ATTACHMENT K

CONSTRUCTION DETAILS

1. FACILITY INFORMATION

Facility Name: CarbonFrontier

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Well Information:

Well Number	County, State	Latitude	Longitude
CI1-64Z-27N	Kern County, CA	35°33'9.4877"N	119°48'26.3702"W
CI2-64Z-35N	Kern County, CA	35°32'32.6713"N	119°47'37.0682"W
CI3-64Z-35N	Kern County, CA	35°32'11.6457"N	119°47'7.5912"W
CI4-64Z-35N	Kern County, CA	35°31'55.4154"N	119°46'51.7864"W
27R-27N	Kern County, CA	35°33'2.4280"N	119°48'28.6103"W
55-26N	Kern County, CA	35°32'43.2520"N	119°47'32.7755"W
64-35N	Kern County, CA	35°31'44.3600"N	119°46'44.9788"W
9-1N	Kern County, CA	35°31'31.6480"N	119°46'37.0154"W
64-27N	Kern County, CA	35°32'38.0979"N	119°47'54.6576"W

Version History

File Name	Version	Date	Description of Change
Attachment K – Aera CCS Construction Details.pdf	1	January 19, 2023	Original document
Attachment K – CarbonFrontier Construction Details V2 04182024.pdf	2	April 18, 2024	Revisions made based on additional monitoring well and construction specifications
Attachment K – CarbonFrontier Construction Details V3 10152024.pdf	3	October 15, 2024	Revisions made based on EPA Technical Review comments from September 12, 2024

The construction details for the following wells are described in this attachment:

- New-drill injection wells:
  - CI1-64Z-27N
  - CI2-64Z-35N
  - CI3-64Z-35N
  - CI4-64Z-35N

- Repurposed injection wells:
  - 27R-27N
  - 55-26N
  - 64-35N
  - 9-1N
  - 64-27N
- Repurposed monitoring wells:
  - 1-28N
  - 25-26N
  - 27-1N
  - 39-26N
  - 35X-27N

2. WELL CONSTRUCTION DETAILS – NEW-DRILL INJECTION WELLS

The well construction diagram for new-drill wells (CI1-64Z-27N, CI2-64Z-35N, CI3-64Z-35N, and CI4-64Z-35N) is shown in **Figure 1. Tables 1.a, 1.b, 1.c,** and **1.d** show the respective well construction details.

Table 1.a: Open Hole Diameters and Intervals – New-Drill Wells

Name	Depth Interval (ft)	Open Hole Diameter (in.)	Comment
Conductor	Surface – 50	26	New drilled hole and casing
Surface	Surface – 1,000	17.5	New drilled hole and casing
Intermediate	Surface – 6,100	12.25	New drilled hole and casing
Long-string section 1	Surface – 6,000	8.5	New drilled hole and casing
Long-string section 2	6,000 – 8,000	8.5	New drilled hole and casing
Liner	7,700 – 8,500	6	New drilled hole and casing

ft: feet
in. inches

Table 1.b: Casing Specifications – New-Drill Well

Name	Depth Interval (ft)	Outside Diameter (in.)	Inside Diameter (in.)	Weight (ppf)	Grade (API)	Design Coupling (Short or Long Threaded)	Thermal Conductivity @68^{0}F (BTU/ft hr, ^{0}F)	Burst Strength (psi)	Collapse Strength (psi)
Conductor	Surface – 50	20	19.124	94	H40	Short	26.2	1,530	520
Surface	Surface – 1,000	13.375	12.615	54.5	K55	Short	26.2	2,730	1,130
Intermediate	Surface – 6,100	9.625	8.835	40	K55	Long	26.2	3,950	2,570
Long-string section 1	Surface - 6,000	7	6.276	26	L80	Long	26.2	7,240	5,410
Long-string section 2	6,000 - 8,000	7	6.276	29	Mod 13Cr110	Long	15.0	9,960	6,230
Liner	7,700 – 8,500	4.5	3.958	12.6	Mod 13Cr95	Long	15.0	10,010	6,350

BTU/ft hr, ^{0}F: amount of heat in British thermal units that flows through one foot of the material per hour due to a one-degree Fahrenheit temperature difference across it
ppf: pounds per foot
psi: pounds per square inch

Table 1.c: Tubing Specifications – New-Drill Well

Name	Depth Interval (ft)	Outside Diameter (in.)	Inside Diameter (in.)	Weight (ppf)	Grade (API)	Design Coupling (Short or Long Threaded)	Burst strength (psi)	Collapse strength (psi)	Tensile strength (lbf)
Injection tubing	Surface - 7,300	4.5	4.000	11.6	Mod 13Cr80	Long	7,780	6,350	267,040

lbf: pound (force)

Table 1.d: Packer Specifications – New-Drill Well

Packer Type and Material	Packer Setting Depth (ft)	Length (in.)	Nominal Casing Weight (ppf)	Packer Main Body Outer Diameter (in.)	Packer Inner Diameter (in.)
Permanent or retrievable with latched seal assembly – Alloy 718 or equivalent	7,300	74	23-32	5.937	3.875 in. (based on tubing drift ID)

Tensile Rating (lbs)	Burst Rating (psi)	Collapse Rating (psi)	Max. Casing Inner Diameter (in.)	Min. Casing Inner Diameter (in.)
151,585	10,000	9,676	6.276 in. (nominal ID for 7 in. 26-ppf casing)	6.151 in. (drift diameter for 7-in. 26-ppf casing)

3. WELL CONSTRUCTION DETAILS – 27R-27N

The well construction diagram for well 27R-27N is shown in **Figure 2**. **Tables 2.a, 2.b, 2.c,** and **2.d** show the respective well construction details.

Table 2.a: Open Hole Diameters and Intervals – 27R-27N

Name	Depth Interval (ft)	Open Hole Diameter (in.)	Comment
Conductor	Surface – 90	Not reported	Existing casing
Surface	Surface – 805	22-in. hole	Existing casing
Long-string	Surface – 7,789	10.625-in. hole	Existing casing
Cutoff Casing	7,775 – 8,820	7.875-in. hole	Existing casing
Liner	8,800 – 8,940	5.625-in. hole	Existing liner
Long-string section 1	Surface – 7,220	8.032 (ID of 9-in. casing)	New inner casing
Long-string section 2	7,220 – 7,693	8.032 (ID of 9-in. casing)	New inner casing
Liner	7,630 – 8,250	5.855 (ID of 6.625-in. liner)	New inner liner

Table 2.b: Casing Specifications – 27R-27N

Name	Depth Interval (ft)	Outside Diameter (in.)	Inside Diameter (in.)	Weight (ppf)	Grade (API)	Design Coupling (Short or Long Threaded)	Thermal Conductivity @68^{0}F (BTU/ft hr, ^{0}F)	Burst Strength (psi)	Collapse Strength (psi)
Conductor	Surface – 90	20	Not reported	Not reported	Not reported	Short	26.2	Not reported	Not reported
Surface	Surface – 805	16	15.124	72.72	Not reported	Short	26.2	Not reported	Not reported
Long-string	Surface – 7,789	9	8.032	45	J55	Long	26.2	5,180	4,670
Cutoff casing	7,775 – 8,820	6.625	5.885	26	N80	Long	26.2	8,140	6,980
Liner	8,800 – 8,940	4.75	4.082	16	J55	Long	26.2	6,770	7,190
Long-string section 1	Surface – 7,220	7	6.276	26	L80	Long	26.2	7,240	5,410
Long-string section 2	7,220 – 7,693	7	6.276	26	Mod 13Cr80	Long	15.0	7,240	5,410
Liner	7,630 – 8,250	4.5	3.958	11.6	Mod 13Cr80	Long	15.0	10,010	8,410

Table 2.c: Tubing Specifications – 27R-27N

Name	Setting Depth (ft)	Outside Diameter (in.)	Inside Diameter (in.)	Weight (ppf)	Grade (API)	Design Coupling (Short or Long Threaded)	Burst strength (psi)	Collapse strength (psi)	Tensile strength (lbf)
Injection tubing	Surface - 7,570	4.5	4.000	11.6	Mod 13Cr80	Long	7,780	6,350	267,040

Table 2.d: Packer Specifications – 27R-27N

Packer Type and Material	Packer Setting Depth (ft)	Length (in.)	Nominal Casing Weight (ppf)	Packer Main Body Outer Diameter (in.)	Packer Inner Diameter (in.)
Permanent or retrievable with latched seal assembly – Alloy 718 or equivalent	7,570	74	23-32	5.937	3.875 in. (based on tubing drift ID)

Tensile Rating (lbs)	Burst Rating (psi)	Collapse Rating (psi)	Max. Casing Inner Diameter (in.)	Min. Casing Inner Diameter (in.)
151,585	10,000	9,676	6.276 in. (nominal ID for 7-in. 26-ppf casing)	6.151 in. (drift diameter for 7-in. 26-ppf casing)

4. WELL CONSTRUCTION DETAILS – 55-26N

The well construction diagram for well 55-26N is shown in **Figure 3. Tables 3.a, 3.b, 3.c,** and **3.d** show the respective well construction details.

Table 3.a: Open Hole Diameters and Intervals – 55-26N

Name	Depth Interval (ft)	Open Hole Diameter (in.)	Comment
Conductor	Surface – 48	Not reported	Existing casing
Surface	Surface – 812	22-in. hole	Existing casing
Intermediate	Surface – 5,700	14 ¾-in. hole	Existing casing
Long string	Surface – 8,230	10 5/8-in. hole	Existing casing
Cutoff casing	8,260 – 9,442	7 7/8 -n. hole	Existing casing
Liner	9,340 – 10,800	5 5/8-in. hole	Existing liner
Long-string section 1	Surface – 7,260	8.032 (ID of 9-in. casing)	New inner casing
Long-string section 2	7,260 – 7,630	8.032 (ID of 9-in. casing)	New inner casing
Liner	7,575 – 8,161	8.032 (ID of 9-in. casing)	New liner

Table 3.b: Casing Specifications – 55-26N

Name	Depth Interval (ft)	Outside Diameter (in.)	Inside Diameter (in.)	Weight (ppf)	Grade (API)	Design Coupling (Short or Long Threaded)	Thermal Conductivity @68^{0}F (BTU/ft hr, ^{0}F)	Burst Strength (psi)	Collapse Strength (psi)
Conductor	Surface – 48	30	Not reported	Not reported	Not reported	Short	26.2	Not reported	Not reported
Surface	Surface – 812	16	15.124	72.72	Not reported	Short	26.2	Not reported	Not reported
Intermediate	Surface – 5,700	11.75	10.772	61	J55	Long	26.2	4,010	2,670
Long-string	Surface – 8,230	9	8.032	45	J55	Long	26.2	5,180	4,670
Cutoff casing	8,260 – 9,442	6.625	5.855	26	N80	Long	26.2	10,250	10,690
Liner	9,340 – 10,800	4.75	4.082	16	J55	Long	26.2	6,770	7,190
Long-string section 1	Surface - 7,260	7	6.276	26	L80	Long	26.2	7,240	5,410
Long-string section 2	7,260 - 7,630	7	6.276	26	Mod 13Cr80	Long	15.0	7,240	5,410
Liner	7,575 - 8,161	4.5	3.958	12.6	Mod 13Cr95	Long	15.0	10,010	8,410

Table 3.c: Tubing Specifications – 55-26N

Name	Depth Interval (ft)	Outside Diameter (in.)	Inside Diameter (in.)	Weight (ppf)	Grade (API)	Design Coupling (Short or Long Threaded)	Burst strength (psi)	Collapse strength (psi)	Tensile strength (lbf)
Injection tubing	Surface - 7,510	4.5	4.000	11.6	Mod 13Cr80	Long	7,780	6,350	267,040

Table 3.d. Packer Specifications – 55-26N

Packer Type and Material	Packer Setting Depth (ft)	Length (in.)	Nominal Casing Weight (ppf)	Packer Main Body Outer Diameter (in.)	Packer Inner Diameter (in.)
Permanent or retrievable with latched seal assembly – Alloy 718 or equivalent	7,510	74	23-32	5.937	3.875 in. (based on tubing drift ID)

Tensile Rating (lbs)	Burst Rating (psi)	Collapse Rating (psi)	Max. Casing Inner Diameter (in.)	Min. Casing Inner Diameter (in.)
151,585	10,000	9,676	6.276 in. (nominal ID for 7-in. 26-ppf casing)	6.151 in. (drift diameter for 7-in. 26-ppf casing)

5. WELL CONSTRUCTION DETAILS – 64-35N

The well construction diagram for well 64-35N is shown in **Figure 4. Tables 4.a, 4.b, 4.c,** and **4.d** show the respective well construction details.

Table 4.a: Open Hole Diameters and Intervals – 64-35N

Name	Depth Interval (ft)	Open Hole Diameter (in.)	Comment
Conductor	Surface – 89	Not reported	Existing casing
Surface	Surface – 870	22-in. hole	Existing casing
Intermediate	Surface – 5,683	14.75-in. hole	Existing casing
Long-string	Surface – 7,820	10.625-in. hole	Existing casing
Liner	7,787 – 8156	7.875-in. hole.	Uncemented liner to be removed.
Long-string section 1	Surface – 7,220	8.032 (ID of 9-in. casing)	New inner casing
Long-string section 2	7,220 – 7,630	8.032 (ID of 9-in. casing)	New inner casing
Liner	7,580 – 8,151	6.276 (ID of 7-in. casing)	New liner

Table 4.b: Casing Specifications – 64-35N

Name	Depth Interval (ft)	Outside Diameter (in.)	Inside Diameter (in.)	Weight (ppf)	Grade (API)	Design Coupling (Short or Long Threaded)	Thermal Conductivity @68^{0}F (BTU/ft hr, ^{0}F)	Burst Strength (psi)	Collapse Strength (psi)
Conductor	Surface – 89	20	Not reported	Not reported	Not reported	Short	26.2	Not reported	Not reported
Surface	Surface – 870	16	15.124	72.72	Not reported	Short	26.2	Not reported	Not reported
Intermediate	Surface – 5,683	11.75	10.772	61	J55	Long	26.2	4,010	2,670
Long-string	Surface - 5,631	9	8.032	46.1	J55	Long	26.2	5,180	4,670
Long-string	5631 – 7,820	9	8.032	45	J55	Long	26.2	5,180	4,670
Long-string 1	Surface - 7,220	7	6.276	26	L80	Long	26.2	7,240	5,410
Long-string 2	7,220 - 7,630	7	6.276	26	Mod 13Cr80	Long	15.0	7,240	5,410
Liner	7,580 - 8,151	4.5	3.958	12.6	Mod 13Cr110	Long	15.0	10,010	8,410

Table 4.c: Tubing Specifications – 64-35N

Name	Depth Interval (ft)	Outside Diameter (in.)	Inside Diameter (in.)	Weight (ppf)	Grade (API)	Design Coupling (Short or Long Threaded)	Burst strength (psi)	Collapse strength (psi)	Tensile strength (lbf)
Injection tubing	Surface - 7,530	4.5	4.000	11.6	Mod 13Cr80	Long	7,780	6,350	267,040

Table 4.d: Packer Specifications – 64-35N

Packer Type and Material	Packer Setting Depth (ft)	Length (in.)	Nominal Casing Weight (ppf)	Packer Main Body Outer Diameter (in.)	Packer Inner Diameter (in.)
Permanent or retrievable with latched seal assembly – Alloy 718 or equivalent	7,530	74	23-32	5.937	3.875 in. (based on tubing drift ID)

Tensile Rating (lbs)	Burst Rating (psi)	Collapse Rating (psi)	Max. Casing Inner Diameter (in.)	Min. Casing Inner Diameter (in.)
151,585	10,000	9,676	6.276 in. (nominal ID for 7-in. 26-ppf casing)	6.151 in. (drift diameter for 7-in. 26-ppf casing)

6. WELL CONSTRUCTION DETAILS – 9-1N

The well construction diagram for well 9-1N is shown in **Figure 5**. **Tables 5.a, 5.b, 5.c,** and **5.d** show the respective well construction details.

Table 5.a: Open Hole Diameters and Intervals – 9-1N

Name	Depth Interval (ft)	Open Hole Diameter (in.)	Comment
Conductor	Surface – 52	Not reported	Existing casing
Surface	Surface – 815	22-in. hole	Existing casing
Intermediate	Surface – 5,855	14-3/4-in. hole	Existing casing
Long string	Surface – 7,985	10-5/8-in. hole	Existing casing
Liner	7,935 – 8,455	7-5/8-in. hole	Existing liner
Long-string	Surface – 7,390	8.032 (ID of 9-in. casing)	New inner casing
Long-string	7,390 – 7,840	8.032 (ID of 9-in. casing)	New inner casing
Liner	7,780 – 8,374	4.892 (ID of 5-1/2-in. liner)	New inner liner

Table 5.b: Casing Specifications – 9-1N

Name	Depth Interval (ft)	Outside Diameter (in.)	Inside Diameter (in.)	Weight (ppf)	Grade (API)	Design Coupling (Short or Long Threaded)	Thermal Conductivity @68^{0}F (BTU/ft hr, ^{0}F)	Burst Strength (psi)	Collapse Strength (psi)
Conductor	Surface – 52	20	Not reported	Not reported	Not reported	Short	26.2	Not reported	Not reported
Surface	Surface – 815	16	15.124	72.72	Not reported	Short	26.2	Not reported	Not reported
Intermediate	Surface – 5,855	11.75	10.772	61	J55	Long	26.2	4,010	2,670
Long-string	Surface – 7,985	9	8.032	45	J55	Long	26.2	5,180	4,670
Liner	7,935 – 8,455	5.5	4.892	17	K55	Long	26.2	5,320	4,910
Long-string section 1	Surface – 7,390	7	6.276	26	L80	Long	26.2	7,240	5,410
Long-string section 2	7,390 – 7,840	7	6.276	26	Mod 13Cr80	Long	15.0	7,240	5,410
Liner	7,780 – 8,374	3.5	2.992	9.2	Mod 13Cr80	Long	15.0	10,160	10,540

Table 5.c: Tubing Specifications – 9-1N

Name	Depth Interval (ft)	Outside Diameter (in.)	Inside Diameter (in.)	Weight (ppf)	Grade (API)	Design Coupling (Short or Long Threaded)	Burst strength (psi)	Collapse strength (psi)	Tensile strength (lbf)
Injection tubing	Surface - 7,720	4.5	4.000	11.6	Mod 13Cr80	Long	7,780	6,350	267,040

Table 5.d: Packer Specifications – 9-1N

Packer Type and Material	Packer Setting Depth (ft)	Length (in.)	Nominal Casing Weight (ppf)	Packer Main Body Outer Diameter (in.)	Packer Inner Diameter (in.)
Permanent or retrievable with latched seal assembly – Alloy 718 or equivalent	7,720	74	23-32	5.937	3.875 in. (based on tubing drift ID)

Tensile Rating (lbs)	Burst Rating (psi)	Collapse Rating (psi)	Max. Casing Inner Diameter (in.)	Min. Casing Inner Diameter (in.)
151,585	10,000	9,676	6.276 in. (nominal ID for 7-in. 26-ppf casing)	6.151 in. (drift diameter for 7-in. 26-ppf casing)

7. WELL CONSTRUCTION DETAILS – 64-27N

The well construction diagram for well 64-27N is shown in **Figure 6. Tables 6.a, 6.b, 6.c,** and **6.d** show the respective well construction details.

Table 6.a: Open Hole Diameters and Intervals – 64-27N

Name	Depth Interval (ft)	Open Hole Diameter (in.)	Comment
Surface	Surface – 1,045	Not reported	Existing casing
Intermediate	Surface – 4,929	Not reported.	Existing casing
Long-string	Surface – 7,450	Not reported.	Existing casing
Long string	Surface – 8,060	Not reported.	Uncemented long string to be removed.
Long-string 1	Surface – 7,050	7.285 in. (ID of 8-1/8-in. casing)	New inner casing
Long-string 2	7,050 – 7,538	7.285 in. (ID of 8-1/8-in. casing)	New inner casing
Liner	7,480 – 8,038	5.921 in. (ID of 6-5/8-in. casing)	New liner

Table 6.b: Casing Specifications – 64-27N

Name	Depth Interval (ft)	Outside Diameter (in.)	Inside Diameter (in.)	Weight (ppf)	Grade (API)	Design Coupling (Short or Long Threaded)	Thermal Conductivity @68^{0}F (BTU/ft hr, ^{0}F)	Burst Strength (psi)	Collapse Strength (psi)
Surface	Surface – 1,045	16	15.124	75	Not reported	Short	26.2	Not reported	Not reported
Intermediate	Surface – 4,929	10.75	9.950	45.5	D	Long	26.2	3,580	2,090
Long-string	Surface – 7,450	8.125	7.285	35.5	D	Long	26.2	4,980	4,320
Long-string 1	Surface – 7,050	6.625	5.921	24	L80	Long	26.2	7,440	5,760
Long-string 2	7,050 – 7,538	6.625	5.921	24	Mod 13Cr80	Long	15.0	7,440	5,760
Liner	7,480 – 8,038	4.5	3.958	12.6	Mod 13Cr110	Long	15.0	10,010	8,410

Table 6.c: Tubing Specifications – 64-27N

Name	Depth Interval (ft)	Outside Diameter (in.)	Inside Diameter (in.)	Weight (ppf)	Grade (API)	Design Coupling (Short or Long Threaded)	Burst strength (psi)	Collapse strength (psi)	Tensile strength (lbf)
Injection tubing	Surface - 7,420	4.5	4.000	11.6	Mod 13Cr80	Long	7,780	6,350	267,040

Table 6.d: Packer Specifications – 64-27N

Packer Type and Material	Packer Setting Depth (ft)	Length (in.)	Nominal Casing Weight (ppf)	Packer Main Body Outer Diameter (in.)	Packer Inner Diameter (in.)
Permanent or retrievable with latched seal assembly – Alloy 718 or equivalent	7,420	62.876	24	5.656	3.875 in. (based on tubing drift ID)

Tensile Rating (lbs)	Burst Rating (psi)	Collapse Rating (psi)	Max. Casing Inner Diameter (in.)	Min. Casing Inner Diameter (in.)
187,175	7,500	7,000	5.901 in. (nominal ID for 6.625 in. 24.6-ppf casing)	5.776 in. (drift diameter for 6.625 in. 24.6-ppf casing)

8. WELL CONSTRUCTION DETAILS – 1-28N

The well construction diagram for well 1-28N is shown in **Figure 7. Tables 7.a, 7.b, 7.c,** and **7.d** show the respective well construction details.

Table 7.a: Open Hole Diameters and Intervals – 1-28N

Name	Depth Interval (ft)	Open Hole Diameter (in.)	Comment
Surface	Surface – 807	22-in. hole	Existing casing
Intermediate	Surface – 5,930	14.75-in. hole	Existing casing
Long-string	Surface – 8,000	10.625-in. hole	Existing casing
Liner	7,974 – 8,450	7.875	Existing liner
Long-string section 1	Surface – 7,900	8.032 in. (ID of 9-in. casing)	New inner casing
Long-string section 2	7,900 – 8,450	4.082 in. (ID of 4.75-in. liner)	New inner casing

Table 7.b: Casing Specifications – 1-28N

Name	Depth Interval (ft)	Outside Diameter (in.)	Inside Diameter (in.)	Weight (ppf)	Grade (API)	Design Coupling (Short or Long Threaded)	Thermal Conductivity @68^{0}F (BTU/ft hr, ^{0}F)	Burst Strength (psi)	Collapse Strength (psi)
Surface	Surface – 807	16	15.124	72.72	C	Short	26.2	Not reported	Not reported
Intermediate	Surface – 5,930	11.75	10.772	61	D	Long	26.2	4,010	2,670
Long-string	Surface - 5,929	9	8.032	46.1	D	Long	26.2	5,180	4,670
Long-string	5,929 – 8,000	9	8.032	45	D	Long	26.2	5,180	4,670
Slotted liner	7,974 - 8,450	4.75	4.082	16	D	Long	26.2	Not reported	Not reported
Long-string section 1	Surface – 7,300	7	6.276	26	L80	Long	26.2	7,240	5,410
Long-string section 2	7,300 – 7,972	7	6.276	26	Mod 13Cr80	Long	15.0	7,240	5,410 – 10,540
Long-string section 3	7,972 – 8,450	3.5	2.992	9.2	Mod 13Cr80	Long	15.0	11,200	11,780

Table 7.c: Tubing Specifications – 1-28N

Name	Depth Interval (ft)	Outside Diameter (in.)	Inside Diameter (in.)	Weight (ppf)	Grade (API)	Design Coupling (Short or Long Threaded)	Burst strength (psi)	Collapse strength (psi)	Tensile strength (lbf)
Tubing	7,400	2.375	1.995	4.60	Mod 13Cr80	Long	11,200	11,780	104.350
Tubing	7,850	2.375	1.995	4.60	Mod 13Cr80	Long	11,200	11,780	104.350

Table 7.d: Packer Specifications – 1-28N

Packer Type and Material	Packer Setting Depth (ft)	Length (in.)	Nominal Casing Weight (ppf)	Packer Main Body Outer Diameter (in.)	Packer Inner Diameter (in.)
Permanent or retrievable with latched seal assembly – Alloy 718 or equivalent	Packer 1 - 7,400 Packer 2 - 7,850	74 74	23-32 23-32	5.937 5.937	1.995 in. (for both, based on tubing drift ID)

Tensile Rating (lbs)	Burst Rating (psi)	Collapse Rating (psi)	Max. Casing Inner Diameter (in.)	Min. Casing Inner Diameter (in.)
187,175 187,175	8,750 8,750	8,500 8,500	6.276 in. (for both, nominal ID for 7-in. 26-ppf casing)	6.151 in. (for both, drift diameter for 7-in. 26-ppf casing)

9. WELL CONSTRUCTION DETAILS – 25-26N

The well construction diagram for well 25-26N is shown in **Figure 8. Tables 8.a, 8.b, 8.c,** and **8.d** show the respective well construction details.

Table 8.a: Open Hole Diameters and Intervals – 25-26N

Name	Depth Interval (ft)	Open Hole Diameter (in.)	Comment
Conductor	Surface – 90	32	Existing casing
Surface	Surface – 800	22	Existing casing
Intermediate	Surface – 5,900	14.75	Existing casing
Long String	Surface – 6,244	10.625	Existing casing
Long String	Surface – 8,133	7.875	Existing casing
Long-String section 1	Surface – 7,500	5.855 in. (ID of 6-5/8-in. Casing)	New inner casing
Long-string section 2	7,500 – 7,800	5.855 in. (ID of 6-5/8-in. Casing)	New inner casing

Table 8.b: Casing Specifications – 25-26N

Name	Depth Interval (ft)	Outside Diameter (in.)	Inside Diameter (in.)	Weight (ppf)	Grade (API)	Design Coupling (Short or Long Threaded)	Thermal Conductivity @68^{0}F (BTU/ft hr, ^{0}F)	Burst Strength (psi)	Collapse Strength (psi)
Conductor	Surface – 90	20	Not reported	94	H-40	Short	26.2	Not reported	Not reported
Surface	Surface – 800	16	15.124	72.72	Not reported	Short	26.2	Not reported	Not reported
Intermediate	Surface – 5,900	11.75	10.772	61	C-55	Long	26.2	4,010	2,670
Long-string	Surface - 5,891	9	8.032	46.1	C-55	Long	26.2	4,460	3,450
Long-string	5,891 - 6,244	9	8.032	45	C-55	Long	26.2	4,460	3,450
Long-string	Surface – 8,133	6.625	5.855	26	J-55	Long	26.2	5,590	5,380
Long-string section 1	Surface – 7,500	4.5	4.000	11.6	L80	Long	26.2	7,780	6,350
Long-string section 2	7,500 – 7,800	4.5	4.000	11.6	Mod 13Cr95	Long	15.0	9,240	7,030

Table 8.c: Tubing Specifications – 25-26N

Name	Depth Interval (ft)	Outside Diameter (in.)	Inside Diameter (in.)	Weight (ppf)	Grade (API)	Design Coupling (Short or Long Threaded)	Burst strength (psi)	Collapse strength (psi)	Tensile strength (lbf)
Tubing	Surface - 7,600	2.375	1.995	4.60	Mod 13Cr80	Long	11,200	11,780	104,350

Table 8.d: Packer Specifications – 25-26N

Packer Type and Material	Packer Setting Depth (ft)	Length (in.)	Nominal Casing Weight (ppf)	Packer Main Body Outer Diameter (in.)	Packer Inner Diameter (in.)
Permanent or retrievable with latched seal assembly – Alloy 718 or equivalent	7,600	53.168	11.6-13	3.771	1.995 in. (based on tubing drift ID)

Tensile Rating (lbs)	Burst Rating (psi)	Collapse Rating (psi)	Max. Casing Inner Diameter (in.)	Min. Casing Inner Diameter (in.)
56,000	6,265	5,720	3.958 in. (nominal ID for 4.5 in. 12.6-ppf casing)	3.833 in. (drift diameter for 4.5 in. 12.6-ppf casing)

10. WELL CONSTRUCTION DETAILS – 27-1N

The well construction diagram for well 27-1N is shown in **Figure 9. Tables 9.a, 9.b, 9.c,** and **9.d** show the respective well construction details.

Table 9.a: Open Hole Diameters and Intervals – 27-1N

Name	Depth Interval (ft)	Open Hole Diameter (in.)	Comment
Conductor	Surface – 95	Not reported	Existing casing
Surface	Surface – 816	22-in. hole	Existing casing
Intermediate	Surface – 6,010	14.75-in. hole	Existing casing
Long-string	Surface – 8,115	10.625-in. hole	Existing casing
Liner	8,080 – 8,440	7.875	Existing liner
Long-string section 1	Surface – 8,000	8.032 (ID of 9-in. casing)	New inner casing
Long-string section 2	8,000 – 8,440	8.032 (ID of 9-in. casing)	New inner casing

Table 9.b: Casing Specifications – 27-1N

Name	Depth Interval (ft)	Outside Diameter (in.)	Inside Diameter (in.)	Weight (ppf)	Grade (API)	Design Coupling (Short or Long Threaded)	Thermal Conductivity @68^{0}F (BTU/ft hr, ^{0}F)	Burst Strength (psi)	Collapse Strength (psi)
Conductor	Surface – 95	20	Not reported	Not reported	Not reported	Short	26.2	Not reported	Not reported
Surface	Surface – 816	16	15.124	72.72	Not reported	Short	26.2	Not reported	Not reported
Intermediate	Surface – 6,010	11.75	10.772	61	J55	Long	26.2	4,010	2,670
Long-string	Surface - 6,002	9	8.032	46.1	J55	Long	26.2	5,180	4,670
Long-string	6,002 – 8,115	9	8.032	45	J55	Long	26.2	5,180	4,670
Liner	8,080 – 8,440	5.5	4.892	17	K55	Long	26.2	5,320	4,910
Long-string section 1	Surface - 7,580	5.5	4.950	15.5	L80	Long	26.2	7,000	4,950
Long-string section 2	7,580 – 8,000	5.5	4.892	17	Mod 13Cr80	Long	15.0	7,740	6,290
Long-string section 3	8,000 – 8,440	3.5	2.992	9.2	Mod 13Cr80	Long	15	10,160	10,540

Table 9.c: Tubing Specifications – 27-1N

Name	Depth Interval (ft)	Outside Diameter (in.)	Inside Diameter (in.)	Weight (ppf)	Grade (API)	Design Coupling (Short or Long Threaded)	Burst strength (psi)	Collapse strength (psi)	Tensile strength (lbf)
Tubing	Surface - 7,800	2.375	1.995	4.60	Mod 13Cr80	Long	11,200	11,780	104,350

Table 9.d: Packer Specifications – 27-1N

Packer Type and Material	Packer Setting Depth (ft)	Length (in.)	Nominal Casing Weight (ppf)	Packer Main Body Outer Diameter (in.)	Packer Inner Diameter (in.)
Permanent or retrievable with latched seal assembly – Alloy 718 or equivalent	7,800	52.125	13-20	4.625	1.995 in. (based on tubing drift ID)

Tensile Rating (lbs)	Burst Rating (psi)	Collapse Rating (psi)	Max. Casing Inner Diameter (in.)	Min. Casing Inner Diameter (in.)
87,333	6,000	6,000	6.276 in. (nominal ID for 7-in. 26-ppf casing)	6.151 in. (drift diameter for 7-in. 26-ppf casing)

11. WELL CONSTRUCTION DETAILS – 39-26N

The well construction diagram for well 39-26N is shown in **Figure 10. Tables 10.a, 10.b, 10.c,** and **10.d** show the respective well construction details.

Table 10.a: Open Hole Diameters and Intervals – 39-26N

Name	Depth Interval (ft)	Open Hole Diameter (in.)	Comment
Conductor	Surface – 92	32-in. hole	Existing casing
Surface	Surface – 803	22-in. hole	Existing casing
Intermediate	Surface – 5,875	14.75-in. hole	Existing casing
Long String	Surface – 8,100	10.625-in. hole	Existing casing
Long-string section 1	Surface – 7,500	6.214 (ID of 7-in. casing)	New inner casing
Long-string section 2	7,500 – 8,100	6.214 (ID of 7-in. casing)	New inner casing
Long-string section 3	8,100 – 8,232	6 in. hole	New inner casing

Table 10.b: Casing Specifications – 39-26N

Name	Depth Interval (ft)	Outside Diameter (in.)	Inside Diameter (in.)	Weight (ppf)	Grade (API)	Design Coupling (Short or Long Threaded)	Thermal Conductivity @68^{0}F (BTU/ft hr, ^{0}F)	Burst Strength (psi)	Collapse Strength (psi)
Conductor	Surface – 92	20	Not Reported	94	H40	Short	26.2	–	–
Surface	Surface – 803	16	15.124	72.72	Not Reported	Short	26.2	Not reported	Not reported
Intermediate	Surface – 5,875	11.75	10.772	61	NC55	Long	26.2	4,010	2,670
Long String	Surface – 8,100	7	6.214	28	J-55	Long	26.2	5,400	5,050
Long-string section 1	Surface – 7,500	4.5	4.000	11.6	L80	Long	26.2	7,780	6,350
Long-string section 2	7,500 - 8,100	4.5	4.000	11.6	Mod 13Cr95	Long	15.0	9,240	7,030
Long-string section 3	8,100 - 8,232	4.5	4.000	11.6	Mod 13Cr95	Long	15.0	9,240	7,030

Table 10.c: Tubing Specifications – 39-26N

Name	Depth Interval (ft)	Outside Diameter (in.)	Inside Diameter (in.)	Weight (ppf)	Grade (API)	Design Coupling (Short or Long Threaded)	Burst strength (psi)	Collapse strength (psi)	Tensile strength (lbf)
Tubing	Surface - 7,850	2.375	1.995	4.60	Mod 13Cr80	Long	11,200	11,780	104,350

Table 10.d: Packer Specifications – 39-26N

Packer Type and Material	Packer Setting Depth (ft)	Length (in.)	Nominal Casing Weight (ppf)	Packer Main Body Outer Diameter (in.)	Packer Inner Diameter (in.)
Permanent or retrievable with latched seal assembly – Alloy 718 or equivalent	7,850	53.168	11.6-13	3.771	1.995 in. (based on tubing drift ID)

Tensile Rating (lbs)	Burst Rating (psi)	Collapse Rating (psi)	Max. Casing Inner Diameter (in.)	Min. Casing Inner Diameter (in.)
56,000	6,265	5,720	4.000 in. (nominal ID for 4.5-in. 11.6-ppf casing)	3.875 in. (drift diameter for 4.5-in. 11.6-ppf casing)

12. WELL CONSTRUCTION DETAILS – 35X-27N

The well construction diagram for well 35X-27N is shown in **Figure 11. Tables 11.a, 11.b, 11.c,** and **11.d** show the respective well construction details.

Table 11.a: Open Hole Diameters and Intervals – 35X-27N

Name	Depth Interval (ft)	Open Hole Diameter (in.)	Comment
Conductor	Surface – 90	Not reported	Existing casing
Surface	Surface – 1,027	17.5-in. hole	Existing casing
Intermediate	Surface – 5,608	12.25-in. hole	Existing casing
Long String	Surface – 7,707	8.5-in. hole	Existing casing
Open Hole	7,707 – 7,835	6.125 in. hole	Open hole

Table 11.b: Casing Specifications – 35X-27N

Name	Depth Interval (ft)	Outside Diameter (in.)	Inside Diameter (in.)	Weight (ppf)	Grade (API)	Design Coupling (Short or Long Threaded)	Thermal Conductivity @68^{0}F (BTU/ft hr, ^{0}F)	Burst Strength (psi)	Collapse Strength (psi)
Conductor	Surface – 90	20	Not Reported	52	Not Reported	Short	Not Reported	Not Reported	Not Reported
Surface	Surface – 1,027	13.375	12.615	54.5	K – 55	Not Reported	26.2	2,735	1,130
Intermediate	Surface – 3,916	9.625	8.835	40	J – 55	Long	26.2	3,950	2,570
Intermediate	3,916 – 5,608	9.625	8.835	40	N – 80	Long	26.2	5,750	3,090
Long-string section 1	Surface – 2,269	7	6.276	26	N – 80	Long	26.2	7,240	5,410
Long-string section 2	2,269 – 4,286	7	6.366	23	N – 80	Long	26.2	6,340	3,830
Long-string section 3	4,286 – 7,635	7	6.366	23	K – 55	Long	26.2	4,360	3,270
Long-string section 4	7,635 – 7,707	7	6.276	26	N – 80	Long	26.2	7,240	5,410

Table 11.c: Tubing Specifications – 35X-27N

Name	Depth Interval (ft)	Outside Diameter (in.)	Inside Diameter (in.)	Weight (ppf)	Grade (API)	Design Coupling (Short or Long Threaded)	Burst strength (psi)	Collapse strength (psi)
Tubing	Surface - 6,450	2.375	1.995	4.7	L – 80	Long	11,200	11,780

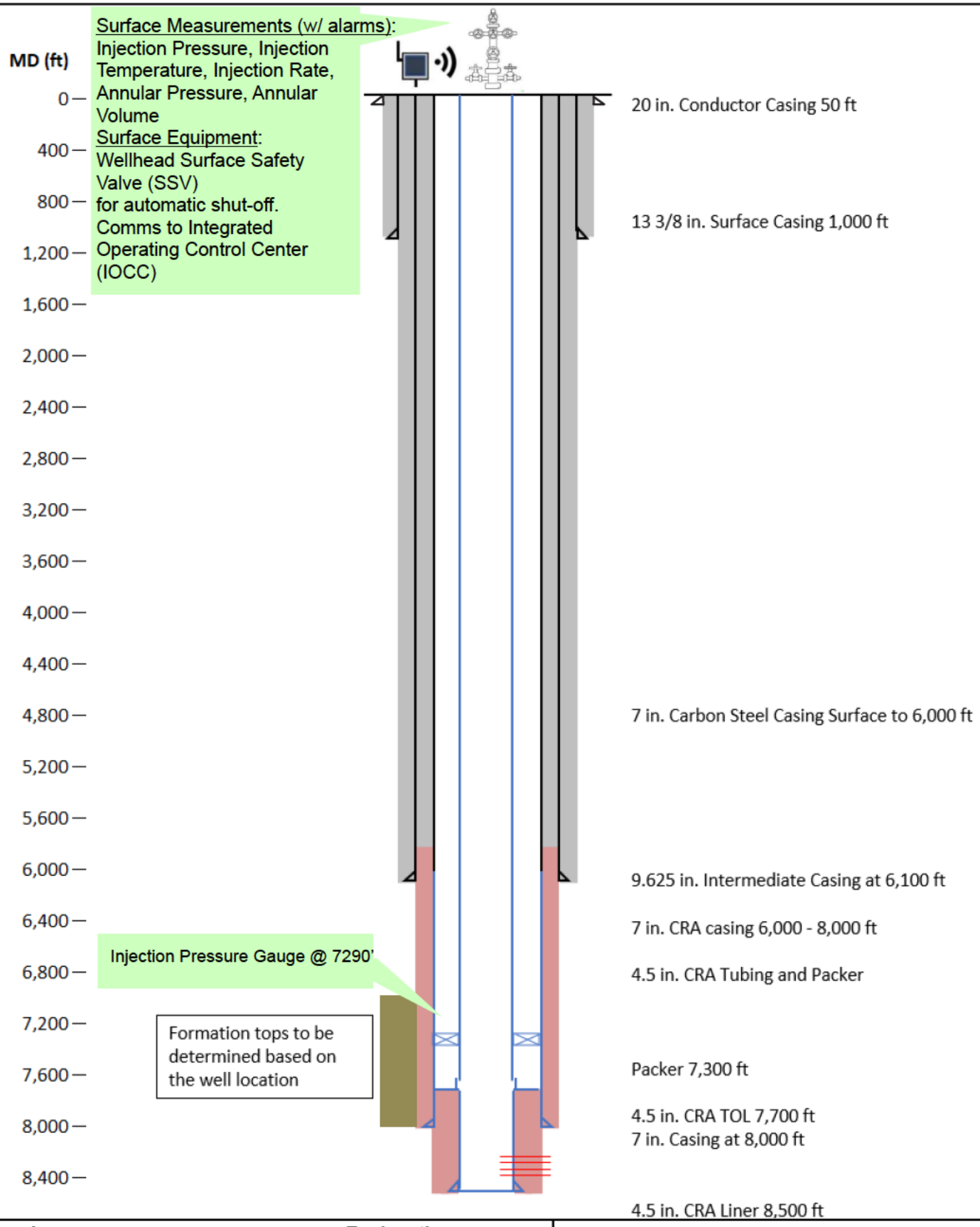
Table 11.d: Packer Specifications – 35X-27N

Packer Type and Material	Packer Setting Depth (ft)	Length (in.)	Nominal Casing Weight (ppf)	Packer Main Body Outer Diameter (in.)	Packer Inner Diameter (in.)
Permanent or retrievable with latched seal assembly – Carbon Steel	6,450	91.06	17 – 26	6.000	1.995 in. (based on tubing drift ID)

Tensile Rating (lbs)	Burst Rating (psi)	Collapse Rating (psi)	Max. Casing Inner Diameter (in.)	Min. Casing Inner Diameter (in.)
92,600	7,000	7,000	6.366 in. (nominal ID for 7.0-in. 23-ppf casing)	6.241 in. (drift diameter for 7.0-in. 23-ppf casing)

Figures

Figure Index



Legend

- Caprock
- CO_2 Resistant Cement
- Corrosion-Resistant Alloys (CRA)

Explanation

in. - inch
ft - feet
MD - Measured Depth
TOC - Top of Cement
TOL - Top of Liner
CO_2 - Carbon Dioxide

Note:
Well will have Distributed Temperature Sensor monitoring equipment installed.

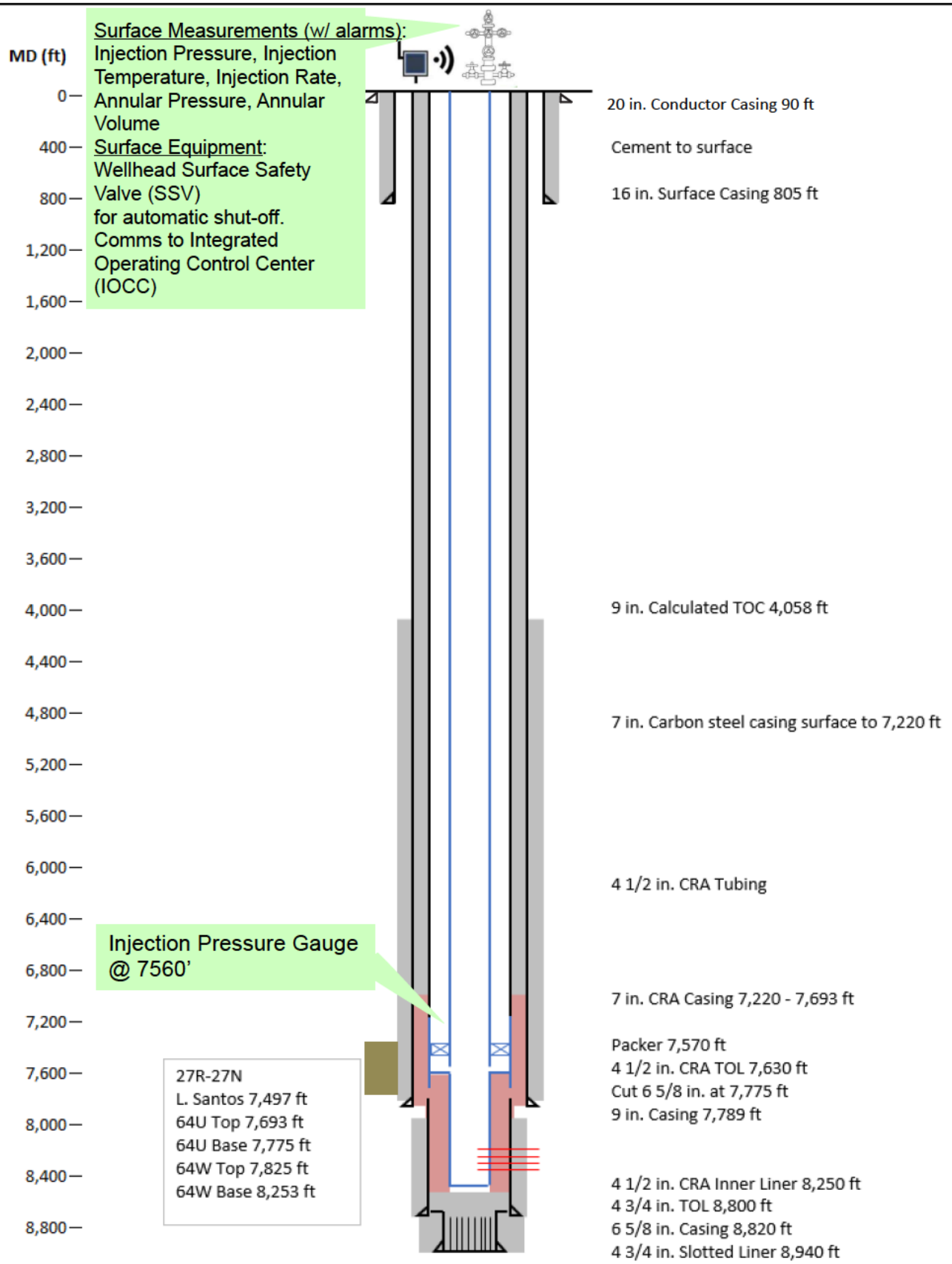
New Injection Well for CO_2 Injection

North Belridge Oil Field
Western Kern County
California

BLADE ENERGY PARTNERS

CarbonFrontier	October 2024	**Figure 1**

"Geosyntec\Aera Belridge CCUS Project - General\A. Technical\Blade Figures\Well Permit Figures Ver 1 - FORMATTED_AI Files\..."



Legend

- Caprock
- CO_2 Resistant Cement
- Corrosion-Resistant Alloys (CRA)

Explanation

in. - inch
ft - feet
MD - Measured Depth
TOC - Top of Cement
TOL - Top of Liner
CO_2 - Carbon Dioxide

Note:
Well will have Distributed Temperature Sensor monitoring equipment installed.

27R-27N Repurposed for CO_2 Injection

North Belridge Oil Field
Western Kern County
California

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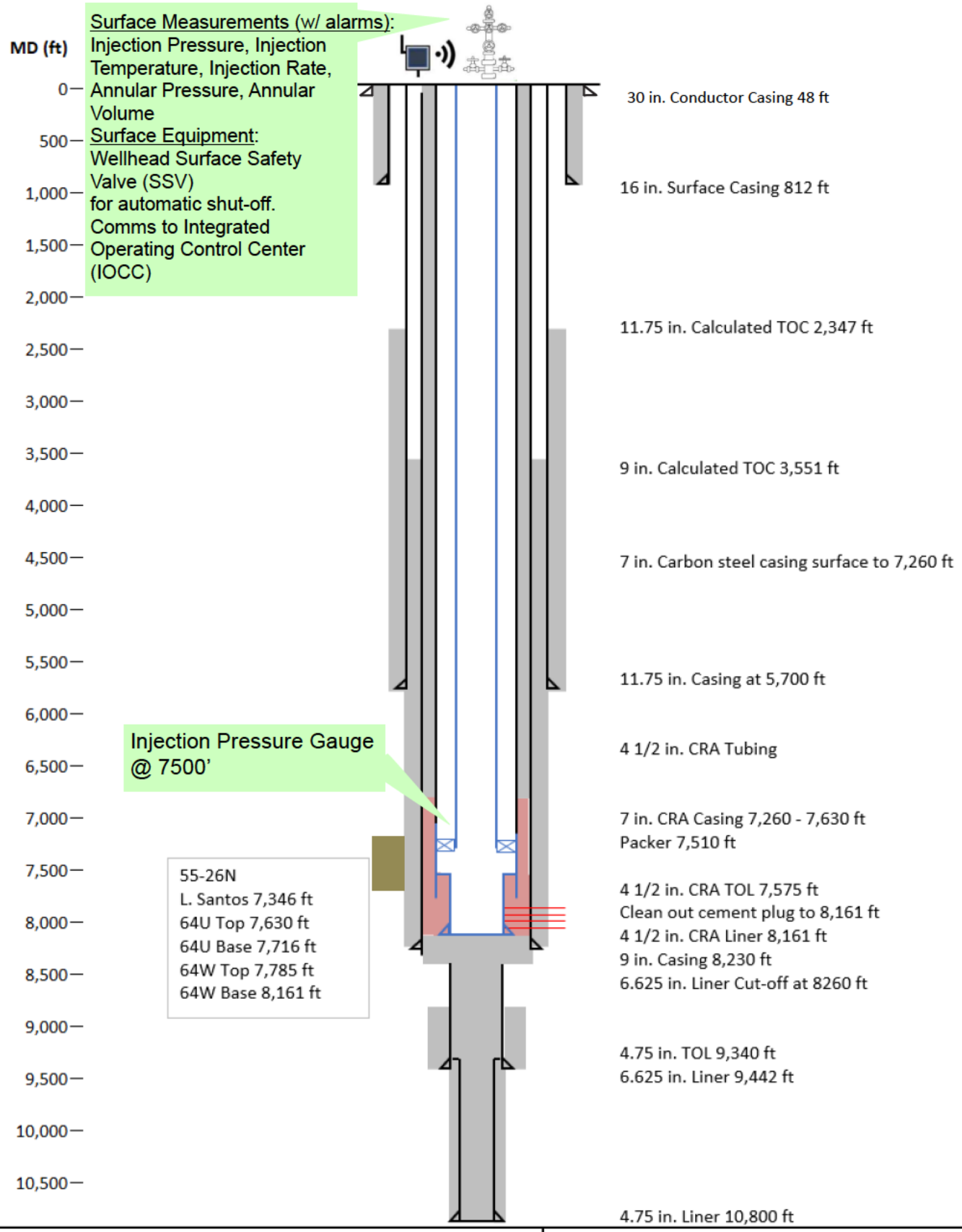
Figure 2

"Geosyntec\Aera Belridge CCUS Project - General\A. Technical\Blade Figures\Well Permit Figures Ver 1 - FORMATTED_AI Files\..."



Legend

- Caprock
- CO_2 Resistant Cement
- Corrosion-Resistant Alloys (CRA)

Explanation

in. - inch
ft - feet
MD - Measured Depth
TOC - Top of Cement
TOL - Top of Liner
CO_2 - Carbon Dioxide

Note:
Well will have Distributed Temperature Sensor monitoring equipment installed.

55-26N Repurposed for CO_2 Injection

North Belridge Oil Field
Western Kern County
California

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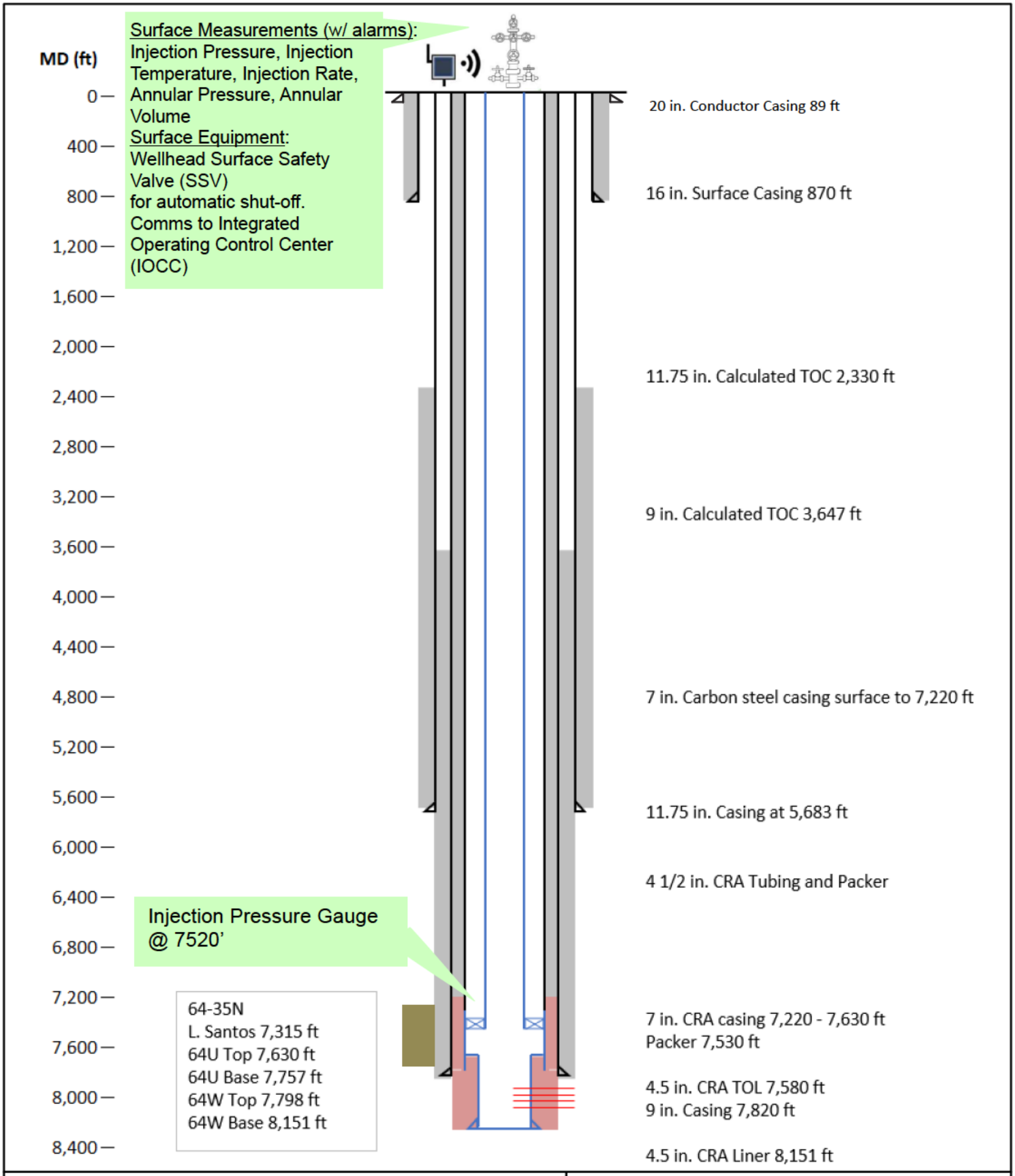
Figure 3

"Geosyntec\Aera Belridge CCUS Project - General\A. Technical\Blade Figures\Well Permit Figures Ver 1 - FORMATTED_AI Files\..."



Legend

- Caprock
- CO_2 Resistant Cement
- Corrosion-Resistant Alloys (CRA)

Explanation

in. - inch
ft - feet
MD - Measured Depth
TOC - Top of Cement
TOL - Top of Liner
CO_2 - Carbon Dioxide

Note:
Well will have Distributed Temperature Sensor monitoring equipment installed.

64-35N Repurposed for CO_2 Injection

North Belridge Oil Field
Western Kern County
California

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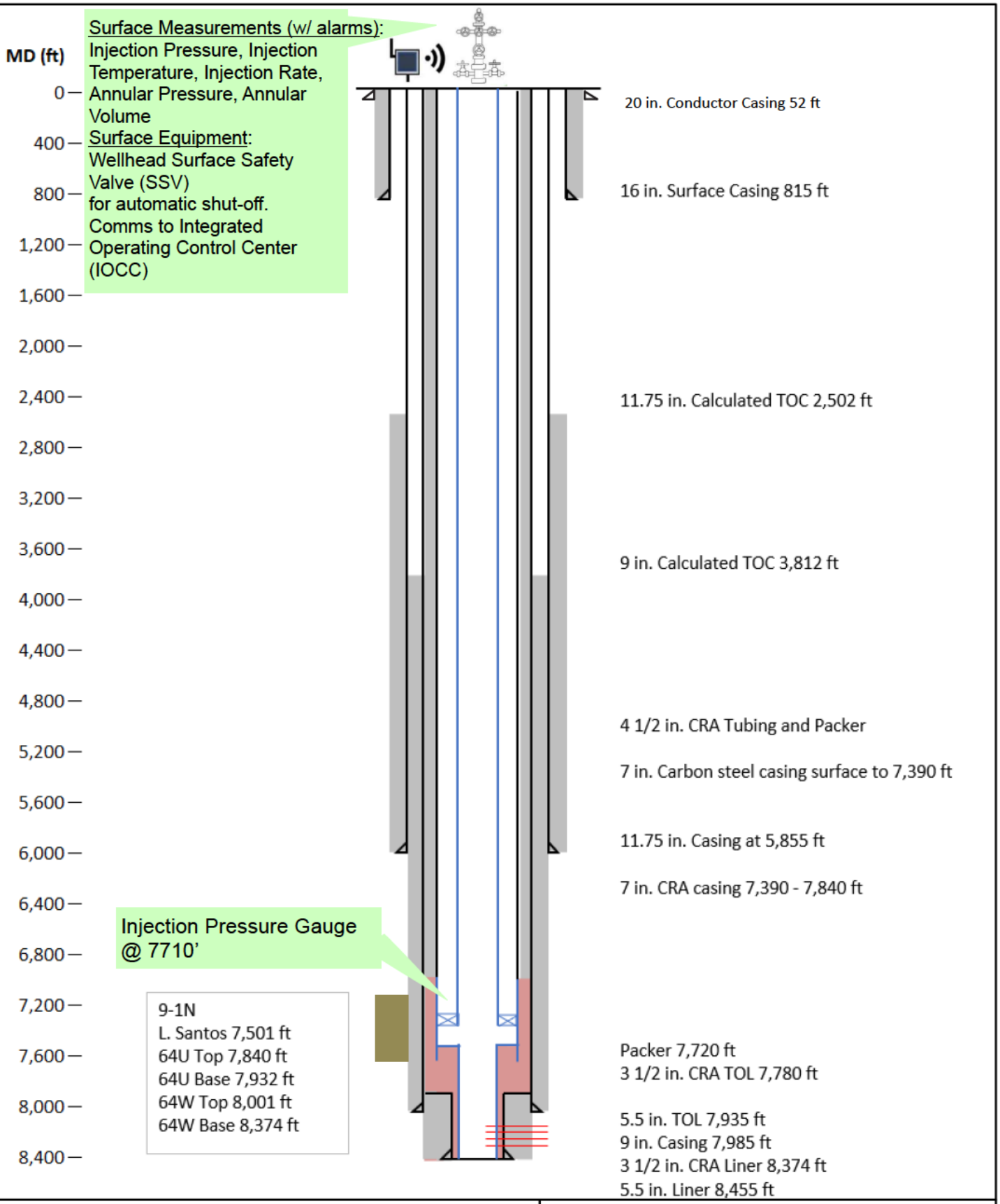
Figure 4

"Geosyntec\Aera Belridge CCUS Project - General\A. Technical\Blade Figures\Well Permit Figures Ver 1 - FORMATTED_AI Files\..."



Legend

- Caprock
- CO_2 Resistant Cement
- Corrosion-Resistant Alloys (CRA)

Explanation

in. - inch
ft - feet
MD - Measured Depth
TOC - Top of Cement
TOL - Top of Liner
CO_2 - Carbon Dioxide

Note:
Well will have Distributed Temperature Sensor monitoring equipment installed.

9-1N Repurposed for CO_2 Injection

North Belridge Oil Field
Western Kern County
California

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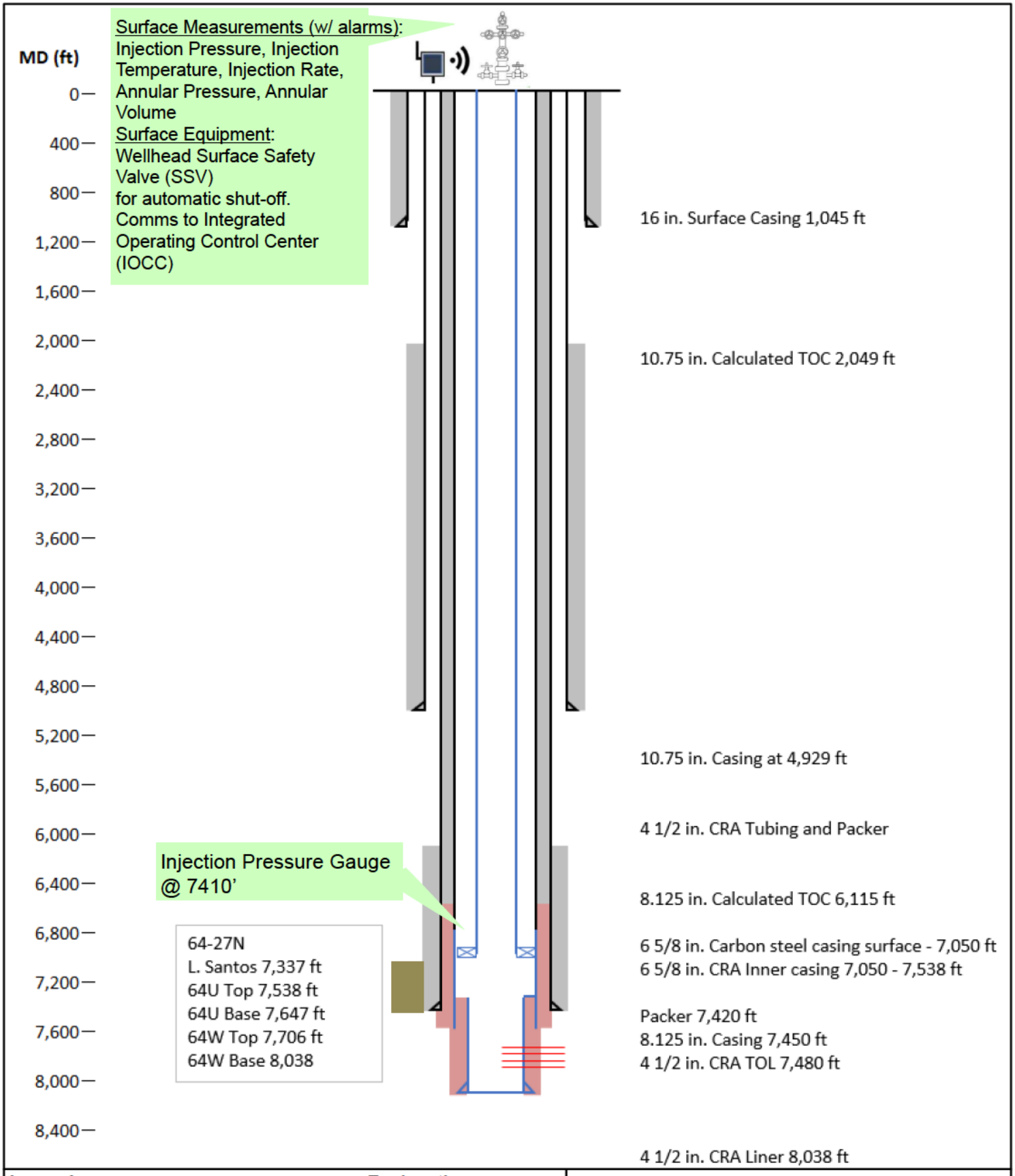
Figure 5

"Geosyntec\Aera Belridge CCUS Project - General\A. Technical\Blade Figures\Well Permit Figures Ver 1 - FORMATTED_AI Files\..."



Legend

- Caprock
- CO_2 Resistant Cement
- Corrosion-Resistant Alloys (CRA)

Explanation

in. - inch
ft - feet
MD - Measured Depth
TOC - Top of Cement
TOL - Top of Liner
CO_2 - Carbon Dioxide

Note:
Well will have Distributed Temperature Sensor monitoring equipment installed.

64-27N Repurposed for CO_2 Injection

North Belridge Oil Field
Western Kern County
California

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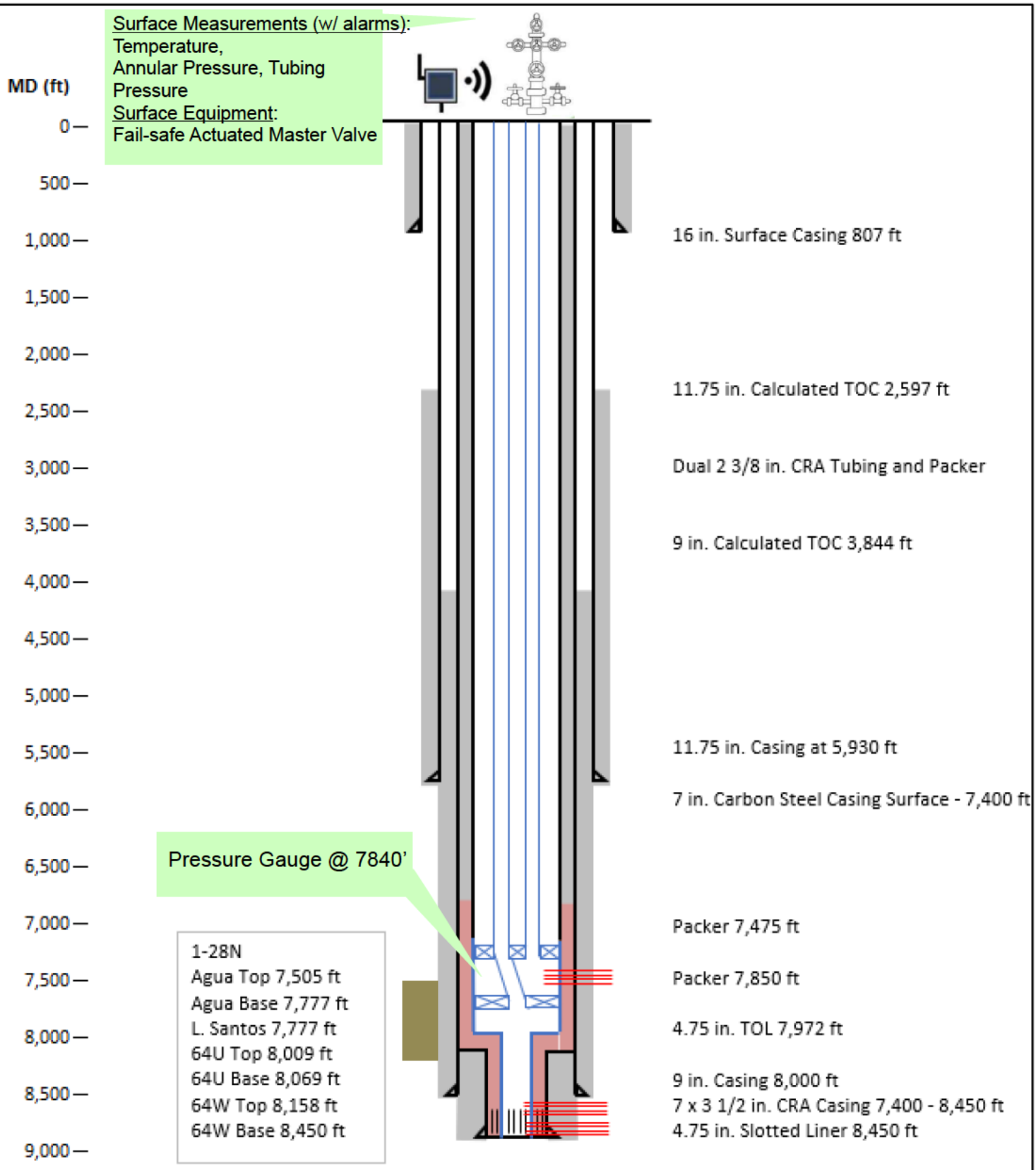
Figure 6

"Geosyntec\Aera Belridge CCUS Project - General\A. Technical\Blade Figures\Well Permit Figures Ver 1 - FORMATTED_AI Files\..."



Legend

- Caprock
- CO_2 Resistant Cement
- Corrosion-Resistant Alloys (CRA)

Explanation

in. - inch
ft - feet
MD - Measured Depth
TOC - Top of Cement
TOL - Top of Liner
CO_2 - Carbon Dioxide

Note:
Well will have Distributed Temperature Sensor and Pressure monitoring equipment installed.

1-28N Repurposed for Monitoring

North Belridge Oil Field
Western Kern County
California

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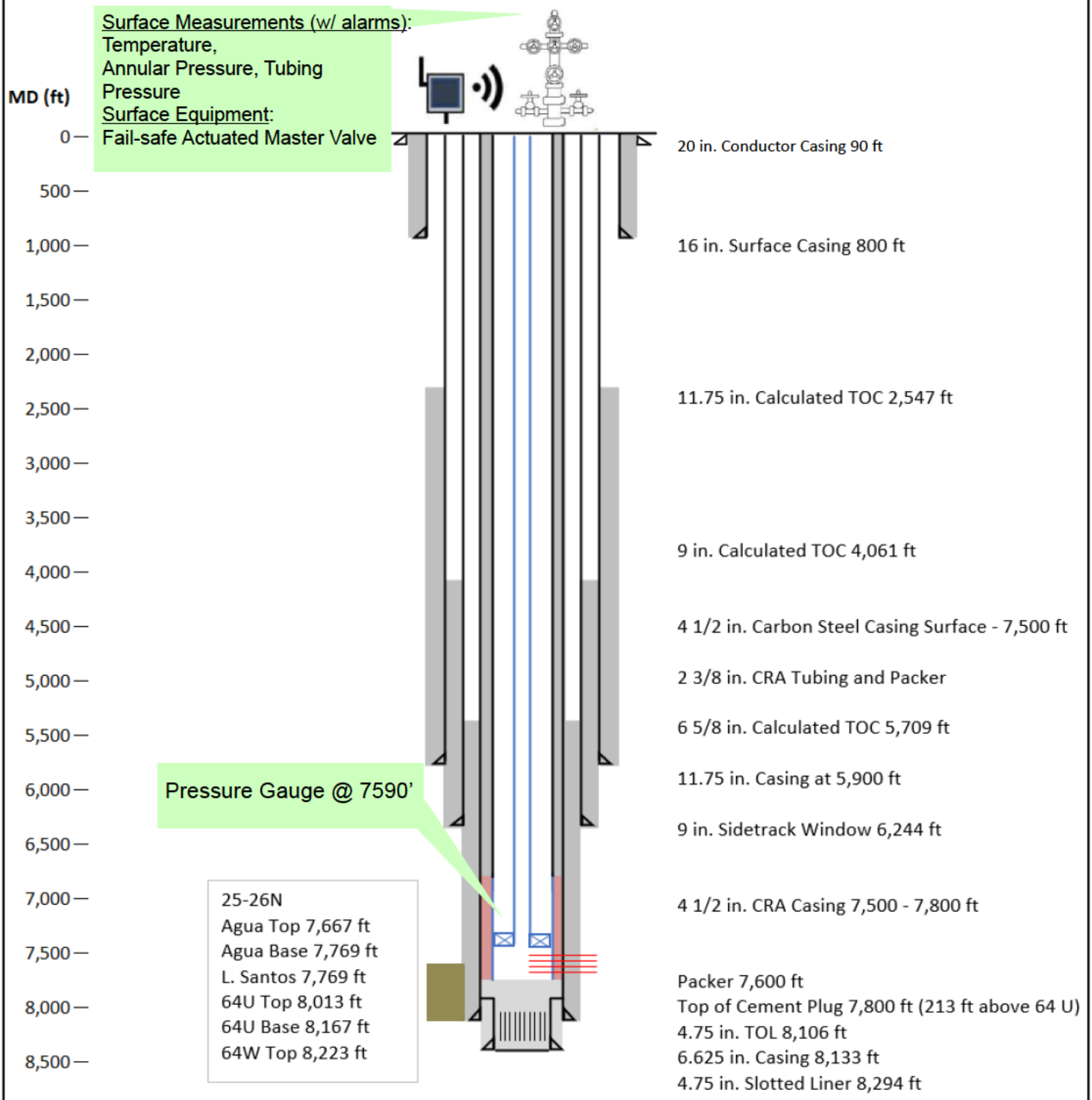
Figure 7

"Geosyntec\Aera Belridge CCUS Project - General\A. Technical\Blade Figures\Well Permit Figures Ver 1 - FORMATTED_AI Files\..."



Legend

- Caprock
- CO_2 Resistant Cement
- Corrosion-Resistant Alloys (CRA)

Explanation

in. - inch
ft - feet
MD - Measured Depth
TOC - Top of Cement
TOL - Top of Liner
CO_2 - Carbon Dioxide

Note:
Well will have Pressure monitoring equipment installed.

25-26N Repurposed for Monitoring

North Belridge Oil Field
Western Kern County
California

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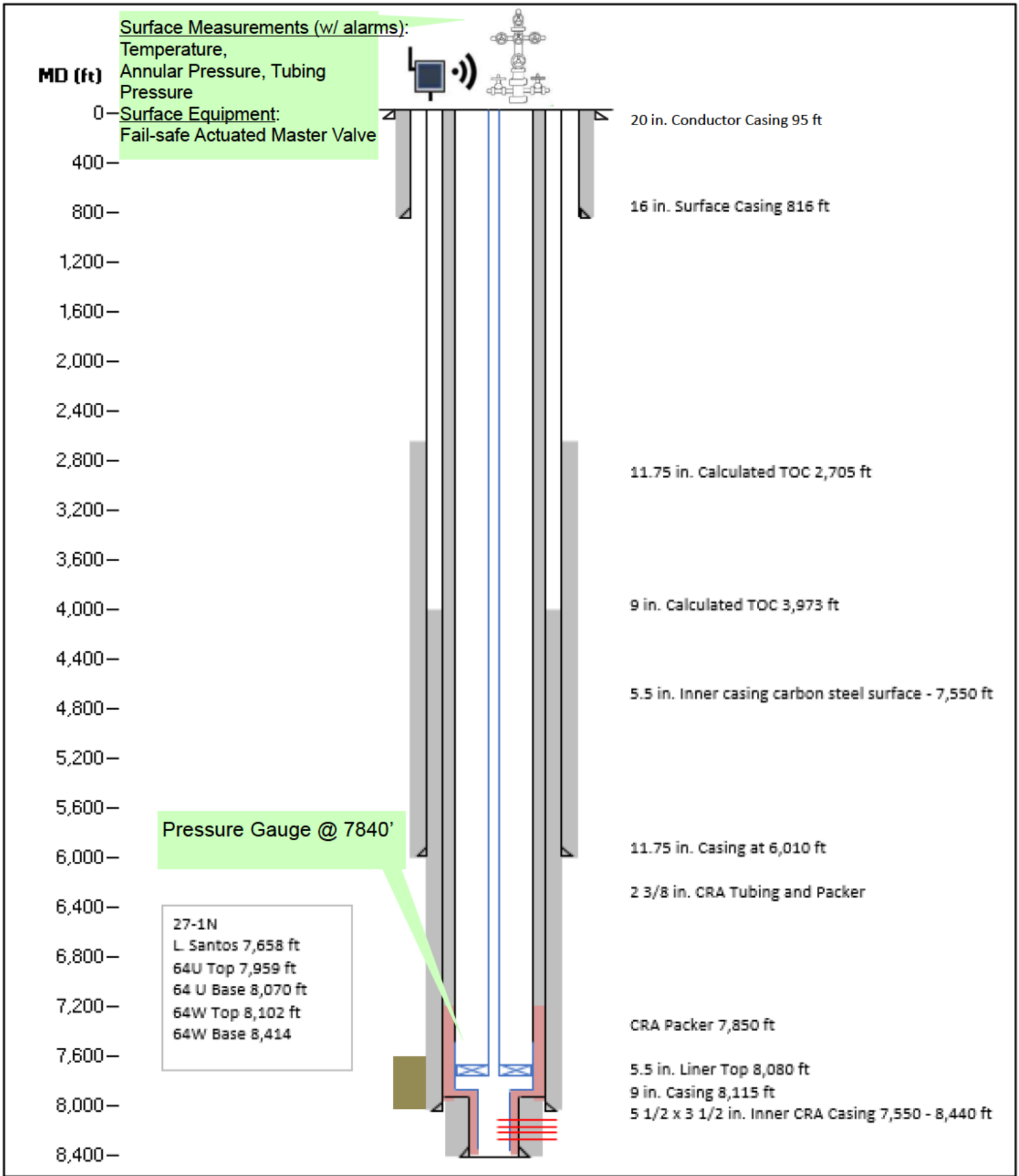
Figure 8

"Geosyntec\Aera Belridge CCUS Project - General\A. Technical\Blade Figures\Well Permit Figures Ver 1 - FORMATTED_AI Files\..."



Legend

- Caprock
- CO_2 Resistant Cement
- Corrosion-Resistant Alloys (CRA)

Explanation

in. - inch
ft - feet
MD - Measured Depth
TOC - Top of Cement
TOL - Top of Liner
CO_2 - Carbon Dioxide

Note:
Well will have Distributed Temperature Sensor and Pressure monitoring equipment installed.

27-1N Repurposed for Monitoring

North Belridge Oil Field
Western Kern County
California

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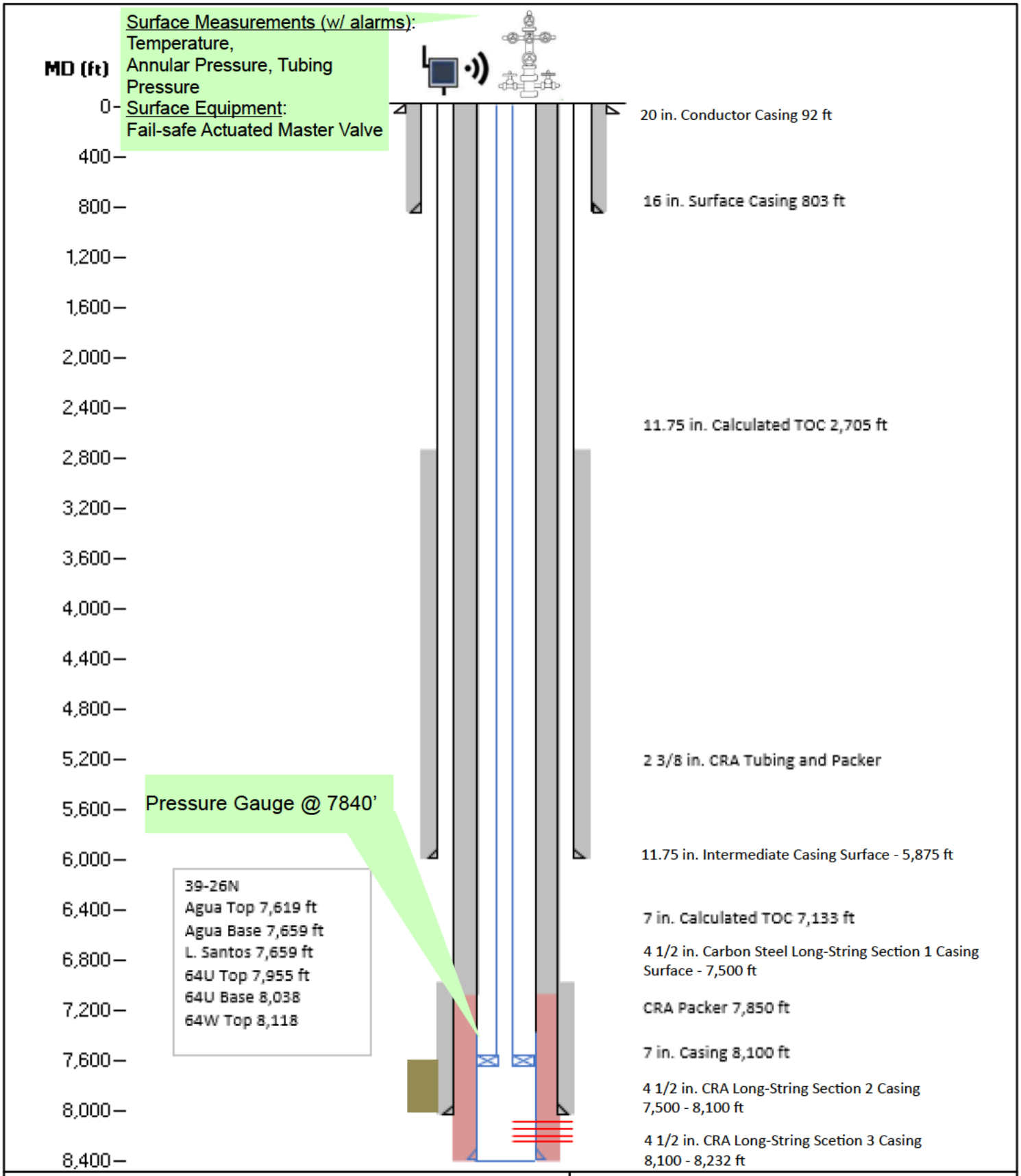
CarbonFrontier	October 2024	Figure 9



Legend

- Caprock
- CO_2 Resistant Cement
- Corrosion-Resistant Alloys (CRA)

Explanation

in. - inch
ft - feet
MD - Measured Depth
TOC - Top of Cement
TOL - Top of Liner
CO_2 - Carbon Dioxide

Note:
Well will have Distributed Temperature Sensor and Pressure monitoring equipment installed.

39-26N Repurposed for Monitoring

North Belridge Oil Field
Western Kern County
California

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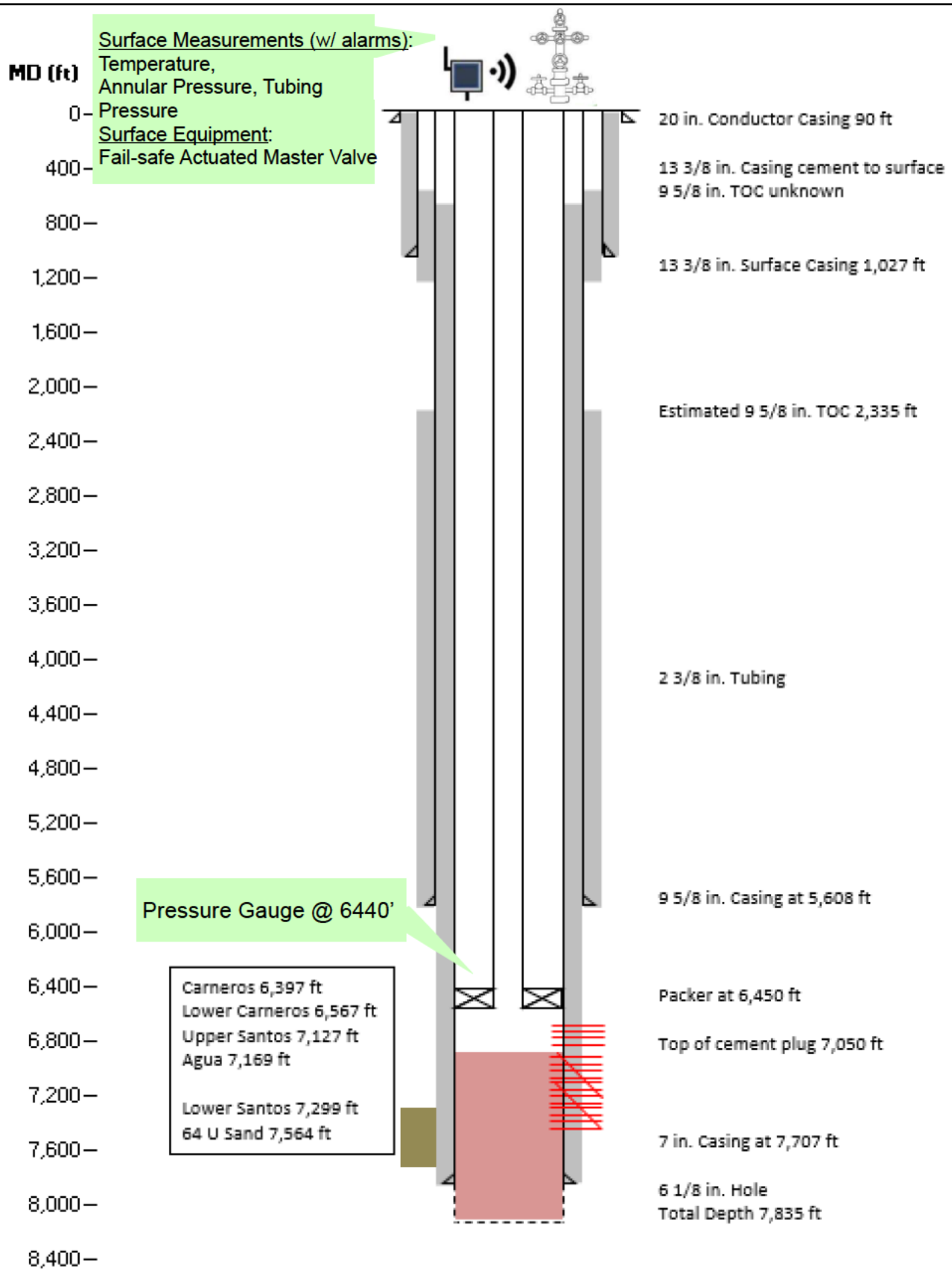
Figure 10

"Geosyntec\Aera Belridge CCUS Project - General\A. Technical\Blade Figures\Well Permit Figures Ver 1 - FORMATTED_AI Files\..."



Legend

- Caprock
- CO_2 Resistant Cement

Explanation

in. - inch
ft - feet
MD - Measured Depth
TOC - Top of Cement
TOL - Top of Liner
CO_2 - Carbon Dioxide

Note:
Well will have Pressure monitoring equipment installed.

35X-27N Repurposed for Monitoring

North Belridge Oil Field
Western Kern County
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Figure 11

"Geosyntec\Aera Belridge CCUS Project - General\A. Technical\Blade Figures\Well Permit Figures Ver 1 - FORMATTED_AI Files\..."