REGION 8
DENVER, CO 80202

DRAFT PERMIT MODIFICATION #1 (MAJOR MODIFICATION)
Underground Injection Control (UIC)
Area Permit No. CO12143-00000

Well Name	Permit Number	Original Effective Date	Modification Effective Date(s)
ECCV DI-1 ECCV DI-2 ECCV DI-3	CO12143-00000	April 23, 2020	none

Pursuant to Title 40 of the Code of Federal Regulations, section 144.39, and Part III.B.1 of the above referenced Class I UIC permit (Permit), as of the date of this Permit modification, EPA hereby proposes the changes as described below. The modified conditions of the permit are identified with **blue** colored text.

APPENDIX A. WELL CONSTRUCTION REQUIREMENTS of the Final Permit:

All wells shall be cased and cemented to prevent the movement of fluids into or between USDWs, and in accordance with 40 CFR § 146.12 and other applicable federal, state or local laws and regulations.

General requirements include:

- The well shall be completed with at least two cemented casing strings set within a drilled hole.
- Cemented casing shall be cemented from the casing shoe to the surface and care shall be taken to maximize cement fill and bond in the annulus behind the casing.
- The casing and cement used in the construction of the well shall be designed for the life expectancy of the well, including the natural and applied pressures expected during the life of the well.
- When drilling the surface hole, unless waived by the Director, air or mud made with water containing no additives and no more than 3,000 mg/L TDS shall be used. At no time shall the Permittee conduct any activity that endangers any USDW, as prohibited by 40 CFR § 144.12.
- The well shall be completed with injection tubing set on at least one packer.
- The uppermost packer must be set within 100 feet of the uppermost open perforation.

The well construction plans for DI-1 and DI-2 have been approved. Either plan is approved the for DI-3 well. The casing, tubing and liner weight, grades, and sizes may be modified with Director approval prior

to well construction. The depths of the well, will vary based on the geology found at the DI-3 location. A final well construction diagram shall be provided with updated depths, prior to authorization to inject.

Multi-stage cementing is not required; however, demonstration of competent cement must be shown prior to authorization to inject. If such demonstration cannot be made, remedial cement or additional monitoring may be required.

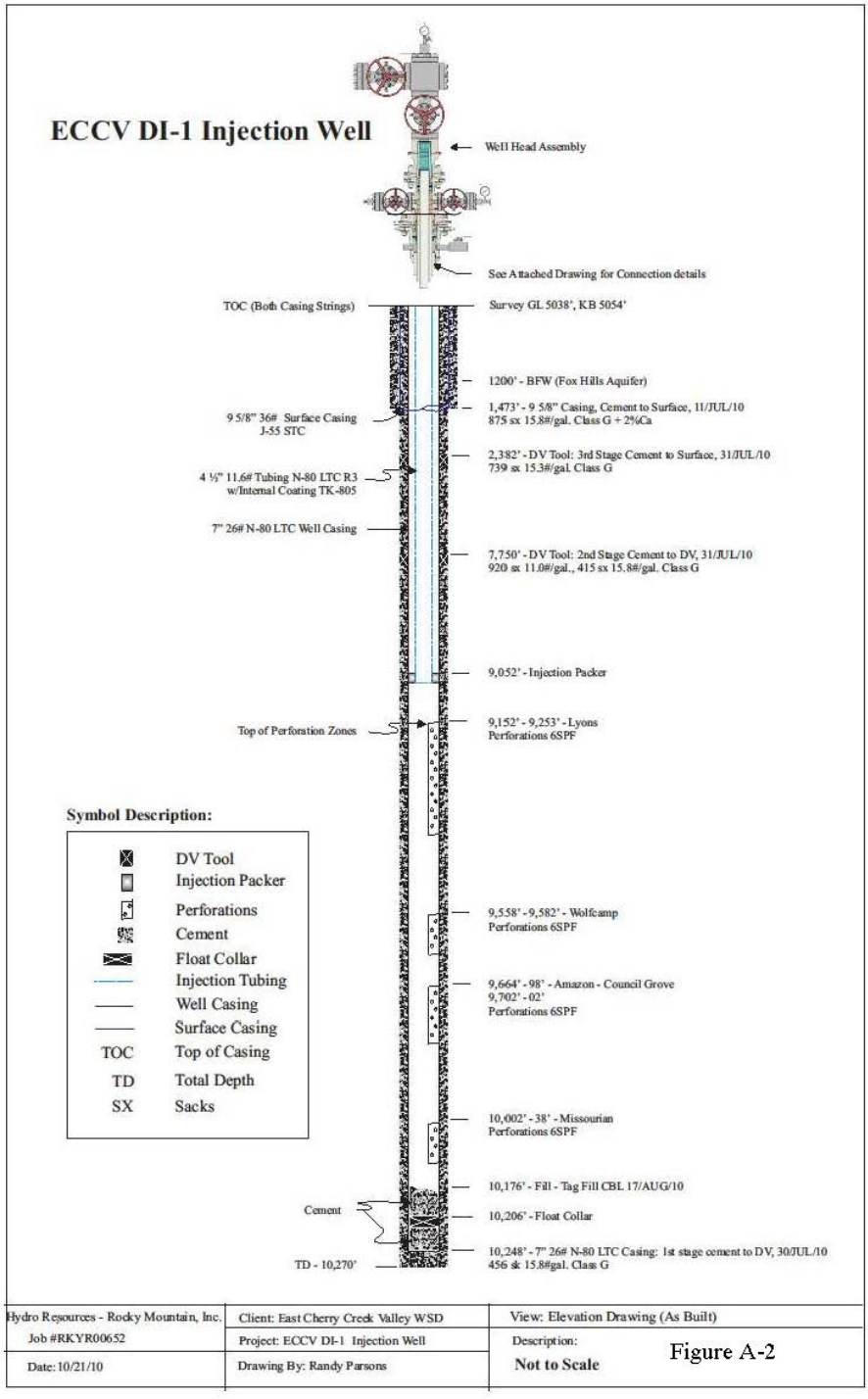
DI-1

Surface Casing: A 9-5/8" 36# J-55 STC casing set at a depth of 1,473' (Laramie-Fox Hills) in a 12-1/4" hole and cemented to surface with 875 sx 15.8#/gal. Class G + 2%Ca.

Production Casing: A 7" 26# N-80 LTC casing set at 10,248 feet in an 8-3/4" hole and cemented to surface in three stages. The first stage involved 456 sx of 15.8#gal. Class G cemented to DV tool set at 7,750'. The second stage above the DV tool included 920 sx of 11.0#/gal., 415 sx 15.8#/gal. Class G to DV tool set at 2,382'. 3rd stage cement to surface with 739 sx 15.3#/gal. Class G.

Tubing Packer: The packer is set at 9,052' with a 4-1/2" 11.6# tubing N-80 LTC R3 Internal Coating TK-805.

The current well construction, including perforations are shown in Figure A-2.



APPENDIX A. WELL CONSTRUCTION REQUIREMENTS is modified to:

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General requirements include:

- The well shall be completed with at least two cemented casing strings set within a drilled hole.
- Cemented casing shall be cemented from the casing shoe to the surface and care shall be taken to maximize cement fill and bond in the annulus behind the casing.
- The casing and cement used in the construction of the well shall be designed for the life expectancy of the well, including the natural and applied pressures expected during the life of the well.
- When drilling the surface hole, unless waived by the Director, air or mud made with water containing no additives and no more than 3,000 mg/L TDS shall be used. At no time shall the Permittee conduct any activity that endangers any USDW, as prohibited by 40 CFR § 144.12.
- The well shall be completed with injection tubing set on at least one packer.
- **The uppermost packer must be set within 100 feet (ft) of the uppermost open perforation for the DI-2 and DI-3 wells.**
- **The uppermost packer must be set within 140 ft of the uppermost open perforation at 9,152 ft for the DI-1 well.**
- **The DI-1 well may be completed with additional packers to remain in place unless they prevent passage of geophysical logging tools or interferes with cement placement during plugging and abandonment; if so, the packers must be removed.**

The construction plans for DI-1 and DI-2 have been approved. Construction plans submitted for the DI-3 well is approved. The casing, tubing and liner weight, grades, and sizes may be modified with Director approval prior to well construction. The depths of the well, will vary based on the geology found at the DI-3 location. A final well construction diagram shall be provided with updated depths, prior to authorization to inject.
Multi-stage cementing is not required; however, demonstration of competent cement must be shown prior to authorization to inject. If such demonstration cannot be made, remedial cement or additional monitoring may be required.

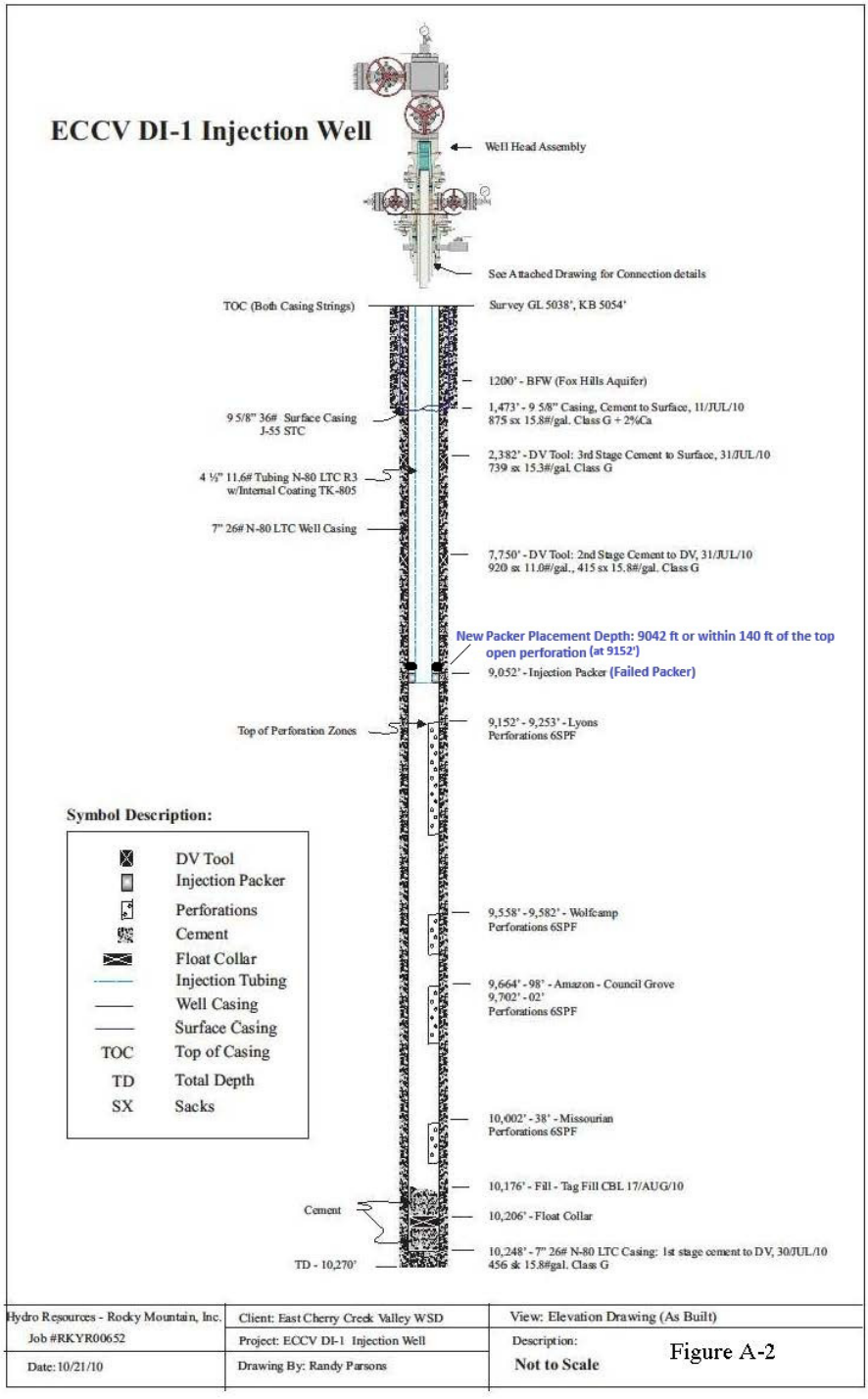
DI-1
Surface Casing: A 9-5/8" 36# J-55 STC casing set at a depth of 1,473' (Laramie-Fox Hills) in a 12-1/4" hole and cemented to surface with 875 sx 15.8#/gal. Class G + 2%Ca.

Production Casing: A 7" 26# N-80 LTC casing set at 10,248 feet in an 8-3/4" hole and cemented to surface in three stages. The first stage involved 456 sx of 15.8#gal. Class G cemented to DV tool set at 7,750'. The second stage above the DV tool included 920 sx of 11.0#/gal., 415 sx 15.8#/gal. Class G to DV tool set at 2,382'. 3rd stage cement to surface with 739 sx 15.3#/gal. Class G.

Tubing and Packer#1: Set the packer at 9,042 ft with a 4-1/2" 11.6# tubing N-80 LTC R3 Internal Coating TK-805.

Packer #2: An existing packer is left at 9,052'.

The proposed well construction, including perforations are shown in Figure A-2.



APPENDIX E. PLUGGING AND ABANDONMENT (P&A) REQUIREMENTS of the Final Permit

All wells shall be plugged with cement in a manner which isolates the injection zone and will not allow the movement of fluids either into or between USDWs in accordance with 40 CFR § 146.10. Additional federal, state or local law or regulations may also apply. General requirements applicable to all wells include:

- Prior to plugging a well, mechanical integrity must be established unless the P&A plan will address the mechanical integrity issue. Injection tubing shall be pulled.
- Cement plugs shall have sufficient compressive strength to maintain adequate plugging effectiveness.
- Each plug placement, unless above a retainer or bridge plug, must be verified by tagging the top of the plug after the cement has had adequate time to set.
- A minimum 50 feet surface plug is required inside and, if necessary, outside of the surface casing, to seal pathways for fluid migration into the subsurface.
- If there is more than 2,000 mg/liter difference of TDS between individual exposed USDWs, they must be isolated from each other.

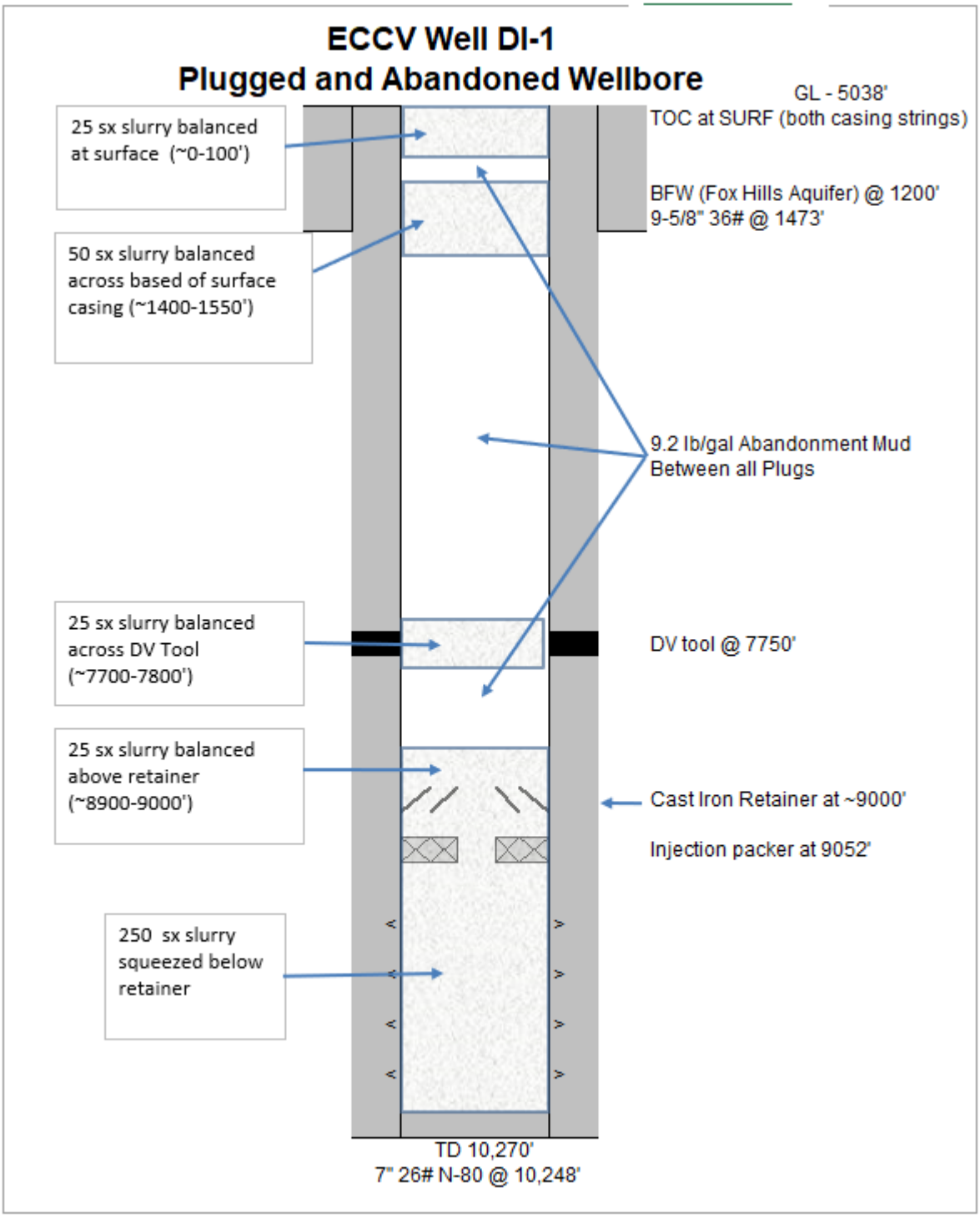
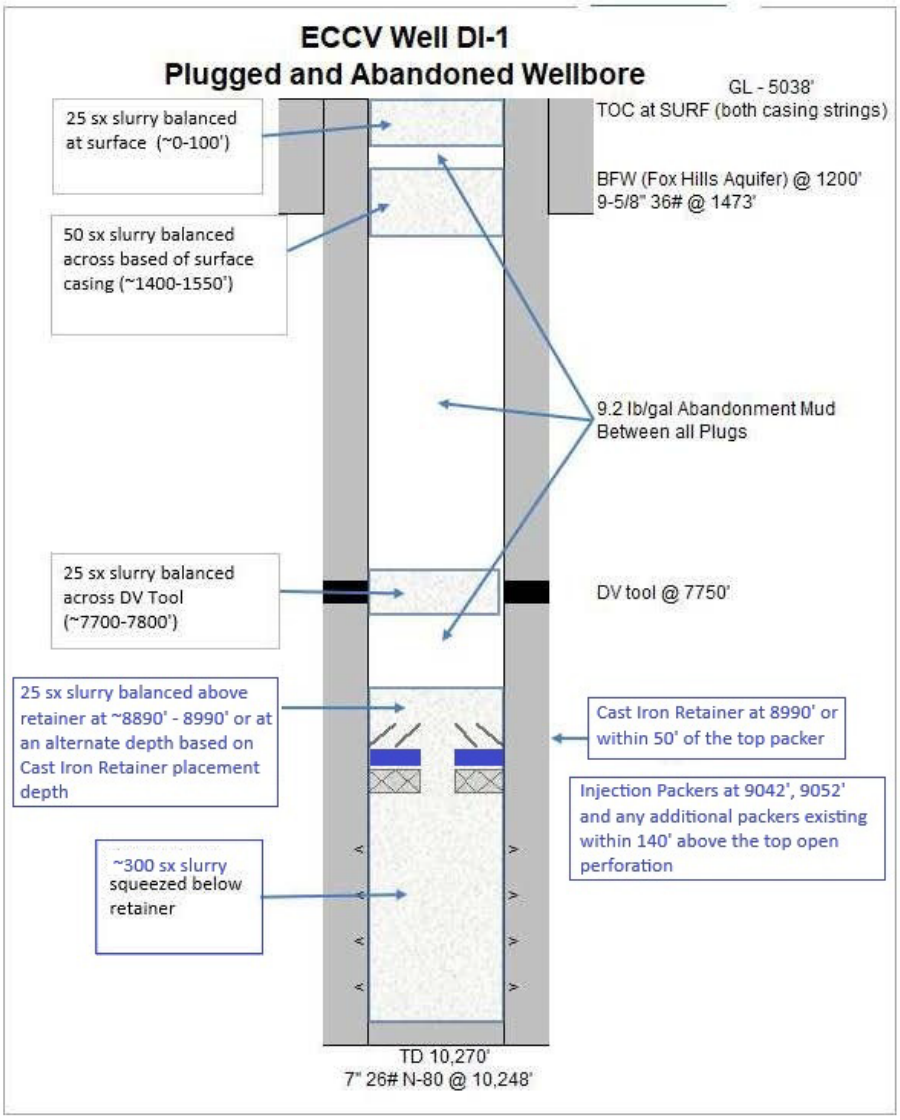

ECCV Well DI-1
Plugged and Abandoned Wellbore
GL - 5038'
TOC at SURF (both casing strings)
25 sx slurry balanced at surface (~0-100')
BFW (Fox Hills Aquifer) @ 1200'
9-5/8" 36# @ 1473'
50 sx slurry balanced across based of surface casing (~1400-1550')
9.2 lb/gal Abandonment Mud Between all Plugs
25 sx slurry balanced across DV Tool (~7700-7800')
DV tool @ 7750'
25 sx slurry balanced above retainer (~8900-9000')
Cast Iron Retainer at ~9000'
Injection packer at 9052'
250 sx slurry squeezed below retainer
TD 10,270'
7" 26# N-80 @ 10,248'

Figure E-1

APPENDIX E. PLUGGING AND ABANDONMENT (P&A) REQUIREMENTS is modified to:

All wells shall be plugged with cement in a manner which isolates the injection zone and will not allow the movement of fluids either into or between USDWs in accordance with 40 CFR § 146.10. Additional federal, state or local law or regulations may also apply. General requirements applicable to all wells include:

- Prior to plugging a well, mechanical integrity must be established unless the P&A plan will address the mechanical integrity issue. Injection tubing shall be pulled.
- Cement plugs shall have sufficient compressive strength to maintain adequate plugging effectiveness.
- Each plug placement, unless above a retainer or bridge plug, must be verified by tagging the top of the plug after the cement has had adequate time to set.
- A minimum 50 feet surface plug is required inside and, if necessary, outside of the surface casing, to seal pathways for fluid migration into the subsurface.
- If there is more than 2,000 mg/liter difference of TDS between individual exposed USDWs, they must be isolated from each other.
- **All cement plugs shown in Figures E-1 must be installed by running cement through all existing packers in the wells, unless the Director authorizes an alternative plan.**
- **The existing packers in the DI-1 well may be left in place if cement can be placed to isolate the injection zone. If the packers interfere with cement placement, they must be removed prior to installing cement plugs.**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50 sx slurry balanced across based of surface casing (~1400-1550')
9.2 lb/gal Abandonment Mud Between all Plugs
25 sx slurry balanced across DV Tool (~7700-7800')
DV tool @ 7750'
25 sx slurry balanced above retainer at ~8890' - 8990' or at an alternate depth based on Cast Iron Retainer placement depth
Cast Iron Retainer at 8990' or within 50' of the top packer
Injection Packers at 9042', 9052' and any additional packers existing within 140' above the top open perforation
~300 sx slurry squeezed below retainer
TD 10,270'
7" 26# N-80 @ 10,248'

Figure E-1

Effective Date is date of signature noted below:

DRAFT

Sarah Bahrman, Acting Director
Water Division