



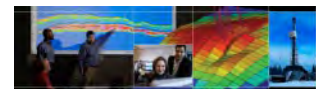
PetroTechnical Services

Ultrasonic Imager Corrosion Summary Listing

| | |
|--------------|-----------------|
| Company | XCEL Energy Inc |
| Well | Roundup 24 |
| Field | Roundup |
| Logging Date | 17-Jun-2015 |
| Log Analyst | Brett DiCio |
| Report Date | 6/23/2015 |

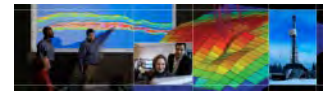
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**Objective:**

To evaluate the condition of the 5.5", 15.5lbs/ft casing in the Roundup 24 well, and compare the response to the same log performed in 2010.

Summary of findings:

Overall the casing quality is very good, with the largest amount of penetration being ~18% found in joint 28 compared to joint 40 in the 2010 log. There are minor discrepancies, but the average trend appears to show a very minor increase in corrosion between the logs.

Detailed findings:

There are only two anomalies on the log, but neither affect the log in a significant way. Around ~3683' there is an attenuating mark on the amplitude image (AWBK) that indicates something on the inside surface of the casing, but no similar response in the internal radius or thickness measurements. There may be some minor dog-leg in this section as it correlates with changes in the eccentering (ECCE) curve.

A similar pattern starts around ~5220' and shows a stronger correlation to eccentering as the image begins to show a common 'track' pattern of light-dark-light-dark. The comments in the log indicate this was the depth where the sidetrack was initiated, which adds confidence that this anomaly is due to eccentering of the tool as it squeezes through a tight curve.

The rest of the log shows nothing significant and appears to be in very good condition. As mentioned in the summary above, there are some minor discrepancies between the 2010 and 2015 log such as the 2015 log showing less corrosion in some cases. This could be due to tool anomalies that appeared correct, anomalies in the well that distorted data, or erroneous data that could not be corrected.

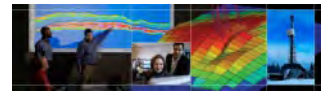
If possible, repeat passes across the entire well would be beneficial in eliminating one-off erroneous responses. With the current data, a third run in several years will provide further support to which peaks exist, and which are most likely erroneous.

Log Quality Control:

Minor reprocessing was performed to clean up the known, intermittent erroneous responses on the 72nd azimuth of the data (71st if counting 0), and averaging the surrounding data.

As well, the 2015 data was normalized by comparing the average penetration of the two wells and applying a single offset based on the difference.

The remaining data, such as fluid velocity, appears to be valid and was verified by comparing the expected average internal radius measurement of 2.475" against the actual measured value of 2.471". As well, the average thickness measured was approximately 0.278" compared to an API expected value of 0.275". Both measurements are well within tool tolerances.



Corrosion Summary Listing

A total of joints were analysed. The minimum thickness was found in **joint 28** with a value of **0.227"**. Minimum burst pressure was calculated at **4446.4 psi** using a yield value of 55000 psi and a casing size of 5.5".

(Burst is calculated using the following API formula:- $Burst = SF * 2 * Yp * Minimum\ Thickness / OD$ where $SF = 0.98$)

Note:- The following joints were not included in the above summary, but are displayed in the joint tables and plots:

[]

Joint Tally

| | |
|--|-----|
| Number of joints below 12.5% Penetration | 128 |
| Number of joints between 12.5 and 40 Penetration | 27 |
| Number of joints above 40% Penetration | 0 |

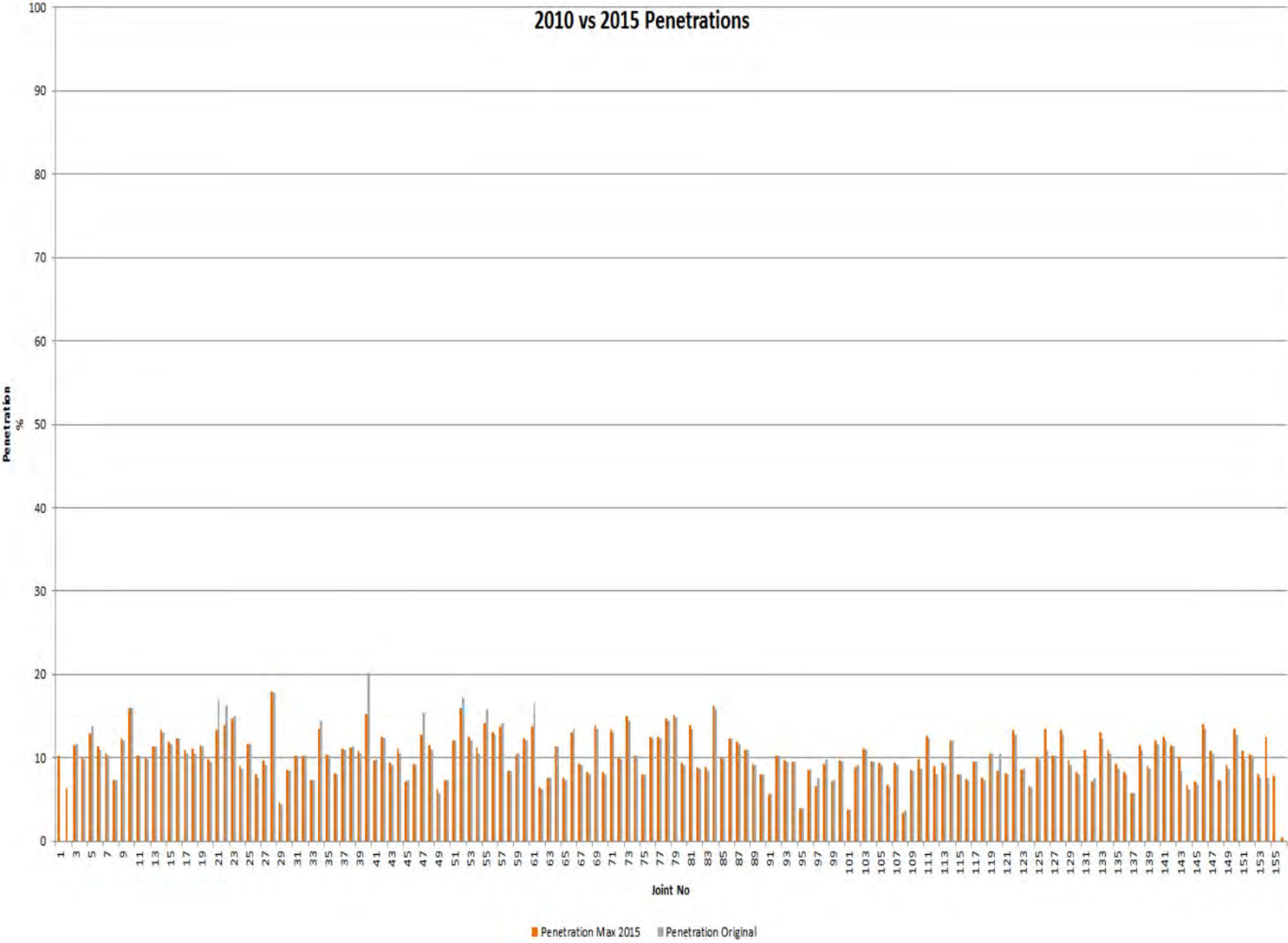
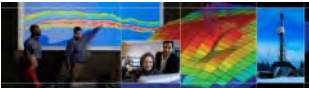
Summary

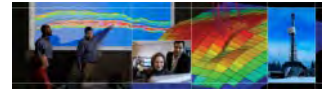
| | | |
|--|--------|-----|
| Joints Excluded from Summaries | [] | |
| Minimum Burst | 4446.4 | psi |
| Minimum Burst Found In Joint | 28 | |
| Casing Size Used For Minimum Burst Computation | 5.5 | in |
| Yield Used For Minimum Burst Computation | 55000 | psi |
| Safety Factor Used in Min Burst Computation | 0.98 | |
| | | |
| Minimum Thickness | 0.227 | in |
| Minimum Thickness Found In Joint | 28 | |

Charts:

The barchart of max penetration vs joint number provides a quicklook overview of the whole well, enabling trouble areas to be quickly recognised. The bars are color coded as above.

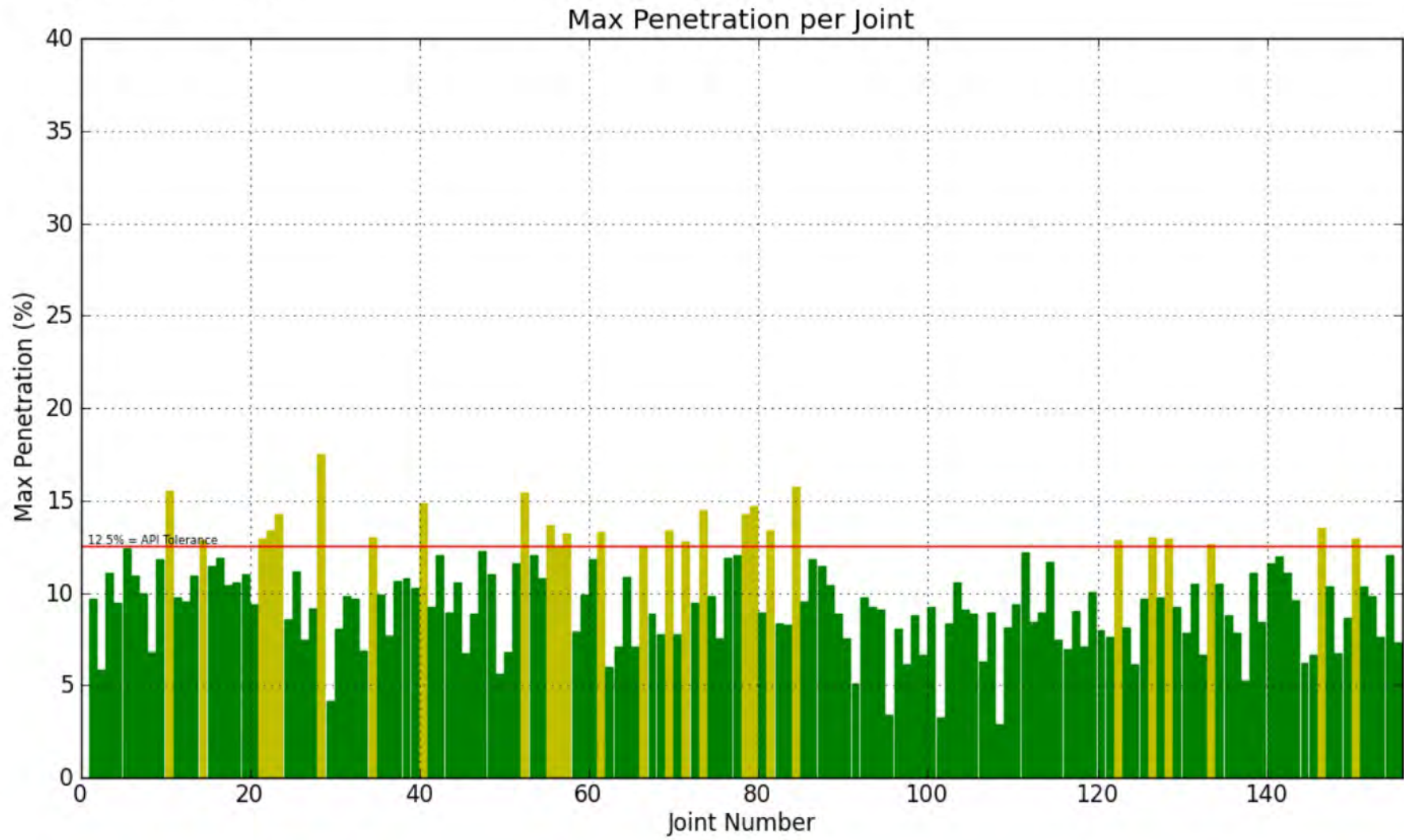
The histogram of casing thickness average per joint can be used to quickly see if the casing is all one weight of pipe. The histogram of all thickness measurements gives an indication of the casing quality (ERW pipe will show a very narrow distribution of thicknesses, whilst older milled casing will have a broader distribution).

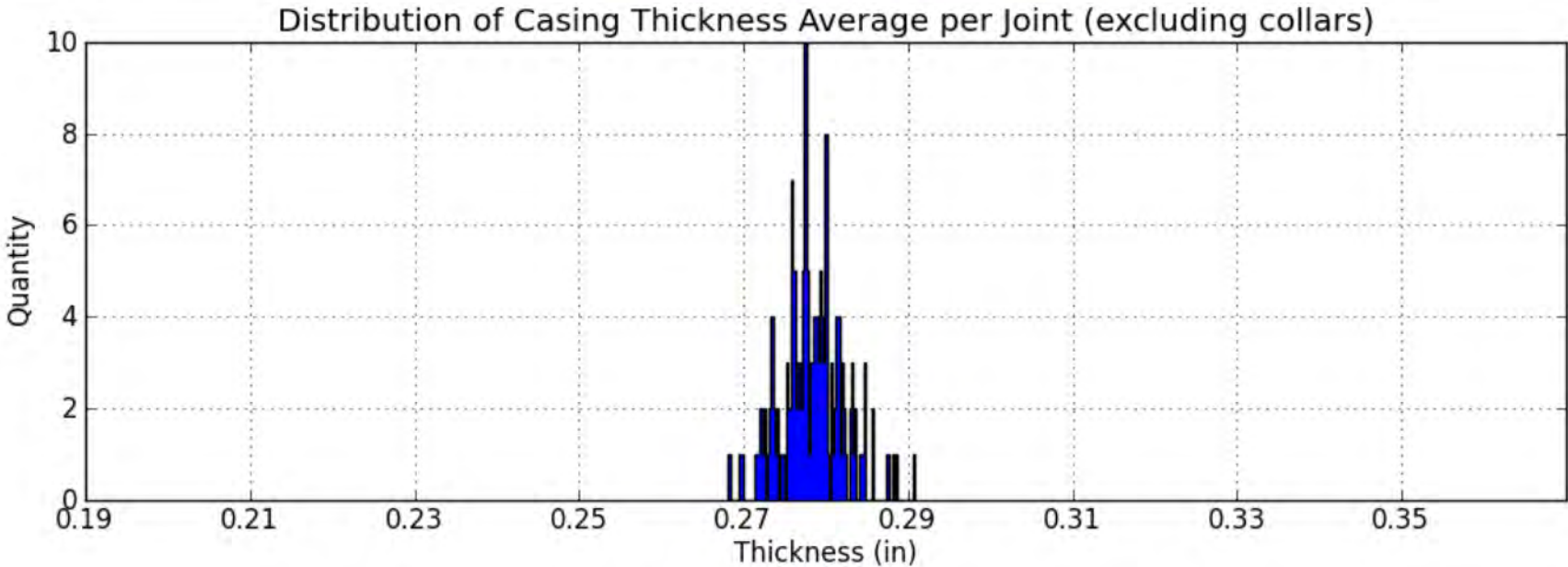
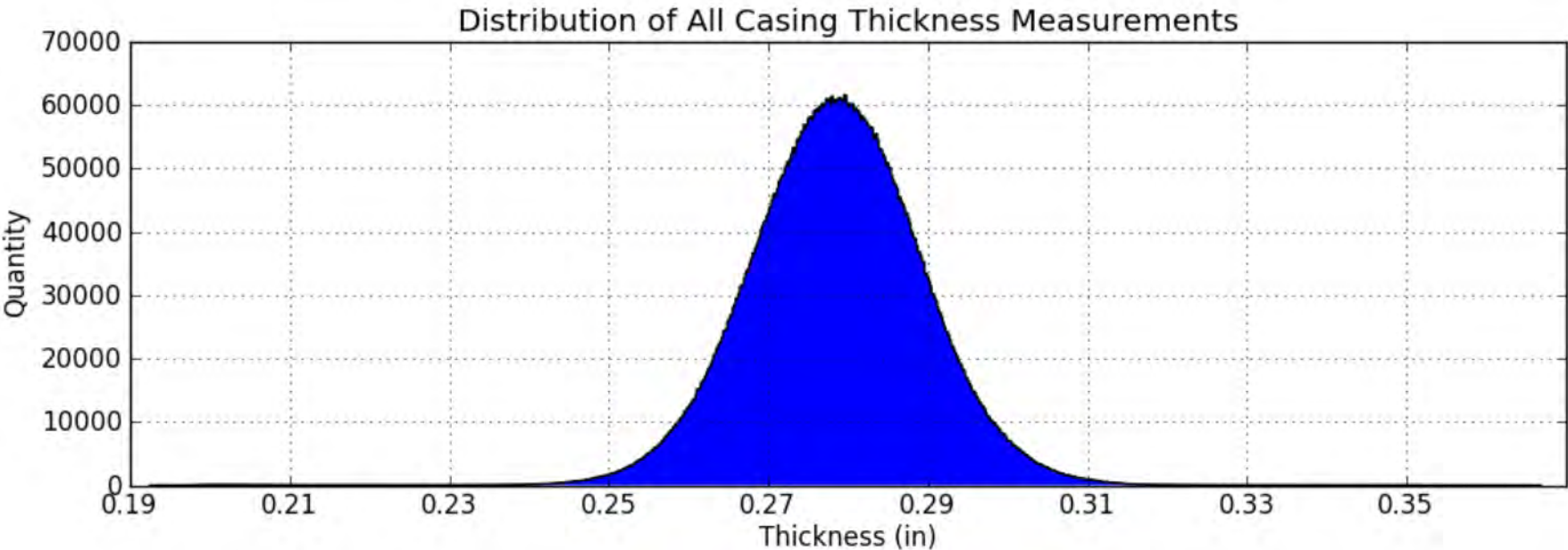
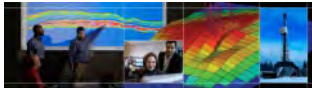


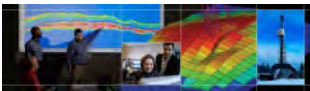


(Roundup 24_CSL_TL_Roundup 24_Main_6B_CSL_Report)

Minimum Burst = 4446.4 psi
In Joint Number 28
(Excluding joints [])

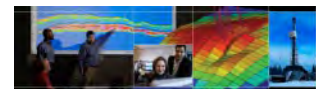




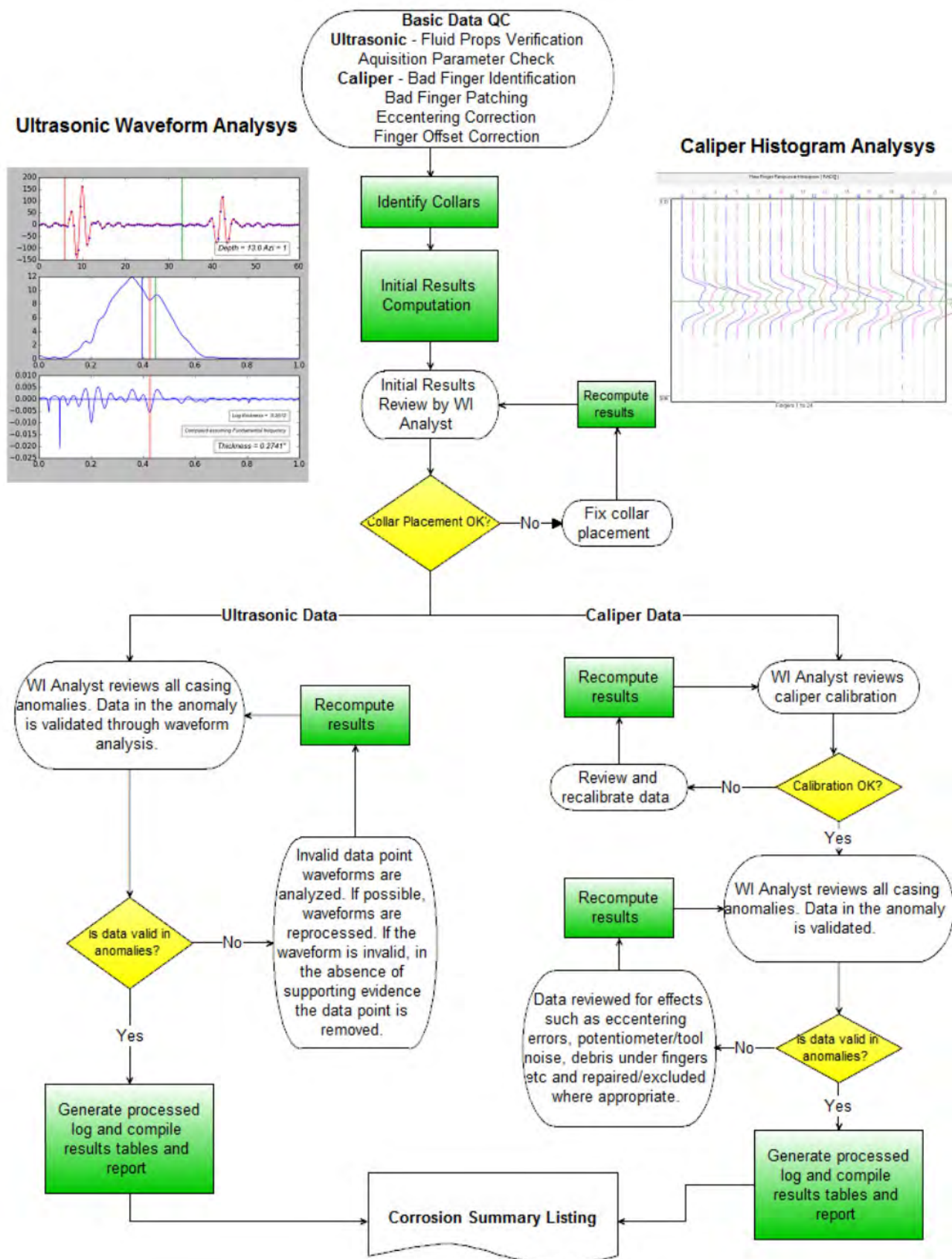


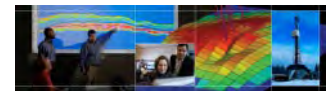
Summary of Header Information

| | | |
|----------------------------|-----------------------------|-----------|
| XCEL Energy Inc | Roundup 24 | Roundup |
| | | |
| Logging Date: 17-Jun-2015 | Engineer: Aleksei Bekhterev | Witness: |
| Unit Locn: Ft. Morgan, CO | Unit: | |
| Casing Size: | Casing Grade: N/A | Bit Size: |
| Elevation Drill Floor: | | |
| Elevation Ground Level: | | |
| Elevation KB: | | |
| Elevation Permanent Datum: | | |
| Permanent Datum: | | |

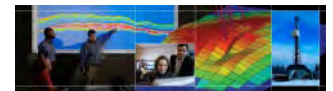


CSL Workflow Diagram

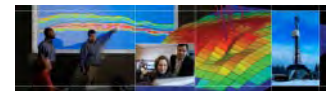




| Joint_No | Joint_Top | Joint_Length | Remark | Penetration_Max | IR_Min | Depth_IR_Min | IR_Max | Depth_IR_Max | Min_ID | Depth_Min_ID | Collapse_Min_Joi | Burst_Min_USI_th |
|----------|-----------|--------------|--------|-----------------|--------|--------------|--------|--------------|--------|--------------|------------------|------------------|
| | ft | ft | | | | ft | | ft | | ft | psi | psi |
| 1 | -0.7 | 38.77 | | 10.2 | 2.433 | 5.0 | 2.508 | 1.3 | 4.884 | 5.0 | 3247 | 4867 |
| 2 | 38.1 | 40.7 | | 6.4 | 2.435 | 42.3 | 2.526 | 41.4 | 4.888 | 41.5 | 3562 | 5074 |
| 3 | 78.8 | 41.15 | | 11.6 | 2.447 | 79.9 | 2.507 | 83.1 | 4.899 | 79.9 | 3134 | 4794 |
| 4 | 119.9 | 40.85 | | 10.0 | 2.434 | 124.2 | 2.513 | 124.2 | 4.886 | 124.2 | 3265 | 4879 |
| 5 | 160.8 | 40.5 | | 12.9 | 2.443 | 164.9 | 2.501 | 164.9 | 4.904 | 167.1 | 3023 | 4721 |
| 6 | 201.3 | 41.65 | | 11.4 | 2.437 | 205.0 | 2.504 | 205.2 | 4.89 | 205.0 | 3148 | 4803 |
| 7 | 242.9 | 41.35 | | 10.5 | 2.444 | 247.0 | 2.523 | 247.1 | 4.901 | 247.1 | 3223 | 4852 |
| 8 | 284.3 | 39.7 | | 7.3 | 2.429 | 288.7 | 2.513 | 288.8 | 4.878 | 288.7 | 3484 | 5023 |
| 9 | 324.0 | 42.45 | | 12.3 | 2.44 | 327.5 | 2.524 | 327.5 | 4.902 | 327.5 | 3070 | 4752 |
| 10 | 366.5 | 41.9 | | 16.0 | 2.442 | 370.3 | 2.52 | 370.3 | 4.903 | 370.2 | 2768 | 4554 |
| 11 | 408.4 | 40.75 | | 10.2 | 2.439 | 412.3 | 2.515 | 412.1 | 4.889 | 428.5 | 3245 | 4866 |
| 12 | 449.1 | 40.9 | | 10.0 | 2.439 | 453.3 | 2.508 | 453.2 | 4.897 | 453.3 | 3261 | 4877 |
| 13 | 490.0 | 43.05 | | 11.4 | 2.439 | 494.0 | 2.51 | 493.9 | 4.89 | 494.0 | 3147 | 4802 |
| 14 | 533.0 | 41.3 | | 13.3 | 2.446 | 537.3 | 2.504 | 537.3 | 4.909 | 537.5 | 2991 | 4700 |
| 15 | 574.3 | 40.25 | | 11.9 | 2.437 | 608.8 | 2.501 | 578.1 | 4.881 | 576.8 | 3103 | 4773 |
| 16 | 614.6 | 42.0 | | 12.4 | 2.448 | 636.2 | 2.499 | 618.6 | 4.913 | 618.5 | 3064 | 4748 |
| 17 | 656.6 | 39.15 | | 10.9 | 2.447 | 660.4 | 2.517 | 660.5 | 4.914 | 657.9 | 3189 | 4829 |
| 18 | 695.8 | 41.0 | | 11.1 | 2.439 | 699.7 | 2.519 | 699.7 | 4.895 | 699.8 | 3176 | 4821 |
| 19 | 736.8 | 40.2 | | 11.5 | 2.44 | 740.8 | 2.518 | 740.8 | 4.891 | 740.8 | 3140 | 4797 |
| 20 | 777.0 | 40.45 | | 9.9 | 2.433 | 781.0 | 2.511 | 781.0 | 4.893 | 781.0 | 3271 | 4884 |
| 21 | 817.4 | 41.05 | | 13.4 | 2.442 | 821.4 | 2.518 | 821.3 | 4.899 | 821.3 | 2984 | 4695 |
| 22 | 858.5 | 41.45 | | 13.9 | 2.433 | 861.9 | 2.515 | 862.5 | 4.894 | 861.9 | 2945 | 4670 |
| 23 | 899.9 | 40.45 | | 14.8 | 2.445 | 904.1 | 2.495 | 904.0 | 4.902 | 901.1 | 2870 | 4620 |
| 24 | 940.3 | 39.35 | | 9.0 | 2.424 | 944.5 | 2.511 | 944.6 | 4.87 | 944.7 | 3341 | 4929 |
| 25 | 979.7 | 41.25 | | 11.6 | 2.442 | 983.2 | 2.502 | 983.2 | 4.898 | 981.3 | 3130 | 4791 |
| 26 | 1021.0 | 39.85 | | 7.9 | 2.434 | 1024.8 | 2.499 | 1024.7 | 4.879 | 1024.8 | 3431 | 4989 |
| 27 | 1060.8 | 42.75 | | 9.6 | 2.435 | 1065.2 | 2.491 | 1093.4 | 4.887 | 1065.1 | 3293 | 4898 |
| 28 | 1103.6 | 40.7 | | 18.0 | 2.447 | 1107.6 | 2.507 | 1107.6 | 4.907 | 1105.2 | 2604 | 4446 |
| 29 | 1144.3 | 38.4 | | 4.6 | 2.43 | 1148.3 | 2.49 | 1148.0 | 4.871 | 1148.3 | 3703 | 5167 |
| 30 | 1182.7 | 39.3 | | 8.6 | 2.434 | 1186.5 | 2.501 | 1186.5 | 4.884 | 1186.5 | 3381 | 4956 |
| 31 | 1221.9 | 39.5 | | 10.3 | 2.431 | 1225.8 | 2.496 | 1252.9 | 4.876 | 1225.8 | 3238 | 4862 |



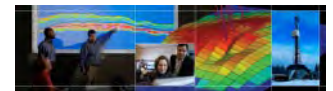
| Joint_No | Joint_Top | Joint_Length | Remark | Penetration_Max | IR_Min | Depth_IR_Min | IR_Max | Depth_IR_Max | Min_ID | Depth_Min_ID | Collapse_Min_Joi | Burst_Min_USI_th |
|----------|-----------|--------------|--------|-----------------|--------|--------------|--------|--------------|--------|--------------|------------------|------------------|
| | ft | ft | | | | ft | | ft | | ft | psi | psi |
| 32 | 1261.4 | 42.6 | | 10.2 | 2.438 | 1265.0 | 2.502 | 1300.1 | 4.9 | 1265.0 | 3247 | 4868 |
| 33 | 1304.1 | 40.7 | | 7.4 | 2.438 | 1308.2 | 2.501 | 1307.9 | 4.896 | 1305.2 | 3479 | 5020 |
| 34 | 1344.8 | 42.55 | | 13.5 | 2.444 | 1347.3 | 2.502 | 1383.4 | 4.905 | 1347.3 | 2976 | 4690 |
| 35 | 1387.3 | 41.95 | | 10.4 | 2.456 | 1391.9 | 2.504 | 1419.9 | 4.925 | 1388.5 | 3231 | 4857 |
| 36 | 1429.3 | 42.45 | | 8.2 | 2.431 | 1453.7 | 2.496 | 1433.3 | 4.879 | 1433.8 | 3413 | 4977 |
| 37 | 1471.7 | 38.75 | | 11.1 | 2.447 | 1478.1 | 2.508 | 1496.5 | 4.905 | 1475.9 | 3173 | 4819 |
| 38 | 1510.4 | 40.45 | | 11.3 | 2.448 | 1514.5 | 2.502 | 1514.3 | 4.906 | 1514.3 | 3159 | 4810 |
| 39 | 1550.9 | 41.9 | | 10.8 | 2.44 | 1591.8 | 2.502 | 1591.7 | 4.903 | 1551.9 | 3201 | 4837 |
| 40 | 1592.8 | 41.05 | | 15.3 | 2.447 | 1601.6 | 2.508 | 1596.8 | 4.906 | 1596.9 | 2824 | 4590 |
| 41 | 1633.8 | 41.35 | | 9.8 | 2.426 | 1637.4 | 2.498 | 1673.2 | 4.873 | 1637.4 | 3283 | 4891 |
| 42 | 1675.2 | 42.4 | | 12.5 | 2.44 | 1680.0 | 2.503 | 1679.8 | 4.901 | 1680.0 | 3055 | 4742 |
| 43 | 1717.6 | 39.45 | | 9.5 | 2.441 | 1721.8 | 2.492 | 1721.7 | 4.894 | 1721.8 | 3307 | 4907 |
| 44 | 1757.1 | 40.75 | | 11.0 | 2.442 | 1761.9 | 2.503 | 1780.7 | 4.892 | 1758.2 | 3178 | 4823 |
| 45 | 1797.8 | 42.2 | | 7.2 | 2.43 | 1801.9 | 2.499 | 1801.7 | 4.889 | 1799.1 | 3494 | 5029 |
| 46 | 1840.0 | 39.7 | | 9.3 | 2.427 | 1842.6 | 2.492 | 1876.3 | 4.89 | 1842.6 | 3318 | 4914 |
| 47 | 1879.7 | 40.0 | | 12.8 | 2.447 | 1883.4 | 2.498 | 1918.3 | 4.898 | 1883.4 | 3035 | 4729 |
| 48 | 1919.7 | 41.2 | | 11.5 | 2.45 | 1923.8 | 2.494 | 1947.8 | 4.906 | 1923.8 | 3139 | 4797 |
| 49 | 1960.9 | 38.4 | | 6.1 | 2.432 | 1965.0 | 2.489 | 1965.0 | 4.886 | 1964.5 | 3582 | 5087 |
| 50 | 1999.3 | 41.1 | | 7.3 | 2.439 | 2003.7 | 2.497 | 2003.7 | 4.892 | 2001.0 | 3488 | 5025 |
| 51 | 2040.4 | 44.1 | | 12.1 | 2.447 | 2044.3 | 2.505 | 2082.2 | 4.913 | 2041.6 | 3088 | 4764 |
| 52 | 2084.5 | 40.77 | | 16.0 | 2.445 | 2088.6 | 2.5 | 2121.7 | 4.899 | 2085.8 | 2773 | 4557 |
| 53 | 2125.3 | 42.58 | | 12.6 | 2.435 | 2127.6 | 2.496 | 2165.4 | 4.883 | 2127.6 | 3053 | 4740 |
| 54 | 2167.9 | 42.4 | | 11.3 | 2.439 | 2172.0 | 2.495 | 2200.0 | 4.904 | 2170.2 | 3159 | 4810 |
| 55 | 2210.2 | 42.85 | | 14.2 | 2.436 | 2214.0 | 2.516 | 2242.0 | 4.902 | 2211.5 | 2919 | 4653 |
| 56 | 2253.1 | 43.16 | | 13.1 | 2.433 | 2256.8 | 2.503 | 2290.2 | 4.886 | 2256.8 | 3011 | 4713 |
| 57 | 2296.3 | 40.98 | | 13.7 | 2.444 | 2305.1 | 2.492 | 2334.3 | 4.895 | 2305.1 | 2958 | 4678 |
| 58 | 2337.2 | 43.07 | | 8.4 | 2.439 | 2339.9 | 2.501 | 2374.5 | 4.893 | 2339.9 | 3394 | 4964 |
| 59 | 2380.3 | 42.03 | | 10.4 | 2.437 | 2382.3 | 2.496 | 2397.1 | 4.887 | 2382.3 | 3233 | 4858 |
| 60 | 2422.3 | 42.85 | | 12.3 | 2.437 | 2423.6 | 2.502 | 2460.2 | 4.89 | 2423.6 | 3075 | 4755 |
| 61 | 2465.2 | 44.13 | | 13.8 | 2.44 | 2469.0 | 2.509 | 2505.7 | 4.906 | 2469.0 | 2952 | 4674 |
| 62 | 2509.3 | 39.1 | | 6.5 | 2.443 | 2513.8 | 2.487 | 2545.9 | 4.896 | 2513.8 | 3550 | 5066 |



| Joint_No | Joint_Top | Joint_Length | Remark | Penetration_Max | IR_Min | Depth_IR_Min | IR_Max | Depth_IR_Max | Min_ID | Depth_Min_ID | Collapse_Min_Joi | Burst_Min_USI_th |
|----------|-----------|--------------|--------|-----------------|--------|--------------|--------|--------------|--------|--------------|------------------|------------------|
| | ft | ft | | | | ft | | ft | | ft | psi | psi |
| 63 | 2548.4 | 42.8 | | 7.6 | 2.436 | 2550.6 | 2.503 | 2579.4 | 4.884 | 2550.6 | 3462 | 5008 |
| 64 | 2591.2 | 41.9 | | 11.3 | 2.439 | 2593.2 | 2.496 | 2595.2 | 4.891 | 2593.2 | 3153 | 4806 |
| 65 | 2633.1 | 39.5 | | 7.6 | 2.442 | 2636.0 | 2.492 | 2667.4 | 4.897 | 2636.0 | 3459 | 5006 |
| 66 | 2672.6 | 43.2 | | 13.1 | 2.439 | 2676.6 | 2.5 | 2675.1 | 4.906 | 2676.7 | 3009 | 4712 |
| 67 | 2715.8 | 40.3 | | 9.3 | 2.447 | 2718.9 | 2.495 | 2747.1 | 4.9 | 2722.9 | 3319 | 4915 |
| 68 | 2756.1 | 40.76 | | 8.2 | 2.448 | 2758.4 | 2.5 | 2788.1 | 4.905 | 2758.4 | 3407 | 4973 |
| 69 | 2796.9 | 42.59 | | 13.8 | 2.435 | 2801.0 | 2.502 | 2832.7 | 4.891 | 2801.0 | 2948 | 4672 |
| 70 | 2839.4 | 40.55 | | 8.3 | 2.433 | 2850.5 | 2.49 | 2842.1 | 4.874 | 2850.5 | 3406 | 4972 |
| 71 | 2880.0 | 40.29 | | 13.3 | 2.45 | 2882.6 | 2.492 | 2909.3 | 4.907 | 2885.1 | 2991 | 4700 |
| 72 | 2920.3 | 39.66 | | 10.0 | 2.429 | 2924.3 | 2.489 | 2955.1 | 4.874 | 2922.3 | 3267 | 4881 |
| 73 | 2960.0 | 40.25 | | 14.9 | 2.44 | 2996.4 | 2.502 | 2962.5 | 4.888 | 2994.6 | 2857 | 4612 |
| 74 | 3000.2 | 41.0 | | 10.3 | 2.449 | 3002.4 | 2.499 | 3034.5 | 4.913 | 3002.4 | 3239 | 4863 |
| 75 | 3041.2 | 41.27 | | 8.0 | 2.451 | 3042.5 | 2.495 | 3077.8 | 4.906 | 3042.8 | 3426 | 4985 |
| 76 | 3082.5 | 42.93 | | 12.4 | 2.443 | 3085.0 | 2.5 | 3121.1 | 4.91 | 3085.0 | 3064 | 4748 |
| 77 | 3125.4 | 40.77 | | 12.5 | 2.448 | 3129.9 | 2.497 | 3146.9 | 4.902 | 3129.9 | 3054 | 4741 |
| 78 | 3166.2 | 40.26 | | 14.7 | 2.442 | 3170.3 | 2.495 | 3188.6 | 4.899 | 3170.4 | 2874 | 4623 |
| 79 | 3206.4 | 41.25 | | 15.2 | 2.453 | 3211.0 | 2.506 | 3230.0 | 4.916 | 3209.1 | 2838 | 4599 |
| 80 | 3247.7 | 40.93 | | 9.4 | 2.439 | 3250.2 | 2.492 | 3280.8 | 4.88 | 3250.2 | 3309 | 4908 |
| 81 | 3288.6 | 40.14 | | 13.9 | 2.449 | 3292.1 | 2.498 | 3309.9 | 4.901 | 3292.1 | 2944 | 4669 |
| 82 | 3328.8 | 41.1 | | 8.9 | 2.448 | 3351.2 | 2.495 | 3364.9 | 4.898 | 3331.0 | 3355 | 4939 |
| 83 | 3369.9 | 40.25 | | 8.8 | 2.444 | 3372.1 | 2.491 | 3408.6 | 4.899 | 3372.1 | 3363 | 4943 |
| 84 | 3410.1 | 42.45 | | 16.2 | 2.443 | 3417.0 | 2.505 | 3439.9 | 4.9 | 3417.0 | 2749 | 4541 |
| 85 | 3452.6 | 40.75 | | 10.0 | 2.447 | 3456.4 | 2.494 | 3483.8 | 4.898 | 3456.4 | 3263 | 4878 |
| 86 | 3493.3 | 41.15 | | 12.3 | 2.446 | 3521.3 | 2.494 | 3521.3 | 4.897 | 3496.0 | 3075 | 4755 |
| 87 | 3534.5 | 43.25 | | 11.9 | 2.447 | 3536.9 | 2.499 | 3572.4 | 4.913 | 3536.6 | 3104 | 4774 |
| 88 | 3577.7 | 40.85 | | 10.9 | 2.451 | 3583.6 | 2.496 | 3609.4 | 4.908 | 3580.2 | 3188 | 4829 |
| 89 | 3618.6 | 41.8 | | 9.3 | 2.441 | 3620.9 | 2.495 | 3642.1 | 4.897 | 3619.7 | 3318 | 4914 |
| 90 | 3660.4 | 40.7 | | 8.0 | 2.432 | 3662.6 | 2.498 | 3689.7 | 4.877 | 3662.6 | 3425 | 4984 |
| 91 | 3701.1 | 41.45 | | 5.6 | 2.436 | 3703.3 | 2.488 | 3727.5 | 4.877 | 3703.1 | 3625 | 5115 |
| 92 | 3742.5 | 42.54 | | 10.2 | 2.445 | 3762.0 | 2.509 | 3768.4 | 4.899 | 3744.8 | 3244 | 4866 |
| 93 | 3785.1 | 40.15 | | 9.7 | 2.439 | 3786.1 | 2.496 | 3812.0 | 4.889 | 3789.4 | 3285 | 4892 |

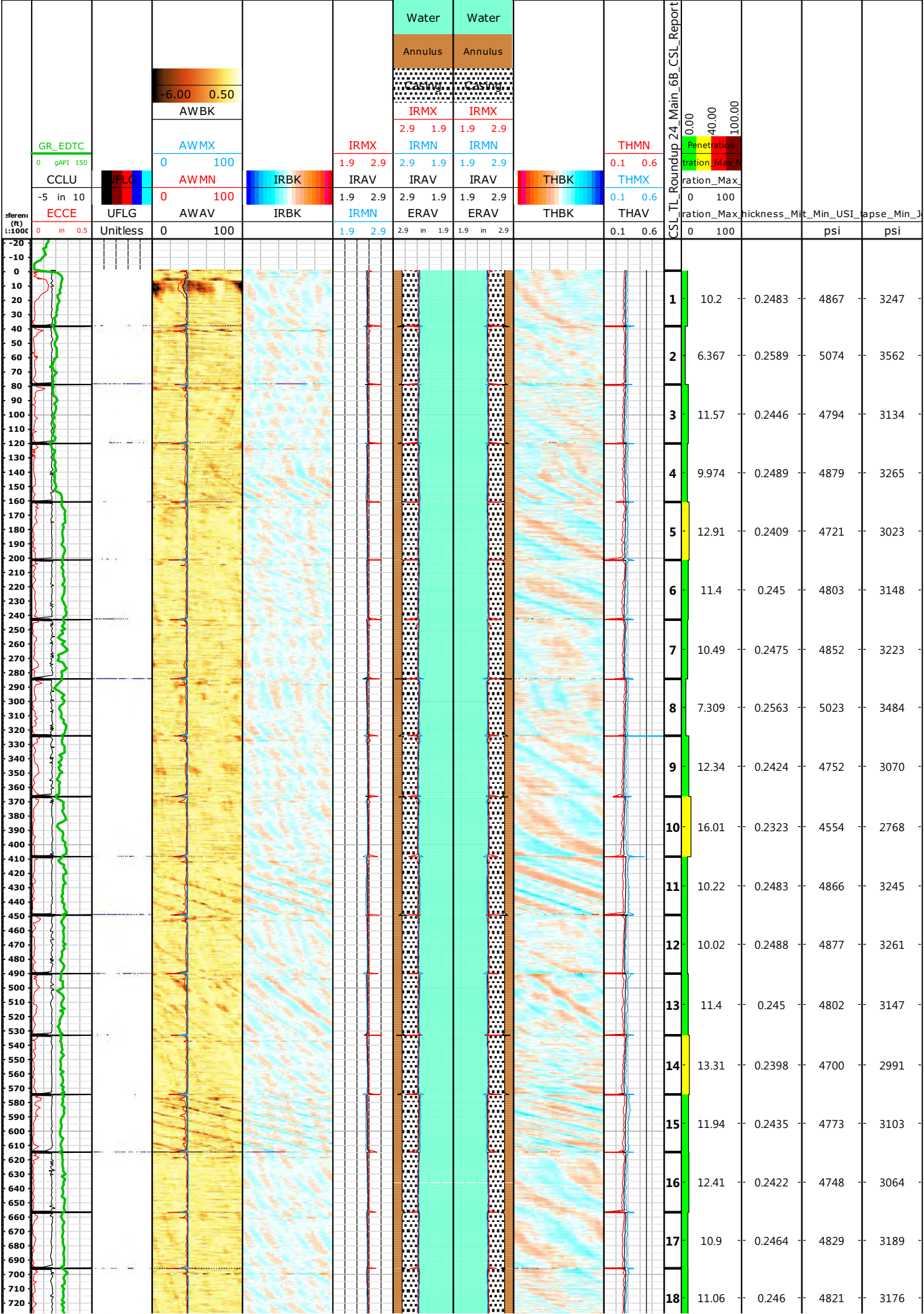


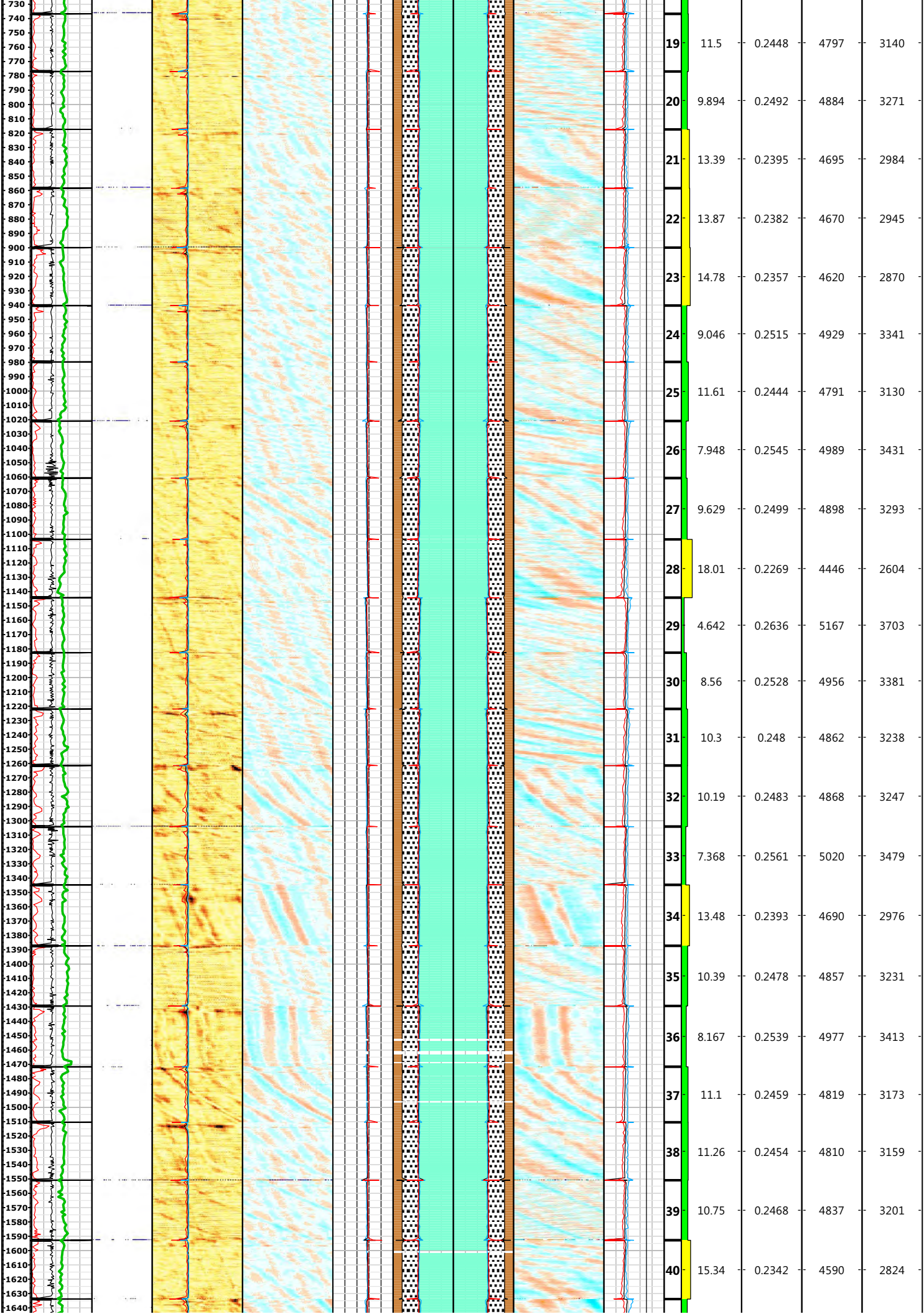
| Joint_No | Joint_Top | Joint_Length | Remark | Penetration_Max | IR_Min | Depth_IR_Min | IR_Max | Depth_IR_Max | Min_ID | Depth_Min_ID | Collapse_Min_Joi | Burst_Min_USI_th |
|----------|-----------|--------------|--------|-----------------|--------|--------------|--------|--------------|--------|--------------|------------------|------------------|
| | ft | ft | | | | ft | | ft | | ft | psi | psi |
| 94 | 3825.2 | 41.35 | | 9.6 | 2.424 | 3827.3 | 2.504 | 3851.1 | 4.863 | 3827.3 | 3299 | 4902 |
| 95 | 3866.6 | 42.2 | | 3.9 | 2.425 | 3868.8 | 2.494 | 3889.8 | 4.866 | 3868.8 | 3764 | 5207 |
| 96 | 3908.8 | 42.05 | | 8.5 | 2.437 | 3910.9 | 2.497 | 3945.4 | 4.877 | 3910.9 | 3383 | 4957 |
| 97 | 3950.8 | 40.0 | | 6.7 | 2.443 | 3953.3 | 2.496 | 3985.4 | 4.897 | 3953.7 | 3537 | 5058 |
| 98 | 3990.8 | 42.5 | | 9.3 | 2.438 | 3993.6 | 2.498 | 4018.9 | 4.9 | 3993.6 | 3321 | 4916 |
| 99 | 4033.3 | 42.57 | | 7.2 | 2.432 | 4036.4 | 2.5 | 4066.6 | 4.872 | 4036.3 | 3496 | 5031 |
| 100 | 4075.9 | 42.33 | | 9.7 | 2.433 | 4077.7 | 2.493 | 4102.3 | 4.883 | 4077.7 | 3285 | 4893 |
| 101 | 4118.2 | 39.78 | | 3.8 | 2.429 | 4121.1 | 2.493 | 4136.7 | 4.881 | 4121.1 | 3775 | 5214 |
| 102 | 4158.0 | 39.97 | | 8.9 | 2.443 | 4160.1 | 2.498 | 4189.2 | 4.903 | 4195.4 | 3357 | 4939 |
| 103 | 4198.0 | 41.37 | | 11.0 | 2.445 | 4201.8 | 2.506 | 4225.8 | 4.905 | 4201.9 | 3177 | 4822 |
| 104 | 4239.3 | 42.48 | | 9.6 | 2.437 | 4241.6 | 2.512 | 4274.4 | 4.883 | 4241.6 | 3299 | 4901 |
| 105 | 4281.8 | 42.82 | | 9.4 | 2.438 | 4305.5 | 2.501 | 4304.9 | 4.881 | 4285.3 | 3313 | 4911 |
| 106 | 4324.6 | 40.93 | | 6.8 | 2.428 | 4327.1 | 2.495 | 4356.8 | 4.875 | 4327.0 | 3526 | 5050 |
| 107 | 4365.5 | 42.4 | | 9.4 | 2.44 | 4367.3 | 2.499 | 4406.2 | 4.891 | 4366.8 | 3311 | 4910 |
| 108 | 4408.0 | 41.45 | | 3.4 | 2.432 | 4412.5 | 2.487 | 4432.8 | 4.877 | 4412.5 | 3809 | 5236 |
| 109 | 4449.4 | 42.25 | | 8.6 | 2.441 | 4451.4 | 2.5 | 4480.4 | 4.892 | 4451.4 | 3377 | 4953 |
| 110 | 4491.6 | 43.17 | | 9.9 | 2.429 | 4531.9 | 2.505 | 4532.8 | 4.888 | 4531.9 | 3272 | 4884 |
| 111 | 4534.8 | 40.53 | | 12.7 | 2.435 | 4536.4 | 2.502 | 4566.8 | 4.884 | 4537.3 | 3042 | 4733 |
| 112 | 4575.4 | 42.49 | | 8.9 | 2.405 | 4613.3 | 2.499 | 4615.0 | 4.87 | 4615.1 | 3350 | 4935 |
| 113 | 4617.8 | 39.36 | | 9.4 | 2.436 | 4620.6 | 2.495 | 4645.4 | 4.887 | 4620.0 | 3312 | 4910 |
| 114 | 4657.2 | 43.55 | | 12.1 | 2.439 | 4659.4 | 2.506 | 4695.5 | 4.899 | 4661.5 | 3088 | 4763 |
| 115 | 4700.7 | 41.25 | | 8.0 | 2.433 | 4702.7 | 2.497 | 4702.8 | 4.87 | 4702.7 | 3428 | 4986 |
| 116 | 4742.0 | 41.85 | | 7.4 | 2.443 | 4744.0 | 2.496 | 4762.6 | 4.891 | 4745.2 | 3475 | 5017 |
| 117 | 4783.9 | 39.93 | | 9.5 | 2.442 | 4805.1 | 2.494 | 4816.2 | 4.889 | 4800.3 | 3305 | 4906 |
| 118 | 4823.8 | 41.05 | | 7.6 | 2.445 | 4828.0 | 2.492 | 4860.4 | 4.896 | 4827.2 | 3461 | 5008 |
| 119 | 4864.8 | 41.06 | | 10.5 | 2.443 | 4874.5 | 2.494 | 4892.0 | 4.891 | 4867.4 | 3218 | 4848 |
| 120 | 4905.9 | 39.55 | | 8.4 | 2.441 | 4943.7 | 2.489 | 4908.4 | 4.895 | 4943.7 | 3391 | 4962 |
| 121 | 4945.5 | 41.3 | | 8.1 | 2.444 | 4946.9 | 2.497 | 4984.0 | 4.891 | 4946.9 | 3416 | 4978 |
| 122 | 4986.8 | 40.6 | | 13.3 | 2.446 | 4989.2 | 2.496 | 5024.8 | 4.894 | 4989.2 | 2991 | 4700 |
| 123 | 5027.4 | 40.5 | | 8.6 | 2.435 | 5047.5 | 2.495 | 5065.0 | 4.881 | 5046.6 | 3377 | 4953 |
| 124 | 5067.9 | 40.15 | | 6.6 | 2.442 | 5070.8 | 2.495 | 5093.0 | 4.903 | 5070.8 | 3540 | 5060 |



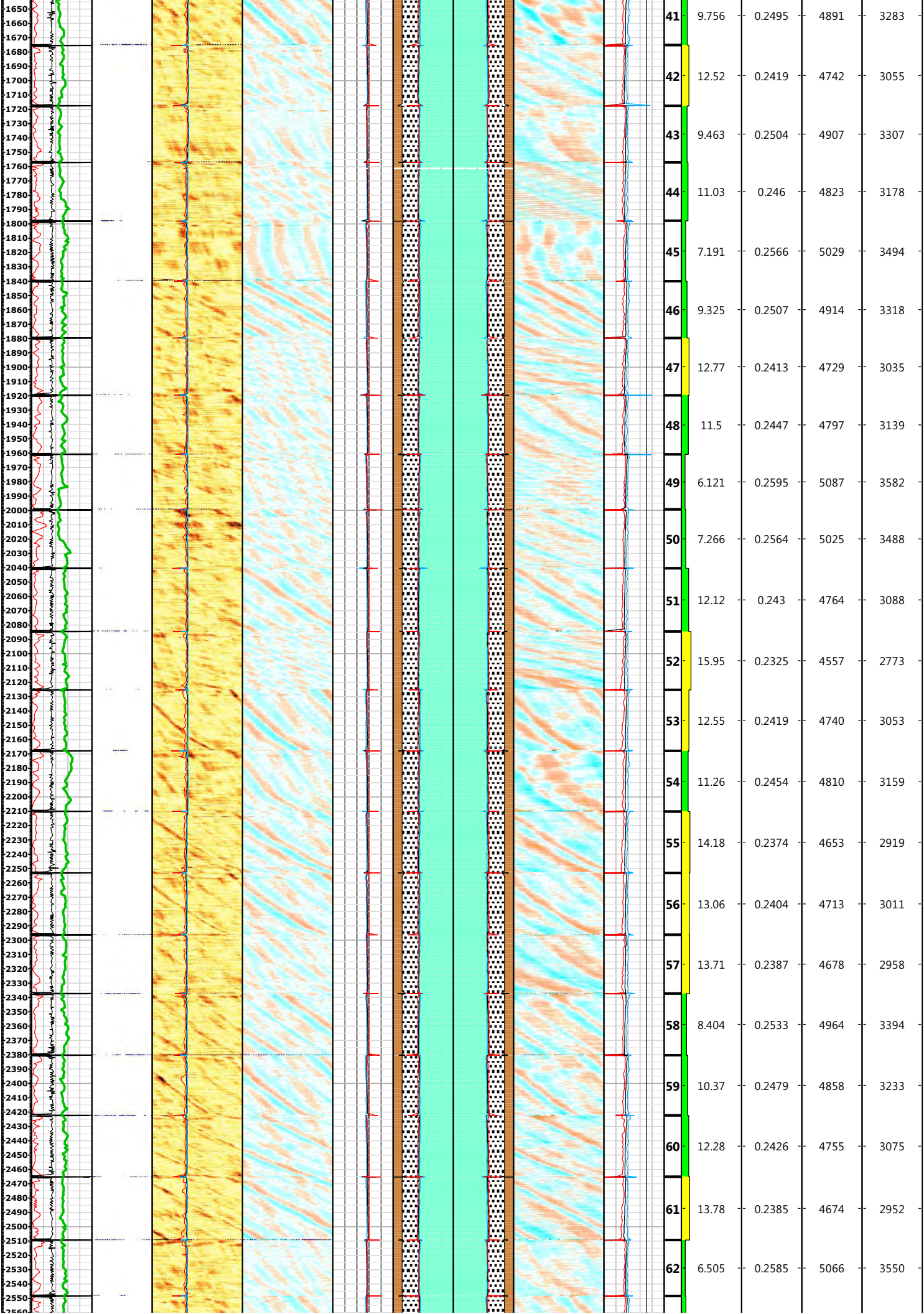
| Joint_No | Joint_Top | Joint_Length | Remark | Penetration_Max | IR_Min | Depth_IR_Min | IR_Max | Depth_IR_Max | Min_ID | Depth_Min_ID | Collapse_Min_Joi | Burst_Min_USI_th |
|----------|-----------|--------------|--------|-----------------|--------|--------------|--------|--------------|--------|--------------|------------------|------------------|
| | ft | ft | | | | ft | | ft | | ft | psi | psi |
| 125 | 5108.0 | 41.6 | | 10.1 | 2.446 | 5110.9 | 2.501 | 5122.6 | 4.899 | 5110.9 | 3251 | 4870 |
| 126 | 5149.6 | 40.43 | | 13.5 | 2.447 | 5184.5 | 2.495 | 5152.1 | 4.897 | 5159.7 | 2978 | 4691 |
| 127 | 5190.0 | 41.52 | | 10.2 | 2.451 | 5223.9 | 2.519 | 5224.5 | 4.907 | 5201.0 | 3244 | 4865 |
| 128 | 5231.5 | 40.39 | | 13.4 | 2.443 | 5235.9 | 2.501 | 5265.6 | 4.893 | 5234.6 | 2985 | 4696 |
| 129 | 5271.9 | 41.05 | | 9.7 | 2.445 | 5273.9 | 2.502 | 5308.7 | 4.902 | 5280.0 | 3288 | 4895 |
| 130 | 5313.0 | 40.45 | | 8.3 | 2.441 | 5314.3 | 2.492 | 5344.8 | 4.887 | 5314.3 | 3399 | 4967 |
| 131 | 5353.4 | 41.05 | | 11.0 | 2.445 | 5359.9 | 2.496 | 5392.5 | 4.895 | 5360.8 | 3183 | 4826 |
| 132 | 5394.5 | 40.25 | | 7.2 | 2.442 | 5395.8 | 2.494 | 5419.4 | 4.887 | 5395.9 | 3497 | 5031 |
| 133 | 5434.8 | 41.15 | | 13.1 | 2.444 | 5437.4 | 2.505 | 5463.5 | 4.891 | 5437.4 | 3008 | 4711 |
| 134 | 5475.9 | 41.65 | | 11.0 | 2.437 | 5478.5 | 2.499 | 5478.5 | 4.879 | 5478.4 | 3183 | 4826 |
| 135 | 5517.5 | 40.76 | | 9.3 | 2.436 | 5518.8 | 2.494 | 5555.1 | 4.88 | 5518.9 | 3323 | 4917 |
| 136 | 5558.3 | 40.85 | | 8.3 | 2.44 | 5561.0 | 2.494 | 5590.1 | 4.887 | 5561.0 | 3401 | 4969 |
| 137 | 5599.2 | 40.46 | | 5.7 | 2.442 | 5601.7 | 2.492 | 5631.6 | 4.891 | 5600.5 | 3614 | 5108 |
| 138 | 5639.6 | 40.85 | | 11.6 | 2.446 | 5642.4 | 2.496 | 5664.9 | 4.895 | 5642.4 | 3135 | 4794 |
| 139 | 5680.5 | 41.05 | | 8.9 | 2.442 | 5682.9 | 2.492 | 5713.3 | 4.892 | 5682.8 | 3350 | 4935 |
| 140 | 5721.5 | 41.92 | | 12.1 | 2.445 | 5738.6 | 2.503 | 5753.8 | 4.905 | 5724.1 | 3088 | 4764 |
| 141 | 5763.5 | 40.74 | | 12.5 | 2.445 | 5765.2 | 2.495 | 5800.7 | 4.892 | 5765.2 | 3061 | 4745 |
| 142 | 5804.2 | 40.46 | | 11.6 | 2.448 | 5833.9 | 2.497 | 5840.6 | 4.901 | 5805.4 | 3135 | 4794 |
| 143 | 5844.6 | 40.65 | | 10.1 | 2.447 | 5849.0 | 2.497 | 5867.9 | 4.902 | 5850.0 | 3255 | 4873 |
| 144 | 5885.3 | 40.85 | | 6.7 | 2.446 | 5896.8 | 2.502 | 5919.9 | 4.896 | 5892.8 | 3531 | 5054 |
| 145 | 5926.2 | 40.66 | | 7.1 | 2.441 | 5928.2 | 2.49 | 5959.9 | 4.886 | 5929.1 | 3500 | 5033 |
| 146 | 5966.8 | 41.25 | | 14.0 | 2.444 | 5969.4 | 2.501 | 6004.9 | 4.894 | 5968.7 | 2933 | 4662 |
| 147 | 6008.1 | 41.25 | | 10.8 | 2.441 | 6010.7 | 2.5 | 6039.7 | 4.886 | 6010.7 | 3195 | 4834 |
| 148 | 6049.3 | 41.25 | | 7.2 | 2.432 | 6051.9 | 2.493 | 6066.3 | 4.872 | 6051.9 | 3489 | 5026 |
| 149 | 6090.6 | 41.85 | | 9.1 | 2.449 | 6107.8 | 2.499 | 6117.5 | 4.901 | 6092.0 | 3336 | 4926 |
| 150 | 6132.4 | 41.45 | | 13.4 | 2.446 | 6135.0 | 2.502 | 6159.2 | 4.9 | 6134.9 | 2983 | 4695 |
| 151 | 6173.9 | 40.58 | | 10.8 | 2.443 | 6177.8 | 2.505 | 6208.8 | 4.89 | 6175.8 | 3194 | 4833 |
| 152 | 6214.5 | 40.53 | | 10.3 | 2.434 | 6216.9 | 2.499 | 6251.8 | 4.871 | 6216.9 | 3236 | 4860 |
| 153 | 6255.0 | 39.86 | | 8.1 | 2.447 | 6257.5 | 2.499 | 6287.0 | 4.895 | 6257.5 | 3422 | 4982 |
| 154 | 6294.8 | 39.86 | | 12.5 | 2.443 | 6304.8 | 2.503 | 6328.1 | 4.892 | 6304.8 | 3053 | 4741 |
| 155 | 6334.7 | 20.13 | | 7.8 | 2.438 | 6336.1 | 2.491 | 6351.1 | 4.881 | 6336.1 | 3443 | 4996 |

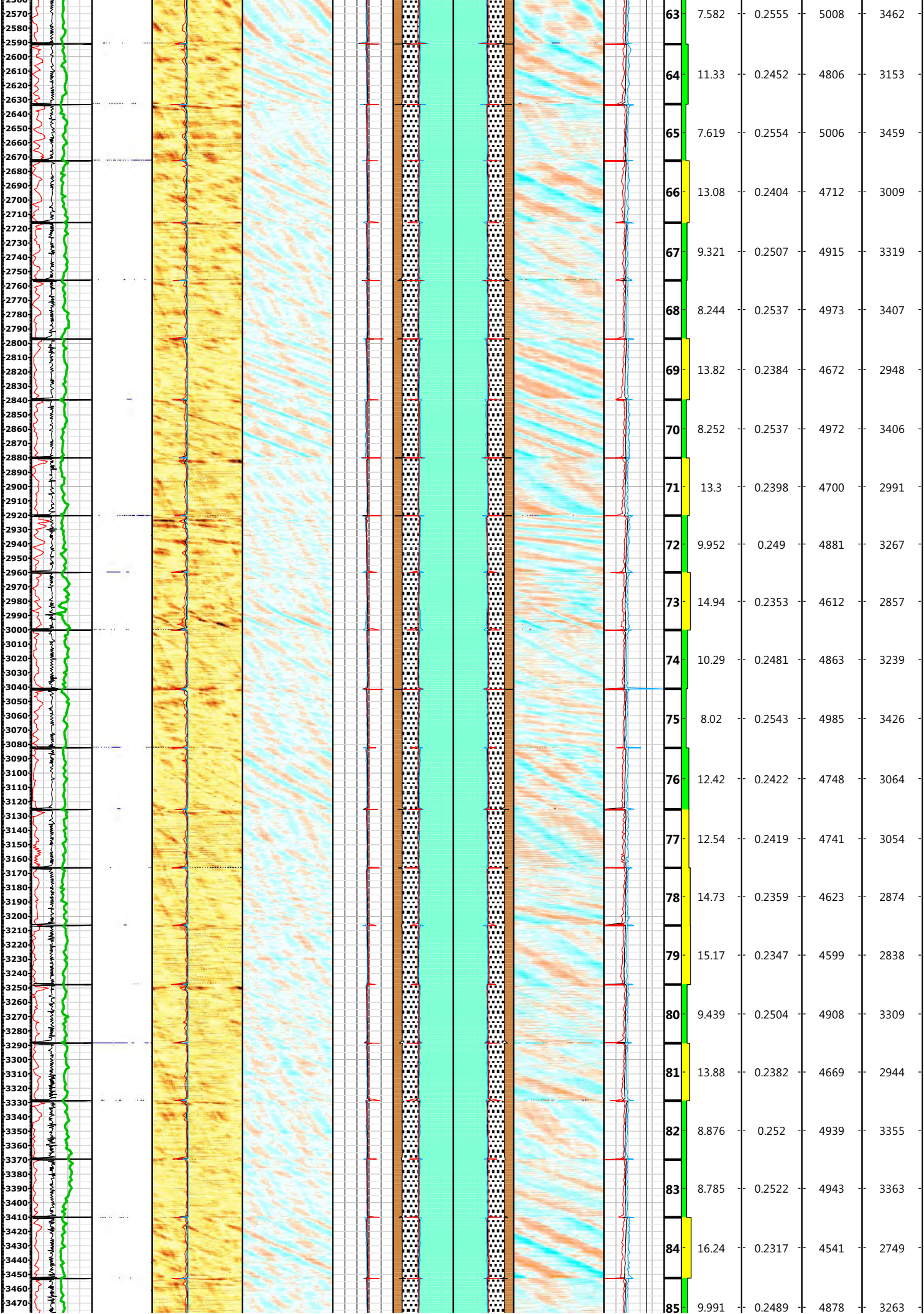
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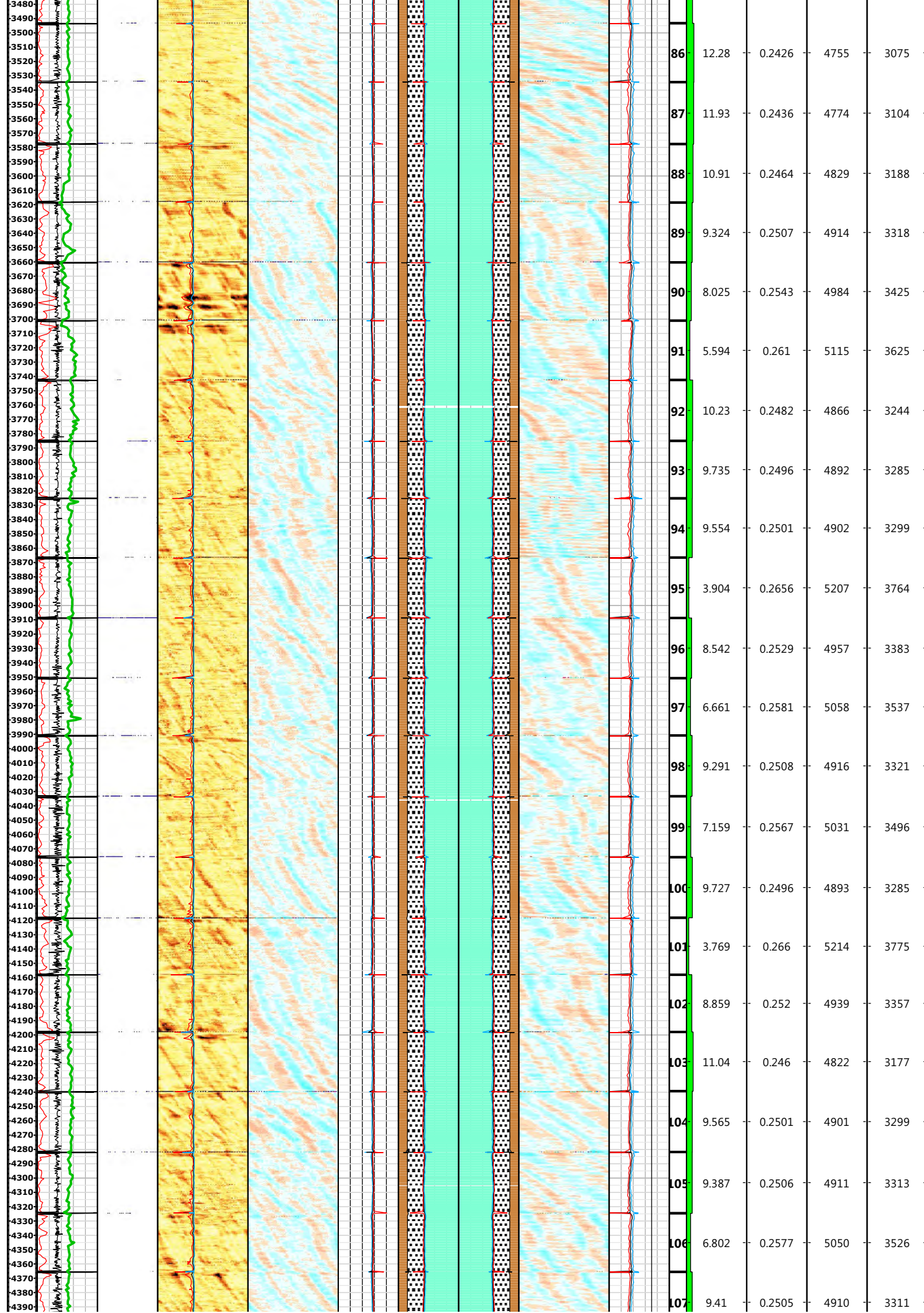


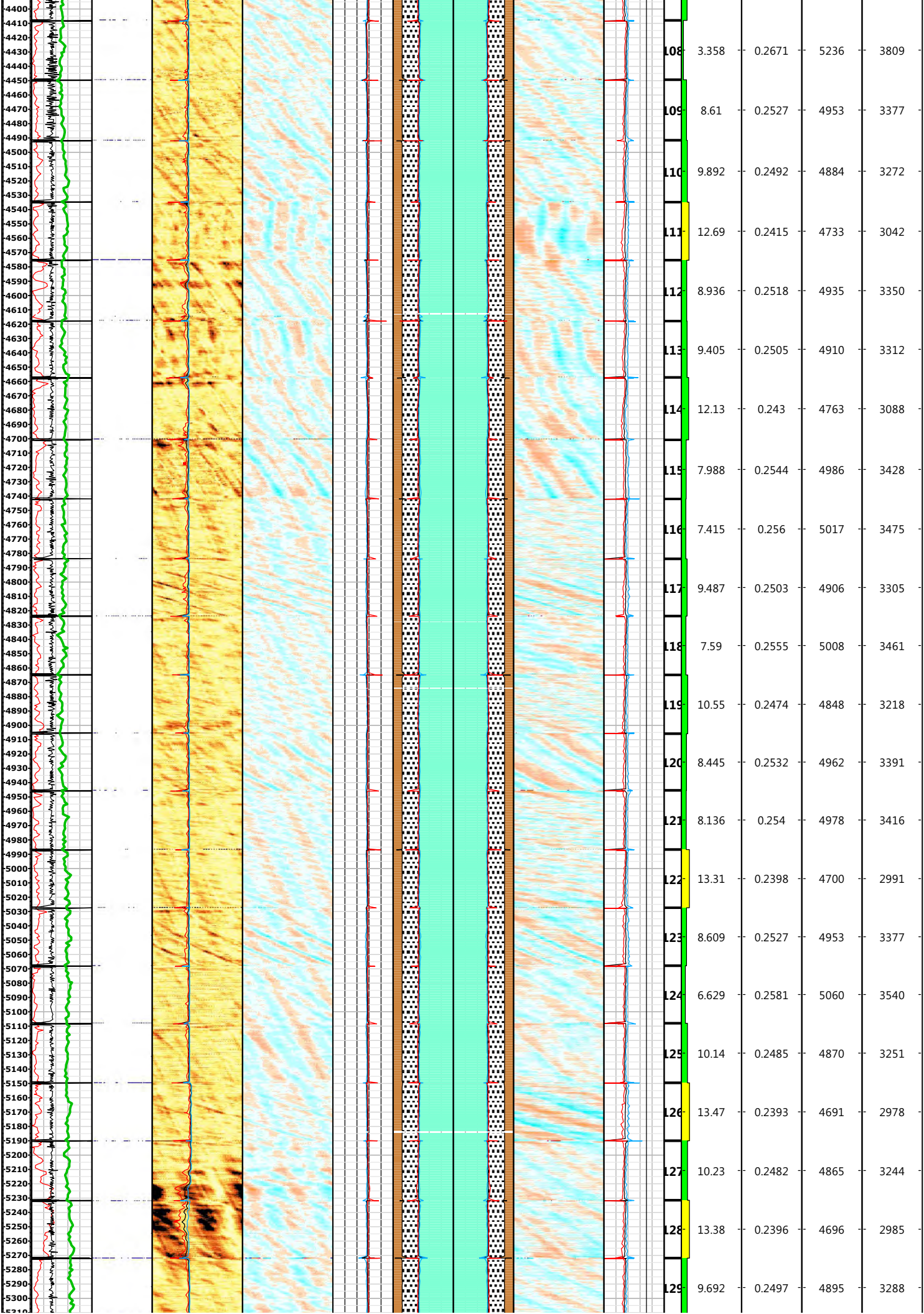


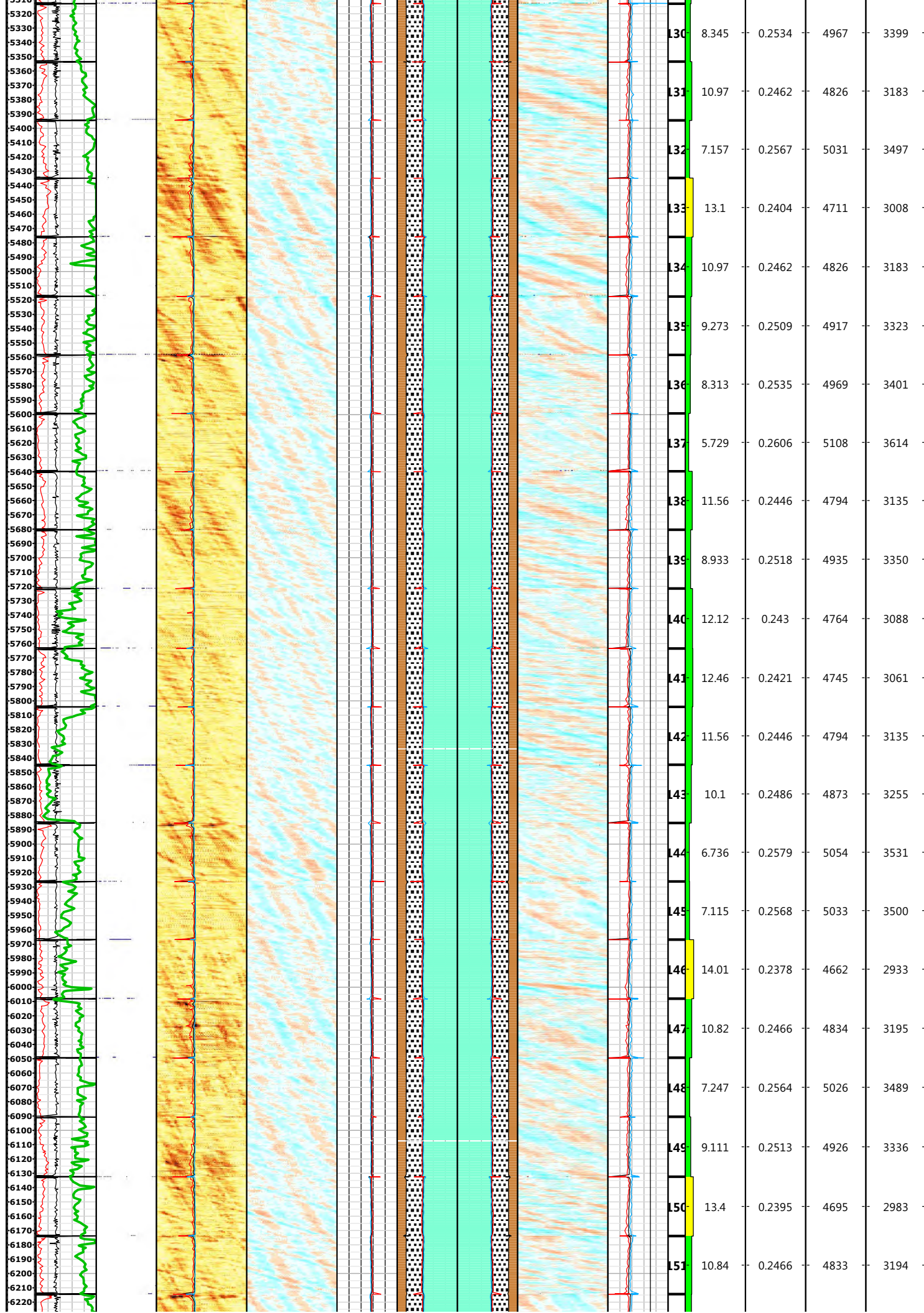
| | | | | |
|----|-------|--------|------|------|
| 19 | 11.5 | 0.2448 | 4797 | 3140 |
| 20 | 9.894 | 0.2492 | 4884 | 3271 |
| 21 | 13.39 | 0.2395 | 4695 | 2984 |
| 22 | 13.87 | 0.2382 | 4670 | 2945 |
| 23 | 14.78 | 0.2357 | 4620 | 2870 |
| 24 | 9.046 | 0.2515 | 4929 | 3341 |
| 25 | 11.61 | 0.2444 | 4791 | 3130 |
| 26 | 7.948 | 0.2545 | 4989 | 3431 |
| 27 | 9.629 | 0.2499 | 4898 | 3293 |
| 28 | 18.01 | 0.2269 | 4446 | 2604 |
| 29 | 4.642 | 0.2636 | 5167 | 3703 |
| 30 | 8.56 | 0.2528 | 4956 | 3381 |
| 31 | 10.3 | 0.248 | 4862 | 3238 |
| 32 | 10.19 | 0.2483 | 4868 | 3247 |
| 33 | 7.368 | 0.2561 | 5020 | 3479 |
| 34 | 13.48 | 0.2393 | 4690 | 2976 |
| 35 | 10.39 | 0.2478 | 4857 | 3231 |
| 36 | 8.167 | 0.2539 | 4977 | 3413 |
| 37 | 11.1 | 0.2459 | 4819 | 3173 |
| 38 | 11.26 | 0.2454 | 4810 | 3159 |
| 39 | 10.75 | 0.2468 | 4837 | 3201 |
| 40 | 15.34 | 0.2342 | 4590 | 2824 |

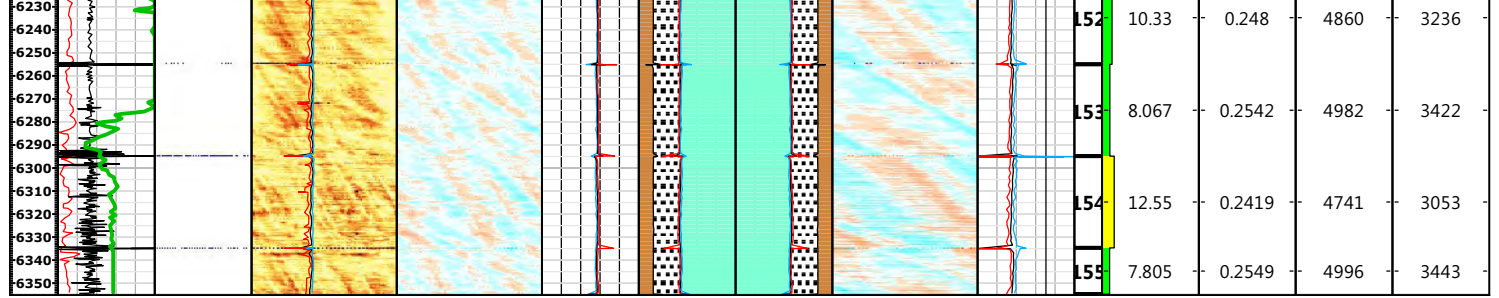


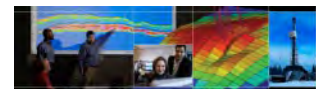












Appendix:

| Schlumberger | | | | | | | | | | Run 1: Toolstring | | | | |
|---|----------------------------------|-------------------------|--|----------------------|--|-----------|--|------------------|--|-------------------|------------------|---------|--------|--|
| Company: | | XCEL Energy Inc | | | | | | | | Equip name | Length | MP name | Offset | |
| Well: | | Roundup 24 | | | | | | | | LEH-QT | 28.97 | | | |
| Field: | | Roundup | | | | | | | | LEH-QT | | | | |
| County: | | Morgan | | State: | | Colorado | | | | | | | | |
| County: Morgan Field: Roundup Location: NESW Sec. 27, T2N, R60W Well: Roundup 24 Company: XCEL Energy Inc | Ultrasonic Imager | | | | | | | | | EDTC-B:9 | 26.06 | | | |
| | Casing Integrity | | | | | | | | | 296 | | | | |
| | Gamma Ray - CCL Log | | | | | | | | | EDTH-B:93 | | | | |
| | NESW Sec. 27, T2N, R60W | | | | | | | | | 47 | | | | |
| | SHL: 1750' FSL x 1750' FWL | | | | | | | | | EDTG-B:79 | | | | |
| | Elev.: K.B. 4681.00 ft | | | | | | | | | 498 | | | | |
| | G.L. 4670.00 ft | | | | | | | | | EDTC-B:92 | | | | |
| | D.F. 4680.00 ft | | | | | | | | | 96 | | | | |
| | Permanent Datum: Ground Level | | | | | | | | | Elev.: | 4670.00 f | | | |
| | Log Measured From: Kelly Bushing | | | | | | | | | 11.00 ft | above Perm.Datum | | | |
| Location: | | Permanent Datum: | | Ground Level | | Elev.: | | 4670.00 f | | AH-184[| 19.56 | | | |
| | | Log Measured From: | | Kelly Bushing | | 11.00 ft | | above Perm.Datum | | 2] | | | | |
| | | Drilling Measured From: | | Kelly Bushing | | | | | | AH-184[| 17.56 | | | |
| | | API Serial No. | | Section: | | Township: | | Range: | | 1] | | | | |
| | | 05-087-07171 | | 27 | | 2N | | 60W | | | | | | |
| Logging Date | | 17-Jun-2015 | | | | | | | | | | | | |
| Run Number | | Run 1 | | | | | | | | | | | | |
| Depth Driller | | 8472.00 ft | | | | | | | | | | | | |
| Schlumberger Depth | | 8472.00 ft | | | | | | | | | | | | |
| Bottom Log Interval | | 6355.00 ft | | | | | | | | | | | | |
| Top Log Interval | | 5.00 ft | | | | | | | | | | | | |
| Casing Fluid Type | | Fresh Water | | | | | | | | | | | | |
| Salinity | | | | | | | | | | | | | | |
| Density | | 8.4 lbm/gal | | | | | | | | | | | | |
| Fluid Level | | 0.00 ft | | | | | | | | | | | | |
| BIT/CASING/TUBING STRING | | | | | | | | | | | | | | |
| Bit Size | | 7.88 in | | | | | | | | | | | | |
| From | | 164.00 ft | | | | | | | | | | | | |
| To | | 8472.00 ft | | | | | | | | | | | | |
| Casing/Tubing Size | | 5.5 in | | | | | | | | | | | | |
| Weight | | 15.5 lbm/ft | | | | | | | | | | | | |
| Grade | | N/A | | | | | | | | | | | | |
| From | | 0.00 ft | | | | | | | | | | | | |
| To | | 8472.00 ft | | | | | | | | | | | | |
| Max Recorded Temperatures | | 177.4 degF | | | | | | | | | | | | |
| Logger on Bottom | | Time | | 17-Jun-2015 07:20:00 | | | | | | | | | | |
| Unit Number | | Location: | | 3022 Ft. Morgan, CO | | | | | | | | | | |
| Recorded By | | Aleksel Bekhterev | | | | | | | | | | | | |
| Witnessed By | | Rusty Tucker | | | | | | | | | | | | |
| Run 1: Remarks | | | | | | | | | | | | | | |
| This is subsequent trip to the well | | | | | | | | | | | | | | |
| Correlation log: Ultrasonic Imager Corrosion Log (SLB 20-Sep-2010) | | | | | | | | | | | | | | |
| Toolstring ran as per toolsketch | | | | | | | | | | | | | | |
| 300 ft repeat pass is done at the bottom | | | | | | | | | | | | | | |
| Repeat pass is done with no pressure | | | | | | | | | | | | | | |
| Main pass performed under 500 psi | | | | | | | | | | | | | | |
| 5.5" 15.5# casing | | | | | | | | | | | | | | |
| Resolution: 5 deg 0.6" | | | | | | | | | | | | | | |
| As per client's information plug is set @ 6385' | | | | | | | | | | | | | | |
| Log started 30 ft above the plug (6355 ft) | | | | | | | | | | | | | | |
| Data adversely affected by sidetrack deviation 5252'-5221' | | | | | | | | | | | | | | |
| Crew: Tim Ludgate, Ian Derry | | | | | | | | | | | | | | |
| Thank you for choosing Schlumberger Wireline! | | | | | | | | | | | | | | |

| | |
|------------|-------|
| CTEM | 22.56 |
| ACCZ | 0.00 |
| HV | 0.00 |
| Gamma Ray | 20.69 |
| TelStatu s | 19.56 |

USIT-E:17

26

ECH-MFA:

1990

USAC-A:1

726

USIS-A:79

1

USSC-B

USRS-A

USI-SENS

OR

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0.37

sor

TOOL_ZERO

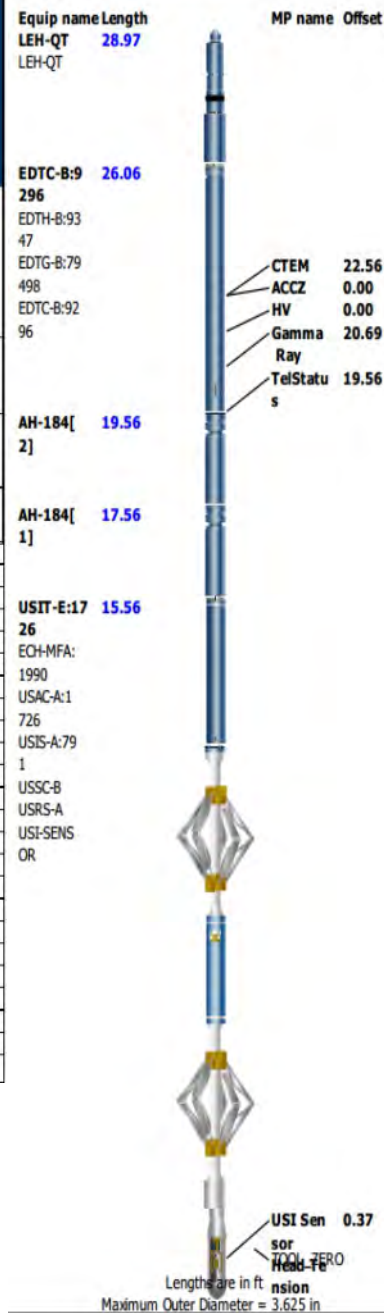
nsion

Lengths are in ft

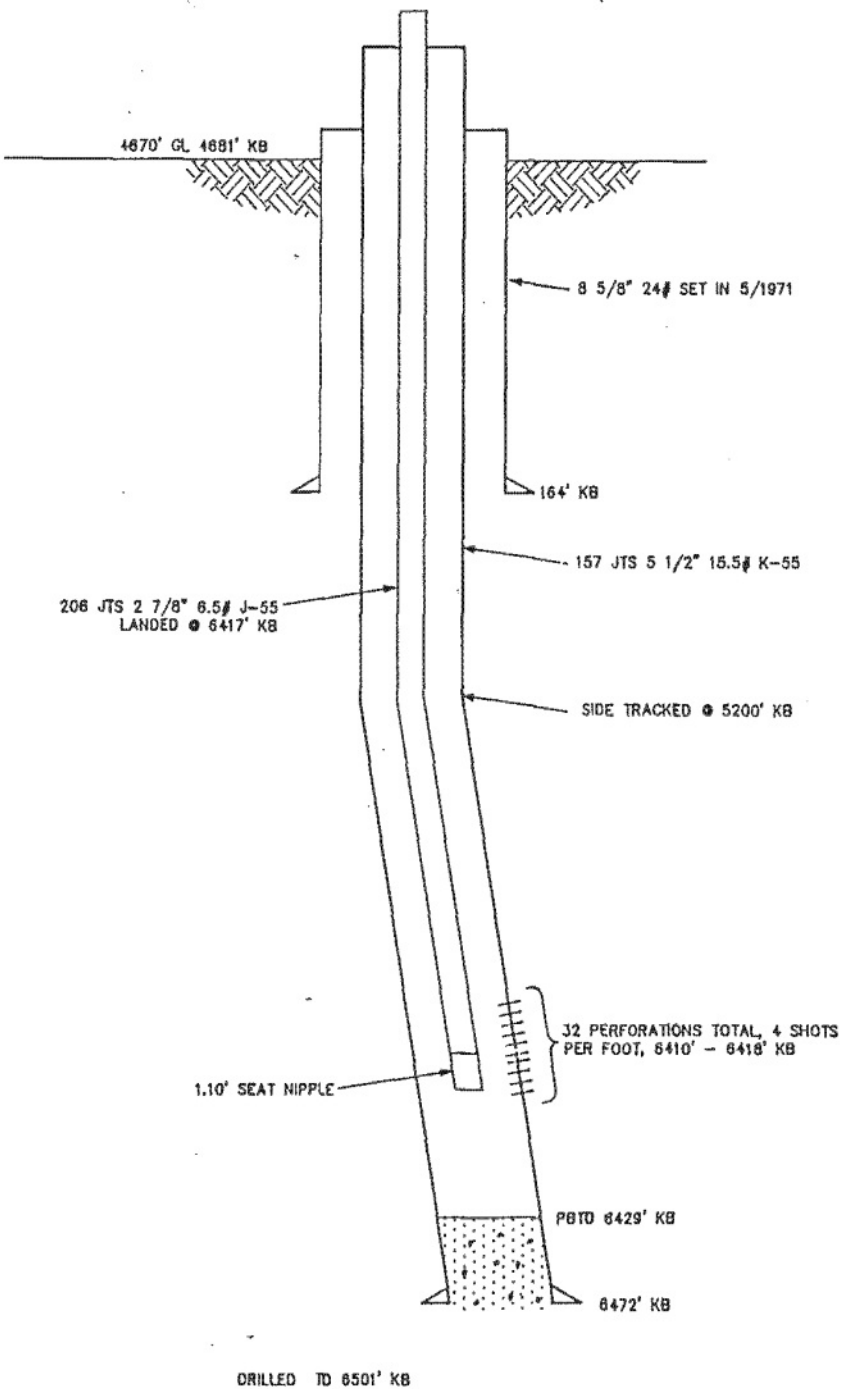
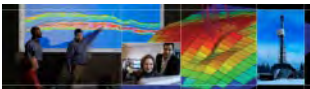
Maximum Outer Diameter = 3.625 in


Line: Sensor Location, Value: Gating Offset

All measurements are relative to TOOL_ZERO



Line: Sensor Location, Value: Gating Offset
All measurements are relative to TOOL_ZERO



| | | | |
|--|---------------|------------------------|--------------------|
|  Western Gas Supply Company EASTERN DIVISION | | | |
| ROUNDUP WELL NO. 24 | | | |
| DATE 10/17/88 | SCALE NONE | DRAWN BY NOFFSINGER | DWG. NO. 1 of 1 |



The USI* UltraSonic Imager tool (USIT) uses a single transducer mounted on an Ultrasonic Rotating Sub (USRS) on the bottom of the tool. The transmitter emits ultrasonic pulses between 200 and 700 kHz and measures the received ultrasonic waveforms reflected from the internal and external casing interfaces. The rate of decay of the waveforms received indicates the quality of the cement bond at the cement/casing interface, and the resonant frequency of the casing provides the casing wall thickness required for pipe inspection. Because the transducer is mounted on the rotating sub, the entire circumference of the casing is scanned. This 360° data coverage enables the evaluation of the quality of the cement bond as well as the determination of the internal and external casing condition. The very high angular and vertical resolutions can detect channels as narrow as 1.2 in. [3.05 cm]. Cement bond, thickness, internal and external radii, and self-explanatory maps are generated in real time at the wellsite.

Applications

- Cement evaluation
- Casing inspection
 - Corrosion detection and monitoring
 - Detection of internal and external damage or deformation
 - Casing thickness analysis for collapse and burst pressure calculations

Measurement Specifications

| | USIT |
|---------------------------------|---|
| Output | Acoustic impedance, cement bonding to casing, internal radius, casing thickness |
| Logging speed | 1,800 ft/hr [549 m/h] |
| Range of measurement | Acoustic impedance: 0 to 10 MRayl [0 to 10 MPa.s/m] |
| Vertical resolution | Standard: 6 in. [15.24 cm] |
| Accuracy | Less than 3.3 MRayl; ± 0.5 MRayl |
| Depth of investigation | Casing-to-cement interface |
| Mud type or weight limitations† | Water-base mud: Up to 15.9 lbm/gal Oil-base mud: Up to 11.2 lbm/gal |
| Combinability | Bottom-only tool, combinable with most tools |
| Special applications | Identification and orientation of narrow channels |

†Exact value depends on the type of mud system and casing size.

| Mechanical Specifications | |
|---------------------------|------------------------|
| | USIT |
| Temperature rating | 350°F [177°C] |
| Pressure rating | 20,000 psi [138 MPa] |
| Casing size—min. | 4½ in. [11.43 cm] |
| Casing size—max. | 13⅞ in. [33.97 cm] |
| Outer diameter† | 3.375 in. [8.57 cm] |
| Length† | 19.75 ft [6.02 m] |
| Weight† | 333 lbm [151 kg] |
| Tension | 40,000 lbf [177,930 N] |
| Compression | 4,000 lbf [17,790 N] |

† Excluding the rotating sub

| USIT Rotating Sub Mechanical Specifications | | | | | |
|---|--------------------|---------------------|----------------------|----------------------|----------------------|
| | USRS-AB | USRS-A | USRS-B | USRS-C | USRS-D |
| Outer diameter | 3.41 in. [8.66 cm] | 3.58 in. [9.09 cm] | 4.625 in. [11.75 cm] | 6.625 in. [16.83 cm] | 8.625 in. [21.91 cm] |
| Length | 9.8 in. [24.89 cm] | 9.92 in. [25.20 cm] | 9.8 in. [24.89 cm] | 8.3 in. [21.08 cm] | 8.3 in. [21.08 cm] |
| Weight | 7.7 lbm [3.5 kg] | 7.7 lbm [3.5 kg] | 10.6 lbm [4.8 Kg] | 15.0 lbm [6.8 kg] | 18.3 lbm [8.3 kg] |