)
Analytical Suite: PCBs^e	
Analytical Group: WSP-8082-PCB	
Analytical Method: SW-846:8082	
12674-11-2	Aroclor-1016
11104-28-2	Aroclor-1221
11141-16-5	Aroclor-1232
53469-21-9	Aroclor-1242
12672-29-6	Aroclor-1248
11097-69-1	Aroclor-1254
11096-82-5	Aroclor-1260
37324-23-5	Aroclor-1262
Analytical Suite: HEXP^f	
Analytical Group: WSP-8330B-NMED HEXP	
Analytical Method: SW-846:8330B	
6629-29-4	Diamino-6-nitrotoluene[2,4-]
59229-75-3	Diamino-4-nitrotoluene[2,6-]
618-87-1	Dinitroaniline[3,5-]
19406-51-0	Amino-2,6-dinitrotoluene[4-]
35572-78-2	Amino-4,6-dinitrotoluene[2-]
99-65-0	Dinitrobenzene[1,3-]
121-14-2	Dinitrotoluene[2,4-]
606-20-2	Dinitrotoluene[2,6-]
2691-41-0	HMX ^g
98-95-3	Nitrobenzene
88-72-2	Nitrotoluene[2-]
99-08-1	Nitrotoluene[3-]
99-99-0	Nitrotoluene[4-]
78-11-5	PETN ^h
121-82-4	RDX ⁱ

Table 3 (continued)

Symbol or CAS No.	Analyte
3058-38-6	TATB ^j
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 To be determined (TBD) pending laboratory contracts; and subject to change.

^e PCB = Polychlorinated biphenyl.

^f HEXP = High explosives.

^g HMX = Her Majesty's Explosive.

^h PETN = Pentaerythritol tetranitrate.

ⁱ RDX = Royal Demolition Explosive.

^j TATB = Triaminotrinitrobenzene.