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Date: **MAR 21 2018**
Symbol: EPC-DO: 18-090
LA-UR: 18-21767
Locates Action No.: U1601822

Ms. Michelle Hunter, Chief
Ground Water Quality Bureau
New Mexico Environment Department
Harold Runnels Building, Room N2261
1190 St. Francis Drive
P.O. Box 26110
Santa Fe, NM 87502

Subject: As-Built Specifications for CrEX-4 and Integrity Testing of Distribution Piping from CrEX-1, CrEX-2, CrEX-3, and CrEX-4 to CrIN-1, CrIN-2, CrIN-3, CrIN-4, CrIN-5, and CrIN-6, Discharge Permit DP-1835, Class V Underground Injection Control Wells

Dear Ms. Hunter:

In accordance with Condition No. 3 of Discharge Permit DP-1835, the U.S. Department of Energy and Los Alamos National Security, LLC (DOE/LANS) are submitting mechanical integrity test results to the New Mexico Environment Department (NMED) for the Chromium Pipeline and Infrastructure Project. This submittal includes the results for the remaining portions of the piping from CrEX-1, CrEX-2, CrEX-3, and CrEX-4 to the groundwater treatment system and the distribution piping connecting the groundwater system to underground injection wells CrIN-1, CrIN-2, CrIN-3, CrIN-4, CrIN-5, and CrIN-6. In addition, this submittal contains the as-built specifications for CrEX-4.

Integrity Testing of Distribution Piping

On October 14, 2016 DOE/LANS submitted a mechanical integrity test method to NMED for the Chromium Pipeline and Infrastructure Project (EPC-DO-16-299). NMED approved the test method on October 17, 2016. Results of integrity testing for different portions of the system have been submitted as follows:

- November 15, 2016 (EPC-DO: 16-345): Pipelines connecting extraction well CrEX-1 to the groundwater treatment system and the distribution piping from the groundwater treatment system to CrIN-4 and CrIN-5;
- August 28, 2017 (EPC-DO: 17-302): Pipelines connecting extraction wells CrEX-1, CrEX-2, and CrEX-3 to the groundwater treatment system and the distribution piping connecting the groundwater treatment system with injection wells CrIN-1, CrIN-2, CrIN-3, CrIN-4 and CrIN-5;
- November 22, 2017 (EPC-DO: 17-465): Remaining segments of pipelines connecting extraction wells CrEX-1, CrEX-2, and CrEX-3 to the groundwater treatment system and the distribution piping connecting the groundwater treatment system with injection wells CrIN-1, CrIN-2, CrIN-3, CrIN-4 and CrIN-5.

DOE/LANS has completed integrity testing of additional segments of piping in accordance with the NMED-approved test methods for the high-density polyethylene (HDPE) pipelines connecting extraction wells CrEX-1, CrEX-2, and CrEX-3 to the groundwater treatment system and for the distribution piping connecting the groundwater treatment system with injection wells CrIN-1, CrIN-2, CrIN-3, CrIN-4, CrIN-5, and CrIN-6 which were not included in any previous submittal. Enclosure 1 provides a cross-reference of the integrity testing completed to date. Enclosure 2 contains the inspection reports (on CD) of these tests. All test results demonstrated satisfactory pipe integrity per the specified test method.

As-Built Specifications for Extraction Well CrEX-4

Four extraction wells have been constructed. Enclosure 3 contains the as-built specifications for extraction well CrEX-4. As-built specifications for all extraction and injection wells have been submitted as follows:

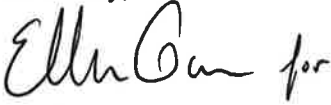
- CrEX-1 as-built specifications submitted in the April 9, 2015 Groundwater Discharge Permit Application (ENV-DO-15-0085) for DP-1835;
- CrEX-2 as-built specifications submitted on July 13, 2017 (EPC-DO: 17-265);
- CrEX-3 as-built specifications submitted on December 9, 2016 (EPC-DO: 16-358);
- CrIN-1, CrIN-2, CrIN-3, CrIN-4, and CrIN-5 as-built specifications/integrity testing submitted on December 9, 2016 (EPC-DO: 16-358);
- CrIN-6 as-built specifications/integrity testing submitted on November 22, 2017 (EPC-DO: 17-465).

Ms. Michelle Hunter
EPC-DO: 18-090

- 3 -

Please contact William J. Foley by telephone at (505) 665-8423 or by email at bfoley@lanl.gov if you have questions regarding this information.

Sincerely,



Benjamin B. Roberts
Division Leader

Sincerely,



Cheryl L. Rodriguez
Program Manager, FPD-II

WF:am

Enclosure(s):

- (1) Summary Table of Distribution Piping Integrity Test Results
- (2) Distribution Piping Integrity Test Results (CD) for Pipelines Connecting Extraction Wells With Injection Wells (available upon request)
- (3) As-Built Specifications for CrEX-4

Copy: Shelly Lemon, NMED/SWQB, Santa Fe, NM, (E-File)
John E. Kieling, NMED/HWB, Santa Fe, NM, (E-File)
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MAR 21 2018

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Dear Ms. Hunter:

In accordance with Condition No. 3 of Discharge Permit DP-1835, the U.S. Department of Energy and Los Alamos National Security, LLC (DOE/LANS) are submitting mechanical integrity test results to the New Mexico Environment Department (NMED) for the Chromium Pipeline and Infrastructure Project. This submittal includes the results for the remaining portions of the piping from CrEX-1, CrEX-2, CrEX-3, and CrEX-4 to the groundwater treatment system and the distribution piping connecting the groundwater system to underground injection wells CrIN-1, CrIN-2, CrIN-3, CrIN-4, CrIN-5, and CrIN-6. In addition, this submittal contains the as-built specifications for CrEX-4.

ENCLOSURE 1

Summary Table of Distribution Piping Integrity Test Results

EPC-DO: 18-090

LA-UR-18-21767

U1601822

Date: MAR 21 2018

ENCLOSURE 1

Summary Table of Distribution Piping Integrity Test Results

Report Number	Rev	Short Description
INP-103371-0250 Rev0	0	Torque Verification of 16 flange bolts in CrIN-6 vault
INP-103371-0250 Rev1	1	Torque Verification of 16 flange bolts in CrIN-6 vault
INP-103371-0255	0	visual weld inspection of 34 HDPE welded piping joints
INP-103371-0260	0	visual weld inspection of 9 HDPE welded piping joints
INP-103371-0273	0	visual weld inspection of 10 HDPE welded piping joints; pneumatic pressure test
INP-103371-0274	0	Pneumatic pressure testing of Low Point Leak Detection HDPE saddle tees
INP-103371-0275	0	hydrostatic pressure test of 2" HDPE pipe
INP-103371-0276	0	visual weld inspection of 10 HDPE welded piping joints; Pneumatic pressure test
INP-103371-0277	0	Visual weld inspection of a total of 6 HDPE thermal fusion butt welds
INP-103371-0284	0	Visual weld inspection of a total of 35 HDPE thermal fusion butt welds
INP-103371-0285	0	visual weld inspection of 37 HDPE welded piping joints
INP-103371-0286	0	hydrostatic pressure leak test and final torque on flange bolts in CrIN-3 Vault
INP-103371-0287	0	hydrostatic pressure leak test and final torquing of flange bolts in CrIN-2 Vault
INP-103371-0295	0	Torque Verification of a total of 48 flange bolts in various manholes at CrEX-4
INP-103371-0296	0	Torque verification of 8 flange bolts; leak test of CrIN-4 manifold piping
INP-103371-0297	0	Pneumatic pressure testing of Low Point Leak Detection HDPE saddle tees
INP-103371-0298	0	Pneumatic pressure testing of Low Point Leak Detection HDPE saddle tees
INP-103371-0299	0	Pneumatic pressure testing of Low Point Leak Detection HDPE saddle tees
INP-103371-0300	0	hydrostatic pressure leak test and final torquing of flange bolts in CrEX-4 Vault
INP-103371-0301	0	60 - Hilti KB-TZ 5/8"x 6" for pipe supports to be uses in the various CrIN vaults.
INP-103371-0249 ¹	0	visual weld inspection of 33 HDPE thermal fusion welded piping joints
INP-103371-0229 ¹	0	Leak test at CrIn # 1 vault

ENCLOSURE 1

Summary Table of Distribution Piping Integrity Test Results

Report Number	Rev	Short Description
INP-103371-0228 ¹	0	hydrostatic pressure test on 4ea. spools of 4"HDPE PIPE .
INP-103371-0225 ¹	0	Pneumatic pressure testing of Low Point Leak Detection HDPE saddle tees
INP-103371-0224 ¹	0	Pneumatic pressure testing of Low Point Leak Detection HDPE saddle tees
INP-103371-0213 ¹	0	Visual weld inspection of 12 various size HDPE piping joints -
INP-103371-0212 ¹	0	In-service leak test of various P.O.C.s - R28
INP-103371-0211 ¹	0	Pre - Operational leak test of 6" HDPE piping from Booster Pump to (2) Frac tank drain lines
INP-103371-0210 ¹	0	Pre - Operational leak test of 6" HDPE piping from Treatment Cont. to Frac. tank fill lines
INP-103371-0210 ¹	1	Pre - Operational leak test of 6" HDPE piping from Treatment Cont. to Frac. tank fill lines
INP-103371-0209 ¹	0	Observation of Flange Bolt Torquing at 4 - 3" flange connections at Frac Tanks R28
INP-103371-0207 ¹	0	Observation of Flange Bolt Torquing at 6" connection - locations as shown on Sheet C-1010 Rev 2
INP-103371-0206 ¹	0	Observation of Flange Bolt Torquing at 4" valves - locations as shown on Sheet C-1010 Rev 2
INP-103371-0205 ¹	0	Observation of Flange Bolt Torquing at 4" valves - locations as shown on Sheet C-1000 Rev 2
INP-103371-0204 ¹	0	Observation of Flange Bolt Torquing at 4" valves - locations as shown on Sheet C-1010 Rev 2
INP-103371-0203 ¹	0	Hydrostatic pressure test of approx. 480 ft. of 4" HDPE at CrIN-1 / CrIN-6 well pads
INP-103371-0201 ¹	0	Pneumatic pressure testing of a total of 2 Low Point Leak Detection HDPE saddle tees
INP-103371-0200 ¹	0	Pneumatic pressure testing of a total of 4 Low Point Leak Detection HDPE saddle tees
INP-103371-0196 ¹	0	Pneumatic pressure testing of approx. 250 ft. of 8" containment pipe of 4" x 8" HDPE - CrEX-2
INP-103371-0190 ¹	0	Pneumatic pressure test - low point leak detection saddle tee at CrEX-1, Manhole #4
INP-103371-0189 ¹	0	Observation of Flange Bolt Torquing at 4" and 6" valves - locations as shown on Sheet C-1003 Rev 2

ENCLOSURE 1

Summary Table of Distribution Piping Integrity Test Results

Report Number	Rev	Short Description
INP-103371-0188 ¹	0	Observation of Flange Bolt Torquing at 4" and 6" valves - locations as shown on Sheet C-1004 Rev 2
INP-103371-0187 ¹	0	Hydrostatic pressure test of CrEX-2 manifold piping assembly
INP-103371-0186 ¹	0	Observation of Flange Bolt Torquing at Booster Pump - inside and outside
INP-103371-0185 ¹	0	Visual weld inspection of 61 various size HDPE piping joints -
INP-103371-0184 ¹	0	visual weld inspection of 8 HDPE thermal fusion welded piping joints at CrEX-1 treatment container
INP-103371-0183 ²	0	Hydrostatic and Pneumatic pressure tests of approx. 130 ft. of 4" x 8" HDPE piping at CrEX-1
INP-103371-0182 ²	0	Hydrostatic pressure test of approx. 500 ft. of 4" x 8" HDPE from CrEX-2 vault to 1st manhole down
INP-103371-0181 ²	0	Observation of Flange Bolt Torquing at 4 - Frac Tank (Fill Line) flanged connections to HDPE
INP-103371-0180 ²	0	Observation of Flange Bolt Torquing in CrEX-2 Vault
INP-103371-0179 ²	0	Hydrostatic pressure test of approx. 250 ft. of 6" and 4" HDPE piping -various spool pcs.
INP-103371-0178 ²	0	In-service leak test at R28 Treatment Container
INP-103371-0177 ²	0	Hydrostatic and Pneumatic pressure tests of approx. 310 ft. of 4" x 8" HDPE piping R28 to CrEX-3
INP-103371-0176 ²	0	visual weld inspection of 19 HDPE thermal fusion welded piping joints
INP-103371-0175 ²	0	Visual weld inspection of 61 various size HDPE piping joints -
INP-103371-0174 ²	0	Visual weld inspection of 22 various size HDPE piping joints -
INP-103371-0158 ²	0	Visual weld inspection of 28 various size HDPE piping joints -
INP-103371-0155 ²	0	Hydrostatic and Pneumatic pressure tests of approx. 130 ft. of 6" HDPE piping
INP-103371-0154 ²	0	Visual weld inspection of 28 various size HDPE piping joints -
INP-103371-0151 ²	0	Hydrostatic and Pneumatic pressure tests of approx. 350 ft. of 6" HDPE piping

ENCLOSURE 1

Summary Table of Distribution Piping Integrity Test Results

Report Number	Rev	Short Description
INP-103371-0150 ²	0	Visual weld inspection of 18 various size HDPE piping joints -
INP-103371-0149 ²	0	Hydrostatic pressure testing of 2 - 1" on 6" HDPE Saddle tees
INP-103371-0148 ²	0	Hydrostatic and Pneumatic pressure tests of approx. 400 ft. of HDPE piping
INP-103371-0147 ²	0	Hydrostatic and Pneumatic pressure tests of approx. 460 ft. of 6" HDPE piping
INP-103371-0146 ²	0	Pneumatic pressure tests of approx. 20 ft. of HDPE piping
INP-103371-0142 ²	0	Pre -operational hydrostatic leak test of portion of 6" HDPE piping
INP-103371-0141 ²	0	Torque verification of 152 flange bolts
INP-103371-0140 ²	0	Visual weld inspection of 18 various size HDPE piping joints -
INP-103371-0138 ²	0	Visual weld inspection of 19 various size HDPE piping joints -
INP-103371-0137 ²	0	Visual weld inspection a a min. of 10% of s.s. well casing joints CrIN-6
INP-103371-0135 ²	0	Hydrostatic and Pneumatic pressure tests of approx. 1300 ft. of HDPE piping
INP-103371-0132 ²	0	Hydrostatic pressure test of HDPE piping assembly near R28 well pad; frac tanks and treatment units
INP-103371-0131 ²	0	Hydrostatic and Pneumatic pressure tests of approx. 380 ft. of 6" HDPE piping
INP-103371-0130 ²	0	Visual weld inspection of 14 HDPE piping joints -
INP-103371-0129 ²	0	Visual weld inspection of 25 HDPE thermal fusion / electro fusion welded piping joints
INP-103371-0122 ²	0	Visual weld inspection of 7 HDPE piping joints -
INP-103371-0121 ²	0	Visual weld inspection of 8 HDPE theraml fusion / electro fusion welded piping joints
INP-103371-0120 ²	0	Hydrostatic and Pneumatic pressure tests of approx. 350 ft. of 4" x 8" HDPE piping
INP-103371-0099 ²	0	Visual weld inspection of 23 various size HDPE piping joints -
INP-103371-0098 ²	0	Hydrostatic leak test of approx. 2400 ft. of 6" HDPE pipeline, flanges, and valves
INP-103371-0097 ²	0	Hydrostatic and Pneumatic pressure tests of approx. 440 ft. of 4" x 8" HDPE piping
INP-103371-0096 ²	0	Hydrostatic and Pneumatic pressure tests of approx. 80 ft. of 4" x 8" HDPE piping

ENCLOSURE 1

Summary Table of Distribution Piping Integrity Test Results

Report Number	Rev	Short Description
INP-103371-0095 ²	0	Torque verification of 40 flange bolts
INP-103371-0094 ²	0	Visual weld inspection of 19 various size and types of HDPE piping fusion welds
INP-103371-0090 ²	0	Hydrostatic and Pneumatic pressure tests of approx. 940 ft. of 4" x 8" HDPE piping
INP-103371-0089 ²	0	Hydrostatic pressure test of a single 6" saddle tee (for CAV) in vault, near CrEX-1
INP-103371-0088 ²	0	Hydrostatic pressure test of a single 4" saddle tee (for CAV) in vault, near CrEX-1
INP-103371-0087 ²	0	Visual weld inspection of 16 various size HDPE piping joints -
INP-103371-0086 ²	0	Visual weld inspection of 32 various size HDPE piping joints -
INP-103371-0085 ²	0	Hydrostatic and Pneumatic pressure tests of approx. 485 ft. of 4" x 8" HDPE piping
INP-103371-0084 ²	0	Hydrostatic and Pneumatic pressure tests of approx. 485 ft. of 4" x 8" HDPE piping
INP-103371-0083 ²	0	Hydrostatic and Pneumatic pressure tests of approx. 600 ft. of 4" x 8" HDPE piping
INP-103371-0082 ²	0	Torque verification of 42 - 3/4" s.s. flange bolts on 3 6" isolation valves
INP-103371-0081 ²	0	Visual weld inspection of 32 various size HDPE piping joints -
INP-103371-0080 ²	0	Hydrostatic pressure test of approx. 1010 ft. of 4" x 8" dia. HDPE pipe
INP-103371-0078 ²	0	Hydrostatic and Pneumatic pressure tests of approx. 511 ft. of 4" x 8" HDPE piping
INP-103371-0077 ²	0	Visual weld inspection of 20 4" x 8" HDPE piping joints -
INP-103371-0076 ²	0	Pneumatic pressure test of approx. 520 ft. of 8" containment pipe (of section of 4" x 8" HDPE X2)
INP-103371-0075 ²	0	Pneumatic pressure test of approx. 490 ft. of 8" containment pipe (of section of 4" x 8" HDPE X2)
INP-103371-0074 ²	0	Hydrostatic pressure test of approx. 1010 ft. of 4" x 8" dia. HDPE pipe
INP-103371-0073 ²	0	Visual weld inspection of 18 HDPE piping joints -
INP-103371-0072 ²	0	Visual weld inspection of 19 HDPE piping joints -
INP-103371-0071 ²	0	Hydrostatic and Pneumatic pressure tests of approx. 520 ft. of 4" x 8" HDPE piping

ENCLOSURE 1

Summary Table of Distribution Piping Integrity Test Results

Report Number	Rev	Short Description
INP-103371-0066 ²	0	Visual weld inspection of 15 - 4" x 8" HDPE thermal fusion piping joints
INP-103371-0064 ²	0	visual weld inspection of 14 - 8" dia. HDPE thermal fusion piping joints
INP-103371-0063 ²	0	Hydrostatic and Pneumatic pressure tests of approx. 770 ft. of 4" x 8" HDPE piping
INP-103371-0062 ²	0	visual weld inspection of 21 HDPE piping joints
INP-103371-0061 ²	0	Observation of handling of 6" HDPE pipe from CrEX-1 downhill towards R45 entrance
INP-103371-0061 ²	1	Observation of handling of 6" HDPE pipe from CrEX-1 downhill towards R45 entrance
INP-103371-0060 ²	0	Hydrostatic pressure test of approx. 1250 ft. 6" dia. HDPE pipe
INP-103371-0051 ²	0	Visual weld inspection of 20 thermal fusion HDPE piping joints (#8-6 through #8-25)
INP-103371-0050 ²	0	Visual weld inspection of 16 thermal fusion HDPE piping joints
INP-103371-0048 ²	0	visual weld inspection of 18 6" HDPE thermal fusion piping joints, and 1 electrofusion saddle joint
INP-103371-0047 ²	0	Hydrostatic pressure testing of approx. 1250 ft. of 6" HDPE pipe, CrEX-1 downhill towards CrIN-1
INP-103371-0046 ²	0	Observation of 19 6" HDPE thermal fusion joints - CrEX-1 towards CrIN-1
INP-103371-0045 ²	0	Observation of 44 6" HDPE fusion joints, and 1 HDPE electro fusion joint - CrEX-1 towards CrIN-1
INP-103371-0036 ²	0	Hydrostatic pressure test performed on S.S. threaded piping in Treatment Container at R-42
INP-103371-0034 ²	0	Hydrostatic pressure test, per ASTM F-2164/Spec. 22-0813, of approx. 420 ft. of 4" HDPE pipe -CrIN-1
INP-103371-0029 ²	0	Visual weld inspection of 12 thermal fusion HDPE piping joints (CrIN-1)
INP-103371-0028 ²	0	visual weld inspection of 16 thermal fusion 4" HDPE piping joints (CrIN-2)
INP-103371-0027 ²	0	Hydrostatic pressure test, per ASTM F2164 /Spec. 22-0813, of approx. 205 ft. of 4" HDPE (CrIN-2)
INP-103371-0024 ²	0	Hydrostatic pressure test on approx. 2240 feet of 4" HDPE pipe from approx. CrIn-3 to approx. R45

ENCLOSURE 1

Summary Table of Distribution Piping Integrity Test Results

Report Number	Rev	Short Description
INP-103371-00019 ²	0	Hydrostatic pressure test on the threaded and flanged galv. piping from the CrEX-1 well head to the POC at treatment container
INP-103371-00012 ²	0	Hydrostatic pressure test on HDPE piping from CrIN-4/CrIN-5 vaults to CrEX-1 well pad
INP-103371-00011 ²	0	Observation of proper torquing of 160 valve flange bolts / sample verification
INP-103371-00007 ²	0	Hydrostatic pressure retest on approx. 160 ft. of 4" HDPE piping from CrIN-4 vault to CrIN-5 vault
INP-103371-00006 ³	0	Hydrostatic pressure test on approx. 160 ft. of 4" HDPE piping from CrIN-4 vault to CrIN-5 vault
INP-103371-00005 ³	0	Hydrostatic pressure test on approx. 210 ft. of 6" HDPE piping from CrEX-1 treatment container up to first 6" isolation valve uphill, towards cutoff to CrIN-4/5 pad
INP-103371-00004 ³	0	Hydrostatic pressure test on approx. 720 ft. of 6" HDPE piping from CrIN-4/5 cutoff to CrEX-1 pad
INP-103371-00003 ³	0	Hydrostatic pressure test on approx. 735 ft. of 6" HDPE piping at CrIN4/5 well pad
INP-103371-00002 ²	0	visual weld inspection of 6 s.s. well casing welds at CrEX-3
INP-103371-00001 ²	0	visual weld inspection of 10% of s.s. well casing welds at CrEX-3

Notes:

1. Test result previously submitted on November 22, 2017 (EPC-DO: 17-465).
2. Test result previously submitted on August 28, 2017 (EPC-DO: 17-302).
3. Test result previously submitted on November 15, 2016 (EPC-DO-16-345).

ENCLOSURE 2

**Distribution Piping Integrity Test Results (CD) for
Pipelines Connecting Extraction Wells With Injection
Wells (upon request)**

EPC-DO: 18-090

LA-UR-18-21767

U1601822

Date: **MAR 2 1 2018**

ABSTRACT: ENCLOSURE 2 CD (1)

Enclosure 2 contains one CD. This CD provides the integrity test results not previously submitted for pipelines connecting extraction wells CrEX-1, CrEX-2, CrEX-3, and CrEX-4 with injection wells CrIN-1, CrIN-2, CrIN-3, CrIN-4, CrIN-5, and CrIN-6. These wells are located in and adjacent to Mortandad Canyon within Technical Area (TA)-05.

ENCLOSURE 3

As-Built Specifications for CrEX-4

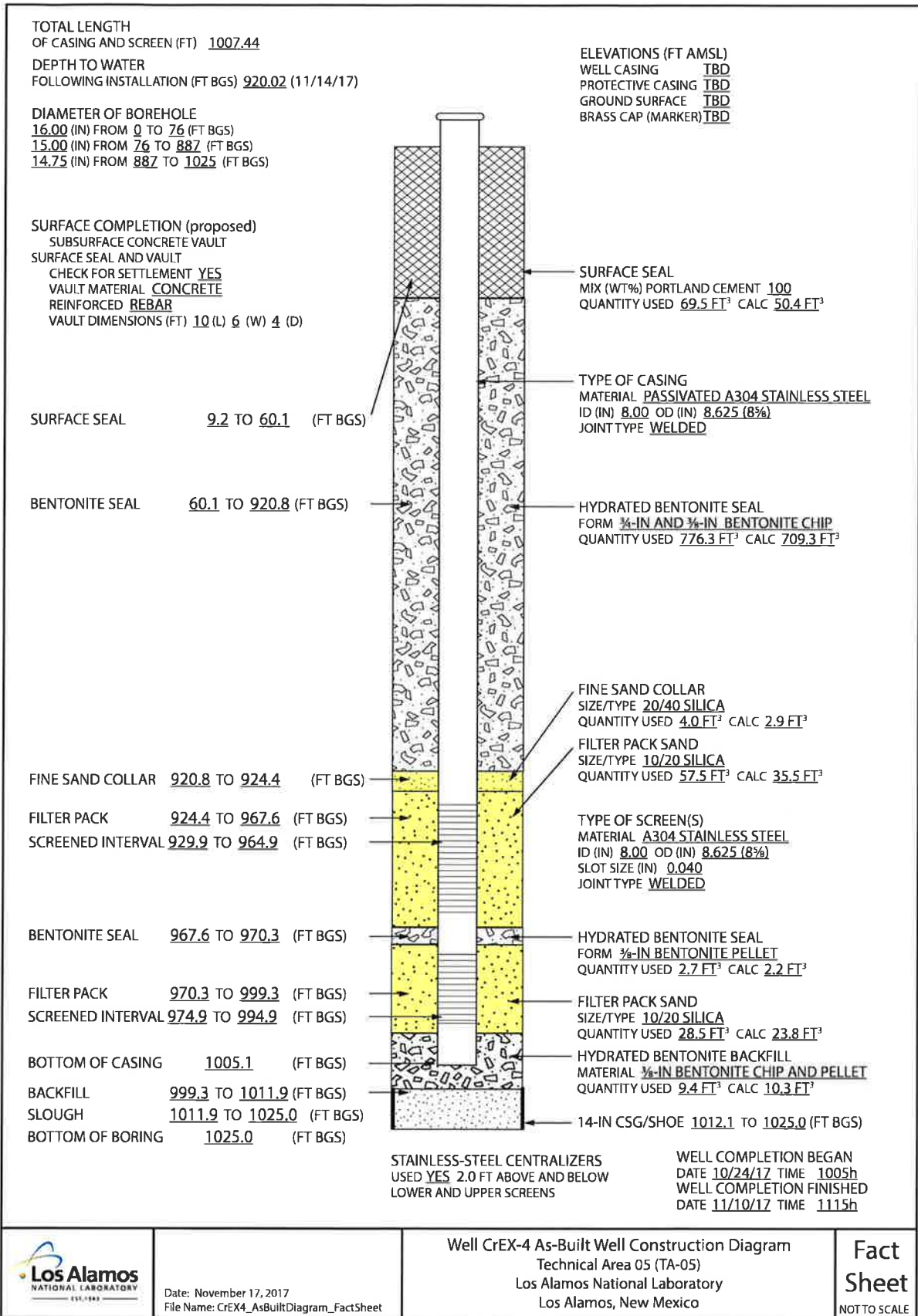
EPC-DO: 18-090

LA-UR-18-21767

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Date: **MAR 21 2018**

ENCLOSURE 3

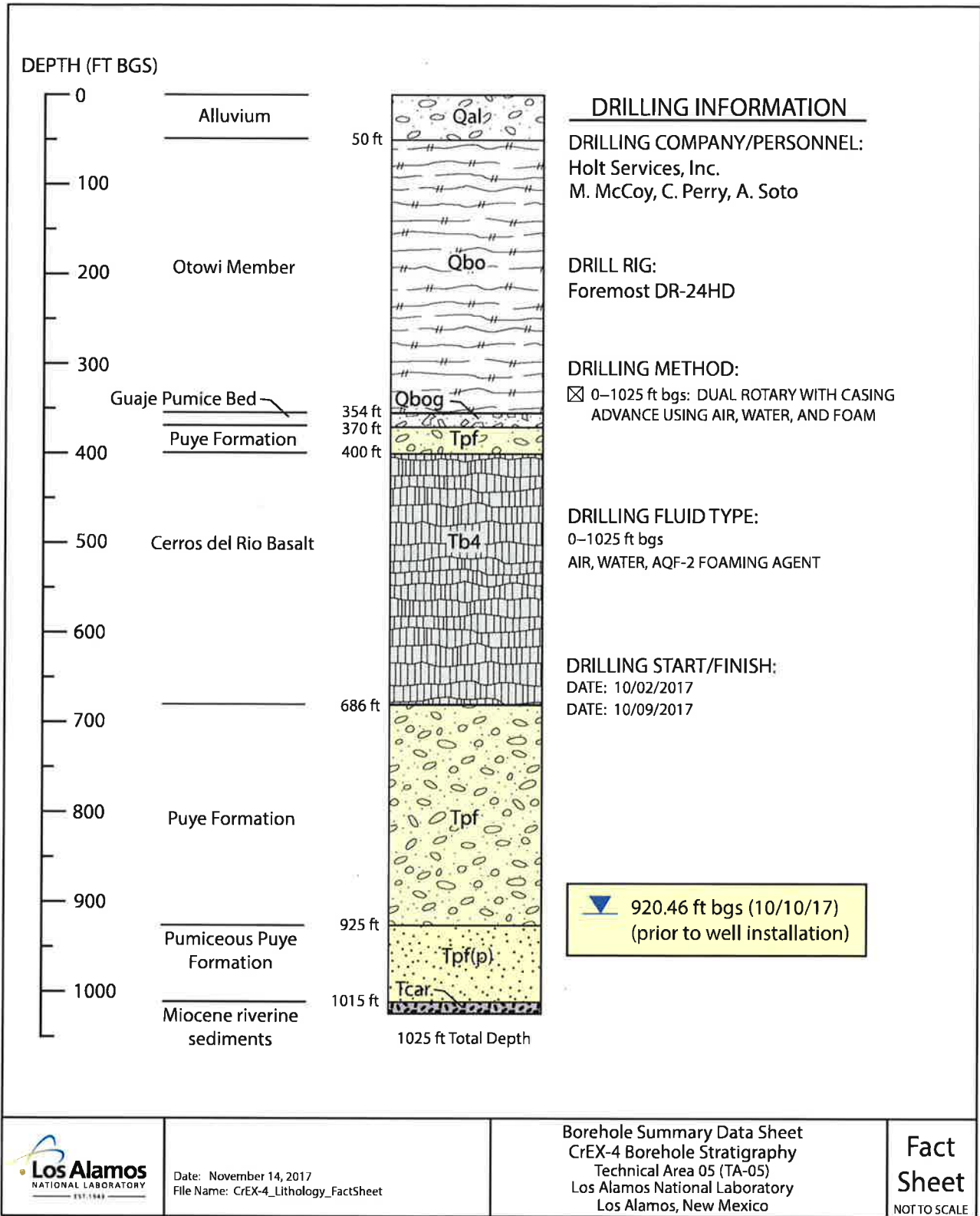


Date: November 17, 2017
 File Name: CrEX4_AsBuiltDiagram_FactSheet

Well CrEX-4 As-Built Well Construction Diagram
 Technical Area 05 (TA-05)
 Los Alamos National Laboratory
 Los Alamos, New Mexico

Fact Sheet
 NOT TO SCALE

ENCLOSURE 3



Date: November 14, 2017
File Name: CrEX-4_Lithology_FactSheet

Borehole Summary Data Sheet
CrEX-4 Borehole Stratigraphy
Technical Area 05 (TA-05)
Los Alamos National Laboratory
Los Alamos, New Mexico

Fact Sheet
NOT TO SCALE