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Environmental Management
 Los Alamos Field Office
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Date: April 30, 2020
Refer To: N3B-2020-0145

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, 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 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 attached 2020 SAP represents the sampling and analysis commitment for the next three quarters of the County sampling calendar (April 1, 2020, to December 31, 2020). 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, R0) 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 work with 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 2020 SAP is consistent with the previous SAP (N3B-19-0113) regarding requirements to sample for new toxic pollutants under 20.6.2 New Mexico Administrative Code. Because laboratories were not set up to sample the new toxic pollutants listed below in the 2019–2020 SAP, sampling for these analytes will be completed as a part of this SAP.

1. Per- and polyfluoroalkyl substances (PFAS) sampling will be conducted for perfluorooctanoic acid, perfluorooctane sulfate, and perfluorohexane sulfonic acid.
2. Additional sampling for 1,4-dioxane and nitrosamines will be completed using low-level methods.
3. Table 2 of the attachment has been revised to include the following information for PFAS analysis: analytical suite, analytical group, field preparation, analytical method, and analytes.
4. Sulfolane and prometon sampling is included in Table 3 of the attachment as part of the semivolatile organic compound analytical suite (subject to change based on analytical laboratory contracts).

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,



Elizabeth Lowes
Program Manager
Environmental, Safety and Health
N3B-Los Alamos

Sincerely,



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

Enclosure(s): Los Alamos National Laboratory Site-Wide Monitoring Program, Los Alamos
County Water-Supply Wells, 2020 Sampling and Analysis Plan (EM2020-0101)

cc (letter and enclosure[s] emailed):

Laurie King, EPA Region 6, Dallas, TX
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Pamela T. Maestas

From: Pamela T. Maestas
Sent: Thursday, April 30, 2020 4:51 PM
To: jack.richardson@lacnm.us
Cc: 'Burgess, Harry'; jennifer.baca@lacnm.us; Ashley Kowalewski; cheryl.rodriguez@em.doe.gov; Regulatory Documentation; Emily M. Day
Subject: Submittal of LANL Sitewide Monitoring Program, LAC Water Supply Wells, 2020 SAP
Attachments: N3B-2020-0145_2020_LAC_SAP_043020.pdf

Mr. Richardson,

Attached for submittal is a pdf of the following:

- Los Alamos National Laboratory Site-Wide Monitoring Program, Los Alamos County Water-Supply Wells, 2020 Sampling and Analysis Plan (letter and enclosure)

Please acknowledge receipt of this submittal by responding to this email.

Let me know if you have any questions.

Thank you.

Pamela T. Maestas

Regulatory Documentation Manager

Newport News Nuclear BWXT-Los Alamos, LLC

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**LOS ALAMOS NATIONAL LABORATORY SITE-WIDE MONITORING PROGRAM,
LOS ALAMOS COUNTY WATER-SUPPLY WELLS, 2020 SAMPLING AND ANALYSIS PLAN**

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

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

Notes: Sampling schedule: Quarter 2 (Q2) = Apr–Jun 2020; Q3 = Jul–Sep 2020; Q4 = Oct–Dec 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 suites, sample field preparation, analytical methods, and analytes for the analytical suites specified in Table 1.

^b VOC = Volatile organic compounds; SVOC = semivolatile organic compounds; PCB = polychlorinated biphenyls; HEXP = high explosives; TPH-DRO = total petroleum hydrocarbons–diesel range organics.

^c PFAS = Perfluorohexane sulfonic acid (PFHxS), perfluorooctane sulfate (PFOS), and perfluorooctanoic acid (PFOA).

^d — = This analytical suite is not scheduled to be collected for this location.

Table 2
Analytes, Field Preparation, and Analytical Methods Used by
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*	Field Preparation	Analytical Method	Analytes
Metals	Unfiltered	SW-846:7470 series	Mercury
		SW-846:6020 series	Aluminum, selenium
	Filtered	SM:A2340	Hardness
		SW-846:6010 series	Barium, beryllium, boron, calcium, iron, magnesium, manganese, potassium, silicon dioxide, sodium, strontium, tin, vanadium, zinc
		SW-846:6020 series	Aluminum, antimony, arsenic, cadmium, chromium, cobalt, copper, lead, molybdenum, nickel, selenium, silver, thallium, uranium
SW-846:7470 series	Mercury		
VOCs	Unfiltered	SW-846:8260 series	See Table 3
SVOCs	Unfiltered	SW-846:8270 series	See Table 3, includes prometon (pesticide) and sulfolane (solvent)
Low-level 1,4-dioxane	Unfiltered	SW-846-8270E-SIM	1,4-dioxane
Low-level nitrosamines	Unfiltered	Proprietary HRGC/MS	Nitrosodiethylamine[N-], Nitrosodimethylamine[N-], Nitroso-di-n-butylamine[N-], Nitroso-di-n-propylamine[N-], Nitrosopyrrolidine[N-]
PCBs	Unfiltered	SW-846:8082 series	See Table 3
HEXP	Unfiltered	SW-846:8260 series	See Table 3
TPH-DRO	Unfiltered	SW-846:8015_TPH_DRO	Total petroleum hydrocarbons
PFAS	Unfiltered	EPA 537.1 Modified	Perfluorohexane sulfonic acid (PFHxS), perfluorooctane sulfate (PFOS), perfluorooctanoic acid (PFOA)
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
		Generic:radium by calculation	Radium-226+228
Low-level tritium	Unfiltered	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 series	Perchlorate
		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
		SW-846:9012 series	Cyanide (Total)

* VOCs = Volatile organic compounds; SVOCs = semivolatile organic compounds; PCBs = polychlorinated biphenyls; HEXP = high explosives; TPH-DRO = total petroleum hydrocarbons–diesel range organics; PFAS = per- and polyfluoroalkyl substances.

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 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

Table 3 (continued)

Symbol or CAS ^a No.	Analyte
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
591-78-6	Hexanone[2-]
74-88-4	Iodomethane
78-83-1	Isobutyl Alcohol
98-82-8	Isopropylbenzene
99-87-6	Isopropyltoluene[4-]

Table 3 (continued)

Symbol or CAS ^a No.	Analyte
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-]
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

Table 3 (continued)

Symbol or CAS ^a No.	Analyte
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-]
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

Table 3 (continued)

Symbol or CAS ^a No.	Analyte
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-]
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: PCBs^d	
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

Table 3 (continued)

Symbol or CAS ^a No.	Analyte
12672-29-6	Aroclor-1248
11097-69-1	Aroclor-1254
11096-82-5	Aroclor-1260
37324-23-5	Aroclor-1262
Analytical Suite: HEXP^e	
Analytical Method: SW-846:8330B	
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-]
99-65-0	Dinitrobenzene[1,3-]
121-14-2	Dinitrotoluene[2,4-]
606-20-2	Dinitrotoluene[2,6-]
2691-41-0	HMX ^f
98-95-3	Nitrobenzene
88-72-2	Nitrotoluene[2-]
99-08-1	Nitrotoluene[3-]
99-99-0	Nitrotoluene[4-]
78-11-5	PETN ^g
121-82-4	RDX ^h
3058-38-6	TATB ⁱ
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 PCB = Polychlorinated biphenyl.

^e HEXP = High explosives.

^f HMX = Her Majesty's Explosive.

^g PETN = Pentaerythritol tetranitrate.

^h RDX = Royal Demolition Explosive.

ⁱ TATB = Triaminotrinitrobenzene.