ATTACHMENT D: INJECTION WELL PLUGGING PLAN

Facility Information

Facility name: Kansas Small Scale Test Wellington Field
KSS191GS0001

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Well location: Sumner County, Kansas
Latitude 37.319485, Longitude -97.4334588

Injection well plugging and abandonment will be conducted according to the procedures below, which are based on information submitted by Berexco LLC.

Upon completion of the Kansas Small Scale Test Wellington Field Class VI injection operation, the well will be plugged in one of two ways, as described below.

To satisfy the requirements of 40 CFR 146.92 and for consistency with the financial responsibility cost estimates (in Attachment H to the Class VI permit), this Well Plugging Plan describes two Options:

Option 1: Plugging to the Mississippian Formation and utilizing as a KCC regulated well.
Option 2: Plugging the well to the surface and abandoning it.

Planned Tests or Measures to Determine Bottom-hole Reservoir Pressure

Berexco LLC will record the bottomhole pressure from a down hole pressure gauge and calculate the kill fluid density.

Planned External Mechanical Integrity Test(s)

Berexco LLC will conduct a temperature log and at least one additional log from the following tests listed to verify external MI prior to plugging the injection well as required in 40 CFR 146.92(a).

Test Description	Location
Noise Log	Wireline Well Log
Oxygen Activation Log	Wireline Well Log

Information on Plugs

The tables below incorporate the following potential plugging scenarios:

Option 1: The well is plugged to the Mississippian Formation and utilized as a KCC regulated well.
Option 2: The well is plugged to the surface and abandoned.

Berexco LLC will inform USEPA which plugging option will be conducted prior to plugging operations via a notice of intent to plug per 40 CFR 146.92(c), and will not proceed with plugging operations until EPA approves the specific plugging operations described.

The volume and depth of the plug or plugs is based on the geology and downhole conditions of the well. The cement(s) formulated for plugging will be compatible with the carbon dioxide stream. The cement formulation and required documents will be submitted to the agency with the well plugging plan. Berexco will report the wet density and will retain duplicate samples of the cement used for each plug. Figures 2 and 3 present plugging schematics for both plugging options.

	Option 1: Plugging the Well to the Mississippian (Figure 2)							
	With Removal of Packer				Retaining Packer in Place			
	Plug #1	Plug #2		Plug #4	Plug #1	Plug #2	Plug #3	Plug #4
Diameter of Boring in Which Plug Will be Placed (inches)	7.875	7.875			7.875	7.875		
Depth to Bottom of Tubing* or Drill Pipe (ft)	4,860	4,860			4,860	4,860		
Sacks of Cement to be Used (each plug)	27	95			27	92		
Slurry Volume to be Pumped (cu. ft)	35	125			35	120		
Slurry Weight (lb/gal)	15	15			15	15		
Calculated Top of Plug (ft)	4,885	3930			4,850	3,930		
Bottom of Plug (ft)	5,155	4,885			5,120	4,850		
Type of Cement or Other Material	AA-2 Cement	AA-2 Cement			AA-2 Cement	AA-2 Cement		
Method of Emplacement	Retainer @ 4,885 ft	Balanced plug			Retainer @ 4,850 ft	Balanced plug		
Method of Emplacement (e.g., balance method, retainer method, or two-plug method)						Balance Method		

*Tubing to be removed before plugging.

	Option 2: Plugging the Well to the Surface and Abandonment (Figure 3)							
	With Removal of Packer				Retaining Packer in Place			
	Plug #1	Plug #2		Plug #4	Plug #1	Plug #2		Plug #4
Diameter of Boring in Which Plug Will be Placed (inches)	7.875	7.875		12.25	7.875	7.875		12.25
Depth to Bottom of Tubing* or Drill Pipe (ft)	4,860	4,860		4,860	4,860	4,860		4,860
Sacks of Cement to be Used (each plug)	123	20		100	119	20		100
Slurry Volume to be Pumped (cu. ft)	160	26		130	155	26		130
Slurry Weight (lb/gal)	15	15		15	15	15		15
Calculated Top of Plug (ft)	3,930	3,400		0	3,930	3,400		0
Bottom of Plug (ft)	5,155	3,600		750	5,120	3,600		750
Type of Cement or Other Material	AA-2 Cement	Bridge plug @ 3,600 ft		AA-2 Cement	AA-2 Cement	Bridge plug @ 3,600 ft		AA-2 Cement
Method of Emplacement	Retainer @ 4,885 ft & cement plug	Balanced plug		Balanced plug	Retainer @ 4,850 ft & cement plug	Balanced plug		Balanced plug
Method of Emplacement (e.g., balance method, retainer method, or two-plug method)						Balance Method		

*Tubing to be removed before plugging.

Narrative Description of Plugging Procedures

Berexco will perform one of the following activities to plug the injection well, after notification of and consultation with EPA:

Injection Well Plugging – Option 1 (Plug to the Mississippian Formation)

1. The injection well (KGS 1-28), and potentially the Arbuckle monitoring well (KGS 2-28) will be plugged to the top of the Pierson formation (the top of the confining zone). (See Figure 2)
2. In compliance with 40 CFR 146.92(c), notify the EPA UIC Program Director at least 60 days before plugging the well and provide updated plugging plan, if applicable.
3. Bottomhole reservoir pressure will be obtained prior to well plugging.
4. Before abandonment, a temperature log will be run and compared with the baseline temperature log in addition to temperature logs during injection and post-injection to determine external mechanical integrity. In addition, either a noise log or oxygen activation log will also be run and evaluated for external mechanical integrity.
5. The wells will be flushed with brine to force the CO_2 injectate into the formation, and a minimum of two wellbore volumes will be injected without exceeding 3,408 psi. The

bottomhole pressure and temperature will be logged to ensure external mechanical integrity.

6. Attempts will be made to remove the packer before cementing operations begin. However, if the packer cannot be released or removed from the cased hole, initial stages of the plugging operation may take place through the injection tubing before using a wire line tubing cutter to cut off the tubing above the injection packer or to cut the tubing above the packer with the packer left in the wellbore casing. Berexco will document how the well was plugged in the final plugging report, required at 40 CFR 146.92(d).
7. After the packer has been removed, plugging will commence at the bottom of the well by squeezing cement into the perforations and spotting balanced cement plugs. If the packer is unable to be removed, the injection tubing will be cut and removed, then a cement retainer will be set approximately 25 ft above the packer cut-off or 25 ft above the highest perforation (at approximately 4,885 ft), stringing into the retainer with work string tubing. Twenty seven sacks of CO_2-compatible cement will be placed through the retainer, cementing the hole from the bottom up to the cement retainer. This will be followed by approximately 95 sacks of CO_2-compatible cement to plug from the top of the retainer to the top of the Pierson at approximately 3,930 ft.

Injection Well Plugging – Option 2 (Plugging the Well to the surface and Abandonment)

1. The injection well (KGS 1-28), and potentially the Arbuckle monitoring well (KGS 2-28) will be plugged to the surface and abandoned (Figure 3).
2. In compliance with 40 CFR 146.92(c), notify the EPA UIC Program Director at least 60 days before plugging the well and provide updated plugging plan, if applicable.
3. Bottomhole reservoir pressure will be obtained prior to well plugging.
4. Before abandonment, a temperature log will be run and compared with the baseline temperature log in addition to temperature logs during injection and post-injection to determine external mechanical integrity. In addition, either a noise log or oxygen activation log will also be run and evaluated for external mechanical integrity.
5. The wells will be flushed with brine to force the CO_2 injectate into the formation, and a minimum of two wellbore volumes will be injected without exceeding 3,408 psi. The bottomhole pressure and temperature will be logged to ensure external mechanical integrity.
6. Attempts will be made to remove the packer before cementing operations begin. However, if the packer cannot be released or removed from the cased hole, initial stages of the plugging operation may take place through the injection tubing before using a wire line tubing cutter to cut off the tubing above the injection packer or to cut the tubing above the packer with the packer left in the wellbore casing. Berexco will document how the well was plugged in the final plugging report, required at 40 CFR 146.92(d).
7. After the packer has been removed, plugging will commence at the bottom of the well by squeezing cement into the perforations and spotting balanced cement plugs. If the packer is unable to be removed, the injection tubing will be cut and removed, then a cement retainer will be set approximately 25 ft above the packer cut-off or 25 ft above the highest perforation (at approximately 4,885 ft), stringing into the retainer with work string tubing. Twenty seven sacks of CO_2-compatible cement will be placed through the retainer, cementing the hole from the bottom up to the cement retainer. This will be

followed by approximately 95 sacks of CO_2-compatible cement to plug to the top of the Pierson at approximately 3,930 ft.

8. The wellbore will then be filled with mud to a depth of approximately 3,600 ft, (bottom of Cherokee Shale). The first cast iron bridge plug will also be set at the bottom of the Cherokee Shale at 3,600 ft. This will be followed by 20 sacks of CO_2-compatible cement to plug from the top of the bridge plug to the top of the Cherokee Shale at approximately 3,400 ft The borehole will then be filled with mud to approximately 750 ft below surface, and then topped with 100 sacks of CO_2-compatible cement to plug from approximately 750 ft to surface.

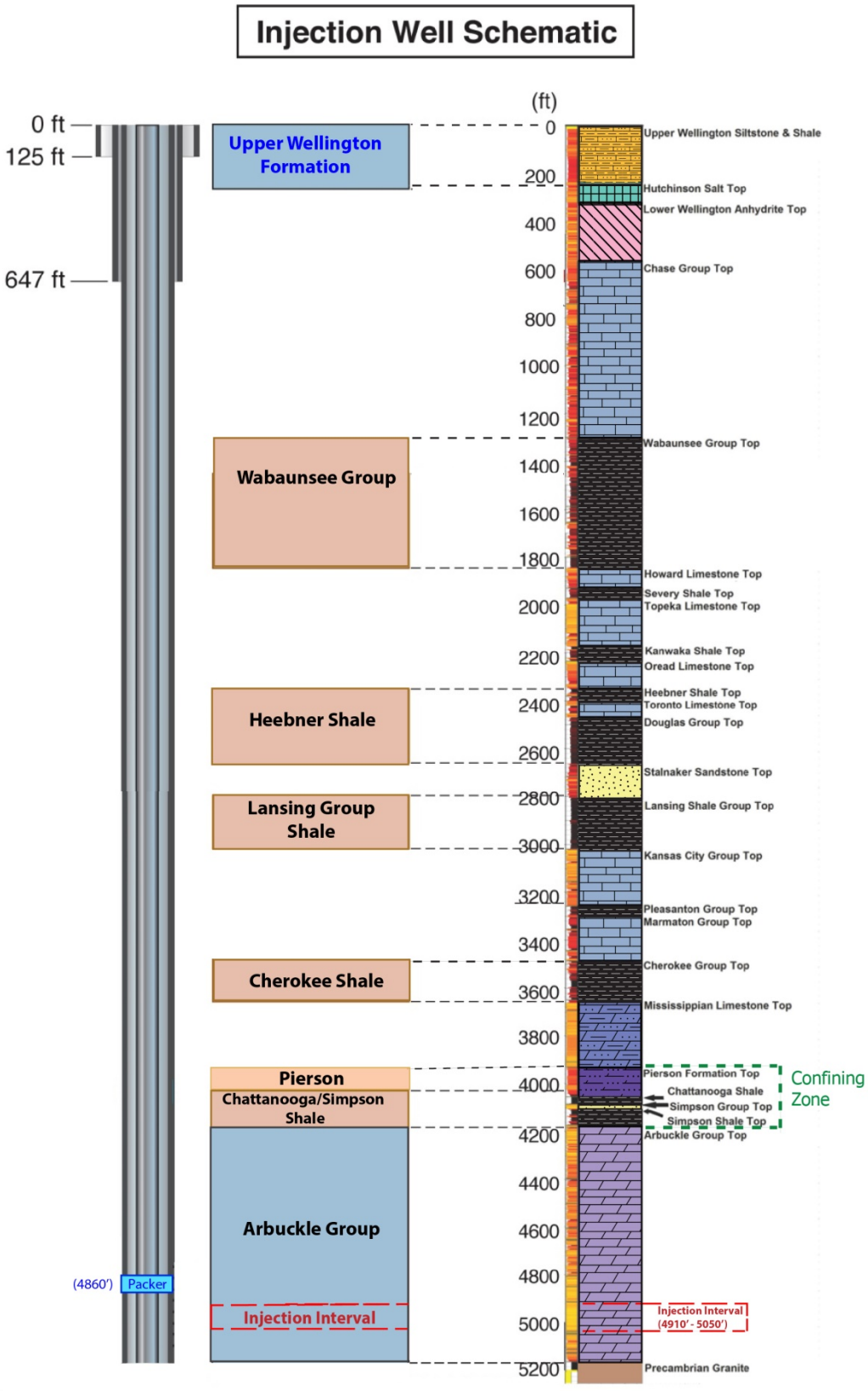

Figure 1. Arbuckle injection well schematic

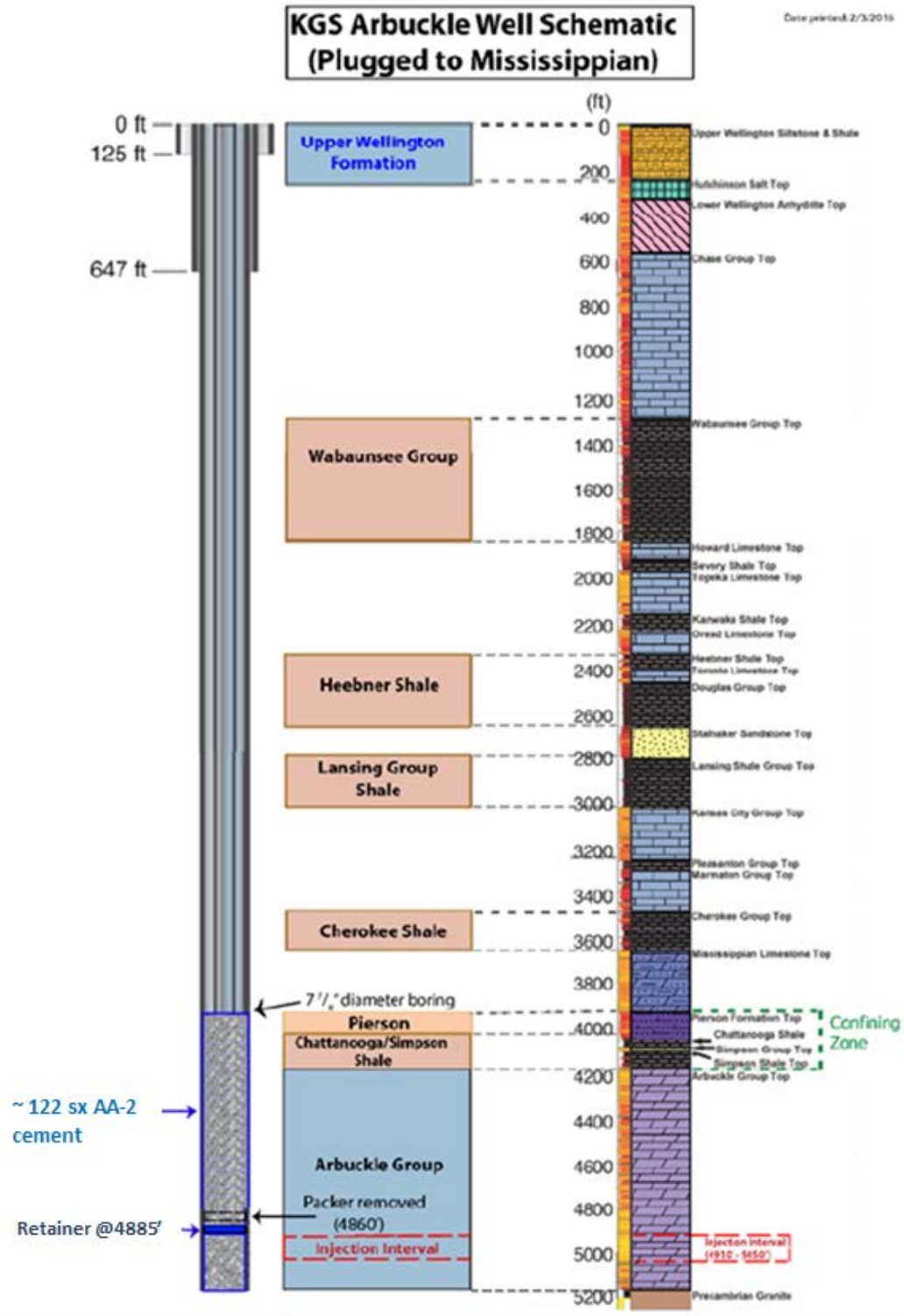

Figure 2. Arbuckle well plugging diagram (Option 1: plugged to Mississippian).

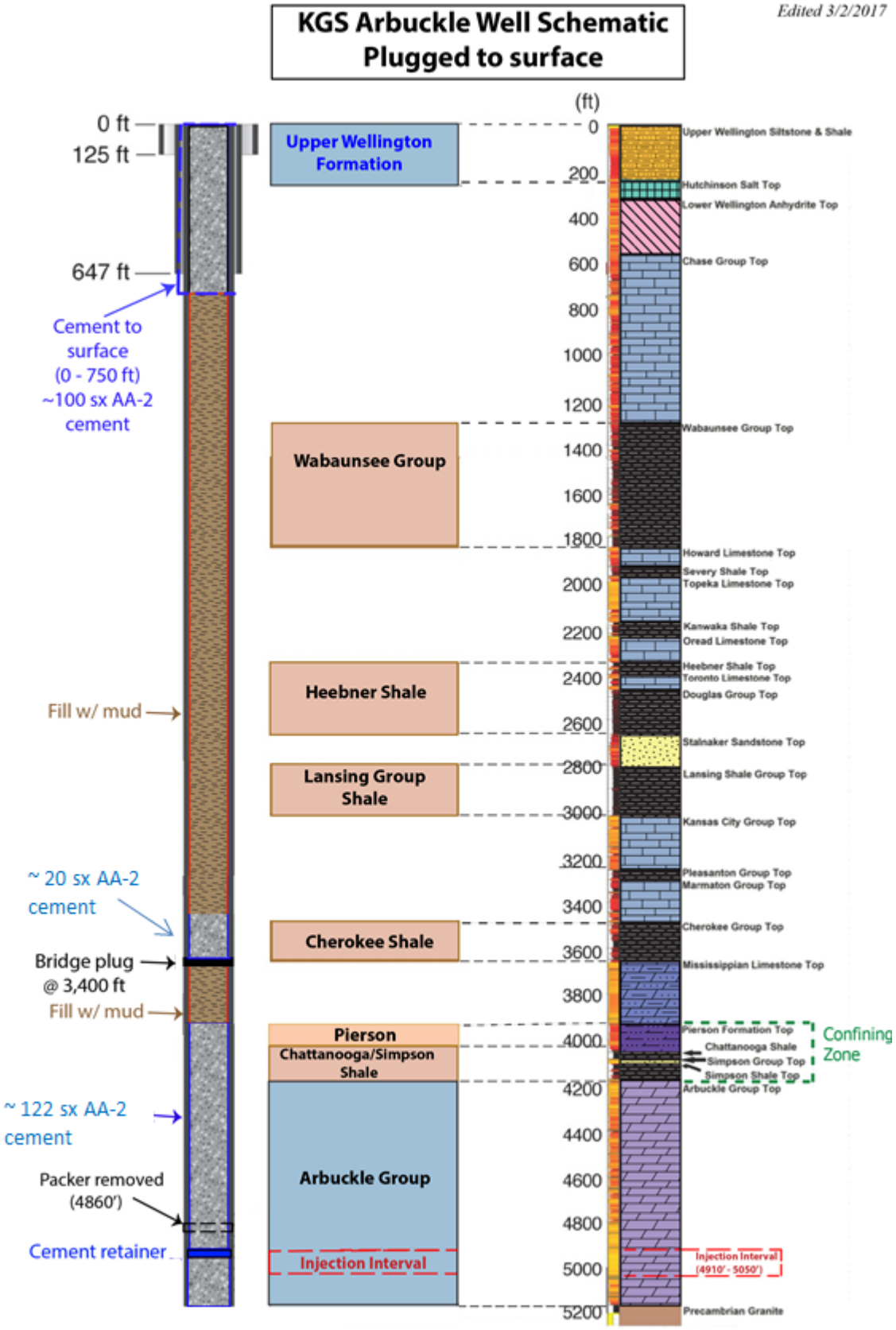

Figure 3. Arbuckle well plugging diagram (Option 2: plugged to surface).