

APPENDIX C-1:

INJECTION AND MONITORING WELL SCHEMATICS

“CTV III” STORAGE PROJECT

The following schematics provide depictions of the proposed injection and monitoring wells associated with CTV III project. This includes the well construction details and the type and location of monitoring equipment within the wellbore and relative to the geologic storage complex. Perforations and gross monitoring intervals have been indicated, but actual completion and monitoring intervals will be confirmed during the pre-operations phase of the project once the wells have been drilled.

Additionally, schematics of the proposed abandonment configurations of all injection and monitoring show proposed cement plug depths to ensure confinement and non-endangerment of USDW. Cement plug descriptions have been provided in tabular format.

Surface Measurements (w/ alarms on each):
 Injection Pressure, Injection Rate, Annular Pressure, Annular Volume
 Surface Equipment:
 Wellhead Surface Safety Valve (SSV) for automatic shut-off
 Comms to Central Control Facility (24-hr monitoring)

MD
 (TVD)

700

1,400

2,100

USDW @ 2530'

2,800

3,500

4,200

4,900

5,600

6,300

7,000

7,700

Casing	Depth Interval	Open Hole Diameter	Outer Diameter	Inner Diameter	Weight	Grade	Design Coupling	Thermal Conductivity @ 77 °F	Burst Strength	Collapse Strength	Tensile Strength
	(feet)	(inches)	(inches)	(inches)	(lb/ft)	(API)	(short or long threaded)	(BTU/ft hr,°F)	(psi)	(psi)	(lbf)
Conductor	14' - 54'	24	20	19.124	94	-	-	2.62	-	-	-
Surface	14' - 600'	17.5	13.375	12.615	54.5	K-55	Short	2.62	2,730	1,130	853,240
Intermediate	14' - 2550'	12.25	9.675	8.755	43.5	N-80	Long	2.62	6,330	3,810	1,065,350
Long-String	14' - 5780' 5780' - 7895'	8.5	7	6.275	25	L-80 L-80 CRA	Long	2.62	7,240	5,410	608,930

Tubing	Depth Interval	Outer Diameter	Inner Diameter	Weight	Grade	Design Coupling	Burst Strength	Collapse Strength	Tensile Strength
	(feet)	(inches)	(inches)	(lb/ft)	(API)	(short or long threaded)	(psi)	(psi)	(lbf)
4-1/2"	5940'	4.5"	4"	11.6	L-80 CRA	Premium	7,780	6,350	267,040

Temperature (DTS)
 @ 2500-2520'

Packer Type and Material	Packer Setting Depth	Length	Nominal Casing Weight	Outer Diameter	Inner diameter
	(feet)	(inches)	(lb/ft)	(inches)	(inches)
Permanent Sealbore Packer, CRA	5920'	30.3	26 - 32	5.875"	4.00"

Tensile Rating	Burst Rating	Collapse Rating	Max Casing Inner Diameter	Min Casing Inner Diameter
(lbs)	(psi)	(psi)	(inches)	(inches)
200,000	7,500	7,500	6.276	6.095

Temperature (DTS)
 @ 5260' - 5380'

Monitoring Interval,
 5260' - 5380'

Confining Layer

Injection Zone

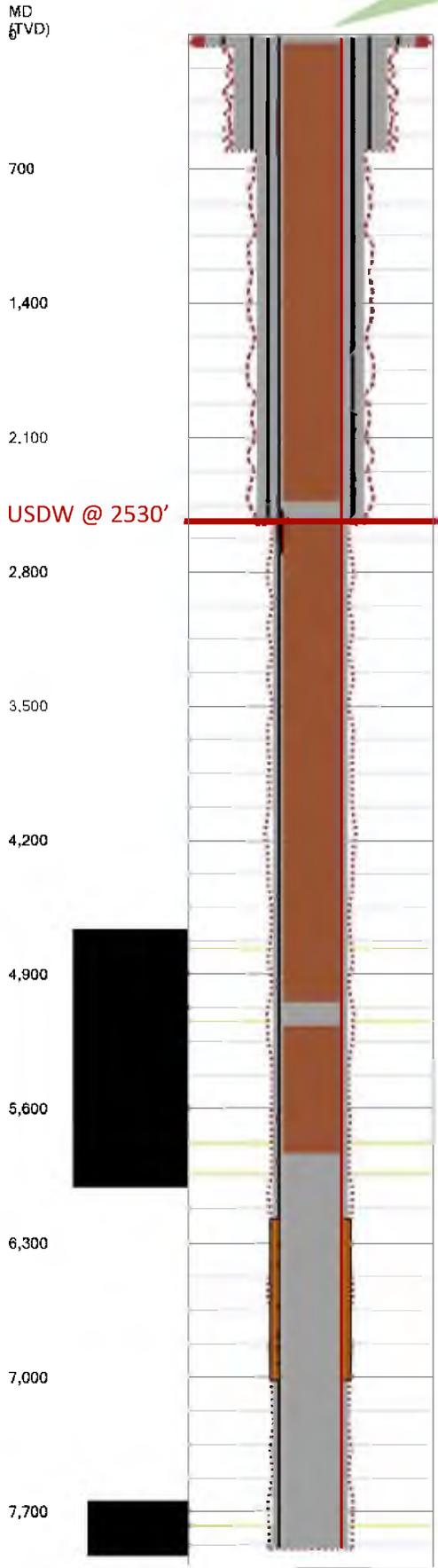
Temperature (DTS),
 Injection Pressure Gauge
 @ 5910'

Packer @ 5920'

Perforations:
 6176' - 7016'

Figure 1. Injection Well C-1, CO₂ Injection Schematic

Cut casing 5' below GL. Stamp and weld cap.
Backfill and reclaim surface location.



Well	C-1			
Plugs	Plug 1	Plug 2	Plug 3	Plug 4
Hole Size (in.)	6.276	6.276	6.276	6.276
Bottom of tubing (ft)	7800	5167	2555	39
Cement Volume (sacks)	367	24	24	5
Slurry Volume (bbl)	75.16	4.92	4.92	1.02
Slurry Weight (lb/gal)	15.8	15.8	15.8	15.8
Top of plug (ft)	5836	5042	2430	14
Bottom of Plug (ft)	7800	5167	2555	39
Type of Cement	Class G	Class G	Class G	Class G
Method of placement	Balanced Plug, Retainer, or CT Plug			

Figure 2. Injection Well C-1, Abandonment Schematic

Surface Measurements (w/ alarms on each):
 Injection Pressure, Injection Rate, Annular Pressure, Annular Volume
 Surface Equipment:
 Wellhead Surface Safety Valve (SSV) for automatic shut-off
 Comms to Central Control Facility (24-hr monitoring)

MD
 (FVD)

800

1,800

2,400

USDW @ 2534'

3,200

4,000

4,800

5,600

6,400

7,200

8,000

Casing	Depth Interval	Open Hole Diameter	Outer Diameter	Inner Diameter	Weight	Grade	Design Coupling	Thermal Conductivity @ 77 °F	Burst Strength	Collapse Strength	Tensile Strength
	(feet)	(inches)	(inches)	(inches)	(lb/ft)	(API)	(short or long threaded)	(BTU/ft hr, °F)	(psi)	(psi)	(lbf)
Conductor	14' - 54'	24	20	19.124	94	-	-	2.62	-	-	-
Surface	14' - 600'	17.5	13.375	12.615	54.5	K-55	Short	2.62	2730	1,130	853,240
Intermediate	14' - 2550'	12.25	9.675	8.755	43.5	N-80	Long	2.62	6330	3,810	1,055,350
Long-String	14' - 5760' 5760' - 7910'	8.5	7	6.276	26	L-80 L-80 CRA	Long	2.62	7240	5,410	603,930

Tubing	Depth Interval	Outer Diameter	Inner Diameter	Weight	Grade	Design Coupling	Burst Strength	Collapse Strength	Tensile Strength
	(feet)	(inches)	(inches)	(lb/ft)	(API)	(short or long threaded)	(psi)	(psi)	(lbf)
4-1/2"	5940'	4.5"	4"	11.6	L-80 CRA	Premium	7,780	6,350	267,040

Temperature (DTS)
 @ 2500-2520'

Packer Type and Material	Packer Setting Depth	Length	Nominal Casing Weight	Outer Diameter	Inner diameter
	(feet)	(inches)	(lb/ft)	(inches)	(inches)
Permanent Sealbore Packer, CRA	5920'	30.3	26 - 32	5.875"	4.00"

Tensile Rating	Burst Rating	Collapse Rating	Max Casing Inner Diameter	Min Casing Inner Diameter
(lbs)	(psi)	(psi)	(inches)	(inches)
200,000	7,500	7,500	6.276	6.095

Temperature (DTS)
 @ 5240' - 5360'

Monitoring Interval,
 5240' - 5360'

Confining Layer

Temperature (DTS),
 Injection Pressure Gauge
 @ 5910'

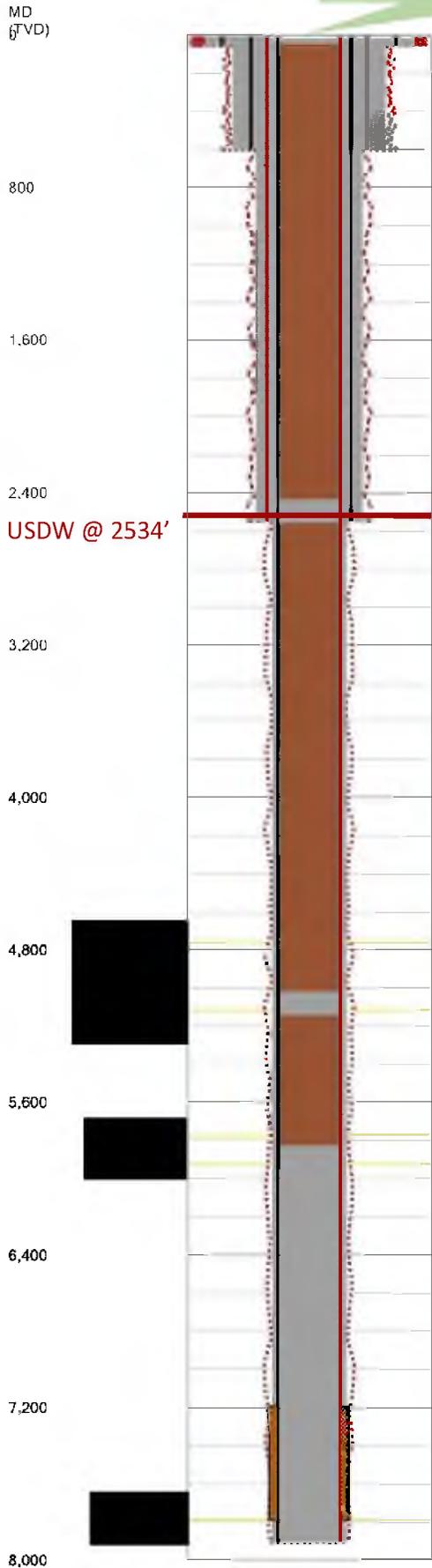
Injection Zone

Packer @ 5920'

Perforations:
 7192' - 7790'

Figure 3. Injection Well C-2, CO₂ Injection Schematic

Cut casing 5' below GL. Stamp and weld cap.
Backfill and reclaim surface location.



Well	C-2			
Plugs	Plug 1	Plug 2	Plug 3	Plug 4
Hole Size (in.)	6.276	6.276	6.276	6.276
Bottom of tubing (ft)	7860	5143	2559	39
Cement Volume (sacks)	380	24	24	5
Slurry Volume (bbt)	77.83	4.92	4.92	1.02
Slurry Weight (lb/gal)	15.8	15.8	15.8	15.8
Top of plug (ft)	5827	5018	2434	14
Bottom of Plug (ft)	7860	5143	2559	39
Type of Cement	Class G	Class G	Class G	Class G
Method of placement	Balanced Plug, Retainer, or CT Plug			

Figure 4. Injection Well C-2, Abandonment Schematic

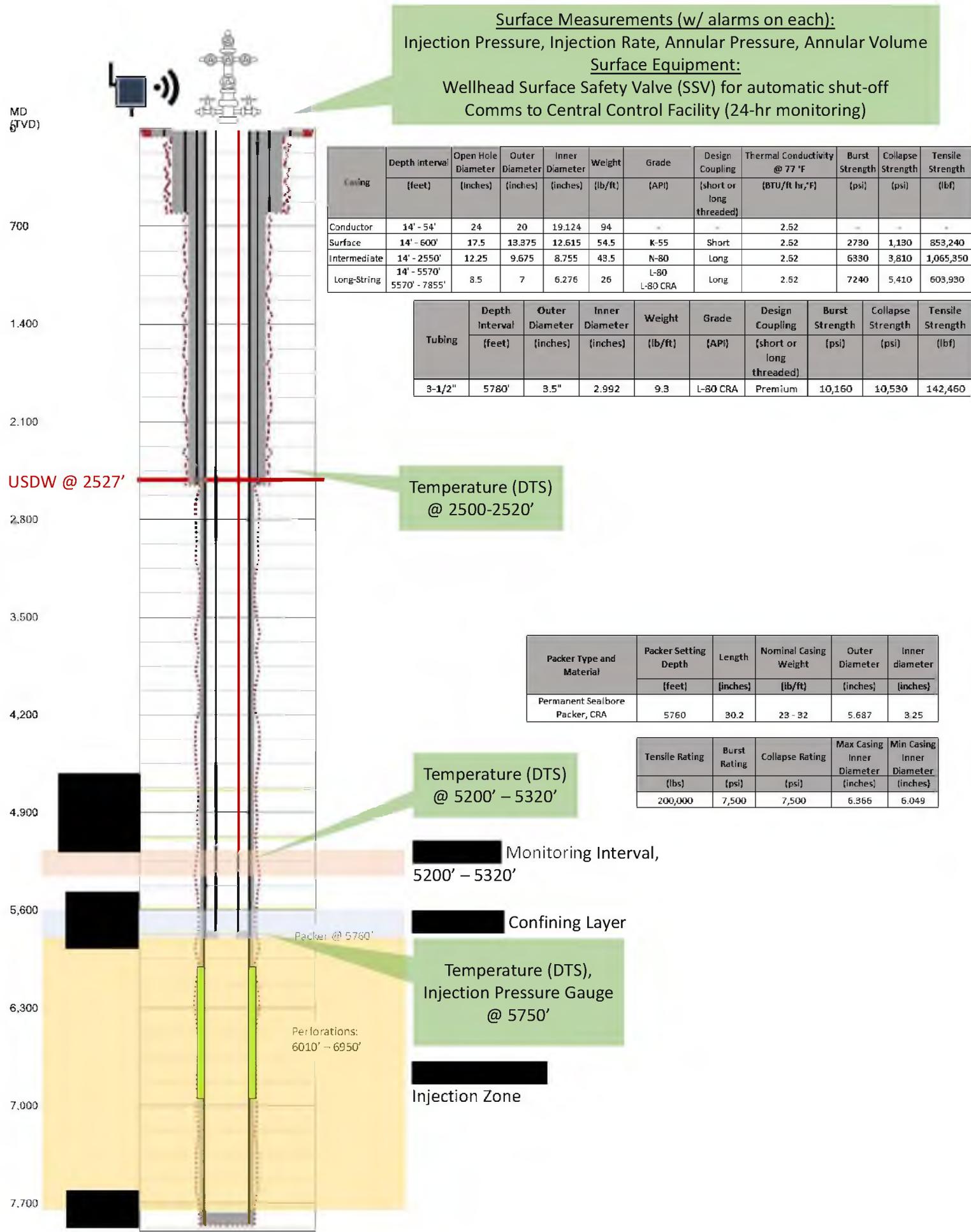
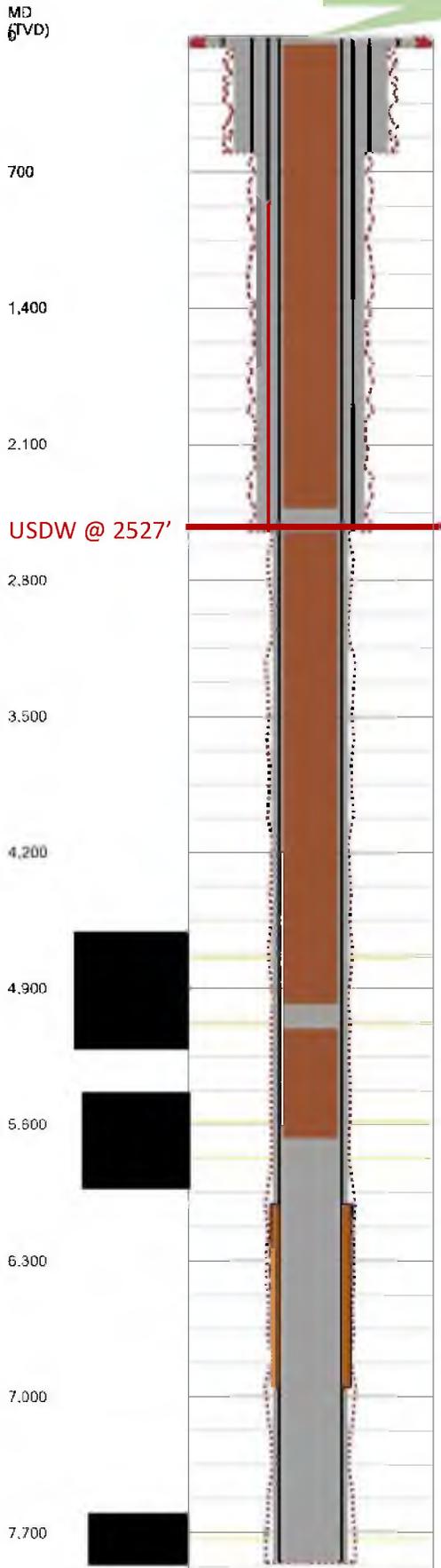


Figure 5. Injection Well E-1, CO₂ Injection Schematic

Cut casing 5' below GL. Stamp and weld cap.
Backfill and reclaim surface location.



Well	E-1			
	Plug 1	Plug 2	Plug 3	Plug 4
Hole Size (in.)	6.276	6.276	6.276	6.276
Bottom of tubing (ft.)	7765	5108	2552	39
Cement Volume (sacks)	391	24	24	3
Slurry Volume (bbl)	80.08	4.92	4.92	1.02
Slurry Weight (lb/gal)	15.8	15.8	15.8	15.8
Top of plug (ft)	5672	4983	2427	14
Bottom of Plug (ft)	7765	5108	2552	39
Type of Cement	Class G	Class G	Class G	Class G
Method of placement	Balanced Plug, Retainer, or CT Plug			

Figure 6. Injection Well E-1, Abandonment Schematic

Surface Measurements (w/ alarms on each):
 Injection Pressure, Injection Rate, Annular Pressure, Annular Volume
Surface Equipment:
 Wellhead Surface Safety Valve (SSV) for automatic shut-off
 Comms to Central Control Facility (24-hr monitoring)

MD
(TVD)

700

1,400

2,100

2,800

3,500

4,200

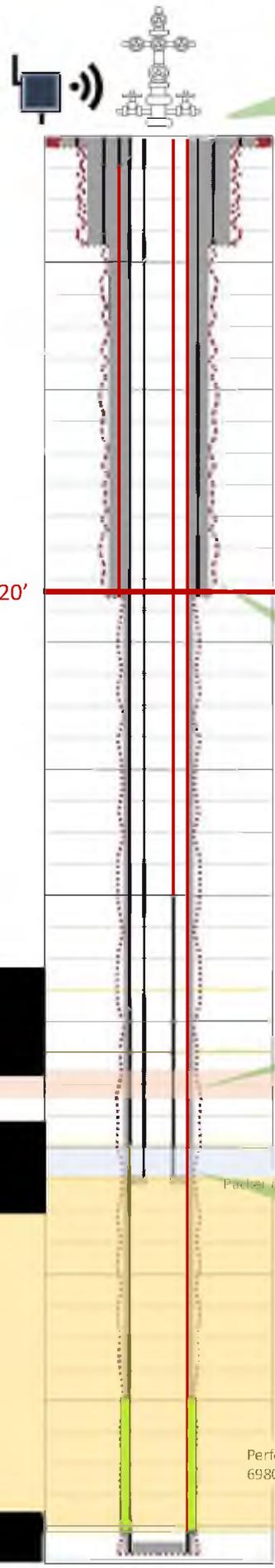
4,900

5,600

6,300

7,000

7,700



Casing	Depth Interval	Open Hole Diameter	Outer Diameter	Inner Diameter	Weight	Grade	Design Coupling	Thermal Conductivity @ 77 °F	Burst Strength	Collapse Strength	Tensile Strength
	(feet)	(Inches)	(Inches)	(Inches)	(lb/ft)	(API)	(short or long threaded)	(BTU/ft hr,°F)	(psi)	(psi)	(lbf)
Conductor	14' - 54'	24	20	19.124	94			2.62	*	*	*
Surface	14' - 600'	17.5	13.375	12.615	54.5	K-55	Short	2.62	2730	1,130	853,240
Intermediate	14' - 2550'	12.25	9.675	8.755	43.5	N-80	Long	2.62	5330	3,810	1,065,350
Long-String	14' - 5570' 5570' - 7845'	8.5	7	6.276	26	L-80 L-80 CRA	Long	2.62	7240	5,410	503,930

Tubing	Depth Interval	Outer Diameter	Inner Diameter	Weight	Grade	Design Coupling	Burst Strength	Collapse Strength	Tensile Strength
	(feet)	(Inches)	(Inches)	(lb/ft)	(API)	(short or long threaded)	(psi)	(psi)	(lbf)
3-1/2"	5780'	3.5"	2.992	9.3	L-80 CRA	Premium	10,160	10,530	142,460

Packer Type and Material	Packer Setting Depth	Length	Nominal Casing Weight	Outer Diameter	Inner diameter
	(feet)	(Inches)	(lb/ft)	(Inches)	(Inches)
Permanent Seal/ore Packer, CRA	5760	30.2	23 - 32	5.687	3.25

Tensile Rating	Burst Rating	Collapse Rating	Max Casing Inner Diameter	Min Casing Inner Diameter
(lbs)	(psi)	(psi)	(Inches)	(Inches)
200,000	7,500	7,500	6.366	6.049

Temperature (DTS)
@ 2500-2520'

Temperature (DTS)
@ 5190' - 5310'

Monitoring Interval,
5190' - 5310'

Confining Layer

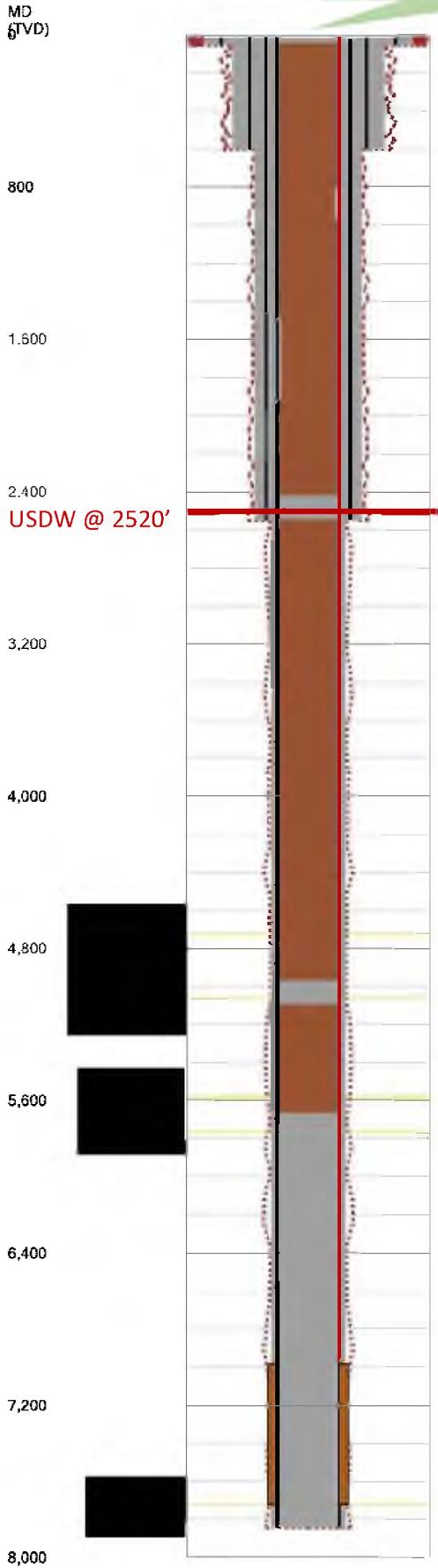
Temperature (DTS),
Injection Pressure Gauge
@ 5750'

Injection Zone

Perforations:
6980' - 7720'

Figure 7. Injection Well E-2, CO₂ Injection Schematic

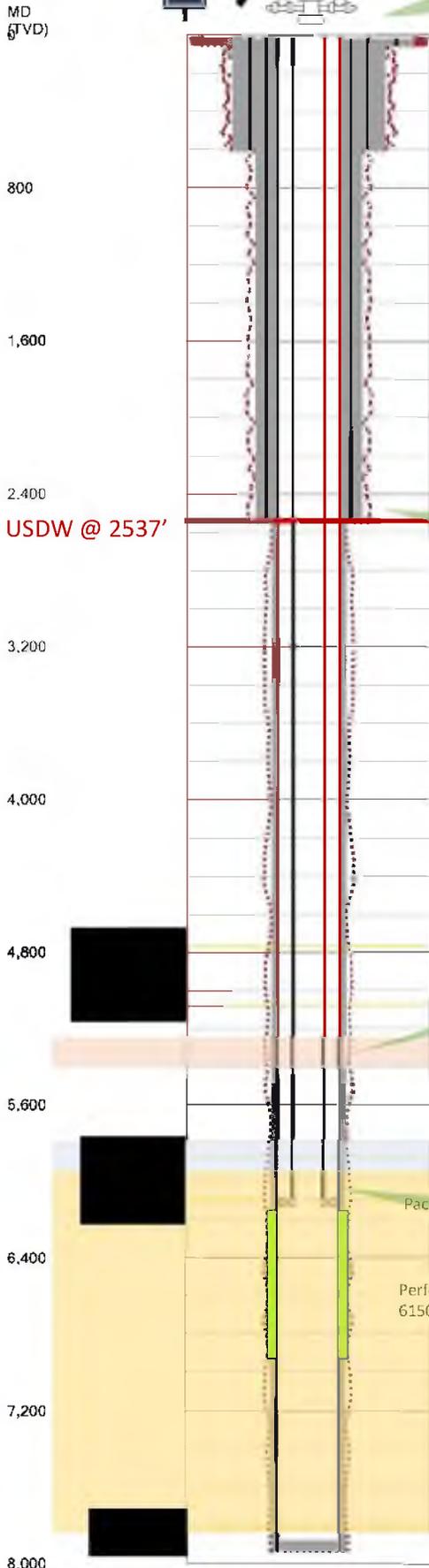
Cut casing 5' below GL. Stamp and weld cap.
Backfill and reclaim surface location.



Well	E-2			
Plugs	Plug 1	Plug 2	Plug 3	Plug 4
Hole Size (in.)	6.276	6.276	6.276	6.276
Bottom of tubing (ft)	7790	5094	2545	39
Cement Volume (sacks)	397	24	24	5
Slurry Volume (bbl)	81.31	4.92	4.92	1.02
Slurry Weight (lb/gal)	15.8	15.8	15.8	15.8
Top of plug (ft)	5668	4969	2420	14
Bottom of Plug (ft)	7790	5094	2545	39
Type of Cement	Class G	Class G	Class G	Class G
Method of placement	Balanced Plug, Retainer, or CT Plug			

Figure 8. Injection Well E-2, Abandonment Schematic

Surface Measurements (w/ alarms on each):
 Injection Pressure, Injection Rate, Annular Pressure, Annular Volume
 Surface Equipment:
 Wellhead Surface Safety Valve (SSV) for automatic shut-off
 Comms to Central Control Facility (24-hr monitoring)



Casing	Depth Interval	Open Hole Diameter	Outer Diameter	Inner Diameter	Weight	Grade	Design Coupling	Thermal Conductivity @ 77 °F	Burst Strength	Collapse Strength	Tensile Strength
	(feet)	(inches)	(inches)	(inches)	(lb/ft)	(API)	(short or long threaded)	(BTU/ft hr; °F)	(psi)	(psi)	(lbf)
Conductor	14' - 54'	24	20	19.124	94	*	*	2.62	*	*	*
Surface	14' - 600'	17.5	13.375	12.615	54.5	K-55	Short	2.62	2730	1,130	853,240
Intermediate	14' - 2550'	12.25	9.675	8.755	43.5	N-80	Long	2.62	6330	3,810	1,065,350
Long-String	14' - 5780' 5780' - 7895'	8.5	7	6.275	26	L-80 L-80 CRA	Long	2.62	7240	5,410	603,930

Tubing	Depth Interval	Outer Diameter	Inner Diameter	Weight	Grade	Design Coupling	Burst Strength	Collapse Strength	Tensile Strength
	(feet)	(inches)	(inches)	(lb/ft)	(API)	(short or long threaded)	(psi)	(psi)	(lbf)
3-1/2"	6120'	3.5"	2.992	9.3	L-80 CRA	Premium	10,160	10,530	142,460

Temperature (DTS)
@ 2500-2520'

Packer Type and Material	Packer Setting Depth	Length	Nominal Casing Weight	Outer Diameter	Inner diameter
	(feet)	(inches)	(lb/ft)	(inches)	(inches)
Permanent Sealbore Packer, CRA	6090'	30.2	23 - 32	5.687	3.25

Tensile Rating	Burst Rating	Collapse Rating	Max Casing Inner Diameter	Min Casing Inner Diameter
(lbs)	(psi)	(psi)	(inches)	(inches)
200,000	7,500	7,500	6.366	6.049

Temperature (DTS)
@ 5200' - 5320'

Monitoring Interval,
5200' - 5320'

Confining Layer

Temperature (DTS),
Injection Pressure Gauge
@ 6080'

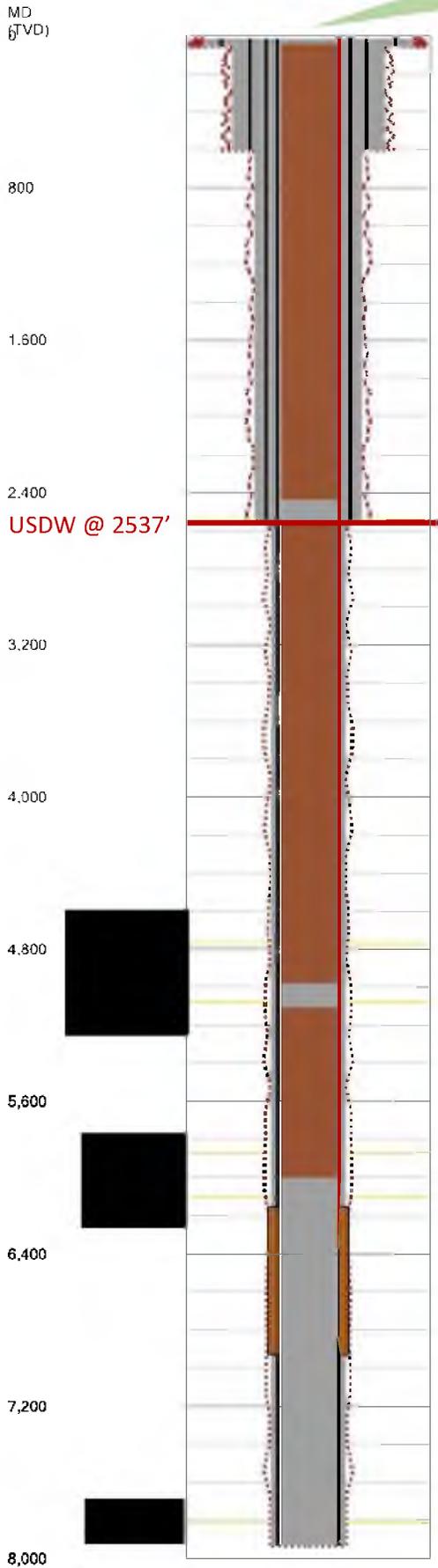
Packer @ 6090'

Perforations
6150' - 6930'

Injection Zone

Figure 9. Injection Well W-1, CO₂ Injection Schematic

Cut casing 5' below GL. Stamp and weld cap.
Backfill and reclaim surface location.

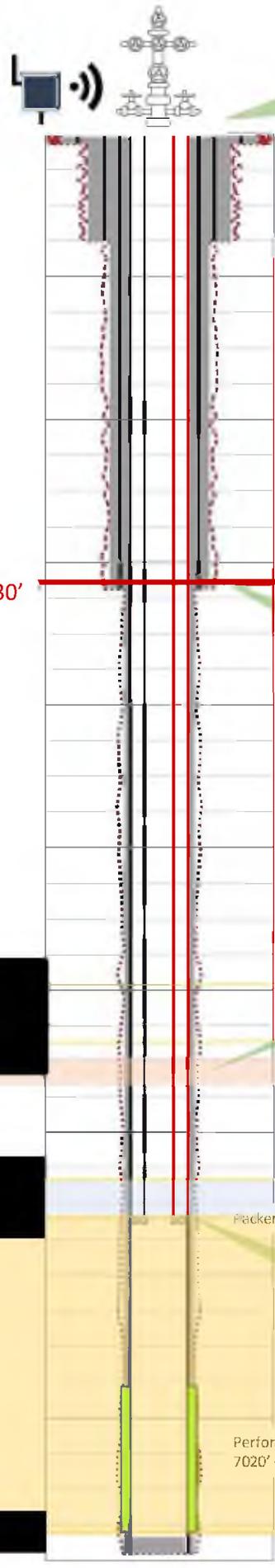


Well	W-1			
Plugs	Plug 1	Plug 2	Plug 3	Plug 4
Hole Size (in.)	6.276	6.275	6.276	6.276
Bottom of tubing (ft)	7875	5105	2562	39
Cement Volume (sacks)	350	24	24	5
Slurry Volume (bbl)	71.68	4.92	4.92	1.02
Slurry Weight (lb/gal)	15.8	15.8	15.8	15.8
Top of plug (ft)	6002	4980	2437	14
Bottom of Plug (ft)	7875	5105	2562	39
Type of Cement	Class G	Class G	Class G	Class G
Method of placement	Balanced Plug, Retainer, or CT Plug			

Figure 10. Injection Well W-1, Abandonment Schematic

Surface Measurements (w/ alarms on each):
 Injection Pressure, Injection Rate, Annular Pressure, Annular Volume
 Surface Equipment:
 Wellhead Surface Safety Valve (SSV) for automatic shut-off
 Comms to Central Control Facility (24-hr monitoring)

MD (TVD)
 800
 1,600
 2,400
 3,200
 4,000
 4,800
 5,600
 6,400
 7,200
 8,000



Casing	Depth Interval (feet)	Open Hole Diameter (Inches)	Outer Diameter (Inches)	Inner Diameter (Inches)	Weight (lb/ft)	Grade (API)	Design Coupling (short or long threaded)	Thermal Conductivity @ 77 °F (BTU/ft hr, °F)	Burst Strength (psi)	Collapse Strength (psi)	Tensile Strength (lbf)
Conductor	14' - 54'	24	20	19.124	94	-	-	2.62	-	-	-
Surface	14' - 600'	17.5	13.375	12.615	54.5	K-55	Short	2.62	2730	1,130	853,240
Intermediate	14' - 2550'	12.25	9.675	8.755	43.5	N-80	Long	2.62	6330	3,810	1,065,350
Long-String	14' - 5850'	8.5	7	6.276	26	L-80	Long	2.62	7240	5,410	503,930

Tubing	Depth Interval (feet)	Outer Diameter (Inches)	Inner Diameter (Inches)	Weight (lb/ft)	Grade (API)	Design Coupling (short or long threaded)	Burst Strength (psi)	Collapse Strength (psi)	Tensile Strength (lbf)
3-1/2"	6,090	3.5"	2.992	9.3	13Cr-L80	Premium	10,160	10,530	142,460

Packer Type and Material	Packer Setting Depth	Length	Nominal Casing Weight	Outer Diameter	Inner diameter
	(feet)	(inches)	(lb/ft)	(inches)	(inches)
Permanent Sealbore Packer, CRA	6070'	30.2	23 - 32	5.687	3.25

Tensile Rating (lbs)	Burst Rating (psi)	Collepse Rating (psi)	Max Casing Inner Diameter (inches)	Min Casing Inner Diameter (inches)
200,000	7,500	7,500	6.366	6.049

Temperature (DTS) @ 2500-2520'

Temperature (DTS) @ 5210' - 5330'

Monitoring Interval, 5210' - 5330'

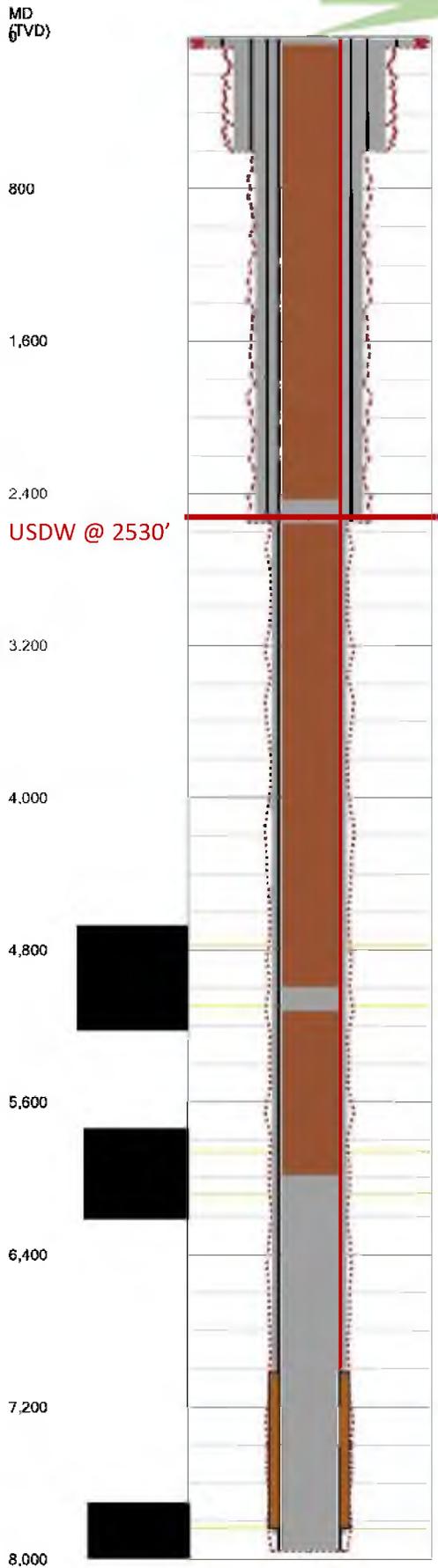
Confining Layer

Temperature (DTS), Injection Pressure Gauge @ 6060'

Injection Zone

Figure 11. Injection Well W-2, CO₂ Injection Schematic

Cut casing 5' below GL. Stamp and weld cap.
Backfill and reclaim surface location.



Well	W-2			
Plugs	Plug 1	Plug 2	Plug 3	Plug 4
Hole Size (in.)	6.276	6.276	6.276	6.276
Bottom of tubing (ft)	7840	5119	2555	39
Cement Volume (sacks)	348	24	24	5
Slurry Volume (bbl)	71.27	4.92	4.92	1.02
Slurry Weight (lb/gal)	15.8	15.8	15.8	15.8
Top of plug (ft)	5982	4994	2430	14
Bottom of Plug (ft)	7840	5119	2555	39
Type of Cement	Class G	Class G	Class G	Class G
Method of placement	Balanced Plug, Retainer, or CT Plug			

Figure 12. Injection Well W-2, Abandonment Schematic

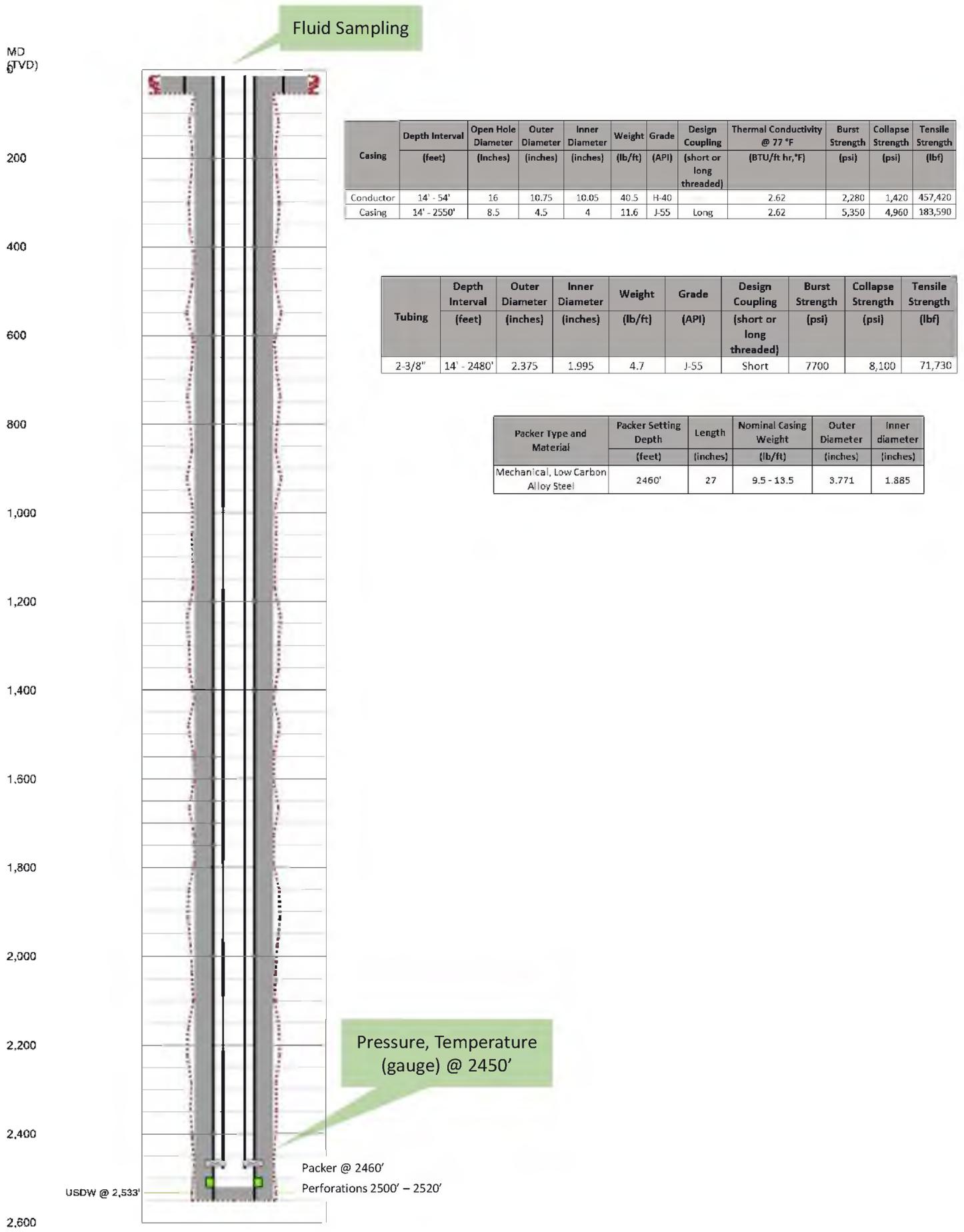


Figure 13. USDW Monitoring Well – US-1, Proposed Monitoring Schematic

MD
(TVD)

200

400

600

800

1,000

1,200

1,400

1,600

1,800

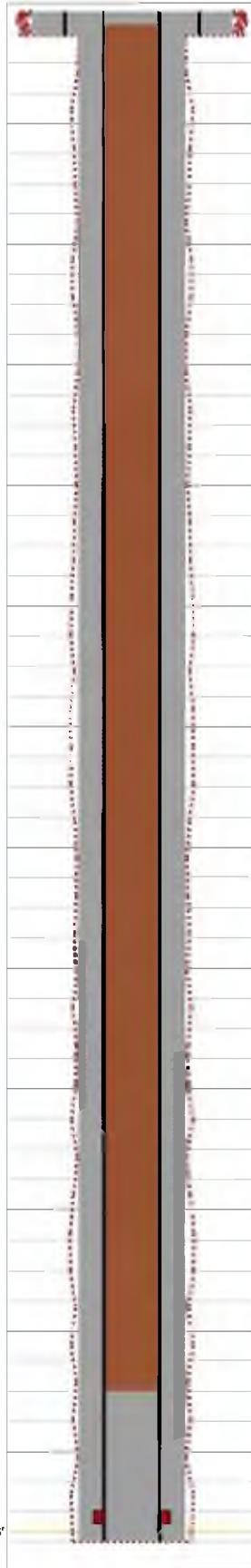
2,000

2,200

2,400

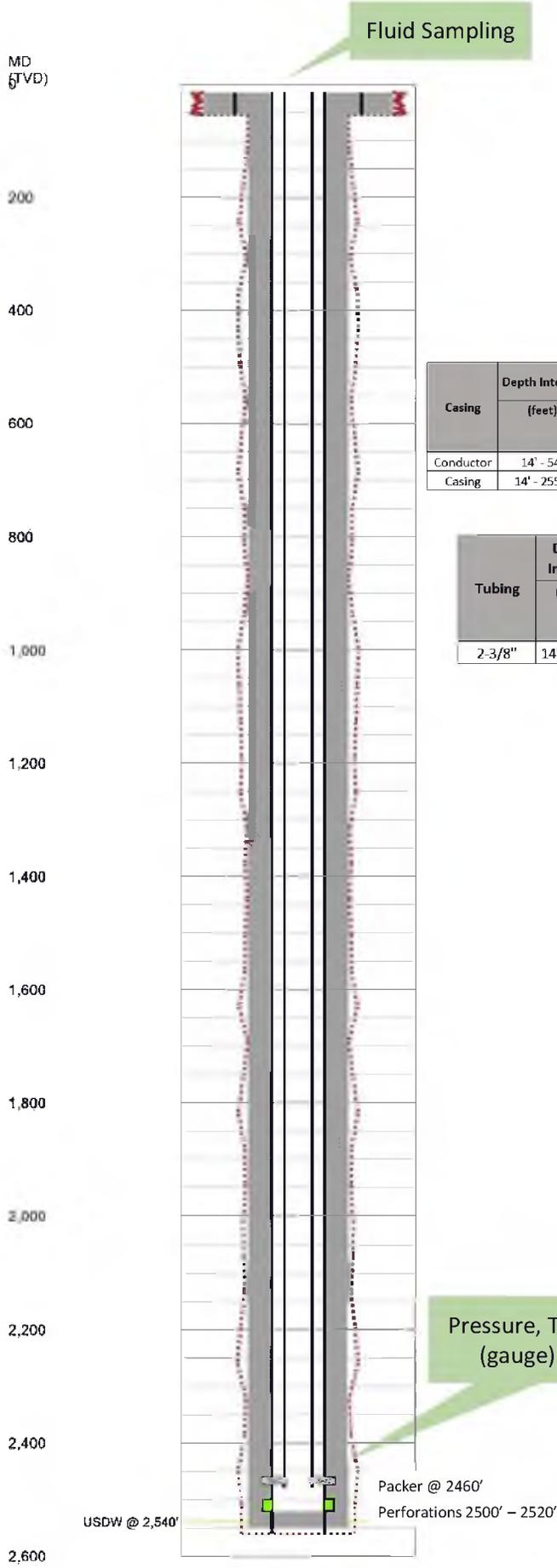
2,600

USDW @ 2,533'



Well	US-1	
Plugs	Plug 1	Plug 2
Diameter of boring in which plug will be placed (in.)	4"	4"
Depth to bottom of tubing or drill pipe (ft)	2520'	39'
Sacks of Cement to be used (each plug)	17	2
Slurry Volume to be pumped (bbl)	3.5	0.4
Slurry Weight (lb/gal)	15.8	15.8
Calculated top of plug (ft)	2300'	14'
Bottom of Plug (ft)	2520'	39'
Type of Cement or other material	Portland	
Method of placement (e.g., balance method, retainer method, or two-plug method)	Balanced Plug, Retainer, or CT Plug	

Figure 14. USDW Monitoring Well – US-1, Proposed Abandonment Schematic

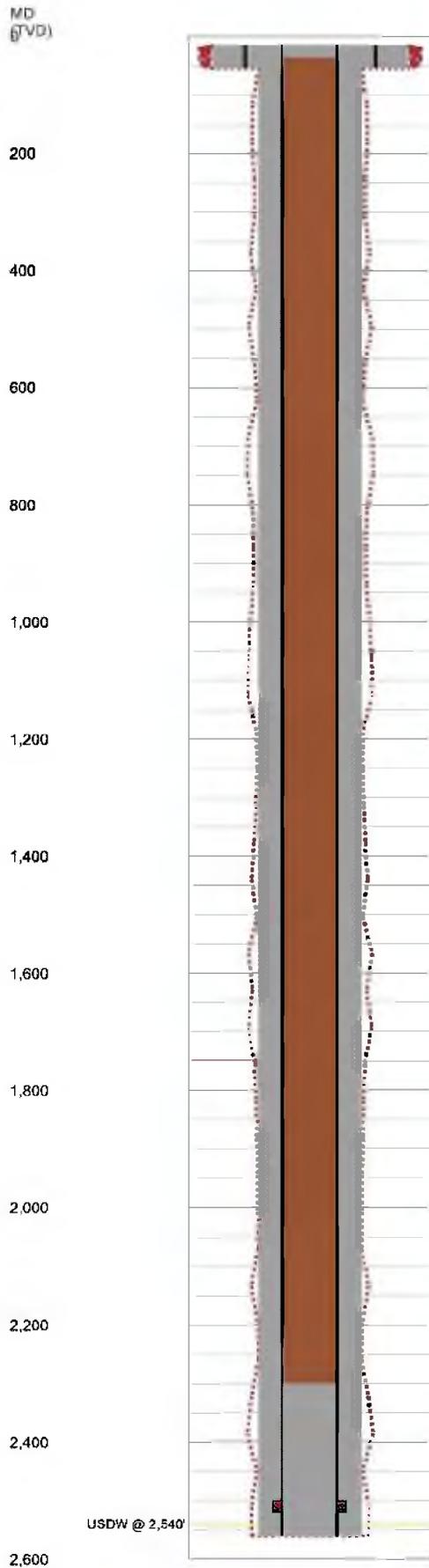


Casing	Depth Interval	Open Hole Diameter	Outer Diameter	Inner Diameter	Weight	Grade	Design Coupling	Thermal Conductivity @ 77 °F	Burst Strength	Collapse Strength	Tensile Strength
	(feet)	(Inches)	(inches)	(inches)	(lb/ft)	(API)	(short or long threaded)	(BTU/ft hr,°F)	(psi)	(psi)	(lbf)
Conductor	14' - 54'	16	10.75	10.05	40.5	H-40		2.62	2,280	1,420	457,420
Casing	14' - 2550'	8.5	4.5	4	11.6	J-55	Long	2.62	5,350	4,960	183,590

Tubing	Depth Interval	Outer Diameter	Inner Diameter	Weight	Grade	Design Coupling	Burst Strength	Collapse Strength	Tensile Strength
	(feet)	(inches)	(inches)	(lb/ft)	(API)	(short or long threaded)	(psi)	(psi)	(lbf)
2-3/8"	14' - 2480'	2.375	1.995	4.7	J-55	Short	7700	8,100	71,730

Packer Type and Material	Packer Setting Depth	Length	Nominal Casing Weight	Outer Diameter	Inner diameter
	(feet)	(inches)	(lb/ft)	(inches)	(inches)
Mechanical, Low Carbon Alloy Steel	2460'	27	9.5 - 13.5	3.771	1.885

Figure 15. USDW Monitoring Well – US-2, Proposed Monitoring Schematic



Well	US-2	
Plugs	Plug 1	Plug 2
Diameter of boring in which plug will be placed (in.)	4"	4"
Depth to bottom of tubing or drill pipe (ft)	2520'	39'
Sacks of Cement to be used (each plug)	17	2
Slurry Volume to be pumped (bbf)	3.5	0.4
Slurry Weight (lb/gal)	15.8	15.8
Calculated top of plug (ft)	2300'	14'
Bottom of Plug (ft)	2520'	39'
Type of Cement or other material	Portland	
Method of placement (a.g., balance method, retainer method, or two-plug method)	Balanced Plug, Retainer, or CT Plug	

Figure 16. USDW Monitoring Well – US-2, Proposed Abandonment Schematic

Surface Measurements (w/ alarms on each):
 Tubing Pressure, Annular Pressure, Annular Volume
 Surface Equipment:
 Comms to Central Control Facility (24-hr monitoring)

MD
 (TVD)

500

1,000

1,500

2,000

USDW @ 2532'

3,000

3,500

4,000

4,500

5,000

5,500

Casing	Depth Interval	Open Hole Diameter	Outer Diameter	Inner Diameter	Weight	Grade	Design Coupling	Thermal Conductivity @ 77 °F	Burst Strength	Collapse Strength	Tensile Strength
	(feet)	(Inches)	(Inches)	(Inches)	(lb/ft)	(API)	(short or long threaded)	(BTU/ft hr, °F)	(psi)	(psi)	(lbf)
Conductor	14' - 54'	24	20	19.124	94			2.62			-
Surface	14' - 600'	17.5	13.375	12.615	54.5	K-55	Short	2.62	2730	1,130	853,240
Intermediate	14' - 2550'	12.25	9.675	8.755	43.5	N-80	Long	2.62	6330	3,810	1,065,350
Long-String	14' - 5700'	8.5	7	6.366	23	L-80	Long	2.62	6340	5,410	532,440

Tubing	Depth Interval	Outer Diameter	Inner Diameter	Weight	Grade	Design Coupling	Burst Strength	Collapse Strength	Tensile Strength
	(feet)	(Inches)	(Inches)	(lb/ft)	(API)	(short or long threaded)	(psi)	(psi)	(lbf)
2-7/8"	5100'	2.875	2.441	6.5	L-80	Premium	10,570	11,170	144,960

Temperature (DTS)
 @ 2500-2520'

Packer Type and Material	Packer Setting Depth	Length	Nominal Casing Weight	Outer Diameter	Inner diameter
	(feet)	(Inches)	(lb/ft)	(Inches)	(Inches)
Mechanical, CRA	5080'	95.4	23 - 29	6	2.37

Tensile Rating	Burst Rating	Collapse Rating	Max Casing Inner Diameter	Min Casing Inner Diameter
(lbs)	(psi)	(psi)	(Inches)	(Inches)
100,000	8000	8000	6.466	6.184

Temperature (DTS),
 Tubing Pressure (Gauge)
 @ 5070'

Packer @ 5080'

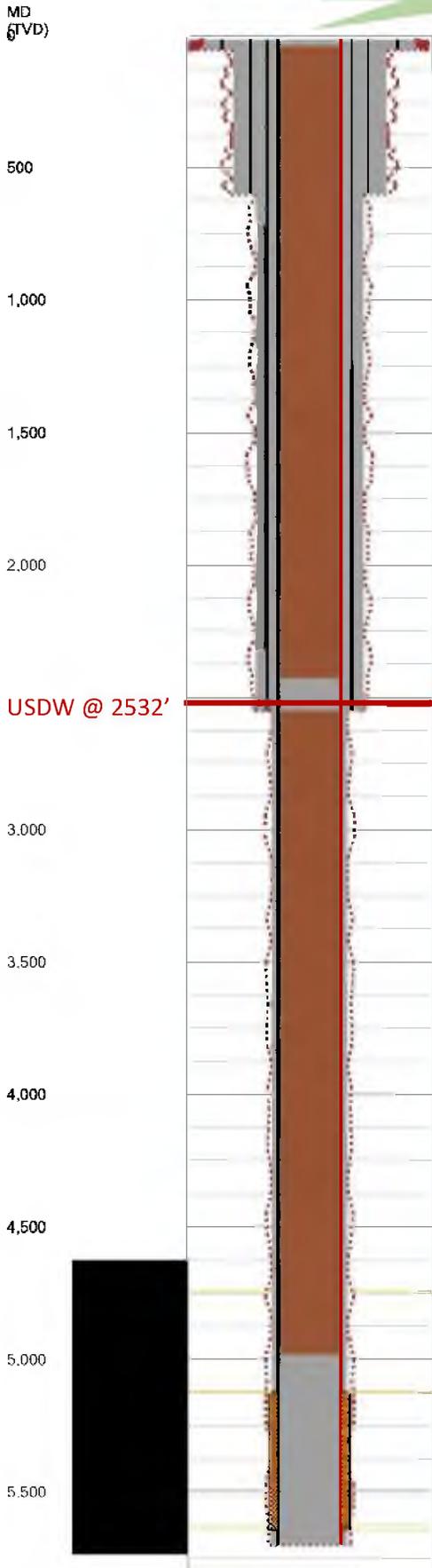
Perforations:
 5240' - 5360'

Monitoring Interval,
 5240' - 5360'

Confining Layer

Figure 17. Monitoring Well D-1, Monitoring Schematic

Cut casing 5' below GL. Stamp and weld cap.
Backfill and reclaim surface location.



Well	D-1			
	Plug 1	Plug 2	Plug 3	Plug 4
Hole Size (in.)	6.276	6.276	6.276	
Bottom of tubing (ft)	5645	2556	39	
Cement Volume (sacks)	117	24	5	
Slurry Volume (bbl)	23.96	4.92	1.02	
Slurry Weight (lb/gal)	15.8	15.8	15.8	
Top of plug (ft)	5022	2431	14	
Bottom of Plug (ft)	5645	2556	39	
Type of Cement	Class G	Class G	Class G	
Method of placement	Balanced Plug, Retainer, or CT Plug			

Figure 18. ██████████ Monitoring Well D-1, Abandonment Schematic

Surface Measurements (w/ alarms on each):
 Tubing Pressure, Annular Pressure, Annular Volume
 Surface Equipment:
 Comms to Central Control Facility (24-hr monitoring)

MD
 (TVD)

700

1,400

2,100

USDW @ 2512'

2,800

3,500

4,200

4,900

5,600

6,300

7,000

7,700

Casing	Depth Interval	Open Hole Diameter	Outer Diameter	Inner Diameter	Weight	Grade	Design Coupling	Thermal Conductivity @ 77 °F	Burst Strength	Collapse Strength	Tensile Strength
	(feet)	(Inches)	(Inches)	(Inches)	(lb/ft)	(API)	(short or long threaded)	(BTU/ft hr, °F)	(psi)	(psi)	(lbf)
Conductor	14' - 54'	24	20	19.124	94			2.62			
Surface	14' - 600'	17.5	13.375	12.615	54.5	K-55	Short	2.62	2730	1,130	853,240
Intermediate	14' - 2550'	12.25	9.675	8.755	43.5	N-80	Long	2.62	6330	3,810	1,065,350
Long-String	14' - 5480'	8.5	7	6.276	26	L-80 L-80 CRA	Long	2.62	7240	5,410	603,930

Tubing	Depth Interval	Outer Diameter	Inner Diameter	Weight	Grade	Design Coupling	Burst Strength	Collapse Strength	Tensile Strength
	(feet)	(Inches)	(Inches)	(lb/ft)	(API)	(short or long threaded)	(psi)	(psi)	(lbf)
2-7/8"	5780'	2.875	2.441	6.5	L-80 CRA	Premium	10,570	11,170	144,960

Packer Type and Material	Packer Setting Depth	Length	Nominal Casing Weight	Outer Diameter	Inner diameter
	(feet)	(Inches)	(lb/ft)	(Inches)	(Inches)
Permanent Seal bore Packer, CRA	5680'	30.2	23 - 32	5.687	3.25

Tensile Rating	Burst Rating	Collapse Rating	Max Casing Inner Diameter	Min Casing Inner Diameter
(lbs)	(psi)	(psi)	(Inches)	(Inches)
200,000	7,500	7,500	6.366	6.049

Temperature (DTS)
 @ 2500-2520'

Temperature (DTS)
 @ 5060' - 5180'

Monitoring Interval,
 5060' - 5180'

Confining Layer

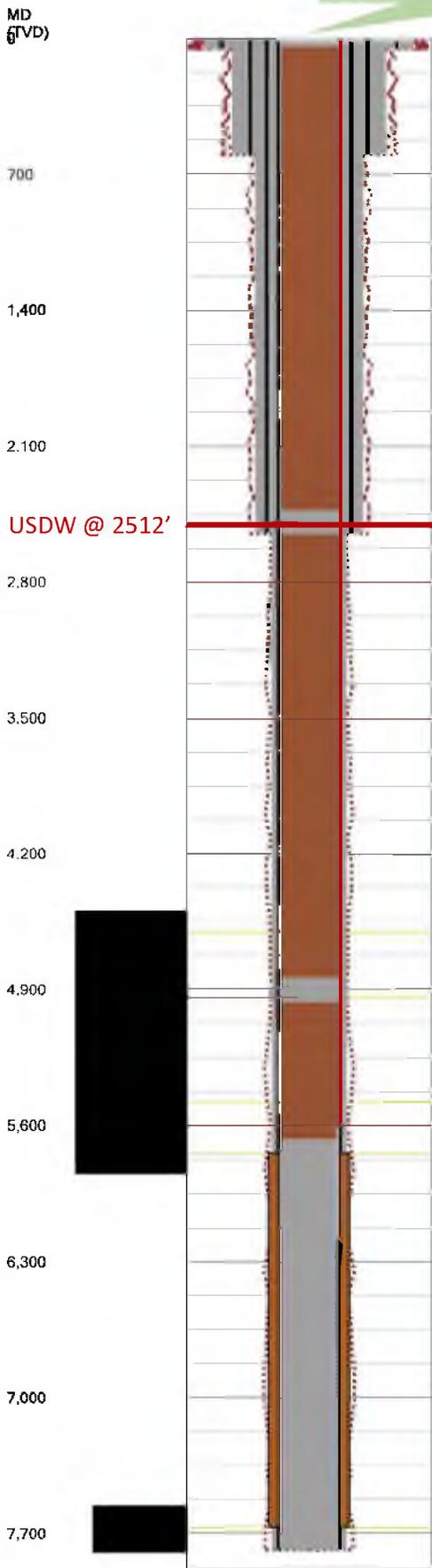
Temperature (DTS),
 Tubing Pressure (Gauge)
 @ 5670'

Injection Zone,
 5744' - 7668'

Perforations TBD

Figure 19. Monitoring Well M-1, Monitoring Schematic

Cut casing 5' below GL. Stamp and weld cap.
Backfill and reclaim surface location.



Well	M-1			
	Plug 1	Plug 2	Plug 3	Plug 4
Hole Size (in.)	6.276	6.276	6.276	6.276
Bottom of tubing (ft)	7678	4962	2536	39
Cement Volume (sacks)	380	24	24	5
Slurry Volume (bbt)	77.83	4.92	4.92	1.02
Slurry Weight (lb/gal)	15.8	15.8	15.8	15.8
Top of plug (ft)	5644	4837	2411	14
Bottom of Plug (ft)	7678	4962	2536	39
Type of Cement	Class G	Class G	Class G	Class G
Method of placement	Balanced Plug, Retainer, or CT Plug			

Figure 20. [Redacted] Monitoring Well M-1, Abandonment Schematic

Surface Measurements (w/ alarms on each):
 Tubing Pressure, Annular Pressure, Annular Volume
 Surface Equipment:
 Comms to Central Control Facility (24-hr monitoring)

MD
 (TVD)

700

1,400

2,100

USDW @ 2541'

2,800

3,500

4,200

4,900

5,600

6,300

7,000

7,700

Casing	Depth Interval (feet)	Open Hole Diameter (Inches)	Outer Diameter (Inches)	Inner Diameter (Inches)	Weight (lb/ft)	Grade (API)	Design Coupling (short or long threaded)	Thermal Conductivity @ 77 °F (BTU/ft hr, °F)	Burst Strength (psi)	Collapse Strength (psi)	Tensile Strength (lbf)
Conductor	14' - 54'	24	20	19.124	94			2.62			
Surface	14' - 600'	17.5	13.375	12.615	54.5	K-55	Short	2.62	2730	1,130	853,240
Intermediate	14' - 2550'	12.25	9.675	8.755	43.5	N-80	Long	2.62	6330	3,810	1,065,350
Long-String	14' - 5860' 5860' - 7823'	8.5	7	6.276	26	L-80 L-80 CRA	Long	2.62	7240	5,410	603,930

Tubing	Depth Interval (feet)	Outer Diameter (inches)	Inner Diameter (inches)	Weight (lb/ft)	Grade (API)	Design Coupling (short or long threaded)	Burst Strength (psi)	Collapse Strength (psi)	Tensile Strength (lbf)
2-7/8"	6130'	2.875	2.441	6.5	L-80 CRA	Premium	10,570	11,170	144,960

Temperature (DTS)
 @ 2500-2520'

Packer Type and Material	Packer Setting Depth	Length	Nominal Casing Weight	Outer Diameter	Inner diameter
	(feet)	(inches)	(lb/ft)	(inches)	(inches)
Permanent Sealbore Packer, CRA	6110'	30.2	23 - 32	5.687	3.25

Temperature (DTS)
 @ 5250' - 5370'

Tensile Rating	Burst Rating	Collapse Rating	Max Casing Inner Diameter	Min Casing Inner Diameter
(lbs)	(psi)	(psi)	(inches)	(inches)
200,000	7,500	7,500	6.366	6.049

Monitoring Interval,
 5250' - 5370'

Confining Layer

Temperature (DTS),
 Injection Pressure Gauge
 @ 6100'

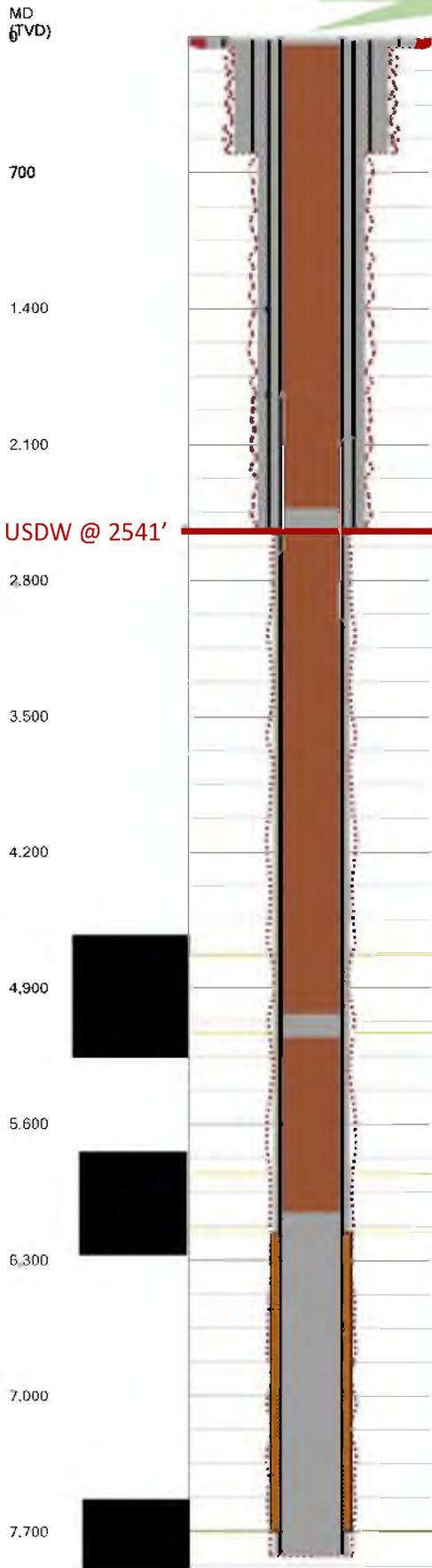
Injection Zone,
 6160' - 7700'

Packer @ 6110'

Perforations TBD

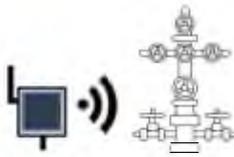
Figure 21. Monitoring Well M-2, Monitoring Schematic

Cut casing 5' below GL. Stamp and weld cap.
Backfill and reclaim surface location.



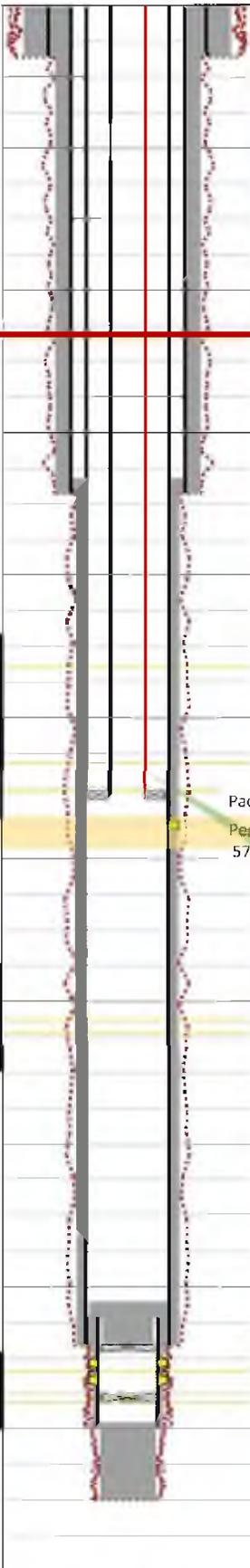
Well	M-2			
Plugs	Plug 1	Plug 2	Plug 3	Plug 4
Hole Size (in.)	6.276	6.276	6.276	6.276
Bottom of tubing (ft)	7702	5156	2556	39
Cement Volume (sacks)	308	24	24	5
Slurry Volume (bbl)	63.08	4.92	4.92	1.02
Slurry Weight (lb/gal)	15.8	15.8	15.8	15.8
Top of plug (ft)	6055	5031	2441	14
Bottom of Plug (ft)	7702	5156	2556	39
Type of Cement	Class G	Class G	Class G	Class G
Method of placement	Balanced Plug, Retainer, or CT Plug			

Figure 22. [REDACTED] Monitoring Well M-2, Abandonment Schematic



Surface Measurements (w/ alarms on each):
 Tubing Pressure, Annular Pressure, Annular Volume
 Surface Equipment:
 Comms to Central Control Facility (24-hr monitoring)

MD (TVD)
 1,000
 2,000
 3,000
 4,000
 5,000
 6,000
 7,000
 8,000
 9,000
 10,000
 11,000



USDW @ 2539'

Packer @ 5690'
 Perforations
 5731' - 5792'

Pressure Monitoring Interval,
 5731' - 5792'

Temperature (DTS),
 Injection Pressure Gauge
 @ 5680'

Casing	Depth Interval (feet)	Open Hole Diameter (Inches)	Outer Diameter (Inches)	Inner Diameter (Inches)	Weight (lb/ft)	Grade (API)	Design Coupling (short or long threaded)	Thermal Conductivity @ 77 °F (BTU/ft hr, °F)	Burst Strength (psi)	Collapse Strength (psi)	Tensile Strength (lbf)
Surface	13' - 357'	17.5	13.375	12.715	48	H-40	Short	2.62	1,730	770	540,960
Intermediate	13' - 3,423'	12.25	9.625	8.921	36	K-55	Short	2.62	3,520	2,020	564,000
Casing	13' - 9,401'	8.625	7	6.276	26	N-80	Long	2.62	7,240	5,410	603,930
Liner	9,215 - 9,962'	6	5	4.276	18	N-80	Long	2.62	10,140	10,490	421,970
-	9,962 - 10,500'	4.75	-	-	-	-	-	-	-	-	-

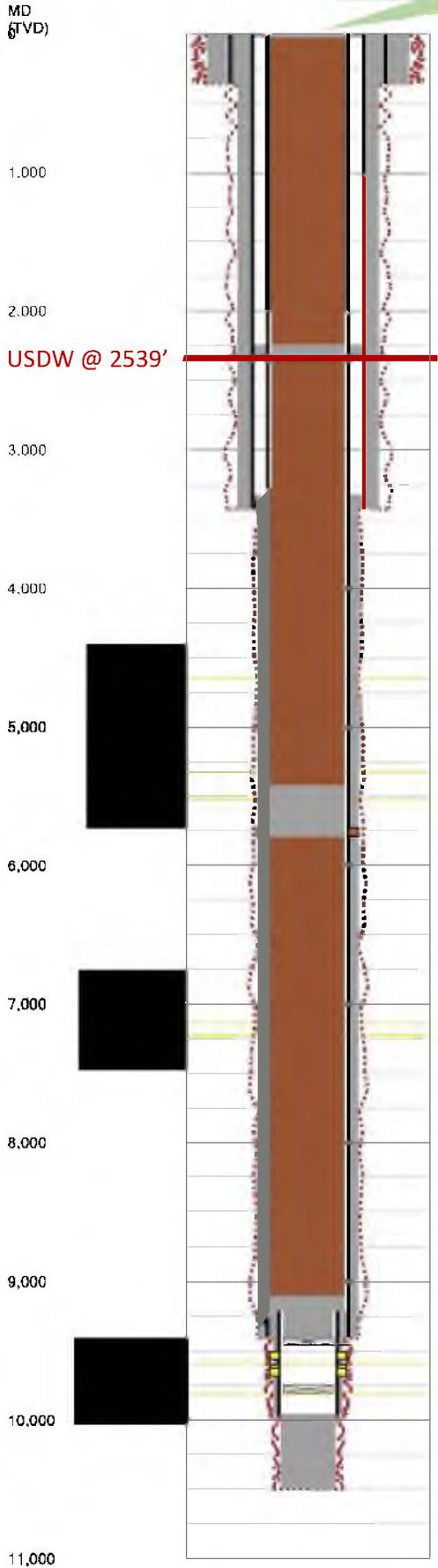
Tubing	Depth Interval (feet)	Outer Diameter (Inches)	Inner Diameter (Inches)	Weight (lb/ft)	Grade (API)	Design Coupling (short or long threaded)	Burst Strength (psi)	Collapse Strength (psi)	Tensile Strength (lbf)
2-7/8"	5700	2.875	2.441	6.5	L-80	Long	10,570	11,170	144,960

Packer Type and Material	Packer Setting Depth	Length	Nominal Casing Weight	Outer Diameter	Inner diameter
	(feet)	(inches)	(lb/ft)	(inches)	(inches)
Mechanical, Low Carbon Alloy Steel	5690'	95.4	23 - 29	6	2.37

Tensile Rating	Burst Rating	Collapse Rating	Max Casing Inner Diameter	Min Casing Inner Diameter
(lbs)	(psi)	(psi)	(inches)	(inches)
100,000	8000	8000	6.466	6.184

Figure 23. [Redacted] Pressure Monitoring Well, [Redacted] Proposed Monitoring Schematic

Cut casing 5' below GL. Stamp and weld cap.
Backfill and reclaim surface location.



Well				
Plugs	Plug 1	Plug 2	Plug 3	Plug 4
Hole Size (in.)	6.276	6.276	6.276	6.276
Bottom of tubing (ft)	9215	5792	2364	39
Cement Volume (sacks)	21	70	24	5
Slurry Volume (bbt)	4.3	14.3	4.9	1.0
Slurry Weight (lb/gal)	15.8	15.8	15.8	15.8
Top of plug (ft)	9104	5422	2239	14
Bottom of Plug (ft)	9215	5792	2364	39
Type of Cement	Class G	Class G	Class G	Class G
Method of placement	Balanced Plug, Retainer, or CT Plug			

Figure 24. [REDACTED] Pressure Monitoring Well, [REDACTED]
[REDACTED], Proposed Abandonment Schematic