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*Date:* April 30, 2020  
*Refer To:* N3B-2020-0146

Rick Carpenter, Water Division Director  
 Sangre de Cristo Water Division  
 City of Santa Fe  
 801 West San Mateo Road  
 Santa Fe, New Mexico 87505

**Subject: Los Alamos National Laboratory Site-Wide Monitoring Program, City of Santa Fe Buckman Water Supply Wells, 2020 Sampling and Analysis Plan**

Dear Mr. Carpenter:

The City of Santa Fe Buckman water supply wells have been sampled since 2001 for both general characterization and specific constituents of interest under Los Alamos National Laboratory's Site-Wide Monitoring Program. These wells include Buckman 1, Buckman 6, Buckman 8, SF-3A, and SF-4A.

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 City of Santa Fe 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 period from April 1, 2020, to December 31, 2020. Sampling for this period will begin in June 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 Buckman 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 City of Santa Fe, the data will be posted to the publicly accessible website, Intellus (<http://www.intellusnm.com>).

2. If a potential contaminant is detected in a Buckman production well, N3B will work with the City of Santa Fe Sangre de Cristo Water Division 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 regarding requirements to sample for new toxic pollutants under 20.6.2 New Mexico Administrative Code (NMAC). 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. Sampling for per- and polyfluoroalkyl substances (PFAS) will be conducted for perfluorooctanoic acid, perfluorooctane sulfate, and perfluorohexane sulfonic acid;
2. Additional sampling using low-level methods for 1,4 dioxane and nitrosamines will be used.
3. Table 2 of the SAP 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 SAP as part of the semivolatiles 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.

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, City of Santa Fe  
Buckman Water Supply Wells, 2020 Sampling and Analysis Plan (EM2020-0100)

cc (letter and enclosure[s] emailed):

Laurie King, EPA Region 6, Dallas, TX  
Chris Catechis, NMED-DOE-OB  
Steve Yanicak, NMED-DOE-OB  
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**Pamela T. Maestas**

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**From:** Pamela T. Maestas  
**Sent:** Thursday, April 30, 2020 4:42 PM  
**To:** rrcarpenter@santafenm.gov  
**Cc:** PUGLISI, ALEX A.; arrand@santafenm.gov; whschneider@santafenm.gov; Ashley Kowalewski; cheryl.rodriquez@em.doe.gov; Regulatory Documentation; Emily M. Day  
**Subject:** Submittal of LANL Sitewide Monitoring Program, City of Santa Fe Buckman Water Supply Wells, 2020 SAP  
**Attachments:** N3B-2020-0146\_2020\_SF\_SAP\_043020.pdf

Mr. Carpenter,

Attached for submittal is a pdf of the following:

- Los Alamos National Laboratory Site-Wide Monitoring Program, City of Santa Fe Buckman 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**

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**LOS ALAMOS NATIONAL LABORATORY SITE-WIDE MONITORING PROGRAM,  
CITY OF SANTA FE BUCKMAN WATER SUPPLY WELLS, 2020 SAMPLING AND ANALYSIS PLAN**

**Table 1  
Sampling and Analysis Plan for the City of Santa Fe  
Buckman Water Supply Wells for the Period of April 1, 2020, to December 31, 2020**

Location	Analytical Suites <sup>a</sup>													
	Metals		Organics <sup>b</sup>				Radionuclides		Inorganics			PFAS	1,4-dioxane	Nitrosamines
	Metals	Hexavalent Chromium	VOCs	SVOCs	PCBs	HEXP	Radionuclides	Low-Level Tritium	General Inorganics	Nitrate+nitrite	Perchlorate	PFAS <sup>c</sup>	Low-level 1,4-dioxane	Low-level nitrosamines
Buckman No. 1	Q2, Q4	Q4	Q4	Q4	Q4	Q4	Q2, Q4	Q2, Q4	Q2, Q4	— <sup>d</sup>	—	Q2	Q2	Q2
Buckman No. 6	Q2, Q4	Q4	Q4	Q4	Q4	Q4	Q2, Q4	Q2, Q4	Q2, Q4	—	—	Q2	Q2	Q2
Buckman No. 8	Q2, Q4	Q4	Q4	Q4	Q4	Q4	Q2, Q4	Q2, Q4	Q2, Q4	—	—	Q2	Q2	Q2
SF-3A	—	Q4	—	—	—	—	—	Q4	—	Q4	Q4	Q2	Q2	Q2
SF-4A	—	Q4	—	—	—	—	—	Q4	—	Q4	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.

<sup>a</sup> 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.

<sup>b</sup> VOC = Volatile organic compounds; SVOC = semivolatile organic compounds; PCBs = polychlorinated biphenyls; HEXP = high explosives; TPH-DRO = total petroleum hydrocarbons–diesel range organics.

<sup>c</sup> PFAS = Perfluorohexane sulfonic acid (PFHxS), perfluorooctane sulfate (PFOS), and perfluorooctanoic acid (PFOA).

<sup>d</sup> — = 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 the City of Santa Fe 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		
Hexavalent Chromium	Unfiltered	IC-ICPMS:Metals_Cr(VI)	Hexavalent Chromium
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
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 <sub>3</sub> , alkalinity-CO <sub>3</sub> +HCO <sub>3</sub>
		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; PFAS = per- and polyfluoroalkyl substances.

**Table 3**  
**Analytical Methods Used**  
**by Contract Laboratories for Samples Collected**  
**under the Sampling and Analysis Plan for the City of Santa Fe Water Supply Wells**

Symbol or CAS <sup>a</sup> No.	Analyte
<b>Analytical Suite: VOCs<sup>b</sup></b>	
<b>Analytical Method: SW-846:8260</b>	
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 <sup>a</sup> 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
80-62-6	Methyl Methacrylate



**Table 3 (continued)**

Symbol or CAS <sup>a</sup> No.	Analyte
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-]
<b>Analytical Suite: SVOCs<sup>c</sup></b>	
<b>Analytical Method: SW-846:8270</b>	
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
65-85-0	Benzoic Acid
100-51-6	Benzyl Alcohol

**Table 3 (continued)**

Symbol or CAS <sup>a</sup> No.	Analyte
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
193-39-5	Indeno(1,2,3-cd)pyrene
78-59-1	Isophorone
90-12-0	Methylnaphthalene[1-]

**Table 3 (continued)**

Symbol or CAS <sup>a</sup> No.	Analyte
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-]
<b>Analytical Suite: PCBs<sup>d</sup></b>	
<b>Analytical Method: SW-846:8082</b>	
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

**Table 3 (continued)**

Symbol or CAS <sup>a</sup> No.	Analyte
<b>Analytical Suite: HEXP<sup>e</sup></b>	
<b>Analytical Method: SW-846:8330B</b>	
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 <sup>f</sup>
98-95-3	Nitrobenzene
88-72-2	Nitrotoluene[2-]
99-08-1	Nitrotoluene[3-]
99-99-0	Nitrotoluene[4-]
78-11-5	PETN <sup>g</sup>
121-82-4	RDX <sup>h</sup>
3058-38-6	TATB <sup>i</sup>
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.

<sup>a</sup> CAS = Chemical Abstracts Service.

<sup>b</sup> VOCs = Volatile organic compounds.

<sup>c</sup> SVOCs = Semivolatile organic compounds.

<sup>d</sup> PCB = Polychlorinated biphenyl.

<sup>e</sup> HEXP = High explosives.

<sup>f</sup> HMX = Her Majesty's Explosive.

<sup>g</sup> PETN = Pentaerythritol tetranitrate.

<sup>h</sup> RDX = Royal Demolition Explosive.

<sup>i</sup> TATB = Triaminotrinitrobenzene.