August 2018

C-147 Registration Package for DeSoto Springs #3 Recycling Containment and Recycling Facility Section 5 T26S R36E, Lea County

View to northeast showing nearby windmill and vegetated low sand dunes that cover the area of the proposed containment and recycling facility. The stake is the northeast corner of the recycling facility pad, which is 504 feet from the windmill.

Prepared for:
Ameredev Operating LLC
Austin, Texas

Prepared by:
R.T. Hicks Consultants, Ltd.
901 Rio Grande NW F-142
Albuquerque, New Mexico

R. T. HICKS CONSULTANTS, LTD.
901 Rio Grande Blvd NW ▲ Suite F-142 ▲ Albuquerque, NM 87104 ▲ 505.266.5004 ▲ Fax: 505.266-0745

August 24, 2018

Ms. Olivia Yu
Mr. Bradford Billings
NMOCD District
1625 French Drive
Hobbs, NM 88240
Via E-Mail

RE: Ameredev Operating – DeSoto Springs #3 C-147 Registration

Dear Ms. Yu and Mr. Billings:

On behalf of Ameredev Operating, Hicks Consultants submits the attached registration. Grading, compaction and geotechnical testing of the containment and liner foundation is being conducted during construction. No variances from the Rule are necessary and this submittal demonstrates compliance with all mandates of the Rule for the containment. Since the recycling facility meets the criteria of 19.15.34.9.B.7, the facility also requires a registration. Thus, the Rule does not require approval by OCD in advance of using the containment. However, we understand that OCD desires to track the containments in New Mexico that do not employ the specific words or numerical values in the Rule. To that end, the C-147 shows that the "permit" box is checked as is the "variance" box.

The containment is under construction and as-built, stamped engineering drawings will be submitted to OCD upon completion of the containment.

This submission includes the following elements that, for the purpose of OCD statistics, would be listed as variances:

1. An equivalency demonstration written by experts for the proposed 40-mil HDPE secondary liner has been previously submitted and approved by OCD. We maintain that the language of the Rule is clear[1] and a variance is not required. For OCD statistics, this would be considered a variance. The previously-submitted demonstration is lengthy and we can submit it under separate cover if requested by OCD..
2. OCD has approved the proposed Avian Protection Plan (Bird-X Mega Blaster Pro) for other containments. Thus, the plan meets the requirement of the rule that the "otherwise protective of wildlife, including migratory birds" and a variance is not required. For OCD statistics, this would be considered a variance. Specifications for the MegaBlaster Pro are provided in a separate transmission.
3. Using a 6-foot high chain link and/or game fence in lieu of a 4-strand barbed wire fence is not a variance. Because feral pigs, javelena and deer are present in the area, a fence is required in order to comply with Section 19.15.34.12 D.1 of the Rule[2]. The specification for fencing provided in 19.15.34.12 D.2 contradicts D.1 because pigs will move beneath the lower strand of a 4-strand, 4-foot high barbed wire fence and deer will jump over. Thus, compliance with D.2 results in a violation of D.1. We maintain that compliance with D.1 is the critical component of the Rule and operators need not be required to submit a variance request in

[1] Secondary liners shall be 30-mil LLDPE string reinforced or equivalent with a hydraulic conductivity no greater than 1 x 10-9 cm/sec
[2] The operator shall fence or enclose a recycling containment in a manner that deters unauthorized wildlife and human access and shall maintain the fences in good repair.

order to follow Best Management Practices and comply with the Rule. For OCD statistics, employing a game fence or 6-foot high chain link fence would be considered a variance.

Site specific information demonstrates compliance with siting criteria for the location.

Appendix A includes DRAFT engineering design for the DeSoto Springs #3 that are currently being used for construction. After construction of the liner foundation is complete, as-built drawings will be prepared then submitted to OCD.

Appendices B, C and D of this registration package are design/construction, operating and maintenance, and closure plans. These plans are verbatim from previously-approved containment submissions. Additionally we include a site survey and photographs of the proposed containment area in Appendix E. Appendix F presents driller's logs from nearby water supply wells.

In compliance with 19.15.34.10 of the Rule, this submission is copied to EOG who is the surface owner of the private surface upon which the containment is constructed.

If you have any questions or concerns regarding this amendment to the registration or the attached C-147, please contact me. As always, we appreciate your work ethic and attention to detail.

Sincerely,
R.T. Hicks Consultants

Randall Hicks
Principal

Copy: Ameredev Operating, LLC
EOG Resources

C-147

R.T. Hicks Consultants, Ltd.
901 Rio Grande Blvd. NW, Suite F-142
Albuquerque, NM 87104

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District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources
Department
Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-147
Revised April 3, 2017

Recycling Facility and/or Recycling Containment

Type of Facility: ☒ Recycling Facility ☒ Recycling Containment*

Type of action: ☒ Permit FOR OCD STATISTICS ☒ Registration
☐ Modification ☐ Extension
☐ Closure ☐ Other (explain) _____

*** At the time C-147 is submitted to the division for a Recycling Containment, a copy shall be provided to the surface owner.**

Be advised that approval of this request does not relieve the operator of liability should operations result in pollution of surface water, ground water or the environment. Nor does approval relieve the operator of its responsibility to comply with any other applicable governmental authority's rules, regulations or ordinances.

1.
Operator: : AMEREDEV OPERATING, LLC, OGRID #: 372224
Address: 5707 Southwest Pkwy, Bldg 1, Austin, TX 78735
Facility or well name (include API# if associated with a well): DeSoto Springs #3
OCD Permit Number: _____ (For new facilities the permit number will be assigned by the district office)
U/L or Qtr/Qtr A Section 5 Township 26S Range 36E County: Lea
Surface Owner: ☐ Federal ☐ State ☒ Private ☐ Tribal Trust or Indian Allotment

2.
☒ **Recycling Facility:** North of Containment
Location of (if applicable): Latitude 32.07599 Longitude -103.28225 NAD83
Proposed Use: ☒ Drilling* ☒ Completion* ☒ Production* ☒ Plugging *
**The re-use of produced water may NOT be used until fresh water zones are cased and cemented*
☐ Other, *requires permit for other uses. Describe use, process, testing, volume of produced water and ensure there will be no adverse impact on groundwater or surface water.*
☒ Fluid Storage
☐ Above ground tanks ☒ Recycling containment ☐ Activity permitted under 19.15.17 NMAC explain type _____
☐ Activity permitted under 19.15.36 NMAC explain type: _____ ☐ Other explain _____
☐ For multiple or additional recycling containments, attach design and location information of each containment
☐ **Closure Report (required within 60 days of closure completion):** ☐ Recycling Facility Closure Completion Date: _____

3.
☒ **Recycling Containment:**
☐ Annual Extension after initial 5 years (attach summary of monthly leak detection inspections for previous year)
Center of Recycling Containment (if applicable) Latitude 32.074731 Longitude -103.28225 NAD83
☐ For multiple or additional recycling containments, attach design and location information of each containment
☒ Lined ☐ Liner type: Thickness Secondary 40 mil Primary 60 mil ☐ LLDPE ☒ HDPE ☐ PVC ☐ Other _____
☐ String-Reinforced
Liner Seams: ☒ Welded ☐ Factory ☐ Other _____ Volume: TBD bbl Dimensions: L _____ x W _____ x D _____
☐ Recycling Containment Closure Completion Date: _____

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4.
Bonding:

☒ Covered under bonding pursuant to 19.15.8 NMAC per 19.15.34.15(A)(2) NMAC **(These containments are limited to only the wells owned or operated by the owners of the containment.)**

☐ Bonding in accordance with 19.15.34.15(A)(1). Amount of bond $_____ **(work on these facilities cannot commence until bonding amounts are approved)**

☐ Attach closure cost estimate and documentation on how the closure cost was calculated.

5.
Fencing:

☐ Four foot height, four strands of barbed wire evenly spaced between one and four feet

☒ Alternate. Please specify__Game fence or chain link _____

6.
Signs:

☒ 12"x 24", 2" lettering, providing Operator's name, site location, and emergency telephone numbers

☐ Signed in compliance with 19.15.16.8 NMAC

7.
Variances:

Justifications and/or demonstrations that the proposed variance will afford reasonable protection against contamination of fresh water, human health, and the environment.

Check the below box only if a variance is requested:

☒ Variance(s): Requests must be submitted to the appropriate division district for consideration of approval. If a Variance is requested, include the variance information on a separate page and attach it to the C-147 as part of the application.

If a Variance is requested, it must be approved prior to implementation. BOX CHECKED FOR OCD STATISTICS ONLY.

8.
Siting Criteria for Recycling Containment

Instructions: The applicant must provide attachments that demonstrate compliance for each siting criteria below as part of the application. Potential examples of the siting attachment source material are provided below under each criteria.

General siting

Ground water is less than 50 feet below the bottom of the Recycling Containment. NM Office of the State Engineer - iWATERS database search; USGS; Data obtained from nearby wells	☐ Yes ☒ No ☐ NA
Within incorporated municipal boundaries or within a defined municipal fresh water well field covered under a municipal ordinance adopted pursuant to NMSA 1978, Section 3-27-3, as amended. - Written confirmation or verification from the municipality; written approval obtained from the municipality	☐ Yes ☒ No ☐ NA
Within the area overlying a subsurface mine. - Written confirmation or verification or map from the NM EMNRD-Mining and Minerals Division	☐ Yes ☒ No
Within an unstable area. - Engineering measures incorporated into the design; NM Bureau of Geology & Mineral Resources; USGS; NM Geological Society; topographic map	☐ Yes ☒ No
Within a 100-year floodplain. FEMA map	☐ Yes ☒ No
Within 300 feet of a continuously flowing watercourse, or 200 feet of any other significant watercourse, or lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark). - Topographic map; visual inspection (certification) of the proposed site	☐ Yes ☒ No
Within 1000 feet from a permanent residence, school, hospital, institution, or church in existence at the time of initial application. - Visual inspection (certification) of the proposed site; aerial photo; satellite image	☐ Yes ☒ No
Within 500 horizontal feet of a spring or a fresh water well used for domestic or stock watering purposes, in existence at the time of initial application. - NM Office of the State Engineer - iWATERS database search; visual inspection (certification) of the proposed site	☐ Yes ☒ No
Within 500 feet of a wetland. - US Fish and Wildlife Wetland Identification map; topographic map; visual inspection (certification) of the proposed site	☐ Yes ☒ No

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9.
Recycling Facility and/or Containment Checklist:
Instructions: Each of the following items must be attached to the application. Indicate, by a check mark in the box, that the documents are attached.

- ☒ Design Plan - based upon the appropriate requirements.
- ☒ Operating and Maintenance Plan - based upon the appropriate requirements.
- ☒ Closure Plan - based upon the appropriate requirements.
- ☒ Site Specific Groundwater Data -
- ☒ Siting Criteria Compliance Demonstrations –
- ☒ **Certify that notice of the C-147 (only) has been sent to the surface owner(s)**

10.
Operator Application Certification:
I hereby certify that the information and attachments submitted with this application are true, accurate and complete to the best of my knowledge and belief.

Name (Print): Shane McNeely Title: Engineer

Signature: Shane McNeely Date: 8/23/2018

e-mail address smcneely@ameredev.com Telephone: 737-300-4729

11.
OCD Representative Signature: Victoria Venegas **Approval Date:** 12/19/2022

Title: Environmental Specialist **OCD Permit Number:** 1RF-498

- [x] OCD Conditions
- [x] Additional OCD Conditions on Attachment

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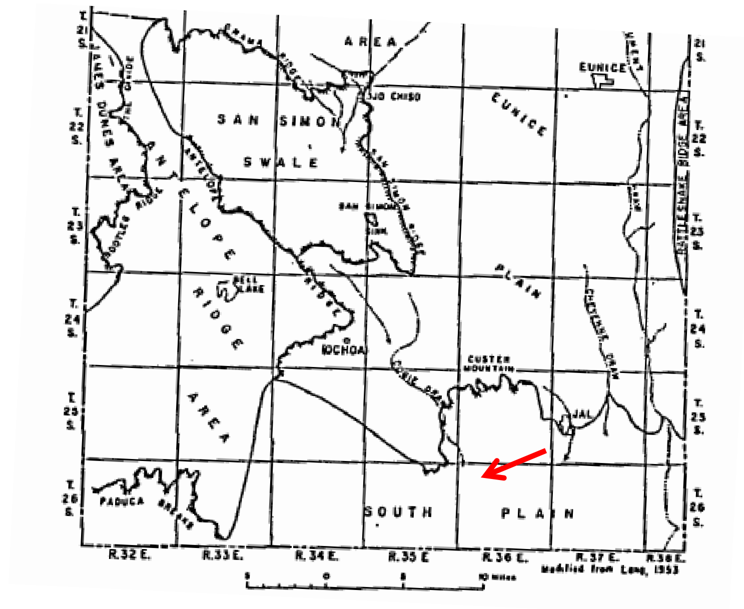
Site Specific Information

R.T. Hicks Consultants, Ltd.
901 Rio Grande Blvd. NW, Suite F-142
Albuquerque, NM 87104

Geologic Setting of the Regional Fresh-Water Bearing Formations

The temporary pit site is located within the South Plain (see inset below, red arrow), which is in the High Plains Physiographic Province.



Groundwater in the area within the South Plain is found in in Mesozoic and Cenozoic Era rocks. The oldest of these are the Triassic age Dockum Group. They consist of conglomerates, cross-bedded sandstones, claystones, and siltstones that were deposited in a continental fluvial environment over the evaporites of the late Permian Ochoan Series, which had filled the Delaware Basin by that time. In much of the South Plain area, the Dockum Group (aka Chinle) is a secondary groundwater zone relative to the Ogallala.

Any Jurassic or Cretaceous age rocks that were deposited above the Triassic have subsequently been removed by erosion leaving an irregular surface on the Triassic rocks. Cenozoic Era rocks in the area consist of the Tertiary age Ogallala Formation and Quaternary age eolian and piedmont deposits. The Ogallala Formation consists of terrestrial sediments (sand with some clay, silt and gravel) that were deposited on the Triassic age rocks. The Quaternary deposits are generally thin veneers over the Ogallala in this area, except in larger drainages, such as Monument Draw.

The Ogallala and associated alluvial aquifers are the primary groundwater source where they are present, mainly in the eastern portion of the South Plain. <u>All of water wells within the area of the containment that were measured by the USGS are considered “Alluvium” by the agency. Drillers and other experts, however, may consider the producing strata equivalent to the Ogallala (see Plate 1). Driller’s logs of several of these wells suggest the water-bearing zone of the deeper wells (500-600 feet) tap the basal conglomerate of the Ogallala.</u>

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Distance to Groundwater

Figure 1, Figure 2, and the discussion presented below demonstrates that the depth to the groundwater surface at the location is approximately 250 feet. Assuming a maximum depth of the proposed containment of 25 feet, the distance between the bottom of the containment and groundwater is approximately 225 feet

Figure 1 is an area geologic base map that depicts regional topography and includes the water wells located nearest to the containment site for which information is available, regardless of how comprehensive or useful. It also shows:

1. The location of the containment in the northeast quarter of Section 5 within an area mapped as Quaternary eolian/piedmont deposits.
2. Water wells from the USGS database as color-coded triangles that indicate the producing aquifer (see Legend).
3. Water wells from the New Mexico Office of the State Engineer (OSE) database as a small blue triangle inside a colored circle that indicates the well depth (see Legend). Please note, OSE wells are often miss-located in the WATERS database as older wells are plotted in the center of the quarter, quarter, quarter, of the Section Township and Range. Topographic maps and/or aerial photographs verified many of the OSE well locations included on this map.
4. Water wells, which are not documented in the public databases but were identified by field inspection or other published reports are shown as a dot inside a color-coded (depth) square.
5. Depth to water and gauging dates from the most recent and reliable measurement for each well is provided adjacent to the well symbol. It should be noted that in most cases the depth to water provided by the OSE database are from drillers log notes estimated at the time of completion, rather than actual field measurements.
6. Based upon the information discussed below, the 80-foot depth to water measurement associated with CP-00938, located about 1 mile northeast of the containment, is erroneous and is probably the depth to drilling mud in the boring at completion of the well. Evidence suggests that the USGS measured a depth to water of 379 feet at this well in 2016 (USGS well 14380), which is about 0.75 miles east of the containment. This active windmill is not shown on the 2005 Google Earth image but is obvious in the 2008 image and therefore corresponds to the drilling date provided on the driller's log in Appendix F. There is no evidence of a well on Google Earth at the location shown on the OSE database for CP-00938.
7. The driller's log for Well CP-01446, about 1 mile east of the containment, shows a total depth of 5,000 feet and contains a detailed mud log. This well is an open hole completion in dolomite from 3632 to 4975 feet below surface. This well appears to be a Capitan Reef test well.

Figure 2 is a regional geologic base map that depicts the potentiometric surface contours of the shallow-most aquifer surrounding the site. The potentiometric contours are labeled in feet above sea level (ASL). The water wells plotted include only the USGS database and published report water wells from Figure 1 for which a reliable depth to water measurement has been recorded. Figure 2 also shows:

1. The location of the containment as a blue rectangle

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2. Groundwater elevations and gauging dates from the most recent available static water level measurement for each well.
3. USGS well 14559 shown east of the containment is mis-located. This USGS well could be well CP-00857, which is located 504 feet north of the northeast corner of the proposed recycling facility and containment or an abandoned windmill located 1500 feet northeast of CP-00857 that is shown on Google Earth.
4. USGS well 14380 also appears slightly mis-located. As mentioned above, we believe this USGS well is the active windmill about 1-mile east of CP-0057 on Google Earth.

Site Geology

The proposed containment is located on what is mapped as Quaternary Age eolian and piedmont deposits (Qe/Qp on Figure 1). Aeolian deposits are fine-grained sands in vegetated low dunes (see site inspection photographs) that cover most of Section 5. Regional evidence suggests that these dunes are 5-10 feet thick and underlain by caliche.

Water Table Elevation and Depth to Groundwater

A large number of depth to groundwater measurements are presented in Figure 2. These data provide a very good estimate of the groundwater elevation in the area (see Figure 2). Figure 2 uses only data from the USGS.

Based on the potentiometric surface contours created using the available measurements from surrounding wells (Figure 2), we conclude that the groundwater elevation at the containment site is approximately 2,775 feet ASL. With a surface elevation of 2,997 feet ASL and a maximum depth of the containment of 25 feet, the depth to groundwater below the containment floor should be approximately (2997-2775-25=) 197 feet.

Distance to Surface Water

Figure 3 and the site visit demonstrates that the location is not within 300 feet of a continuously flowing watercourse, or within 200 feet of any other significant watercourse, lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark).
No continuously flowing watercourses exist within 300 feet of the location. The nearest surface feature is an intermittent stream located about ½ mile to the east (Figure 3). Note that Figure 3 shows the "New Windmill" northeast of the proposed containment, which is the abandoned windmill discussed in the previous section of this submittal.

Stabilized dune fields, like that which characterizes the location and much of the surrounding area, are seldom characterized by well-defined drainage patterns and that is the case in the area shown in Figure 3.

Distance to Permanent Residence or Structures

Figure 4 and the site visit demonstrates that the location is not within 300 feet from a permanent residence, school, hospital, institution, church, or other structure in existence at the time of initial application.

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Distance to Non-Public Water Supply

Figures 1 and 2, and 3 demonstrate that the location is not within 500 feet of a spring or fresh water well used for domestic or stock watering purposes in existence at the time of the initial registration;.

- Figure 1 and the site survey (Appendix E) shows that the closest fresh water well is about 700 feet north of the proposed containment
- Figure 3 shows that no springs are identified within the mapping area and the field survey identified no evidence of springs.

Distance to Municipal Boundaries and Fresh Water Fields

Figure 5 demonstrates that the location is not within incorporated municipal boundaries or defined municipal fresh water well fields covered under a municipal ordinance adopted pursuant to NMSA 1978, Section 3-27-3, as amended.

- The closest municipality is Jal, NM approximately 7 miles to the northeast.
- The closest public well field is located west of Carlsbad or north of Maljamar

Distance to Wetlands

Figure 6 and the site visit demonstrates the location is not within 500 feet of wetlands.

- The nearest designated wetlands are about1.5 miles north of the site and are considered freshwater ponds
- The site inspection identified no evidence of wetlands in the general area

Distance to Subsurface Mines

Figure 7 and our general reconnaissance of the area demonstrate that the nearest mine is caliche pit.

- Figure 7 show the nearest caliche pit about 2 miles southeast of proposed containment

Distance to High or Critical Karst Areas

Figure 8 shows the location of the temporary pit with respect BLM Karst areas

- The proposed temporary pit is located within a “low” potential karst area.
- The nearest moderate potential karst area is located approximately 12 miles west of the site.
- We saw no evidence of unstable ground near the containment location during the site inspection.

Distance to 100-Year Floodplain

Figure 9 demonstrates that the location is within an area that has not yet been mapped by the Federal Emergency Management Agency with respect to the Flood Insurance Rate 100-Year Floodplain.

- Areas that are not mapped are designated as “Undetermined Flood Hazard” and are generally considered minimal flood risk.
- Our field inspection and examination of the topography permit a conclusion that the location is not within any floodplain.

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R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Depth To Water and Geology	Figure 1
	Ameredev Operating Desoto Springs Frac Pond #3	May 2018

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Legend

Desoto Containment

- Area of Disturbance
- MWFM Containment

Containment Buffer

- 200 ft
- 300 ft
- 500 ft
- 1000 ft

USGS Gauging Station (DTW, Date)

Aquifer Code, Well Status

- Alluvium/Bolsom
- Alluvium/Bolsom, Site had been pumped recently.
- Chinle
- Not Defined

Misc. Water Wells (Well ID, DTW)

Well Depth (ft)

- No Data

OSE Water Wells (DTW, Date)

Well Depth (ft)

- <= 150
- 351 - 500
- 501 - 1000
- > 1000

NM Geology

Map Unit, Description

- Qe/Qp, Quaternary-Eolian Piedmont Deposits
- Qp, Quaternary-Piedmont Alluvial Deposits

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Depth To Water and Geology	Figure 1 LEGEND
	Ameredev Operating Desoto Springs Frac Pond #3	May 2018

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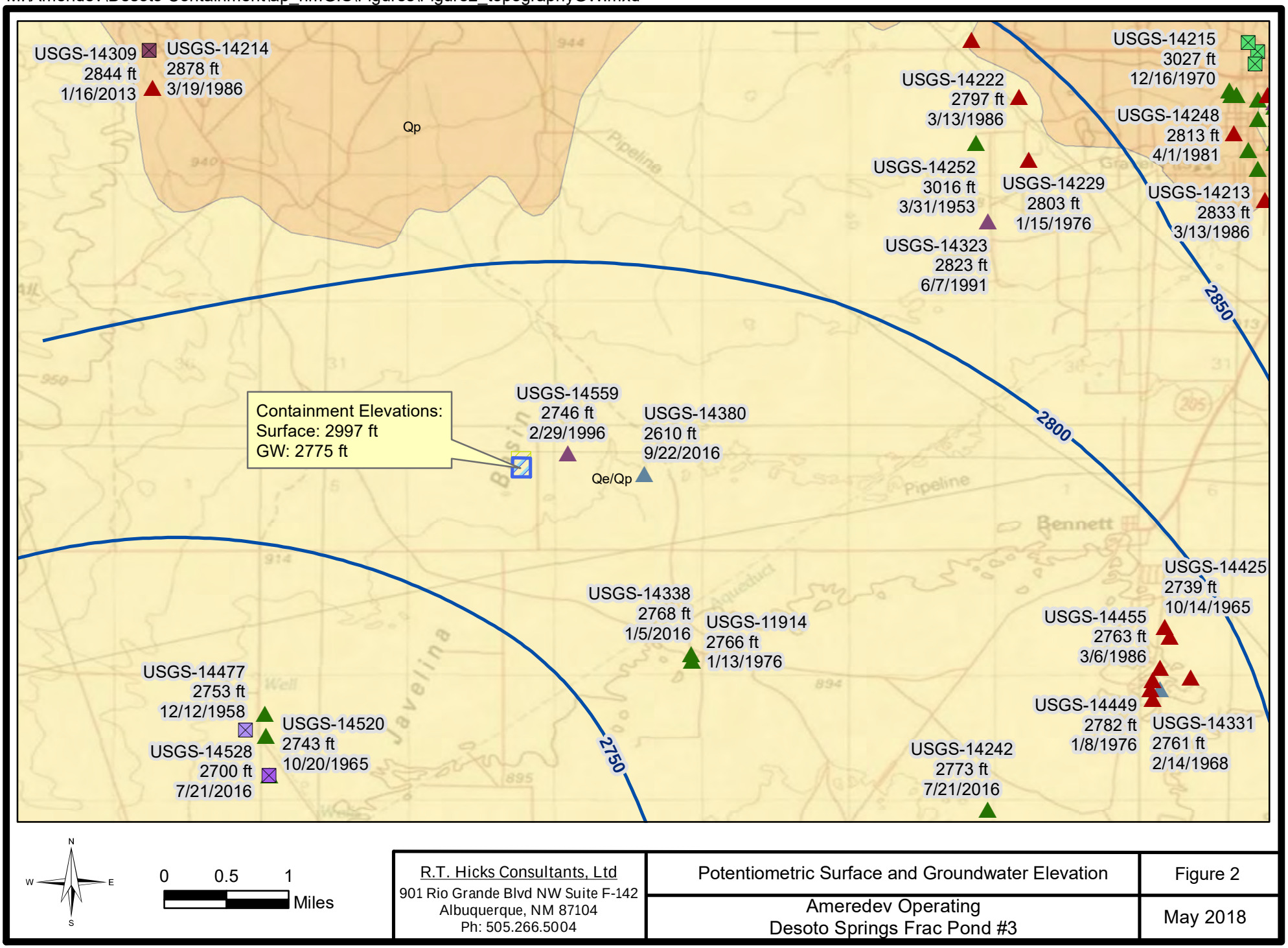

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Potentiometric Surface and Groundwater Elevation Ameredev Operating Desoto Springs Frac Pond #3	Figure 2 May 2018

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Legend

Desoto Containment

- Area of Disturbance
- MWFM Containment

Potentiometric Surface (ft msl)

Isocontours

- Isocontour

USGS Gauging Station (GW Elev, Date)

Aquifer Code, Well Status

- Alluvium/Bolsom
- 110AVMB, Nearby site that taps the same aquifer had been pumped recently.
- 110AVMB, Nearby site that taps the same aquifer was being pumped.
- Alluvium/Bolsom, Site had been pumped recently.
- Chinle
- Chinle, Site was being pumped.
- Santa Rosa
- Not Defined

NM Geology

Map Unit, Description

- Qe/Qp, Quaternary-Eolian Piedmont Deposits
- Qp, Quaternary-Piedmont Alluvial Deposits

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Potentiometric Surface and Groundwater Elevation	Figure 2 LEGEND
	Ameredev Operating Desoto Springs Frac Pond #3	May 2018

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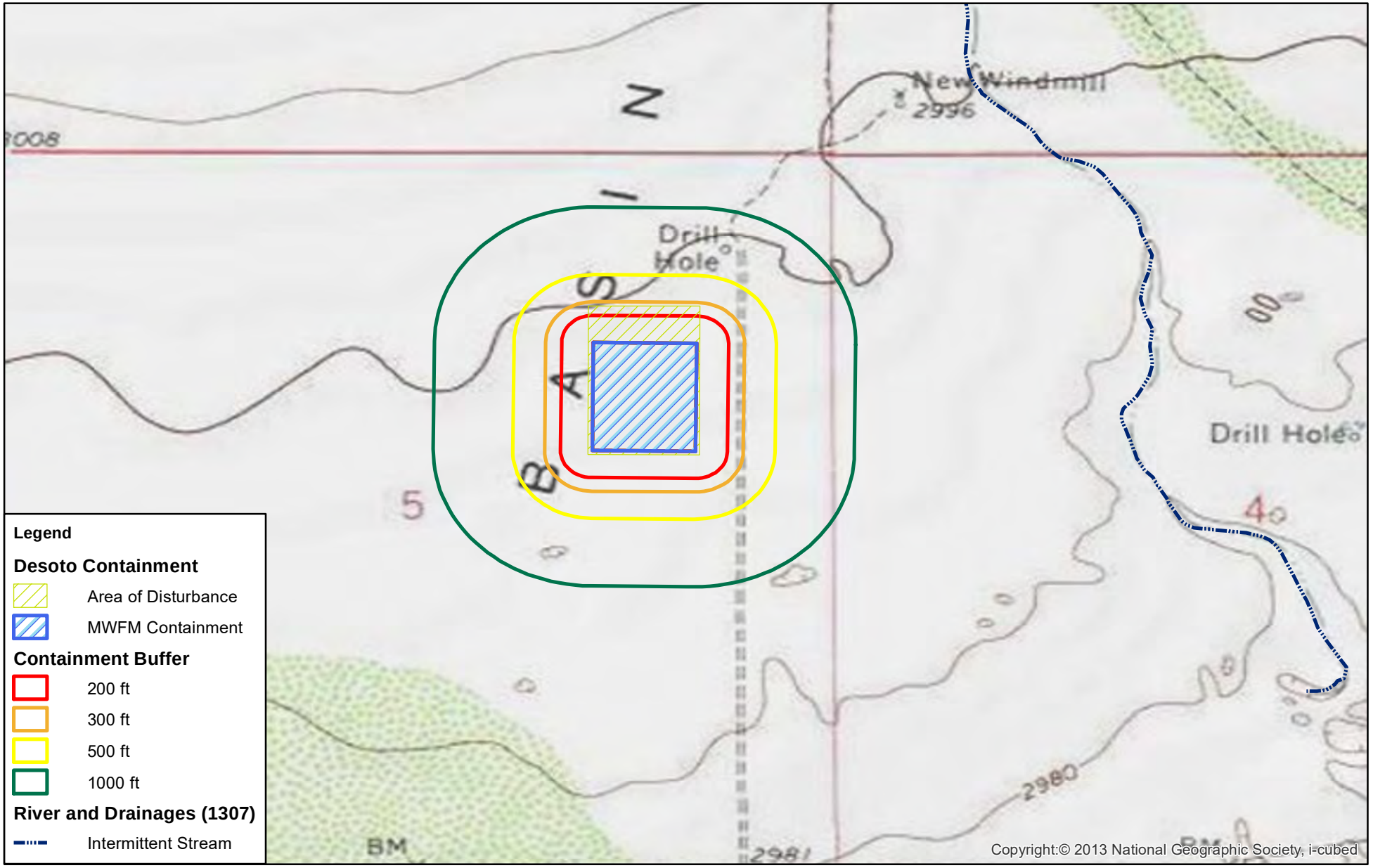

N W E S

0 500 1,000 Feet

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Surface Water and Topography	Figure 3
	Ameredev Operating Desoto Springs Frac Pond #3	May 2018

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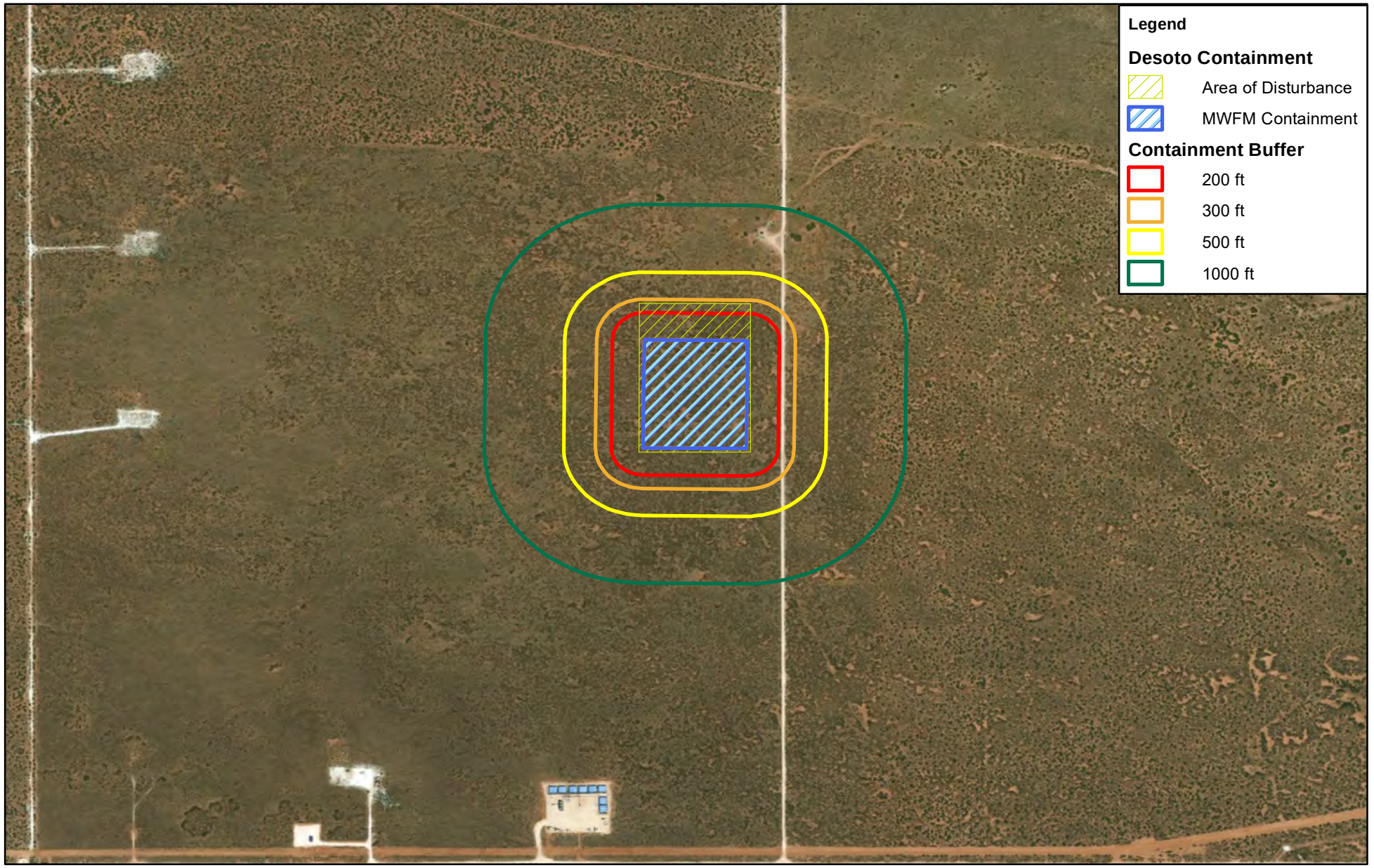

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Nearby Structures	Figure 4
	Ameredev Operating Desoto Springs Frac Pond #3	May 2018

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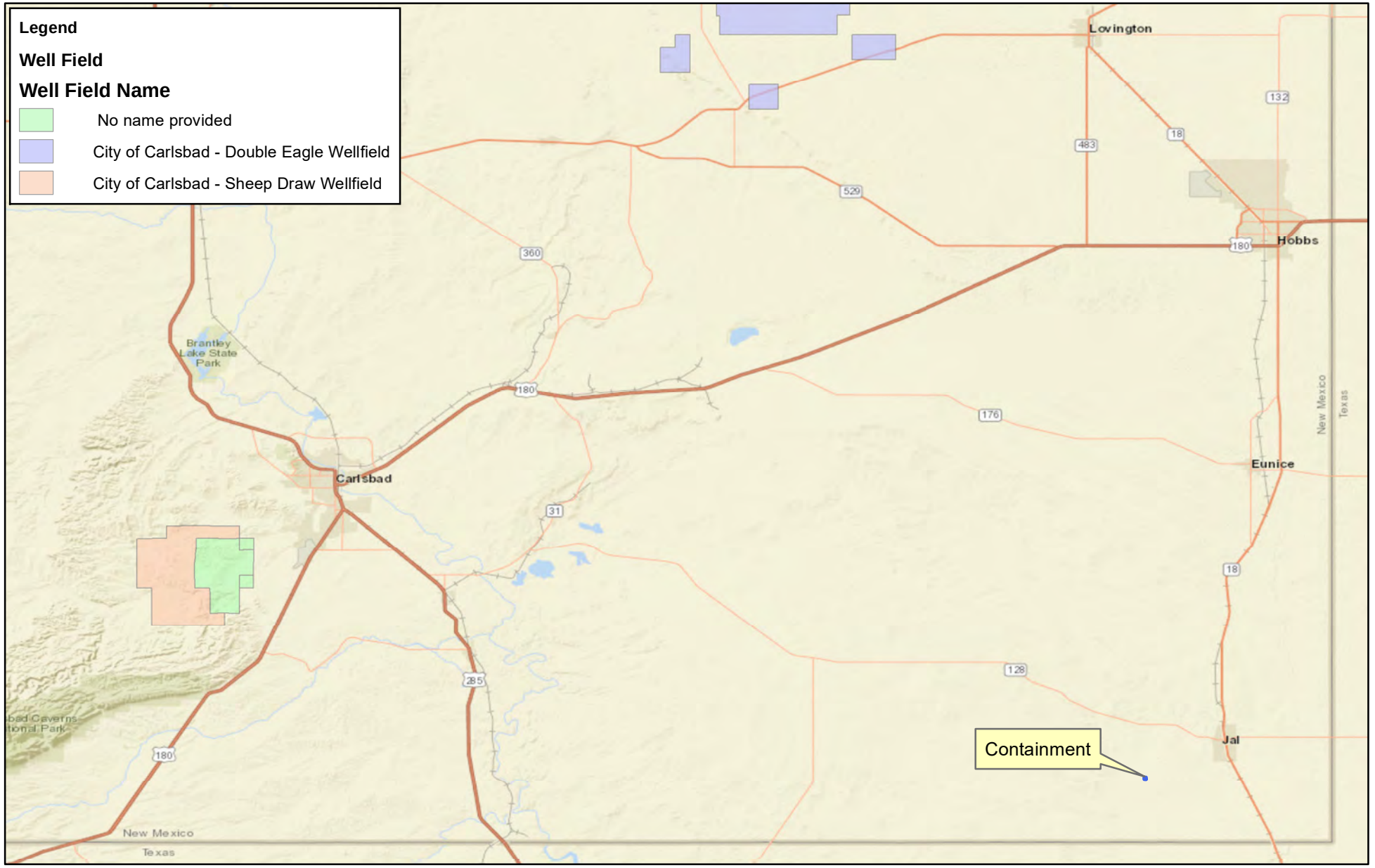

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Nearby Municipalities and Well Fields	Figure 5
	Ameredev Operating Desoto Springs Frac Pond #3	May 2018

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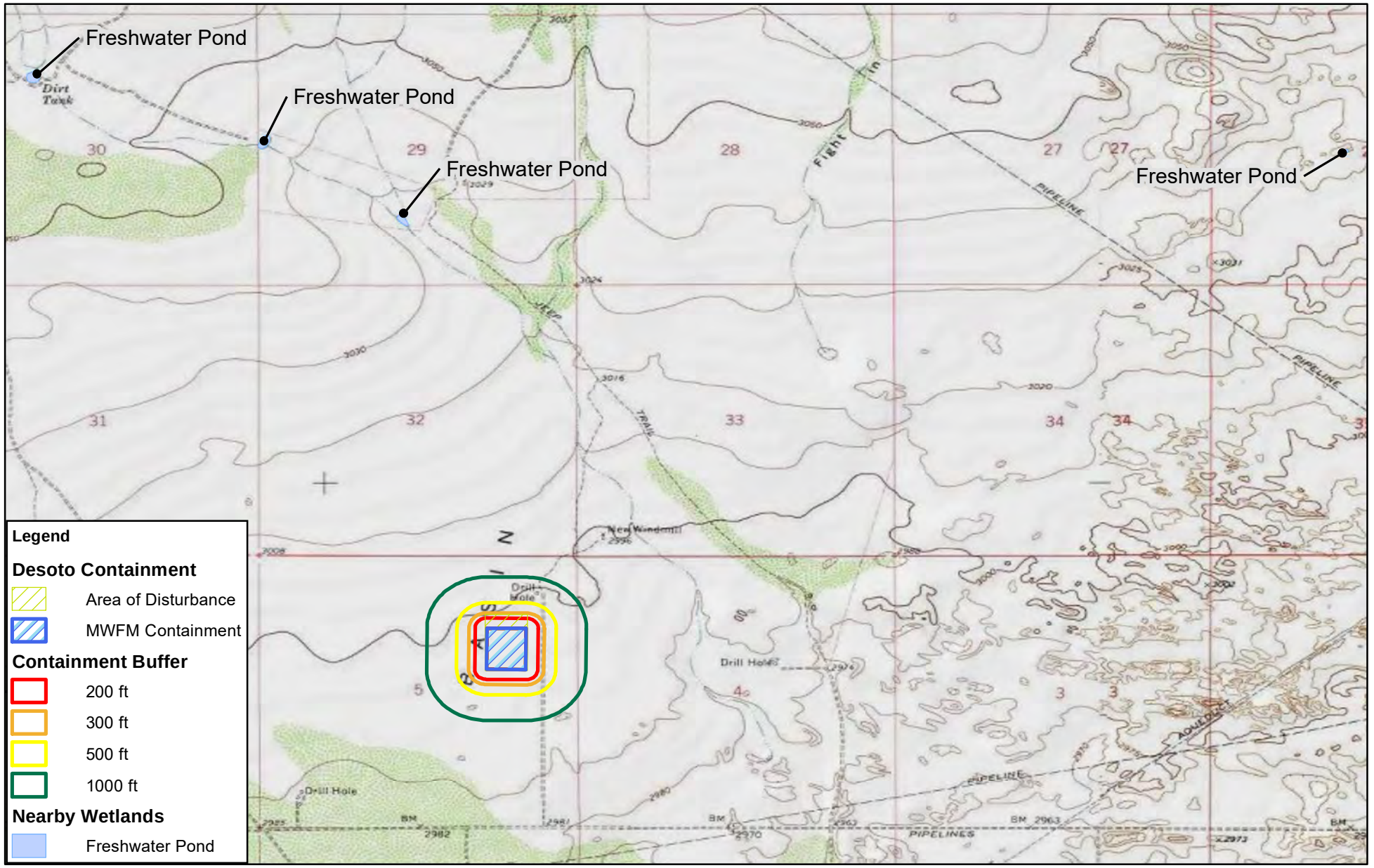

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Nearby Wetlands	Figure 6
	Ameredev Operating Desoto Springs Frac Pond #3	May 2018

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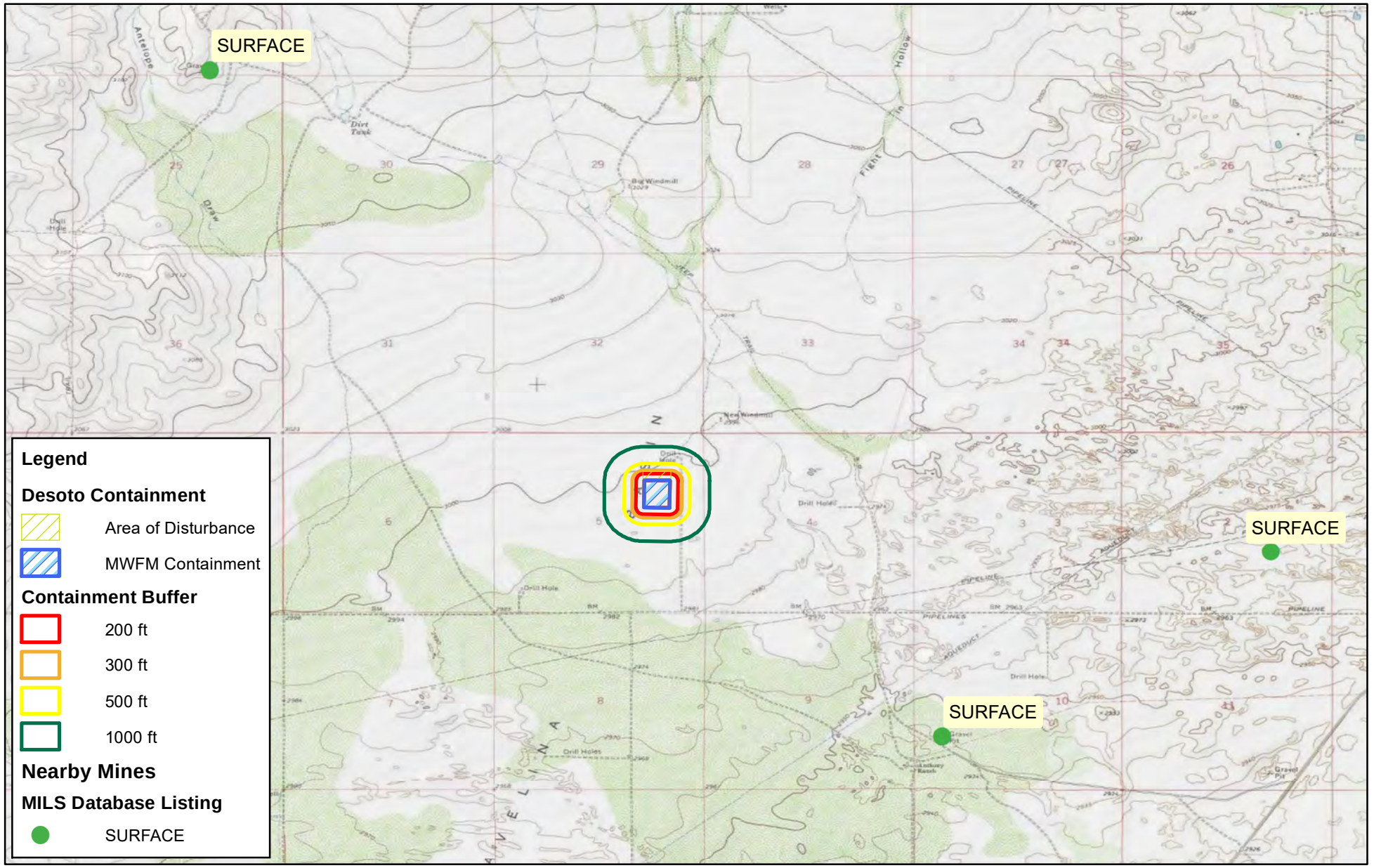

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Nearby Mines and Minerals	Figure 7
	Ameredev Operating Desoto Springs Frac Pond #3	May 2018

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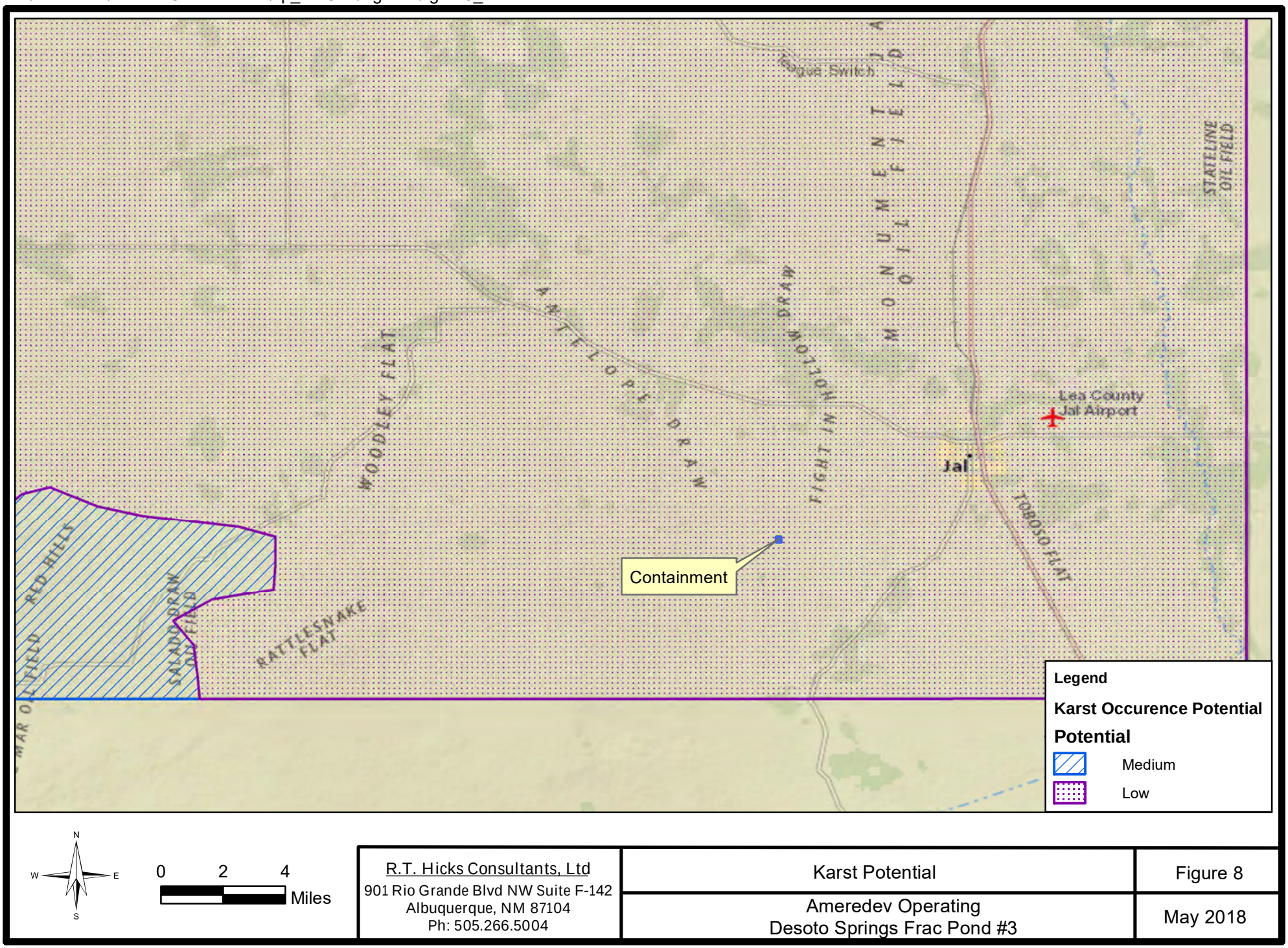

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Karst Potential	Figure 8
	Ameredev Operating Desoto Springs Frac Pond #3	May 2018

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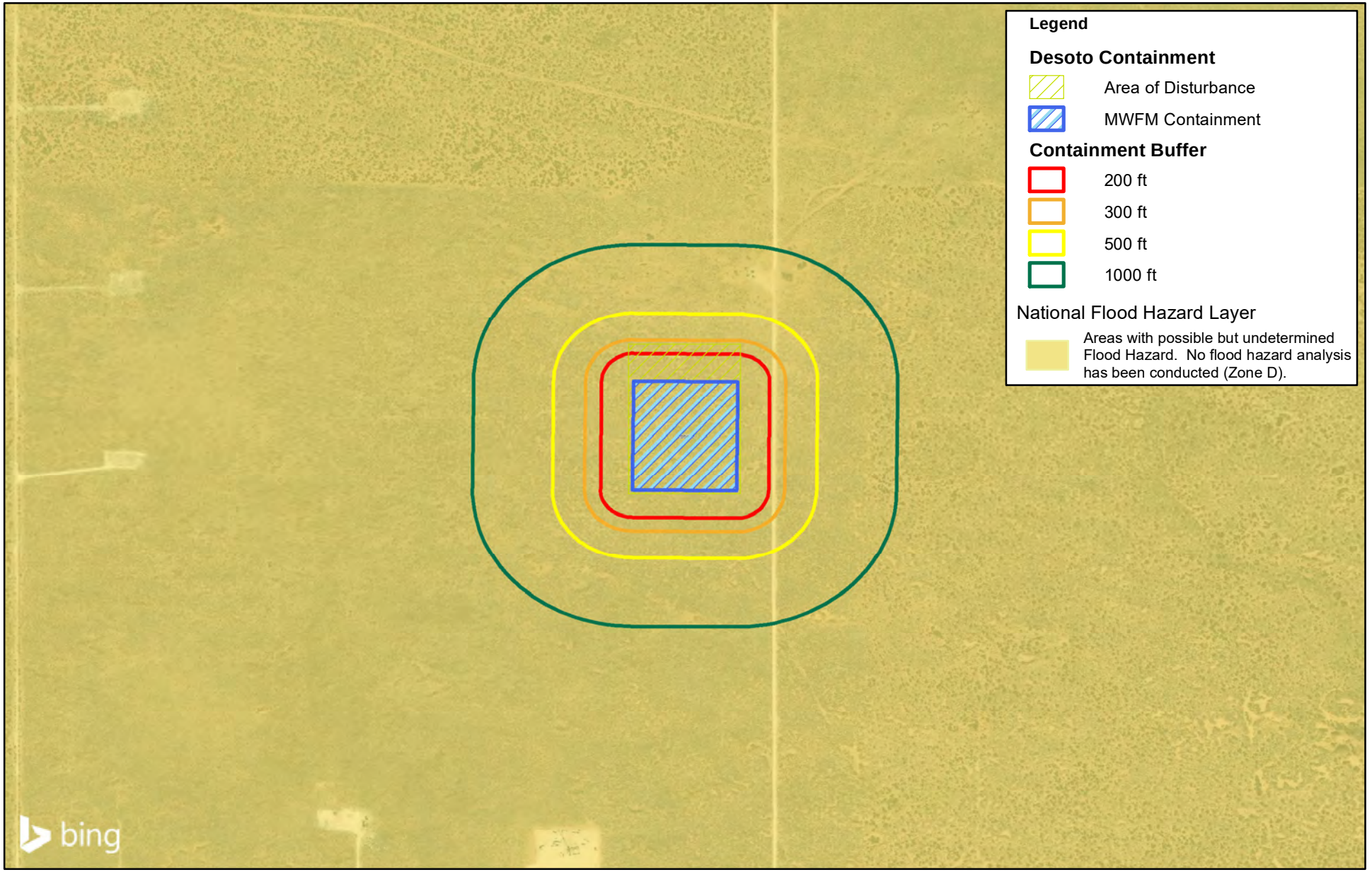

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W E
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0 500 1,000
Feet

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	FEMA Flood Map	Figure 9
	Ameredev Operating Desoto Springs Frac Pond #3	May 2018

Appendix A
Design Specifications

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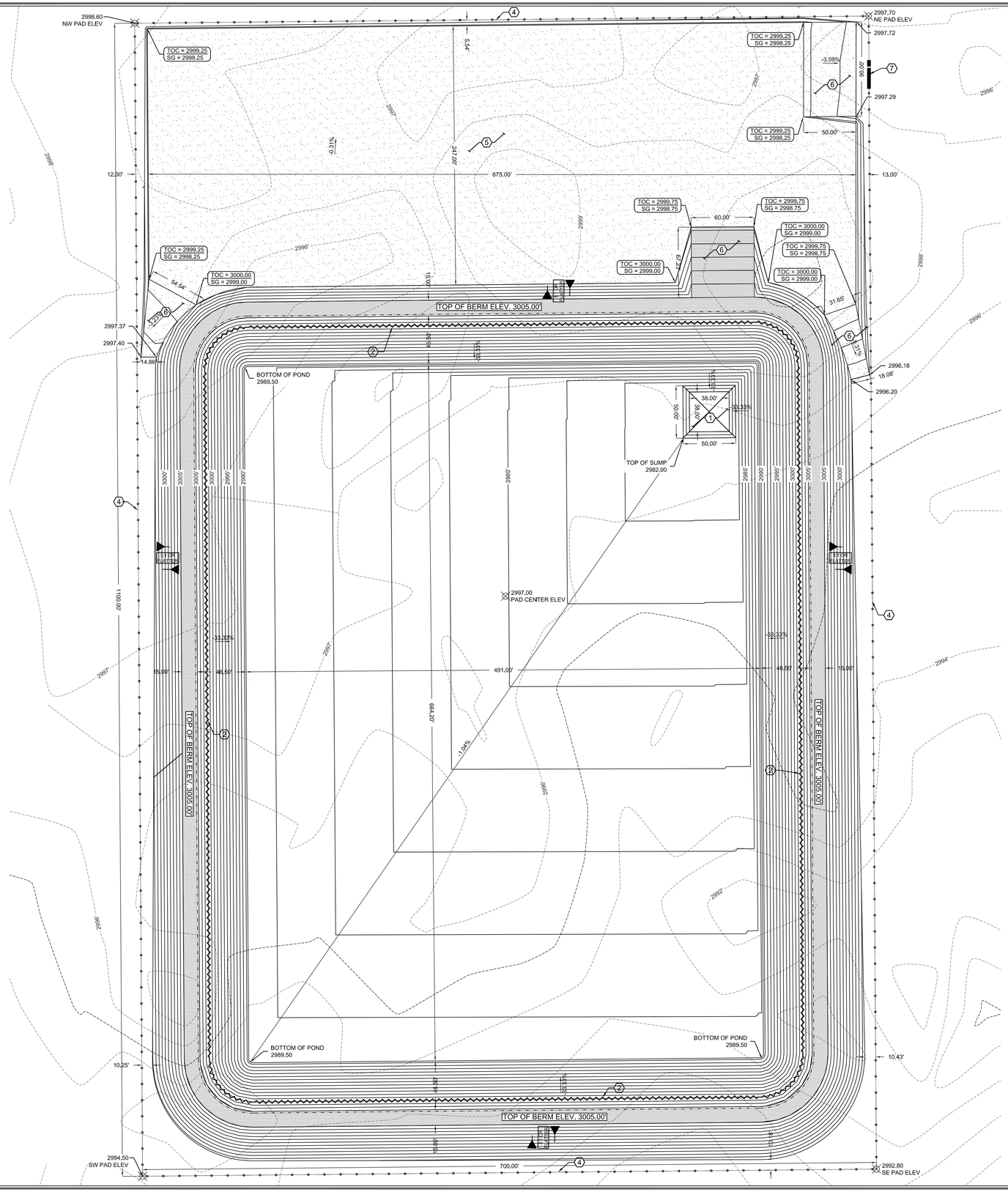

GENERAL NOTES

1. TOPOGRAPHIC INFORMATION WAS OBTAINED FROM TOPOGRAPHIC INC. ELEVATIONS ARE PROXIMATE AND MUST BE FIELD VERIFIED.
2. ALL CONSTRUCTION SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT CONSTRUCTION PLANS OF THE REGISTRATION/PERMIT. NEW MEXICO STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION LATEST EDITION SHALL APPLY TO THIS PROJECT.
3. ALL DATA SHOWN HEREIN CONCERNING EXISTING PRIVATE AND/OR PUBLIC OWNED UTILITIES HAVE BEEN OBTAINED FROM THE OWNERS AND/OR FIELD OBSERVATIONS, THESE MAY OR MAY NOT BE ACCURATE. THE CONTRACTOR IS CAUTIONED THAT HE IS RESPONSIBLE FOR THE EXACT LOCATION AND PROTECTION OF ALL LINES DURING CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING, IN ADVANCE OF HIS/HER CONSTRUCTION OPERATIONS, IF OVERHEAD UTILITY LINES, SUPPORT STRUCTURES, POLES, GUYS, ETC. ARE AN OBSTRUCTION TO CONSTRUCTION OPERATIONS. IF ANY OBSTRUCTION IS EVIDENT, THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH THE APPROPRIATE UTILITY OWNER TO REMOVE OR SUPPORT THE UTILITY OBSTRUCTION. ANY COST ASSOCIATED WITH THIS EFFORT IS INCIDENTAL TO THE PROJECT.
4. IT WILL BE THE CONTRACTOR'S RESPONSIBILITY TO SECURE AND SUPPLY WATER FOR THE PROJECT.
5. THE BOTTOM OF PIT SHALL BE SLOPED AT A MINIMUM 1.00%.
6. THE PERIMETER OF THE SITE SHALL BE ENCLOSED WITH GAME FENCE AS PRESCRIBED BY DESIGN/CONSTRUCTION PLAN IN REGISTRATION/PERMIT APPLICATION.
7. ABOVE GRADE FILL REQUIREMENTS: ALL FILL SHALL BE INSTALLED IN 8"-10" LOOSE LIFTS (6"-8" COMPACTED) AND BE COMPACTED TO 95% OF ITS MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D 698. SOIL COMPACTION SHALL BE TESTED IN 1' (VERTICALLY) INTERVALS.
8. CLEARING AND GRUBBING: ALL VEGETATION AND OTHER DELETERIOUS MATERIALS SHOULD BE REMOVED FROM THE CONSTRUCTION SITE PRIOR TO CONSTRUCTION ACITIVITIES. STRIPPED MATERIALS CONSISTING OF VEGETATION AND ORGANIC MATERIALS (ESTIMATED DEPTH OF 8") SHOULD BE WASTED FROM THE SITE, OR STOCKPILED FOR REUSE DURING PIT CLOSURE. NEW MEXICO ADMINISTRATIVE CODE 19.15.34 AND (DESIGN AND CONSTRUCTION SPECIFICATIONS FOR A RECYCLING CONTAINMENT IN REGISTRATION/PERMIT) SHALL APPLY TO THIS PROJECT.
9. SUBGRADE PREPARATION: ALL SOILS THAT ARE TO RECEIVE FOUNDATION ELEMENTS INCLUDING PRIMARY LINER AND DIKE SHOULD BE SCARIFIED A MINIMUM OF 10" AND COMPACTED, AT APPROXIMATELY OPTIMUM MOISTURE (PLUS 2% TO MINUS 2%), TO NOT LESS THAN 95% OF LABORATORY DENSITY AS DETERMINED BY ASTM D 698. THE ENTIRE SITE SHOULD THEN BE PROOFROLLED TO OBSERVE FOR UNSUITABLE OR WEAK SOILS. AT LEAST FIVE PASSES WITH A HEAVY VIBRATORY ROLLER SHOULD BE MADE DURING PROOFROLLING. SOFT MATERIALS OR LOOSE SOILS INDICATED DURING PROOFROLLING SHOULD BE STRIPPED OR FURTHER COMPACTED. AREAS OF SUBGRADE IN WHICH PUMPING OR SIGNIFICANT DEFLECTIONS ARE OBSERVED SHOULD BE REMOVED OR STABILIZED. USE OF LIME, FLY ASH, KILN DUST, CEMENT OR GEOTEXTILES COULD BE CONSIDERED AS A STABILIZATION TECHNIQUE.
10. ALL FILL AND/OR BACKFILL BE PLACED IN LIFTS NOT TO EXCEED 8" (LOOSE), AND COMPACTED AT APPROXIMATELY OPTIMUM MOISTURE (PLUS 2% TO MINUS 2%), TO NOT LESS THAN 95% OF LABORATORY DENSITY AS DETERMINED BY ASTM D 698. SOIL COMPACTION TESTS SHALL BE TAKEN AT 1' (VERTICAL) INTERVALS FOR EACH BERM.
11. THE RECYCLING CONTAINMENT SHALL HAVE A PROPERLY CONSTRUCTED FOUNDATION AND INTERIOR SLOPES CONSISTING OF A FIRM, UNYIELDING BASE, SMOOTH AND FREE OF ROCKS, DEBRIS, SHARP EDGES OR IRREGULARITIES TO PREVENT THE LINER'S RUPTURE OR TEAR. GEOTEXTILE IS REQUIRED UNDER AND OVER THE LINER WHEN NEEDED TO REDUCE LOCALIZED STRESS-STRAIN OR PROTUBERANCES THAT OTHERWISE MAY COMPROMISE THE LINER'S INTEGRITY.
12. AS DESCRIBED IN THE DESIGN/CONSTRUCTION PLANS OF THE REGISTRATION/PERMIT, ALL PRIMARY (UPPER) LINERS IN A RECYCLING CONTAINMENT SHALL BE GEOMEMBRANE LINERS COMPOSED OF AN IMPERVIOUS, SYNTHETIC MATERIAL THAT IS RESISTANT TO ULTRAVIOLET LIGHT, PETROLEUM HYDROCARBONS, SALTS AND ACIDIC AND ALKALINE SOLUTIONS. ALL PRIMARY LINERS SHALL BE 60-MIL HDPE LINERS. SECONDARY LINERS SHALL BE 60-MIL HDPE. LINER COMPATIBILITY SHALL MEET OR EXCEED THE EPA SW-846 METHOD 9090A OR SUBSEQUENT RELEVANT PUBLICATIONS.
13. LINER SEAMS SHALL BE MINIMIZED AND ORIENTED UP AND DOWN, NOT ACROSS THE SLOPE.
14. EXPANSION WRINKLE SHALL BE INSTALLED IF NECESSARY INSIDE POND FOR THERMAL EXPANSION / CONTRACTION.
15. UNLESS DIFFERENTLY STATED IN THE CONSTRUCTION PLAN OF THE REGISTRATION PERMIT,THE OPERATOR SHALL ENSURE FIELD SEAMS IN GEOSYNTHETIC MATERIAL ARE THERMALLY SEAMED, PRIOR TO FIELD SEAMING, THE OPERATOR SHALL OVERLAP LINERS FOUR TO SIX INCHES. THE OPERATOR SHALL MINIMIZE THE NUMBER OF FIELD SEAMS AND CORNERS AND IRREGULARLY SHAPED AREAS. THERE SHALL BE NO HORIZONTAL SEAMS WITHIN FIVE FEET OF THE SLOPE'S TOE. QUALIFIED PERSONNEL HAVING MORE THAN 1,000,000 SQ.FT. EXPERIENCE SHALL PERFORM FIELD WELDING AND TESTING. DOCUMENTATION OF LINER WELDERS EXPERIENCE IS REQUIRED TO BE PRESENT.
16. AT POINTS OF DISCHARGE INTO OR SUCTION FROM THE RECYCLING CONTAINMENT, THE OPERATOR SHALL INSURE THAT THE LINER IS PROTECTED FROM EXCESSIVE HYDROSTATIC FORCE OR MECHANICAL DAMAGE. EXTERNAL DISCHARGE OR SUCTION LINES SHALL NOT PENETRATE THE LINER.
17. THE OPERATOR SHALL POST AN UPRIGHT SIGN NO LESS THAN 12 INCHES BY 24 INCHES WITH LETTERING NOT LESS THAN TWO INCHES IN HEIGHT IN A CONSPICUOUS PLACE ON THE FENCE SURROUNDING THE CONTAINMENT. THE OPERATOR SHALL POST THE SIGN IN A MANNER AND LOCATION SUCH THAT A PERSON CAN EASILY READ THE LEGEND. THE SIGN SHALL PROVIDE THE FOLLOWING INFORMATION: THE OPERATOR'S NAME, THE LOCATION OF THE SITE BY QUARTER-QUARTER OR UNIT LETTER, SECTION, TOWNSHIP AND RANGE, AND EMERGENCY TELEPHONE NUMBERS.
18. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO CONTACT NEW MEXICO 811 (FORMERLY NEW MEXICO ONE CALL) A MINIMUM OF 48 HOURS BEFORE EXCAVATION. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL EXCAVATE AND VERIFY THE HORIZONTAL AND VERTICAL LOCATIONS OF ALL DESIGNATED UNDERGROUND UTILITIES. SHOULD A CONFLICT EXIST, THE CONTRACTOR SHALL NOTIFY THE ENGINEER SO THAT THE CONFLICT CAN BE RESOLVED WITH A MINIMUM AMOUNT OF DELAY.
19. DURING CONSTRUCTION OF THE CONTAINMENT, THE CONTRACTOR WILL REPORT AND RESPOND TO ANY SPILLS OF HAZARDOUS MATERIALS SUCH AS GASOLINE, DIESEL, MOTOR OILS, SOLVENTS, CHEMICALS, TOXIC OR CORROSIVE SUBSTANCES, ETC. A SPILL IS DEFINED AS ANY RELEASE OF A CORROSIVE, HAZARDOUS, TOXIC OR RADIOACTIVE SUBSTANCE THAT MAY BE A THREAT TO PUBLIC HEALTH OR THE ENVIRONMENT. REPORTS OF SPILLS WILL BE MADE IMMEDIATELY TO BOTH THE NEW MEXICO ENVIRONMENT DEPARTMENT EMERGENCY RESPONSE TEAM (505-827-9329 OR 866-428-6535). THE CONTRACTOR WILL BE RESPONSIBLE FOR REPORTING AND CLEANUP OF ANY SPILL ASSOCIATED WITH PROJECT CONSTRUCTION. THE CONTRACTOR WILL BE RESPONSIBLE FOR REPORTING ANY DISCOVERIES OF PAST SPILLS OR CURRENT SPILLS NOT ASSOCIATED WITH CONSTRUCTION.
20. CONTRACTOR MUST OBTAIN CLIENT PERMISSION BEFORE SALVAGING ANY ITEMS SPECIFIED FOR REMOVAL AND DISPOSAL AFTER COMPLETION OF CONSTRUCTION OF THE CONTAINMENT.
21. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING DISPOSAL SITES THAT ARE ENVIRONMENTALLY SUITABLE FOR DISPOSAL OF ITEMS NOT SPECIFIED TO BE SALVAGED. THE CONTRACTOR IS EXPECTED TO ABIDE BY ALL FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS IN OBTAINING THE NECESSARY PERMITS FROM ALL APPLICABLE AGENCIES AND/OR PRIVATE PROPERTY OWNERS. ALL COSTS ASSOCIATED WITH OBTAINING THESE PERMITS SHALL BE INCIDENTAL TO THE COMPLETION OF THE PROJECT AND NO DIRECT MEASUREMENT OR PAYMENT SHALL BE MADE THEREFORE. THE CONTRACTOR SHALL PROVIDE THE ENGINEER WITH COPIES OF ALL PERTINENT INFORMATION, AGREEMENTS, AND PERMITS RELATED TO DISPOSAL SITES UTILIZED. BORROW MATERIAL, ROCK WASTE, AND VEGETATIVE DEBRIS SHALL NOT BE PLACED IN WETLANDS, ARROYOS, OR AREAS THAT MAY IMPACT THREATENED OR ENDANGERED SPECIES. ARCHEOLOGICAL AND ENVIRONMENTAL CLEARANCES MUST BE OBTAINED BEFORE DISPOSAL.
22. LINER INSTALLATION SHALL BE PERFORMED PER INDUSTRY BEST PRACTICES, STANDARDS AND AMEREDEV PROVIDED GUIDELINES.

KEYED NOTES

1. POND SUMP PER DETAIL 1, SHEET CS-501
2. 3' FREEBOARD DEPTH (ELEV. 3002.00')
3. ANCHOR TRENCH PER DETAIL 4, SHEET CS-501
4. INSTALL 6' CHAINLINK FENCE WITH BARBED WIRE PER DETAIL 8, SHEET CS-501
5. VEHICLE TURNING AREA (CALICHE PAD)
6. ACCESS RAMP FOR VEHICULAR MOVEMENT
7. 20' WIDE GATE AND MAN GATE

RECYCLING POND PARAMETERS*	
TOP OF BERM ELEVATION	3005.00 FT
HIGH WATER ELEVATION (FREEBOARD)	3002.00 FT
BOTTOM OF POND ELEVATION	2989.50 FT
TOP OF SUMP ELEVATION	2982.00 FT
TOTAL CONTAINMENT VOLUME (NO CONTINGENCY)	1,213,750 BBL
TOTAL FLUID VOLUME BELOW 3' FREEBOARD ELEVATION (NO CONTINGENCY)	984,800 BBL

RECYCLING POND CUT/FILL QUANTITIY*			
	CUT (Cu. Yd.)	FILL (Cu. Yd., WITHOUT CALICHE)	NET (Cu. Yd.)
TOTAL	108,450.00	47,760.00	60,690.00 (CUT)

*CUT AND FILL FACTORS NOT APPLIED, ALL QUANTITIES ARE "IN PLACE", CUT AND FILL QUANTITIES WERE CALCULATED WITH RESPECT TO PROPOSED PAD SURFACE. VOLUME WAS CALCULATED USING CIVIL 3D.

CALICHE PAD QUANTITY	
PAD AREA (Sq. Ft.)	CALICHE FILL (Cu. Yd.)
168,210.00	6,230.00

NORTH

SCALE 1" = 50
0' 25 50 100

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Pettigrew.us

DRAFT

PROJECT ENGINEER:	David Roybal, PE
PROJECT DESIGNER:	Laxmi P. Paneru, EI
DRAWN BY:	LPP

EXIST. GRADE 1.0' CONTOUR
EXIST. GRADE 5.0' CONTOUR
FINISHED GRADE 1.0' CONTOUR
FINISHED GRADE 5.0' CONTOUR
DRIVING SURFACE
1' THICK CALICHE PAD
2' FREEBOARD DEPTH
ANCHOR TRENCH
PROPOSED PAD ELEVATION
TOC TOP OF CALICHE
SG SUBGRADE

REVISIONS

No.	DATE	DESCRIPTION

SITE GRADING PLAN

DESOTO SPRINGS RECYCLING POND

AMEREDEV OPERATING, LLC

PROJECT NUMBER: 2018.1154

SHEET: CS-101

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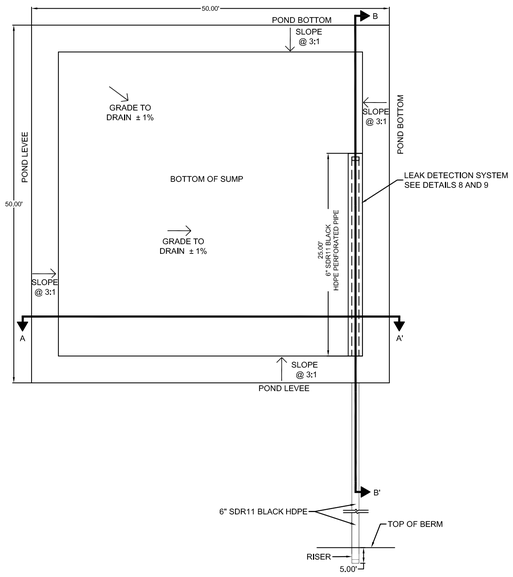

1 LEAK DETECTION SYSTEM SUMP PLAN

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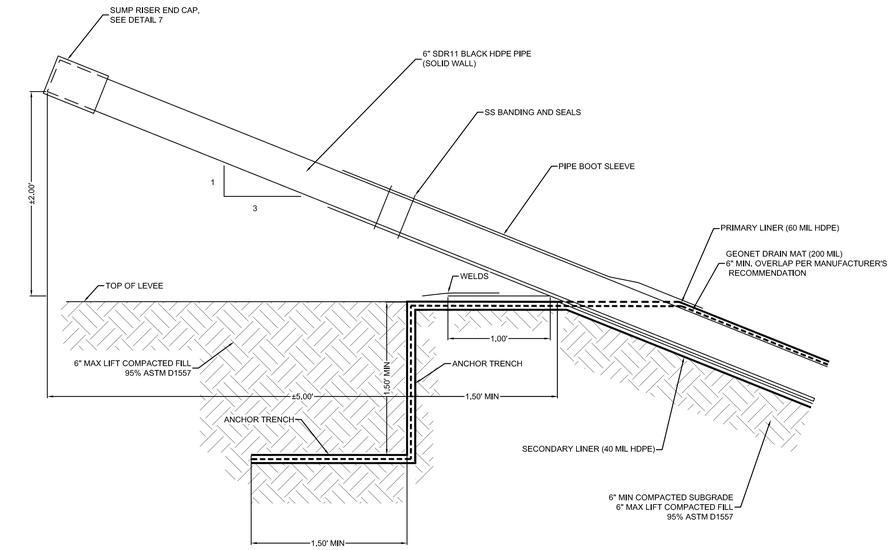

4 LEAK DETECTION SYSTEM TYPICAL ANCHOR TRENCH AND RISER DETAIL

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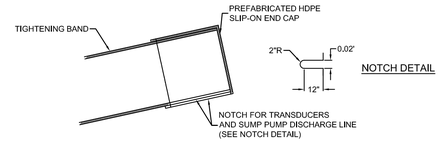
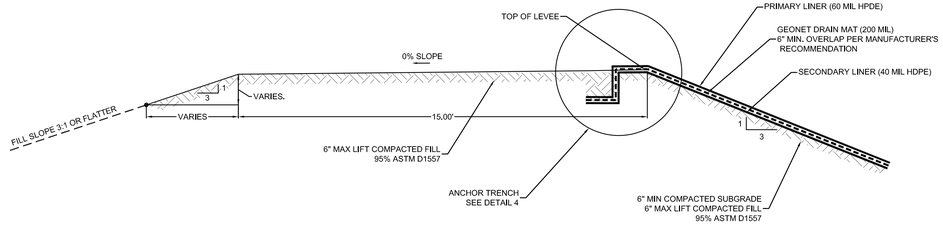


NOTCH DETAIL

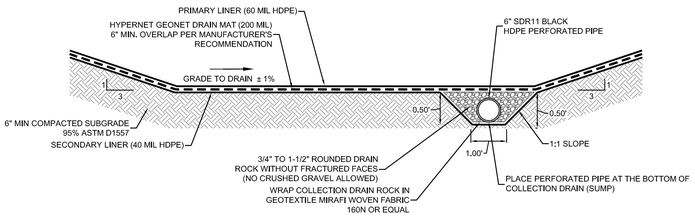
7 SUMP RISER END CAP

SCALE: N.T.S.



5 TOP OF LEVEE AND TYPICAL CONTAINMENT EDGE DETAIL

SCALE: N.T.S.



2 LEAK DETECTION SYSTEM SUMP DETAIL SECTION A-A'

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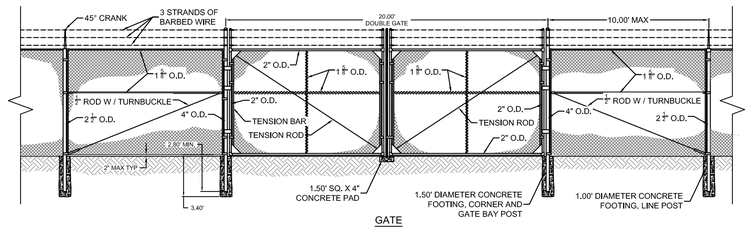
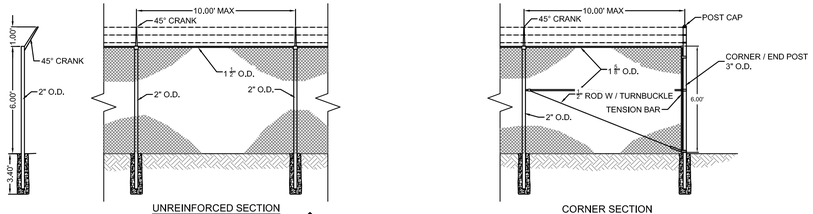
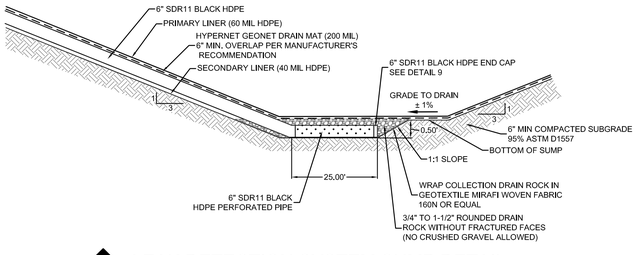


GATE



6 6' CHAIN LINK FENCE

SCALE: N.T.S.



3 LEAK DETECTION SYSTEM SUMP DETAIL SECTION B-B'

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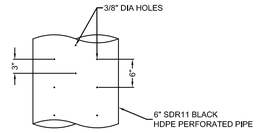

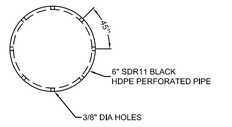

8 LEAK DETECTION SYSTEM PIPE PERFORATION DETAIL

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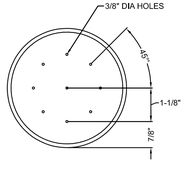

9 LEAK DETECTION SYSTEM PERFORATED END CAP DETAIL

SCALE: N.T.S.

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DRAFT

PROJECT ENGINEER:	David Roybal, PE
PROJECT DESIGNER:	Laxmi P. Paneru, EI
DRAWN BY:	LPP

REVISIONS

No.	DATE	DESCRIPTION

DETAILS

DESOTO SPRINGS RECYCLING POND

AMEREDEV OPERATING, LLC

PROJECT NUMBER: 2018.1154

SHEET: CS-501

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Appendix B
Construction Plan

C-147 Supplemental Information:Appendix B
Design and Construction Plan – De Soto Springs Containment

Applicable mandates in Rule 34 are underlined. This plan addresses construction of the Ameredev Operating De Soto Springs Containment. Appendix A presents the specifictions for construction of Ike's Containment #1 and the De Soto Springs Containment will use these same designs. Ameredev will submit "as built" drawings of the De Soto Containment prepared prior to any storage of produced water.

Pettigrew Engineers is providing the design of the containment will conduct a geotechnical evaluation of the liner foundation and levees for the operator. The stamped "as built" drawings showing all design elements will be submitted to OCD prior to storage of produced water.

Dike Protection and Structural Integrity

The design and operation provide for the confinement of produced water, to prevent releases and to prevent overtopping due to wave action or rainfall. Additionally, the design prevents run-on of surface water as the containment is surrounded by an above-grade levee (a berm) and/or diversion ditch (between the levee and the soil stockpile) to prevent run-on of surface water.

Stockpile Topsoil

Where topsoil was present, prior to constructing containment, the operator stripped and stockpiled the topsoil for use as the final cover or fill at the time of closure.

Signage

The operator will place an upright sign no less than 12 inches by 24 inches with lettering not less than two inches in height in a conspicuous place on the fence surrounding the containment. The sign is posted in a manner and location such that a person can easily read the legend. The sign will provide the following information:

- the operator's name,
- the location of the site by quarter-quarter or unit letter, section, township and range, and
- emergency telephone numbers

Fencing

The operator will provide for a fence to enclose the recycling containment in a manner that deters unauthorized wildlife and human access. The perimeter fence around the entire 40-acre parcel owned by Ameredev is 6-foot high chain link fence rather than a a four foot fence that has at least four strands evenly spaced in the interval between one foot and four feet above ground level. Because feral pigs, javelena and deer are present in the area, a chain link or game fence is required in order to comply with Section 19.15.34.12 D.1 of the Rule[1]. The specification for fencing provided in 19.15.34.12 D.2 contradicts D.1 because pigs will move beneath the lower strand of a 4-strand, 4-foot high barbed wire fence and deer will jump over. Thus, compliance with D.2 results in a violation of D.1. Compliance with D.1 is the critical component of the Rule and operators need not submit a variance

[1] The operator shall fence or enclose a recycling containment in a manner that deters unauthorized wildlife and human access and shall maintain the fences in good repair.

request in order to follow Best Management Practices and comply with the Rule. As stated in the O&M plan, the operator will ensure that all gates associated with the fence are closed and locked when responsible personnel are not onsite.

Netting and Protection of Wildlife

The perimeter game fence will be effective in excluding stock and most terrestrial wildlife. If requested by the surface owner, the game fence can include a fine mesh from the base to 1 foot above the ground to exclude the small reptiles (e.g. dune sagebrush lizard).

The recycling containment will be protective of wildlife, including migratory birds through the implementation of an Avian Protection Plan, routine inspections and the perimeter fence.

The avian protection plan includes the use of a Bird-X Mega Blaster Pro[2] as a primary hazing program for avian species. The device will be equipped with sounds suitable for the Permian Basin environment. In addition to this sonic device, staff will routinely inspect the containment for the presence of avian species and, if detected, will use a blank cartridge or shell in a handgun, starter pistol or shotgun as additional hazing. Decoys of birds of prey may be placed on the game fence and other roosts around the open water to provide additional hazing.

The O&M plan calls for the operator to inspect for and, within 30 days of discovery, report the discovery of dead migratory birds or other wildlife to the appropriate wildlife agency and to the division district office in order to facilitate assessment and implementation of measures to prevent incidents from reoccurring.

Earthwork

The containment will have a properly constructed foundation and interior slopes consisting of a firm, unyielding base, smooth and free of rocks, debris, sharp edges or irregularities to prevent the liner's rupture or tear. Geotextile may be placed under the liner when needed to reduce localized stress-strain or protuberances that otherwise may compromise the liner's integrity.

Appendix A shows that, like Ike's Containment #1, the De Soto Springs Containment will have the following design/construction specifications:

a) levee has inside grade no steeper than two horizontal feet to one vertical foot (2H: 1V).
b) levee outside grade is no steeper than three horizontal feet to one vertical foot (3H: 1V)
c) top of the levee is wide enough to install an anchor trench and provide adequate room for inspection and maintenance.
d) The containment floor design calls for a slope toward the sump in the northeast corner.

[2] https://bird-x.com/bird-products/electronic/sonic/mega-blaster-pro/

Liner and Drainage Geotextile Installation

The containment has a primary (upper) liner and a secondary (lower) liner with a leak detection system appropriate to the site's conditions.

The primary (upper) liner is a geomembrane liner composed of an impervious, synthetic material that is resistant to ultraviolet light, petroleum hydrocarbons, salts and acidic and alkaline solutions. It is 60-mil HDPE. The secondary liner is 40-mil HDPE and is equivalent to 30-mil LLDPEr. Liner compatibility meets or exceeds a subsequent relevant publication to EPA SW -846 method 9090A.

The recycling containment design has a leak detection system between the upper and lower geomembrane liners of 200-mil geonet to facilitate drainage. The leak detection system consists of a properly designed drainage and collection and removal system placed above the lower geomembrane liner in depressions and sloped to facilitate the earliest possible leak detection. The containment floor design calls for a slope toward the sump in the southeast corner. This slope combined with the highly transmissive geonet drainage layer provide for rapid leak detection.

The liners and drainage material will be installed consistent with the Manufacture's specifications. In addition to any specifications of the Manufacturer, protocols for liner installation include measures to:

i. minimizing liner seams and orient them up and down, not across, a slope of the levee.
ii. use factory-welded seams where possible.
iii. use field seams in geosynthetic material that are thermally seamed and prior to field seaming, overlap liners four to six inches.
iv. minimize the number of field seams and comers and irregularly shaped areas.
v. provide for no horizontal seams within five feet of the slope's toe.
vi. use qualified personnel to perform field welding and testing.
vii. avoid excessive stress-strain on the liner
viii. The edges of all liners are anchored in the bottom of a compacted earth-filled trench that is at least 18 inches deep

At points of discharge into the lined earthen containment the pipe configuration effectively protects the liner from excessive hydrostatic force or mechanical damage during filling.

The design shows that at any point of discharge into or suction from the recycling containment, the liner is protected from excessive hydrostatic force or mechanical damage. External discharge or suction lines do not penetrate the liner.

Pumping from the containment to hydraulic fracturing operations is the responsibility of stimulation contractors. Typically, lines are permanently placed in the containment with floats attached to prevent damage to the liner system. The containment may be equipped

with permanent HDPE stinger (supported by a sacrificial liner or geotextile) for withdrawal of fluid if the owner deems necessary during operations.

Leak Detection and Fluid Removal System Installation

The leak detection system, contains the following design elements

a. The 200-mil HyperNet Geonet drainage material between the primary and secondary liner that is sufficiently permeable to allow the transport of fluids to the observation ports (Appendix A).
b. The containment floor is sloped towards the monitoring riser pipe to facilitate the earliest possible leak detection of the containment bottom. A pump may be placed in the observation port to provide for fluid removal.
c. Piping will withstand chemical attack from any seepage; structural loading from stresses and disturbances from overlying water, cover materials, equipment operation or expansion or contraction (see Appendix A).

Appendix C

Operating and Maintenance Plan

R.T. Hicks Consultants, Ltd.
901 Rio Grande Blvd. NW, Suite F-142
Albuquerque, NM 87104

Operating and Maintenance Procedures

In this plan, underlined text represents the language of the Rule.

The operator will operate and maintain the lined earthen containment to contain liquids and solids (blow sand and minimal precipitates from the treated produced water) and maintain the integrity of the liner system in a manner that prevents contamination of fresh water and protects public health and the environment as described below. The purpose of the lined earthen containment is to facilitate recycling, reuse and reclamation of produced water derived from nearby oil and gas wells. During periods when water for E&P operations is not needed, produced water will discharge to one of the injection wells in the operator's SWD system. The containment will not be used for the disposal of produced water or other oilfield waste.

The operation of the containment is summarized below.

A. Via pipeline, produced water generated from nearby oil and gas wells is delivered to a treatment system located as indicated in the C-147.
B. After treatment, the produced water discharges into the containment.
C. When required, treated produced water is removed from the containment for E&P operations. At this time, treated produced water will be used for drilling beneath the fresh water zones (beneath surface casing), for well stimulation (e.g. hydraulic fracturing) and other E&P uses as approved by OCD.
D. Whenever the maximum fluid capacity of the containment is reached, treatment and discharge to the containment ceases (see Freeboard and Overtopping Plan, below).
E. The operator will keep accurate records and shall report monthly to the division the total volume of water received for recycling, with the amount of fresh water received listed separately, and the total volume of water leaving the facility for disposition by use on form C-148.
F. The operator will maintain accurate records that identify the sources and disposition of all recycled water that shall be made available for review by the division upon request.
G. The containment shall be deemed to have ceased operations if less than 20% of the total fluid capacity is used every six months following the first withdrawal of produced water for use. The operator will report cessation of operations to the appropriate division district office. The appropriate division district office may grant an extension to this determination of cessation of operations not to exceed six months.

The operation of the lined earthen containment will follow the mandates listed below:

1. The operator will not discharge into or store any hazardous waste (as defined by 40 CFR 261 and NMAC 19.15.2.7.H.3) in the containments.
2. If the containment's primary liner is compromised above the fluid's surface, the operator will repair the damage or initiate replacement of the primary liner within 48 hours of discovery or seek an extension of time from the division district office.
3. If the primary liner is compromised below the fluid's surface, the operator will remove all fluid above the damage or leak within 48 hours of discovery, notify the division district office and repair the damage or replace the primary liner.
4. If any penetration of the containment liner is confirmed by sampling of fluid in the leak detection system (see Monitoring, Inspection, and Reporting Plan; below), the operator will:

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a. Begin and maintain fluid removal from the leak detection/pump-back system,
b. Notify the district office within 48 hours (phone or email) of the discovery,
c. Identify the location of the leak, and
d. Repair the damage or, if necessary, replace the containment liner.

5. The operator will install, or maintain on site, an oil absorbent boom or other device to contain an unanticipated release and the operator will remove any visible layer of oil from the surface of the recycling containment.
6. The operator will report releases of fluid in a manner consistent with NMAC 19.15.29
7. The containment will be operated to prevent the collection of surface water run-on.
8. The operator will maintain the containment free of miscellaneous solid waste or debris.
9. The operator will maintain at least three feet of freeboard for the containment and will use a free-standing staff gauge to allow easy determination of the required 3-foot of freeboard.
10. As described in the design/construction plan, the injection or withdrawal of fluids from the containment is accomplished through hardware that prevents damage to the liner by erosion, fluid jets or impact from installation and removal of hoses or pipes.
11. The operator shall ensure that all gates associated with the fence are closed and locked when responsible personnel are not onsite.
12. The operator will maintain the fences in good repair.

Monitoring, Inspection, and Reporting Plan

The operator will inspect the recycling containment and associated leak detection systems weekly while it contains fluids. The operator shall maintain a current log of such inspections and make the log available for review by the division upon request.

Weekly inspections consist of:

- reading and recording the fluid height of staff gauges,
- recording any evidence that the pond surface shows visible oil,
- visually inspecting the containment's exposed liners, and
- checking the leak detection system for any evidence of a loss of integrity of the primary liner.

As stated above, if a liner's integrity is compromised, or if any penetration of the liner occurs above the water surface, then the operator will notify the District office within 48 hours (phone or email).

Monthly, the operator will:

A. Inspect diversion ditches and berms around the containment to check for erosion and collection of surface water run-on.
B. Inspect the leak detection system for evidence of damage or malfunction and monitor for leakage.
C. Inspect the containment for dead migratory birds and other wildlife. Within 30 days of discovery, report the discovery of dead migratory birds or other wildlife to the appropriate wildlife agency and to the division district office in order to facilitate assessment and implementation of measures to prevent incidents from reoccurring.
D. Report to the division the total volume of water received for recycling, with the amount of fresh water received listed separately, and the total volume of water leaving the facility for disposition by use on form C-148.
E. Record sources and disposition of all recycled water

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The operator will maintain a log of all inspections and make the log available for the appropriate Division district office's review upon request. An example of the log is attached to this section of the permit application.

Freeboard and Overtopping Prevention Plan

The method of operation of the containment allows for maintaining freeboard with very few potential problems. When the capacity of the containment is reached (3-feet of freeboard), the discharge of treated produced water ceases and the produced water generated by nearby oil and gas wells is managed by an injection well(s).

If rising water levels suggest that 3-feet of freeboard will not be maintained, the operator will implement one or more of the following options:

I. Cease discharging treated produced water to the containment.
II. Accelerate re-use of the treated produced water for purposes approved by the Division.
III. Transfer treated produced water from the containment to injection wells.

The reading of the staff gauge typically occurs daily when treatment operations are ongoing and weekly when discharge to the containment is not occurring.

Protocol for Leak Detection Monitoring, Fluid Removal and Reporting

As shown in Appendix A, the leak detection system includes a monitoring system. Any fluid released from the primary liner will flow to the collection sump where fluid level monitoring is possible at the monitoring riser pipe associated with the leak detection system.

Staff may employ a portable electronic water level meter to determine if fluid exists in the monitoring riser pipe. Obtaining accurate readings of water levels in a sloped pipe beneath a containment can be a challenge. An electrician's wire snake may be required to push the probe to the bottom of the port and the probe may be fixed in a 2-inch pipe "dry housing" to avoid false readings due to water condensation on the pipe. There are many techniques to determine the existence of water in the sumps – including low flow pumps and a simple small bailer affixed to an electrician's snake. The operator will use the method that works best for this containment.

If seepage from the containment into the leak detection system is suspected by a positive fluid level measurement, the operator will:

1. Re-measure fluid levels in the monitoring riser pipe on a daily basis for one week to determine the rate of seepage.
2. Collect a water sample from the monitoring riser pipe to confirm the seepage is treated produced water from the containment via electrical conductivity and chloride measurements.
3. Notify NMOCD of a confirmed positive detection in the system within 48 hours of sampling (initial notification).
4. Install a pump into the monitoring riser pipe sump to continually (manually on a daily basis or via automatic timers) remove fluids from the leak detection system into the containment until the liner is repaired or replaced.
5. Dispatch a liner professional to inspect the portion of the containment

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suspected of leakage during a “low water” monitoring event.

6. Provide NMOCD a second report describing the inspection and/or repair within 20 days of the initial notification.

If the point of release is obvious from a low water inspection, the liner professional will repair the loss of integrity. If the point of release cannot be determined by the inspection, the liner professional will develop a more robust plan to identify the point(s) of release. The inspection plan and schedule will be submitted to OCD with the second report. The operator will implement the plan upon OCD approval.

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Containment Inspection Form

Month **Oct-14**

Day	Weekly	Low Water	Activity	Monthly	Staff Gauge	Comments
1 - Wed						
2	x				8.75	Gate unlocked upon arrival - notified Jerry Smith, no birds in pit
3					10	
4					12	
5			x			Water transfer to frac - pipes are good
6			x			Water transfer to frac - pipes are good
7		x			2.5	No visible liner problems
8					3	
9	x				4	All OK - no oil on surface, no birds in pit
10					5	
11					5	
12					6	
13					7	
14					7.5	
15				x	8	No fluid in leak detection, outer berm and stormater diversion OK, H2S - no alarm,
16					9	
17					9	
18					9.5	
19	x				10	All OK
20					11	
21					12	
22			x			Water transfer to frac - no problems
23			x			Water transfer to frac - no problems
24		x			1.75	No visible liner problems
25					2.25	
26	x				3.75	High wind -liner is good, no birds
27					4.75	
28					5.5	
29					6.75	
30					7.75	
31					8.5	

Appendix D

Closure Plan

R.T. Hicks Consultants, Ltd.
901 Rio Grande Blvd. NW, Suite F-142
Albuquerque, NM 87104

In this plan, underlined text represents the language of the Rule.

After operations cease, the operator will remove all fluids within 60 days and close the containment within six months from the date the operator ceases operations from the containment for use.

The operator shall substantially restore the impacted surface area to

- the condition that existed prior to the construction of the recycling containment or
- to a condition imposed by federal, state trust land or tribal agencies on lands managed by those agencies as these provisions govern the obligations of any operator subject to those provisions,

As this containment will excavate caliche for future use and pay the surface owner (BLM) for the harvest and use of this material. We anticipate the surface owner will impose a closure design that conforms to one of a caliche mine rather than the condition that existed prior to construction. Until a change to closure as a caliche mine is required by BLM, the prescriptive mandates set forth in this plan will be in effect. The operator understands that a variance will be submitted to OCD to allow for any alternative closure protocol.

Excavation and Removal Closure Plan – Protocols and Procedures

The containment is expected to hold a small volume of solids, the majority of which will be windblown sand and dust with some mineral precipitates from the water

1. The operator will remove all liquids from the pits and either:
    a. Dispose of the liquids in a division-approved facility, or
    b. Recycle, reuse or reclaim the water for reuse in drilling and stimulation.
2. The operator will close the recycling containment by first removing all fluids, contents and synthetic liners and transferring these materials to a division approved facility.
3. After the removal of the pit contents and liners, soils beneath the containment will be tested by collection of a five-point (minimum) composite sample which includes stained or wet soils, if any, and that sample shall be analyzed for the constituents listed in Table I of 19.15.34.14.
4. After review of the laboratory results
    a. If any contaminant concentration is higher than the parameters listed in Table I, additional delineation may be required and the operator must receive approval before proceeding with closure.
    b. If all contaminant concentrations are less than or equal to the parameters listed in Table I, then the operator will proceed to
        i. backfill with non-waste containing, uncontaminated, earthen material. Or
        ii. undertake an alternative closure process pursuant to a variance request after approval by OCD

Reclamation and Re-vegetation

a. The operator will reclaim the containment's location to a safe and stable condition that blends with the surrounding undisturbed area.
b. Topsoils and subsoils shall be replaced to their original relative positions and contoured so as to achieve erosion control, long-term stability and preservation of surface water flow patterns.

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c. The disturbed area shall then be reseeded in the first favorable growing season following closure of a recycling containment.

Closure Documentation

Within 60 days of closure completion, the operator shall submit a closure report on form C-147, including required attachments, to document all closure activities including sampling results and the details on any backfilling, capping or covering, where applicable. The closure report shall certify that all information in the report and attachments is correct and that the operator has complied with all applicable closure requirements and conditions specified in division rules or directives.

The operator shall notify the division when reclamation and re-vegetation are complete. Specifically the notice will document that all ground surface disturbing activities at the site have been completed, and a uniform vegetative cover has been established that reflects a life-form ratio of plus or minus fifty percent (50%) of pre-disturbance levels and a total percent plant cover of at least seventy percent (70%) of pre-disturbance levels, excluding noxious weeds.

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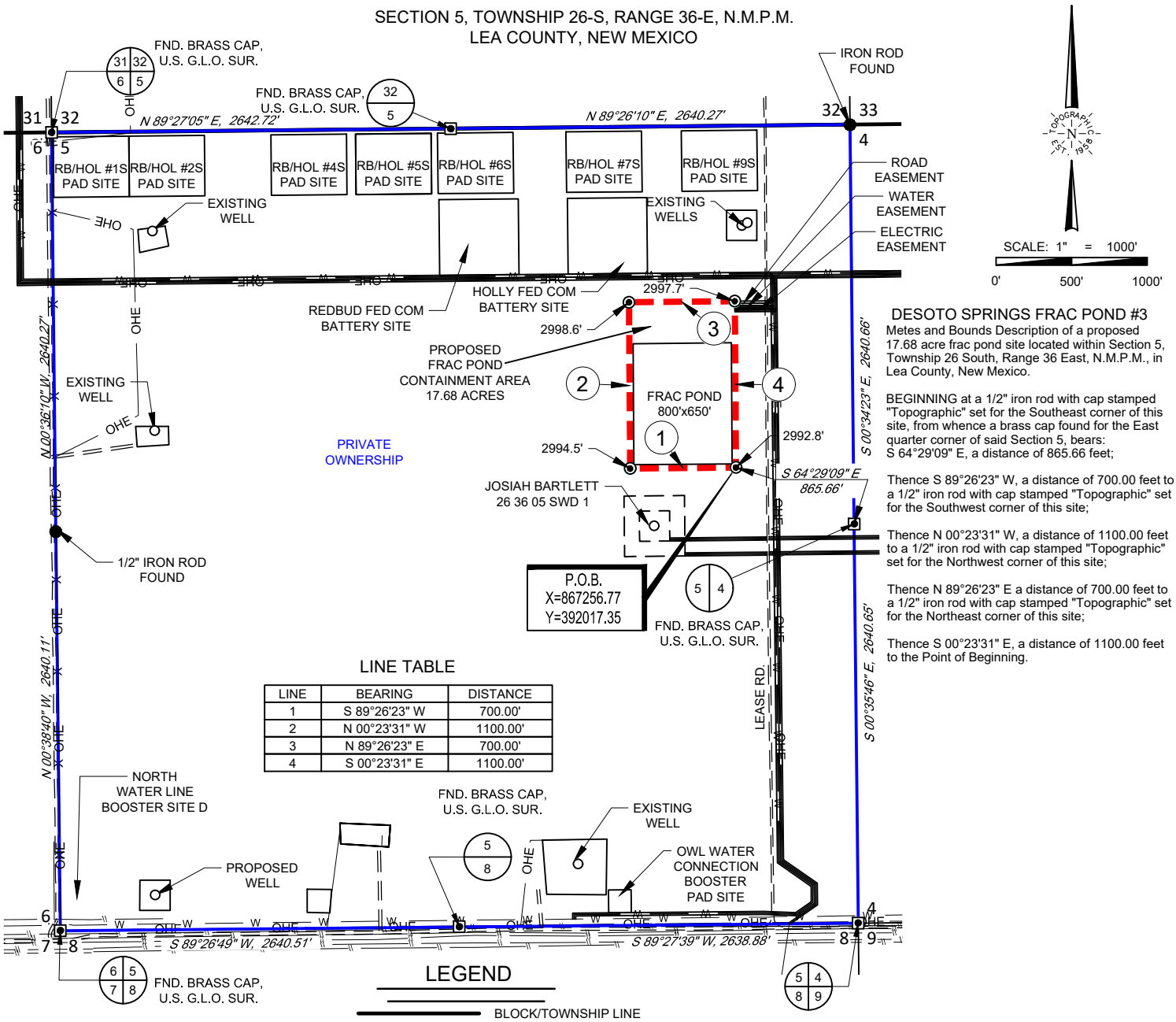
Appendix E
Site Inspection and Survey

R.T. Hicks Consultants, Ltd.
901 Rio Grande Blvd. NW, Suite F-142
Albuquerque, NM 87104

SECTION 5, TOWNSHIP 26-S, RANGE 36-E, N.M.P.M.
LEA COUNTY, NEW MEXICO



SCALE: 1" = 1000'
0' 500' 1000'

DESOTO SPRINGS FRAC POND #3

Metes and Bounds Description of a proposed 17.68 acre frac pond site located within Section 5, Township 26 South, Range 36 East, N.M.P.M., in Lea County, New Mexico.

BEGINNING at a 1/2" iron rod with cap stamped "Topographic" set for the Southeast corner of this site, from whence a brass cap found for the East quarter corner of said Section 5, bears: S 64°29'09" E, a distance of 865.66 feet;

Thence S 89°26'23" W, a distance of 700.00 feet to a 1/2" iron rod with cap stamped "Topographic" set for the Southwest corner of this site;

Thence N 00°23'31" W, a distance of 1100.00 feet to a 1/2" iron rod with cap stamped "Topographic" set for the Northwest corner of this site;

Thence N 89°26'23" E a distance of 700.00 feet to a 1/2" iron rod with cap stamped "Topographic" set for the Northeast corner of this site;

Thence S 00°23'31" E, a distance of 1100.00 feet to the Point of Beginning.

LINE TABLE

LINE	BEARING	DISTANCE
1	S 89°26'23" W	700.00'
2	N 00°23'31" W	1100.00'
3	N 89°26'23" E	700.00'
4	S 00°23'31" E	1100.00'

LEGEND

- BLOCK/TOWNSHIP LINE
- SURVEY/SECTION LINE
- PROPOSED SITE
- ROAD WAY
- EXISTING PIPELINE
- OHE — OVERHEAD ELECTRIC
- W — WATER LINE
- X — FENCE LINE
- MONUMENT
- IRON ROD FOUND

AMEREDEV OPERATING, LLC

TOPOGRAPHIC
LOYALTY INNOVATION LEGACY
1400 EVERMAN PARKWAY, Ste. 146 • FT. WORTH, TEXAS 76140
TELEPHONE: (817) 744-7512 • FAX (817) 744-7554
2903 NORTH BIG SPRING • MIDLAND, TEXAS 79705
TELEPHONE: (432) 682-1653 OR (800) 767-1653 • FAX (432) 682-1743
WWW.TOPOGRAPHIC.COM

STAN W. LLOYD NEW MEXICO 19642 PROFESSIONAL SURVEYOR

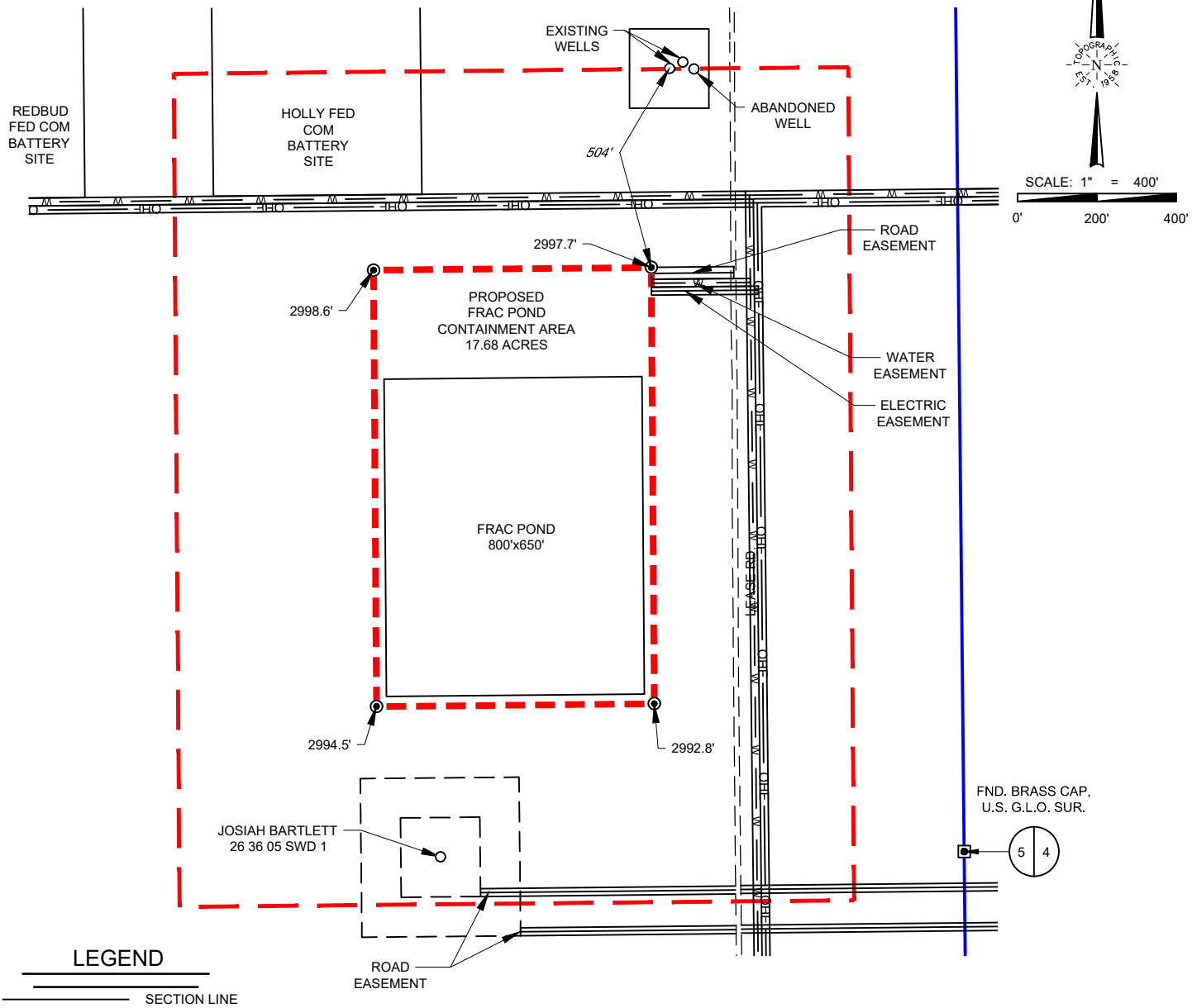
Stan W. Lloyd, P.S. No. 19642
MAY 21, 2018

DESOTO SPRINGS FRAC POND #3	REVISION:	
	EAH	05/03/18
	AMD	05/21/18
DATE: 04/28/18		
FILE: BO_DS_FRAC_POND_3_SITE_REV2		
DRAWN BY: MEH		
SHEET : 1 OF 1		

NOTES:
1. ORIGINAL DOCUMENT SIZE: 8.5" X 11"
2. ALL BEARINGS, DISTANCES, AND COORDINATE VALUES CONTAINED HEREIN ARE GRID BASED UPON THE NEW MEXICO COORDINATE SYSTEM OF 1983, EAST ZONE, U.S. SURVEY FEET.
3. CERTIFICATION IS MADE ONLY TO THE LOCATION OF THIS EASEMENT, IN RELATION TO THE EVIDENCE FOUND DURING A FIELD SURVEY, MADE ON THE GROUND, UNDER MY SUPERVISION, AND USING DOCUMENTATION PROVIDED BY AMEREDEV OPERATING LLC. ONLY UTILITIES/EASEMENTS THAT WERE VISIBLE ON THE DATE OF THIS SURVEY, WITHIN/ADJOINING THIS EASEMENT, HAVE BEEN LOCATED AS SHOWN HEREON OF WHICH I HAVE KNOWLEDGE. THIS CERTIFICATION IS LIMITED TO THOSE PERSONS OR ENTITIES SHOWN ON THE FACE OF THIS PLAT AND IS NON-TRANSFERABLE, AND MADE FOR THIS TRANSACTION ONLY.
4. B.O.L./P.O.B. = BEGINNING OF LINE/POINT OF BEGINNING
5. E.O.L./P.O.E. = END OF LINE/POINT OF EXIT
6. ADJOINER INFORMATION SHOWN FOR INFORMATIONAL PURPOSES ONLY.

S:\SURVEY\AMEREDEV_OPERATING_LLC\DESOTO_SPRINGS_POND\FINAL_PRODUCTS\BO_DS_FRAC_POND_3_SITE_REV2.DWG 5/22/2018 4:52:23 PM ccaston

SECTION 5, TOWNSHIP 26-S, RANGE 36-E, N.M.P.M.
LEA COUNTY, NEW MEXICO



LEGEND

- SECTION LINE
- PROPOSED SITE
- 500' PROXIMITY
- SIXTEENTH SECTION LINE
- TRACT BORDER
- ROAD WAY
- FENCE LINE
- EXISTING PIPELINE
- IRON ROD SET

STAN W. LLOYD NEW MEXICO 19642 PROFESSIONAL SURVEYOR

Stan W. Lloyd

Stan W. Lloyd, P.S. No. 19642
MAY 21, 2018

AMEREDEV OPERATING, LLC

TOPOGRAPHIC
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DESOTO SPRINGS FRAC POND #3	REVISION:	
	EAH	05/03/18
	AMD	05/21/18
DATE: 04/28/18		
FILE: BO_DS_FRAC_POND_3_SITE_REV2		
DRAWN BY: MEH		
SHEET : 1 OF 1		

NOTES:
1. ORIGINAL DOCUMENT SIZE: 8.5" X 11"
2. ALL BEARINGS, DISTANCES, AND COORDINATE VALUES CONTAINED HEREIN ARE GRID BASED UPON THE NEW MEXICO COORDINATE SYSTEM OF 1983, EAST ZONE, U.S. SURVEY FEET.
3. CERTIFICATION IS MADE ONLY TO THE LOCATION OF THIS EASEMENT, IN RELATION TO THE EVIDENCE FOUND DURING A FIELD SURVEY, MADE ON THE GROUND, UNDER MY SUPERVISION, AND USING DOCUMENTATION PROVIDED BY AMEREDEV OPERATING LLC. ONLY UTILITIES/EASEMENTS THAT WERE VISIBLE ON THE DATE OF THIS SURVEY, WITHIN/ADJOINING THIS EASEMENT, HAVE BEEN LOCATED AS SHOWN HEREON OF WHICH I HAVE KNOWLEDGE. THIS CERTIFICATION IS LIMITED TO THOSE PERSONS OR ENTITIES SHOWN ON THE FACE OF THIS PLAT AND IS NON-TRANSFERABLE, AND MADE FOR THIS TRANSACTION ONLY.
4. B.O.L./P.O.B. = BEGINNING OF LINE/POINT OF BEGINNING
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6. ADJOINER INFORMATION SHOWN FOR INFORMATIONAL PURPOSES ONLY.

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View looking east from center of proposed containment. North-south lease road and white truck are shown on horizon.

View north from northwest corner of the containment and recycling facility pad site. Low sand dunes stabilized by shinnery oak overlie caliche throughout this area.

The image is shows the location of the active windmill from the northeast corner of the proposed recycling facility pad. The stake is incorrectly labeled as the "Frac Pond".

The northern edge of the lined containment is 504 feet from the windmill, as verified by the survey.

View west from the southwest corner of the containment and recycling facility pad site. The nature of the landscape is the same throughout this area.

Appendix F

Driller's Logs of Nearby Water Wells

R.T. Hicks Consultants, Ltd.
901 Rio Grande Blvd. NW, Suite F-142
Albuquerque, NM 87104

Revised June 1972

STATE ENGINEER OFFICE

WELL RECORD

Section 1. GENERAL INFORMATION

(A) Owner of well Jay Anthony Owner's Well No. _____
Street or Post Office Address P.O. Box 398
City and State Jal New Mexico 88252

Well was drilled under Permit No. CP-938 and is located in the:

a. _____ ¼ _____ ¼ SE ¼ SE ¼ of Section 33 Township ~~26~~ 25S Range 36E N.M.P.M.

b. Tract No. _____ of Map No. _____ of the _____

c. Lot No. _____ of Block No. _____ of the _____
Subdivision, recorded in _____ County.

d. X= _____ feet, Y= _____ feet, N.M. Coordinate System _____ Zone in the _____ Grant.

(B) Drilling Contractor Duran Drilling License No. WD-1607
Address P.O. Box 1561 Seminole Tx. 79360

Drilling Began 5-10-06 Completed 5-12-06 Type tools Rotary Size of hole 8 3/4 in.

Elevation of land surface or _____ at well is _____ ft. Total depth of well 360 ft.

Completed well is ☐ shallow ☑ artesian. Depth to water upon completion of well 80 ft.

Section 2. PRINCIPAL WATER-BEARING STRATA

Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation	Estimated Yield (gallons per minute)
250	285	35	layers of rocks + Sand	20
300	360	60	layers of rocks + Sand	25

Section 3. RECORD OF CASING

Diameter (inches)	Pounds per foot	Threads per in.	Depth in Feet Top	Depth in Feet Bottom	Length (feet)	Type of Shoe	Perforations From	Perforations To
5 in			0	360	361		260	360

Section 4. RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Hole Diameter	Sacks of Mud	Cubic Feet of Cement	Method of Placement
0	10	8 3/4	7		

STATE ENGINEER ROSWELL, NM
2006 MAY 30 A 11:30

Section 5. PLUGGING RECORD

Plugging Contractor _____
Address _____
Plugging Method _____
Date Well Plugged _____
Plugging approved by:
_____ State Engineer Representative

No.	Depth in Feet Top	Depth in Feet Bottom	Cubic Feet of Cement
1			
2			
3			
4			

FOR USE OF STATE ENGINEER ONLY

Date Received 05/30/06 ~~#358498~~ 477062

Quad _____ FWL _____ FSL _____

File No. CP-938 Use Stk Location No. 25.36.33.44

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color and Type of Material Encountered
0	5	5	Topsoil
5	75	70	Caliche + Sand
75	85	10	layers of Rocks + Sand
85	250	165	Red Clay + White Sand
250	285	35	layers of Rock + White Sand
285	300	15	Clay + White Sand
300	360	60	layers of Rocks + White Sand

Section 7. REMARKS AND ADDITIONAL INFORMATION

STATE ENGINEER OFFICE
ROSWELL, NEW MEXICO
2006 AUG 16 PM 3:11

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described hole.

Luis R. Duran
Driller

INSTRUCTIONS: This form should be executed in triplicate, preferably typewritten, and submitted to the appropriate district office of the State Engineer. All sections, except Section 5, shall be answered as completely and accurately as possible when any well is drilled, repaired or deepened. When this form is used as a plugging record, only Section 1(a) and Section 5 need be completed.

STR

~~358498~~

WELL RECORD & LOG

OFFICE OF THE STATE ENGINEER

www.ose.state.nm.us

COPY

1. GENERAL AND WELL LOCATION

OSE POD NUMBER (WELL NUMBER)	OSE FILE NUMBER(S): CP-1285
WELL OWNER NAME(S): DINWIDDIE CATTLE COMPANY, LLC & ATKINS ENGINEERING A	PHONE (OPTIONAL): 575-354-2489
WELL OWNER MAILING ADDRESS: P.O. BOX 3156	CITY: ROSWELL STATE: NM ZIP: 88202

WELL LOCATION (FROM GPS)	DEGREES	MINUTES	SECONDS	
LATITUDE	32	03	55	N
LONGITUDE	103	17	37	W

* ACCURACY REQUIRED: ONE TENTH OF A SECOND
* DATUM REQUIRED: WGS 84

DESCRIPTION RELATING WELL LOCATION TO STREET ADDRESS AND COMMON LANDMARKS – PLSS (SECTION, TOWNSHIP, RANGE) WHERE AVAILABLE

SE 1/4, SW 1/4, SW 1/4, SECTION 05, TOWNSHIP 26 SOUTH, RANGE 36 EAST N.M.P.M

2. DRILLING & CASING INFORMATION

LICENSE NUMBER	NAME OF LICENSED DRILLER	NAME OF WELL DRILLING COMPANY
WD-1607	LUIS A. (TONY) DURAN	DURAN DRILLING

DRILLING STARTED	DRILLING ENDED	DEPTH OF COMPLETED WELL (FT)	BORE HOLE DEPTH (FT)	DEPTH WATER FIRST ENCOUNTERED (FT)
7/01/15	7/6/15	511	510	250

STATIC WATER LEVEL IN COMPLETED WELL (FT)

COMPLETED WELL IS: ○ ARTESIAN ○ DRY HOLE ◉ SHALLOW (UNCONFINED)

DRILLING FLUID: ○ AIR ○ MUD ADDITIVES – SPECIFY: DRILLING MUD

DRILLING METHOD: ◉ ROTARY ○ HAMMER ○ CABLE TOOL ○ OTHER – SPECIFY:

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	BORE HOLE DIAM (inches)	CASING MATERIAL AND/OR GRADE (include each casing string, and note sections of screen)	CASING CONNECTION TYPE	CASING INSIDE DIAM. (inches)	CASING WALL THICKNESS (inches)	SLOT SIZE (inches)
0	190	16	STEEL	STEEL PERF	10	1/4	-
190	510	16	STEEL PERF	STEEL	10	1/4	1/8

3. ANNULAR MATERIAL

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	BORE HOLE DIAM. (inches)	LIST ANNULAR SEAL MATERIAL AND GRAVEL PACK SIZE-RANGE BY INTERVAL	AMOUNT (cubic feet)	METHOD OF PLACEMENT
0	20	16	20 BGS 80 LBS CEMENT		MIXER
20	510	16	36 YARDS 1/4 GRAVEL PACK		

FOR OSE INTERNAL USE

WR-20 WELL RECORD & LOG (Version 06/08/2012)

FILE NUMBER	CP-1285	POD NUMBER		TRN NUMBER	664512
LOCATION	26S.36E.5.3.3.3				PAGE 1 OF 2

4. HYDROGEOLOGIC LOG OF WELL

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	THICKNESS (feet)	COLOR AND TYPE OF MATERIAL ENCOUNTERED - INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES (attach supplemental sheets to fully describe all units)	WATER BEARING? (YES / NO)	ESTIMATED YIELD FOR WATER-BEARING ZONES (gpm)
0	1	1	TOPSOIL	O Y ◉ N	
1	16	15	CALICHE	O Y ◉ N	
16	230	214	CLAY	O Y ◉ N	
230	285	55	ROCK	O Y ◉ N	
285	290	5	SAND	◉ Y O N	20
290	315	25	ROCK	◉ Y O N	40
315	507	192	SAND	◉ Y O N	30
507	510	3	RED BED	O Y ◉ N	
				O Y O N	
				O Y O N	
				O Y O N	
				O Y O N	
				O Y O N	
				O Y O N	
				O Y O N	
				O Y O N	
				O Y O N	
				O Y O N	
				O Y O N	
				O Y O N	

METHOD USED TO ESTIMATE YIELD OF WATER-BEARING STRATA: O PUMP ◉ AIR LIFT ◉ BAILER O OTHER – SPECIFY:

TOTAL ESTIMATED WELL YIELD (gpm): 90

5. TEST; RIG SUPERVISION

WELL TEST — TEST RESULTS - ATTACH A COPY OF DATA COLLECTED DURING WELL TESTING, INCLUDING DISCHARGE METHOD, START TIME, END TIME, AND A TABLE SHOWING DISCHARGE AND DRAWDOWN OVER THE TESTING PERIOD.

MISCELLANEOUS INFORMATION:

PRINT NAME(S) OF DRILL RIG SUPERVISOR(S) THAT PROVIDED ONSITE SUPERVISION OF WELL CONSTRUCTION OTHER THAN LICENSEE:
LUIS A. DURAN

6. SIGNATURE

THE UNDERSIGNED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND CORRECT RECORD OF THE ABOVE DESCRIBED HOLE AND THAT HE OR SHE WILL FILE THIS WELL RECORD WITH THE STATE ENGINEER AND THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:

Luis A Duran / LUIS A. DURAN — SIGNATURE OF DRILLER / PRINT SIGNEE NAME

7-6-15 — DATE

FOR OSE INTERNAL USE — WR-20 WELL RECORD & LOG (Version 06/08/2012)

FILE NUMBER	CP-1285	POD NUMBER	TRN NUMBER	
LOCATION	26S.36E.5.3.3.3		comm.	PAGE 2 OF 2

WELL RECORD & LOG

OFFICE OF THE STATE ENGINEER

www.ose.state.nm.us

1. GENERAL AND WELL LOCATION

OSE POD NUMBER (WELL NUMBER): 3	OSE FILE NUMBER(S): CP-1263
WELL OWNER NAME(S): BECKHAM RANCH, INC. / MSTAPLETON, LLC	PHONE (OPTIONAL): 575-441-3045
WELL OWNER MAILING ADDRESS: P.O. BOX 823	CITY: JAL STATE: NM ZIP: 88252

WELL LOCATION (FROM GPS)

	DEGREES	MINUTES	SECONDS	
LATITUDE	32	03	55	N
LONGITUDE	103	18	15	W

* ACCURACY REQUIRED: ONE TENTH OF A SECOND

* DATUM REQUIRED: WGS 84

DESCRIPTION RELATING WELL LOCATION TO STREET ADDRESS AND COMMON LANDMARKS - PLSS (SECTION, TOWNSHIP, RANGE) WHERE AVAILABLE

SE 1/4, NW 1/4, SW 1/4, SECTION 06, TOWNSHIP 26S, RANGE 36E

2. DRILLING & CASING INFORMATION

LICENSE NUMBER	NAME OF LICENSED DRILLER	NAME OF WELL DRILLING COMPANY
WD-1607	LUIS A. (TONY) DURAN	DURAN DRILLING

DRILLING STARTED	DRILLING ENDED	DEPTH OF COMPLETED WELL (FT)	BORE HOLE DEPTH (FT)	DEPTH WATER FIRST ENCOUNTERED (FT)
6/24/15	6/28/15	516	515	240

STATIC WATER LEVEL IN COMPLETED WELL (FT)

COMPLETED WELL IS: ○ ARTESIAN ○ DRY HOLE ◉ SHALLOW (UNCONFINED)

DRILLING FLUID: ○ AIR ○ MUD ADDITIVES – SPECIFY: DRILLING MUD

DRILLING METHOD: ◉ ROTARY ○ HAMMER ○ CABLE TOOL ○ OTHER – SPECIFY:

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	BORE HOLE DIAM (inches)	CASING MATERIAL AND/OR GRADE (include each casing string, and note sections of screen)	CASING CONNECTION TYPE	CASING INSIDE DIAM. (inches)	CASING WALL THICKNESS (inches)	SLOT SIZE (inches)
0	215	16	STEEL	STEEL PERF	10	1/4	-
215	515	16	STEEL PERF	STEEL	10	1/4	1/8

3. ANNULAR MATERIAL

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	BORE HOLE DIAM. (inches)	LIST ANNULAR SEAL MATERIAL AND GRAVEL PACK SIZE-RANGE BY INTERVAL	AMOUNT (cubic feet)	METHOD OF PLACEMENT
0	20	16	43 BGS 80 LBS CEMENT		MIXER
20	515	16	36 YARDS 3/8 GRAVEL		

FOR OSE INTERNAL USE

WR-20 WELL RECORD & LOG (Version 06/08/2012)

FILE NUMBER	CP-1263	POD NUMBER	3	TRN NUMBER	
LOCATION	26S.36E.6.4.3.3				PAGE 1 OF 2

Ind.

4. HYDROGEOLOGIC LOG OF WELL

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	THICKNESS (feet)	COLOR AND TYPE OF MATERIAL ENCOUNTERED - INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES (attach supplemental sheets to fully describe all units)	WATER BEARING? (YES / NO)	ESTIMATED YIELD FOR WATER-BEARING ZONES (gpm)
0	1	1	TOPSOIL	○ Y ◉ N	
1	15	14	CALICHE	○ Y ◉ N	
15	35	20	SAND	○ Y ◉ N	
35	85	50	SAND STONE	○ Y ◉ N	
85	160	75	SANDY CLAY	○ Y ◉ N	
160	195	35	BROWN CLAY	○ Y ◉ N	
195	254	59	SAND	◉ Y ○ N	25
254	350	96	SANDY CLAY	○ Y ◉ N	
350	384	34	SAND	◉ Y ○ N	100
384	512	128	SANDY CLAY	○ Y ◉ N	
512	515	3	RED CLAY	○ Y ◉ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	

METHOD USED TO ESTIMATE YIELD OF WATER-BEARING STRATA: ○ PUMP ○ AIR LIFT ◉ BAILER ○ OTHER – SPECIFY:

TOTAL ESTIMATED WELL YIELD (gpm): 125

5. TEST; RIG SUPERVISION

WELL TEST — TEST RESULTS - ATTACH A COPY OF DATA COLLECTED DURING WELL TESTING, INCLUDING DISCHARGE METHOD, START TIME, END TIME, AND A TABLE SHOWING DISCHARGE AND DRAWDOWN OVER THE TESTING PERIOD.

MISCELLANEOUS INFORMATION:

PRINT NAME(S) OF DRILL RIG SUPERVISOR(S) THAT PROVIDED ONSITE SUPERVISION OF WELL CONSTRUCTION OTHER THAN LICENSEE:
LUIS A. DURAN

6. SIGNATURE

THE UNDERSIGNED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND CORRECT RECORD OF THE ABOVE DESCRIBED HOLE AND THAT HE OR SHE WILL FILE THIS WELL RECORD WITH THE STATE ENGINEER AND THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:

Luis A Duran. / LUIS A. DURAN — SIGNATURE OF DRILLER / PRINT SIGNEE NAME

6-28-15 — DATE

FOR OSE INTERNAL USE — WR-20 WELL RECORD & LOG (Version 06/08/2012)

FILE NUMBER	CP-1263	POD NUMBER		TRN NUMBER	
LOCATION	26S.36E.6.4.3.3			Ind.	PAGE 2 OF 2

WELL RECORD & LOG

OFFICE OF THE STATE ENGINEER

www.ose.state.nm.us

1. GENERAL AND WELL LOCATION

OSE POD NUMBER (WELL NUMBER): CP-1446 Pod 1	OSE FILE NUMBER(S): CP-1446 POD 1
WELL OWNER NAME(S): EOG Resources Inc.	PHONE (OPTIONAL): 432-686-3600
WELL OWNER MAILING ADDRESS: 5509 Champions Drive	CITY: Midland STATE: TX ZIP: 79706

WELL LOCATION (FROM GPS) NAD 1927	DEGREES	MINUTES	SECONDS	
LATITUDE	32	03	57.82	N
LONGITUDE	103	17	02.84	W

* ACCURACY REQUIRED ONE TENTH OF A SECOND
* DATUM REQUIRED WGS 84

DESCRIPTION RELATING WELL LOCATION TO STREET ADDRESS AND COMMON LANDMARKS - PLSS (SECTION, TOWNSHIP, RANGE) WHERE AVAILABLE

409' From South Line and 1849' from East Line Section 5 Township 26S Range 36E Lea County NM

2. DRILLING & CASING INFORMATION

LICENSE NUMBER	NAME OF LICENSED DRILLER	NAME OF WELL DRILLING COMPANY
WD-331	Joel Stewart	Stewart Brothers Drilling Co.

DRILLING STARTED	DRILLING ENDED	DEPTH OF COMPLETED WELL (FT)	BORE HOLE DEPTH (FT)	DEPTH WATER FIRST ENCOUNTERED (FT)
8/12/2015	8/24/2015	4,975'	4,975'	Unknown

COMPLETED WELL IS: (•) ARTESIAN ( ) DRY HOLE ( ) SHALLOW (UNCONFINED) — STATIC WATER LEVEL IN COMPLETED WELL (FT): Unknown

DRILLING FLUID: ( ) AIR (•) MUD ADDITIVES – SPECIFY:

DRILLING METHOD: (•) ROTARY ( ) HAMMER ( ) CABLE TOOL ( ) OTHER – SPECIFY

DEPTH (feet bgl) FROM	TO	BORE HOLE DIAM (inches)	CASING MATERIAL AND/OR GRADE (include each casing string, and note sections of screen)	CASING CONNECTION TYPE	CASING INSIDE DIAM. (inches)	CASING WALL THICKNESS (inches)	SLOT SIZE (inches)
0	115	30"	24" H-40 Steel	welded	23.50	0.250	NA
115	2055	20"	16" J-55 75 lbs./foot	buttress	15.124	0.438	NA
2055	3632	14.75"	9 5/8" J-55	LTC	8.835	0.395	NA
3632	4975	8.75"	open hole				

3. ANNULAR MATERIAL

DEPTH (feet bgl) FROM	TO	BORE HOLE DIAM. (inches)	LIST ANNULAR SEAL MATERIAL AND GRAVEL PACK SIZE-RANGE BY INTERVAL	AMOUNT (cubic feet)	METHOD OF PLACEMENT
0	115	30"	Class C Cement + 1.5% CaCl2 + 6.35 GPS FW	482	Pressure Grout
0	2055	20"	Lead-Class C Cement + 4% Bentonite + 2% CaCl2		
			+ 9.2 GPS FW	4375	Pressure Grout
			Tail-Class C + 1.5% CaCl2 + 6.34 GPS FW	623	Pressure Grout
			Top Out - Same as Lead	1040	Tremie
0	3632	14.75"	Lead-Class C+10% Salt + additives+11.88 GPS FW	3330	Pressure Grout
			Tail-Class C + 2% Salt + additives + 6.37 GPS FW	540	Pressure Grout

FOR OSE INTERNAL USE — WR-20 WELL RECORD & LOG (Version 06/08/2012)

FILE NUMBER	CP-1446	POD NUMBER	1	TRN NUMBER	598413
LOCATION	NO1	34.S.26S.36E			PAGE 1 OF 2

4. HYDROGEOLOGIC LOG OF WELL

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	THICKNESS (feet)	COLOR AND TYPE OF MATERIAL ENCOUNTERED - INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES (attach supplemental sheets to fully describe all units)	WATER BEARING? (YES / NO)	ESTIMATED YIELD FOR WATER-BEARING ZONES (gpm)
			See detailed mud log attached	○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	

METHOD USED TO ESTIMATE YIELD OF WATER-BEARING STRATA: ○ PUMP ○ AIR LIFT ○ BAILER ○ OTHER – SPECIFY: Well not tested yet

TOTAL ESTIMATED WELL YIELD (gpm):

5. TEST; RIG SUPERVISION

WELL TEST — TEST RESULTS - ATTACH A COPY OF DATA COLLECTED DURING WELL TESTING, INCLUDING DISCHARGE METHOD, START TIME, END TIME, AND A TABLE SHOWING DISCHARGE AND DRAWDOWN OVER THE TESTING PERIOD.

MISCELLANEOUS INFORMATION:

PRINT NAME(S) OF DRILL RIG SUPERVISOR(S) THAT PROVIDED ONSITE SUPERVISION OF WELL CONSTRUCTION OTHER THAN LICENSEE:

6. SIGNATURE

THE UNDERSIGNED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND CORRECT RECORD OF THE ABOVE DESCRIBED HOLE AND THAT HE OR SHE WILL FILE THIS WELL RECORD WITH THE STATE ENGINEER AND THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:

Joel H. Stewart — SIGNATURE OF DRILLER / PRINT SIGNEE NAME

September 3, 2015 — DATE

FOR OSE INTERNAL USE — WR-20 WELL RECORD & LOG (Version 06/08/2012)

FILE NUMBER	CP-1446	POD NUMBER	1	TRN NUMBER	
LOCATION	NO1	434.5.26S.36E			PAGE 2 OF 2

QUALITY LOGGING, INC

P.O. Box 2463
MIDLAND, TX 79702
(432)682-7168

COMPANY: EOG Resources, Inc.
WELL: Capitan WSW No. 4
FIELD: Red Hills COUNTY: Lea STATE: New Mexico
LOCATION:

Interval Logged: 140 To: 5000 G.L.: 2984 K.B: 0
Date Logged: 8-12-15 To: 8-22-15 Spud Date: 8-12-15
Rig: H & P Rig 415 Unit No.:
Loggers: Gary Gavitt; Dave Pittman
Api No.:
Filename: capitanwswno4.mlw
Geologist: PALKO/ WASHULESKI

Created By MainLog

Abbreviations:

NB...New Bit
CO...Circ Out
NR...No Returns
TG...Trip Gas
WOB...Wt on Bit
RPM...Rev/Min
SG...Survey Gas
DST...Drill Stem Test
DS...Directional Survey
CG...Connection gas
LAT...Logged After Trip
PP...Pump Pressure
SPM...Strokes/Min
DTG...Down Time Gas

Mud Data

WT..Weight
PH..Acidity
CHL..Chlorides
V..Viscosity
F..Filtrate
SC..Solids Content

Lithology Symbols:

Anhydrite, Salt, Granite
Siltstone, Chert, Sandstone
Dolomite, Conglomerate, Limestone
Coal, Shale, Bentonite
Carb Shale, Granite Wash, Quartz Wash
Red Sh, Org Sh, Green Sh
Cust Sh1, Cust Sh2, Cust Sh3
Cust Sh4, Cust Sh5, Cust Sh6

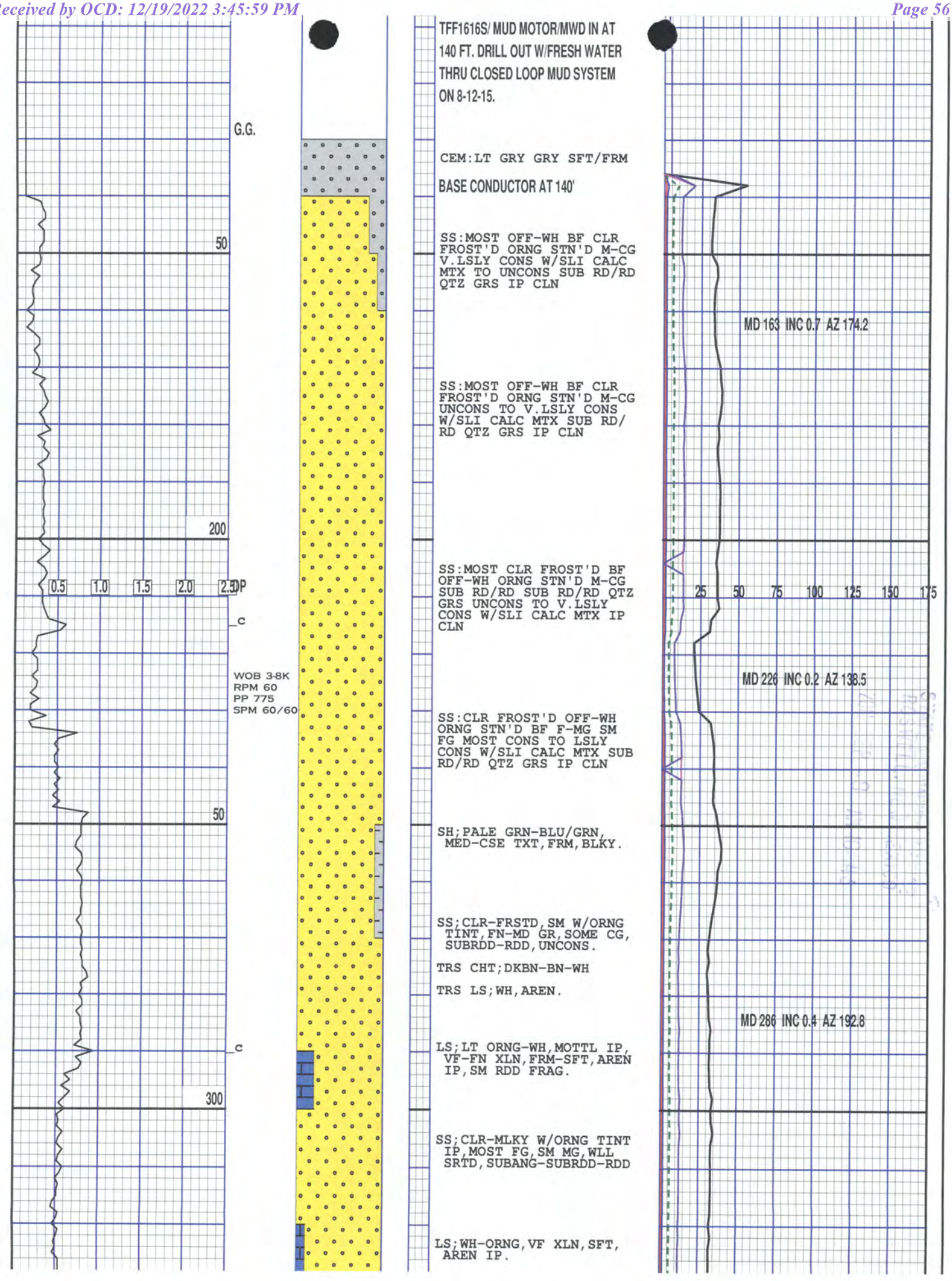
Accessories

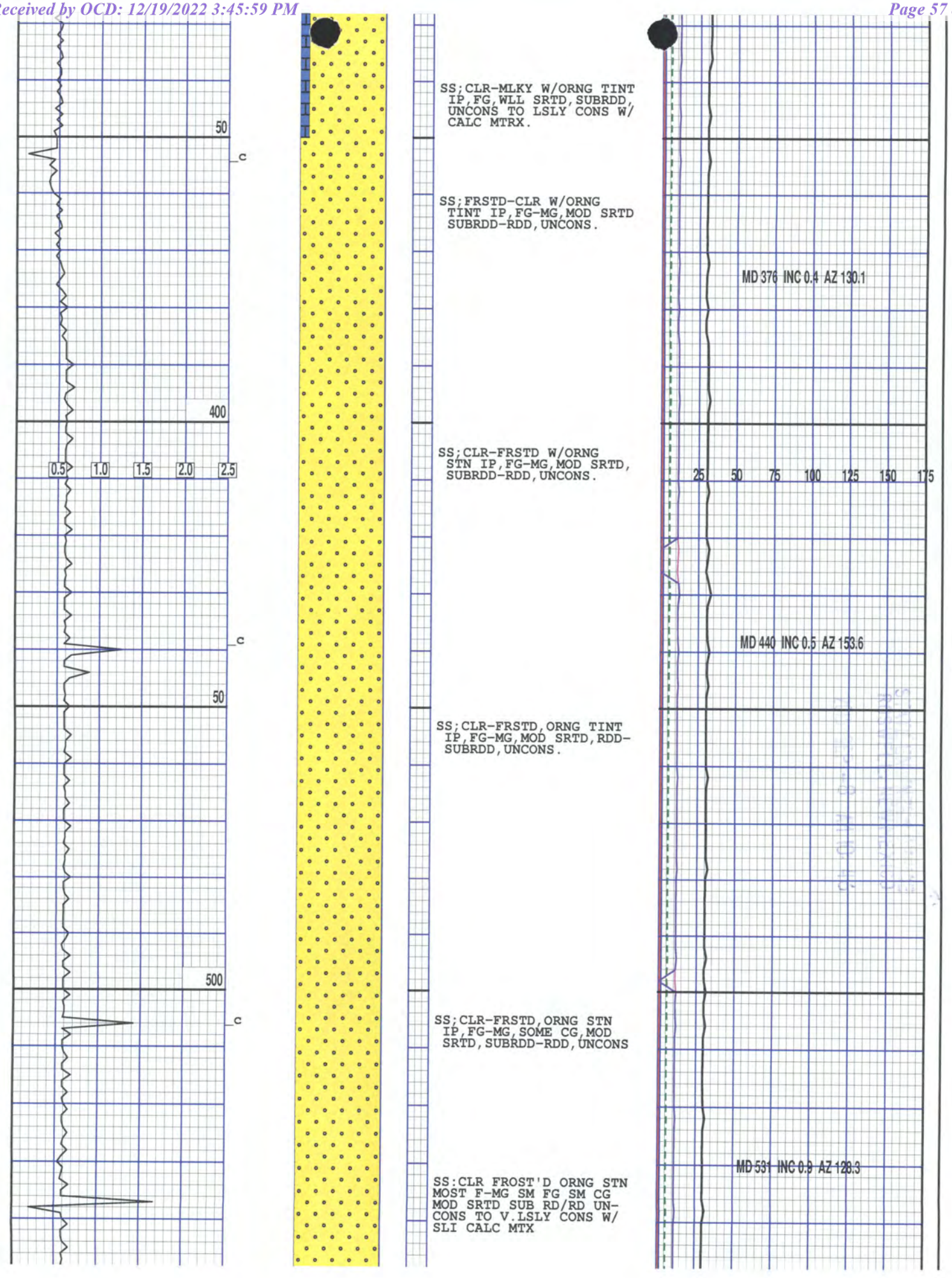
Glauconite, Pyrite, Fossils, Oolites
Fractures, Cement

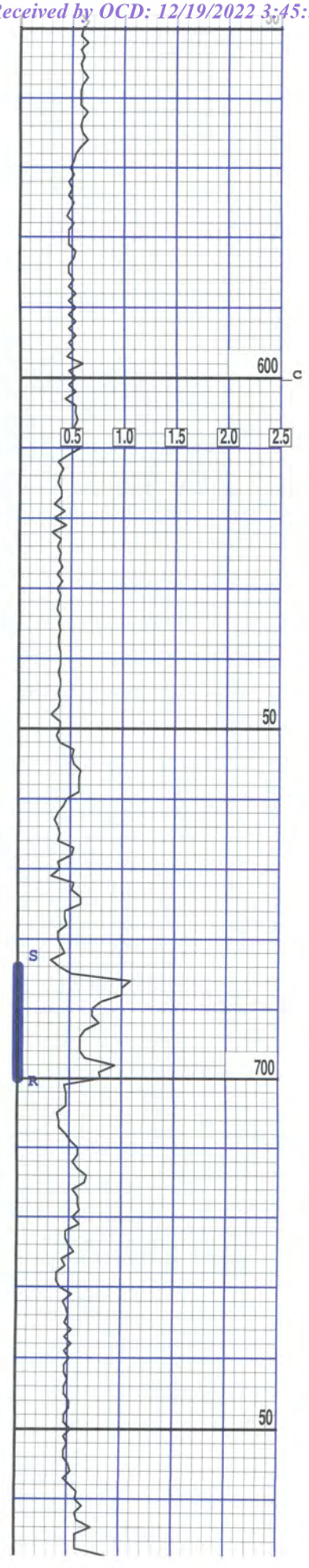
Gas Chromatograph Analysis:

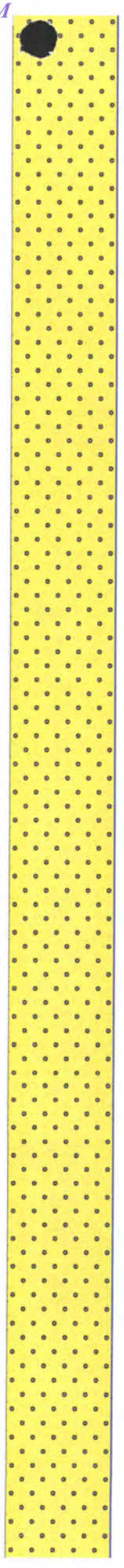
HW
C1
C2
C3
IC4
NC4
IC5

Drilling Rate MIN/FT	Vis Por Tr / p f g	Lithology	% Oil Flu Tr / p f g	Cut Tr / pfg	Descriptions/Remarks	Total Gas/Chromatograph
0.5 1.0 1.5 2.0 2.5 100					RIG UP 2-MAN LOGGING UNIT ON 8-11-15. CONDUCTOR PIPE SET AT 140 FT. SPUD IN W/NB # 1 20" BAKER	25 50 75 100 125 150 175


G.G.
50
200
0.5
1.0
1.5
2.0
2.3
DP
C
WOB 3-8K
RPM 60
PP 775
SPM 60/60
50
C
300
TFF1616S/ MUD MOTOR/MWD IN AT 140 FT. DRILL OUT W/FRESH WATER THRU CLOSED LOOP MUD SYSTEM ON 8-12-15.
CEM:LT GRY GRY SFT/FRM
BASE CONDUCTOR AT 140'
SS:MOST OFF-WH BF CLR FROST'D ORNG STN'D M-CG V.LSLY CONS W/SLI CALC MTX TO UNCONS SUB RD/RD QTZ GRS IP CLN
SS:MOST OFF-WH BF CLR FROST'D ORNG STN'D M-CG UNCONS TO V.LSLY CONS W/SLI CALC MTX SUB RD/ RD QTZ GRS IP CLN
SS:MOST CLR FROST'D BF OFF-WH ORNG STN'D M-CG SUB RD/RD SUB RD/RD QTZ GRS UNCONS TO V.LSLY CONS W/SLI CALC MTX IP CLN
SS:CLR FROST'D OFF-WH ORNG STN'D BF F-MG SM FG MOST CONS TO LSLY CONS W/SLI CALC MTX SUB RD/RD QTZ GRS IP CLN
SH;PALE GRN-BLU/GRN, MED-CSE TXT,FRM,BLKY.
SS;CLR-FRSTD,SM W/ORNG TINT,FN-MD GR,SOME CG, SUBRDD-RDD,UNCONS.
TRS CHT;DKBN-BN-WH
TRS LS;WH,AREN.
LS;LT ORNG-WH,MOTTL IP, VF-FN XLN,FRM-SFT,AREN IP,SM RDD FRAG.
SS;CLR-MLKY W/ORNG TINT IP,MOST FG,SM MG,WLL SRTD,SUBANG-SUBRDD-RDD
LS;WH-ORNG,VF XLN,SFT, AREN IP.
MD 163 INC 0.7 AZ 174.2
MD 226 INC 0.2 AZ 138.5
MD 286 INC 0.4 AZ 192.8
25
50
75
100
125
150
175


50
c
400
0.5
1.0
1.5
2.0
2.5
c
50
500
c
SS;CLR-MLKY W/ORNG TINT IP,FG,WLL SRTD,SUBRDD, UNCONS TO LSLY CONS W/ CALC MTRX.
SS;FRSTD-CLR W/ORNG TINT IP,FG-MG,MOD SRTD SUBRDD-RDD,UNCONS.
SS;CLR-FRSTD W/ORNG STN IP,FG-MG,MOD SRTD, SUBRDD-RDD,UNCONS.
SS;CLR-FRSTD,ORNG TINT IP,FG-MG,MOD SRTD,RDD- SUBRDD,UNCONS.
SS;CLR-FRSTD,ORNG STN IP,FG-MG,SOME CG,MOD SRTD,SUBRDD-RDD,UNCONS
SS:CLR FROST'D ORNG STN MOST F-MG SM FG SM CG MOD SRTD SUB RD/RD UN- CONS TO V.LSLY CONS W/ SLI CALC MTX
MD 376 INC 0.4 AZ 130.1
25
50
75
100
125
150
175
MD 440 INC 0.5 AZ 153.6
MD 531 INC 0.9 AZ 128.3





SS:CLR FROST'D ORNG STN MOST F-MG SM FG SM CG MOST SUB RD/RD SM SUB ANG MOST UNCONS TO V. LSLY CONS W/SLI CALC MTX

SS:CLR FROST'D ORNG STN BF MOST F-MG SM FG SM CG MOST UNCONS TO V. LSLY CONS W/SLI CALC MTX MOST SUB RD/RD SM SUB ANG

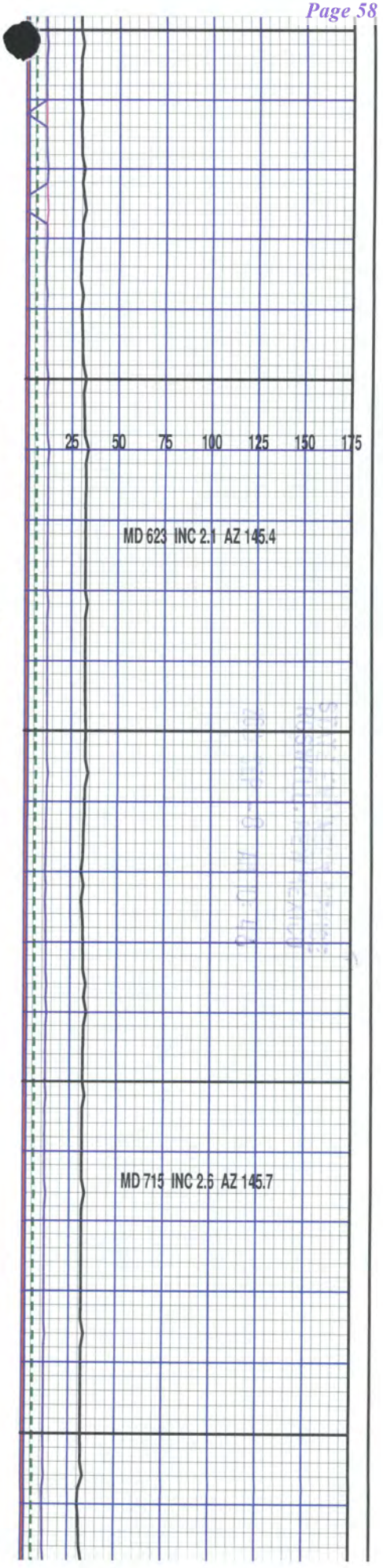
SS:CLR FROST'D ORNG STN BF MOST FG SM M-CG MOST UNCONS TO LSLY CONS W/ SLI CALC MTX FRIA MOST SUB RD/SUB ANG SM RD

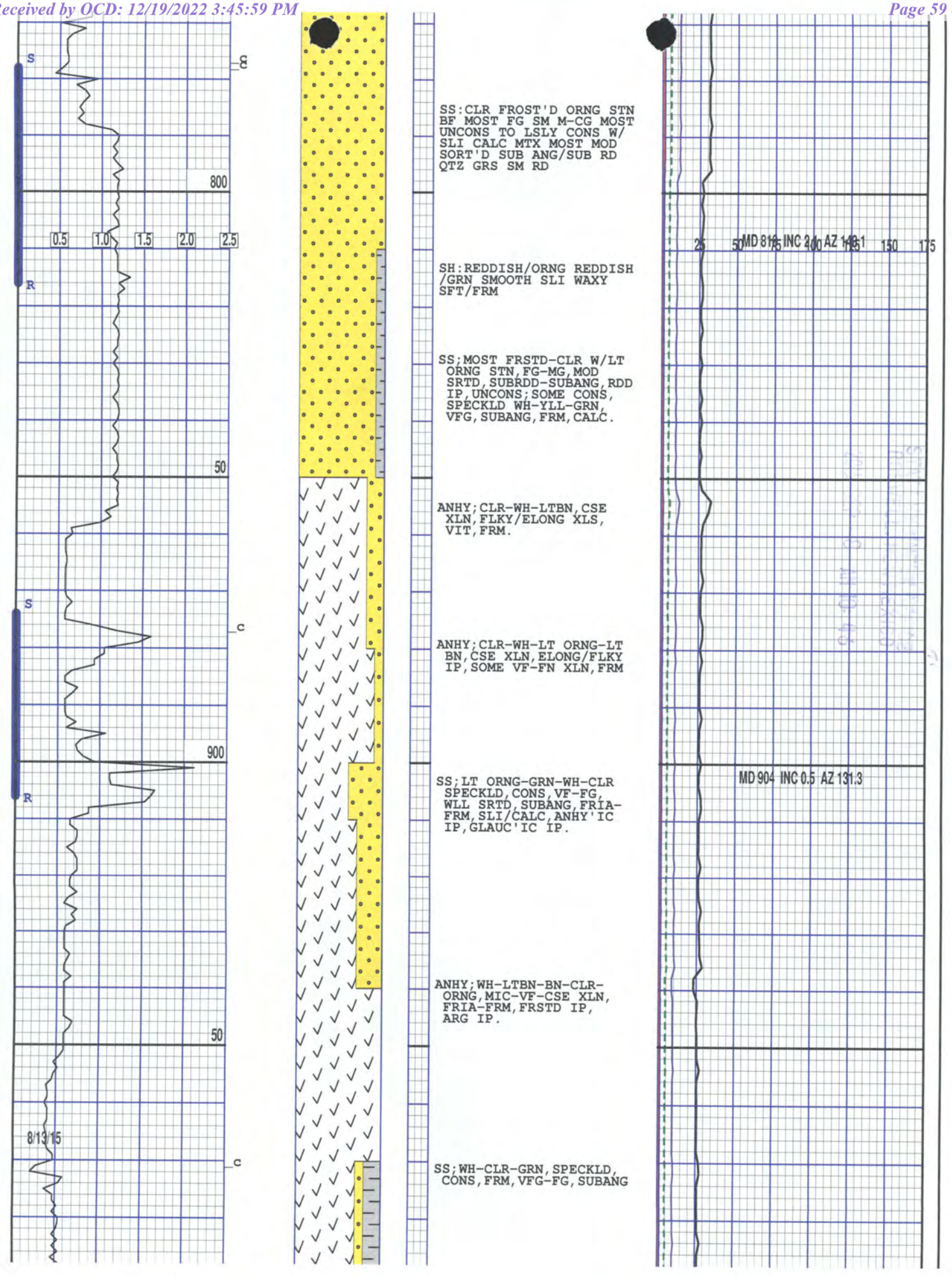
SS:CLR FROST'D BF OFF-WH MOST FG SM F-MG MOST SUB ANG/SUB RD QTZ GRS UNCONS TO LSLY CONS W/ SLI CALC MTX

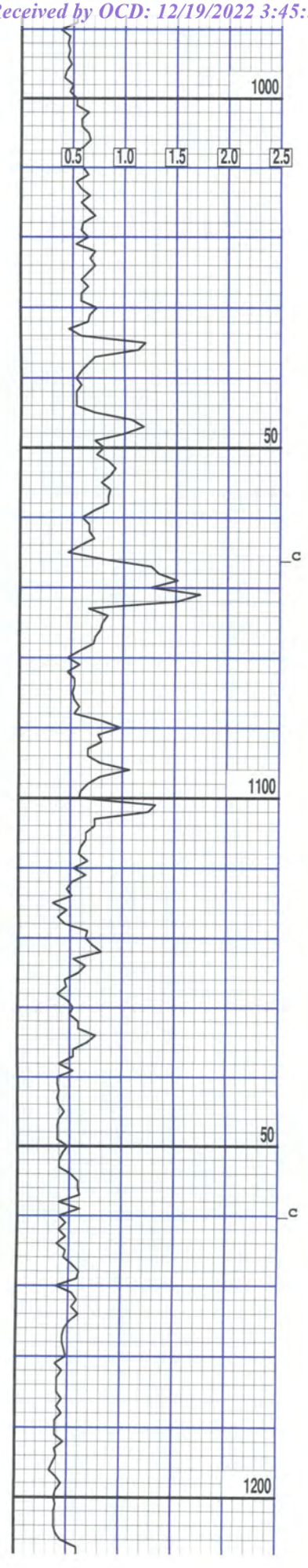
SS:CLR FROST'D BF OFF-WH MOST FG SM F-MG MOST SUB ANG/SUB RD SM RD QTZ GRS LSLY CONS W/SLI CALC MTX TO UNCONS

SS:CLR FROST'D ORNG STN BF OFF-WH MOST FG SM F-MG MOST UNCONS TO V. LSLY CONS W/SLI CALC MTX MOST SUB ANG/SUB RD MOD WELL SORT'D

SS:CLR FROST'D ORNG STN BF OFF-WH MOST FG SM F-MG MOST UNCONS TO V. LSLY CONS W/SLI CALC MTX MOST SUB ANG/SUB RD MOD WELL SORT'D




S
R
800
0.5
1.0
1.5
2.0
2.5
50
S
R
900
50
8/13/15
SS:CLR FROST'D ORNG STN BF MOST FG SM M-CG MOST UNCONS TO LSLY CONS W/ SLI CALC MTX MOST MOD SORT'D SUB ANG/SUB RD QTZ GRS SM RD
SH:REDDISH/ORNG REDDISH /GRN SMOOTH SLI WAXY SFT/FRM
SS;MOST FRSTD-CLR W/LT ORNG STN,FG-MG,MOD SRTD,SUBRDD-SUBANG,RDD IP,UNCONS;SOME CONS, SPECKLD WH-YLL-GRN, VFG,SUBANG,FRM,CALC.
ANHY;CLR-WH-LTBN,CSE XLN,FLKY/ELONG XLS, VIT,FRM.
ANHY;CLR-WH-LT ORNG-LT BN,CSE XLN,ELONG/FLKY IP,SOME VF-FN XLN,FRM
SS;LT ORNG-GRN-WH-CLR SPECKLD,CONS,VF-FG, WLL SRTD,SUBANG,FRIA-FRM,SLI/CALC,ANHY'IC IP,GLAUC'IC IP.
ANHY;WH-LTBN-BN-CLR-ORNG,MIC-VF-CSE XLN, FRIA-FRM,FRSTD IP, ARG IP.
SS;WH-CLR-GRN,SPECKLD, CONS,FRM,VFG-FG,SUBANG
25
50
MD 818 INC 2.00 AZ 149.1
150
175
MD 904 INC 0.5 AZ 131.3



SH;RUST-ORNG,FN TXT, SFT-FRM,BLKY,SLTY.

SS;CLR-FRSTD W/ORNG STN,FG-MG,WLL-MOD SRTD SUBRDD-RDD,UNCONS.

SH;ORNG-RUST-LTGRN,VF-F TXT,FRM-SFT,BLKY,SLTY IP.

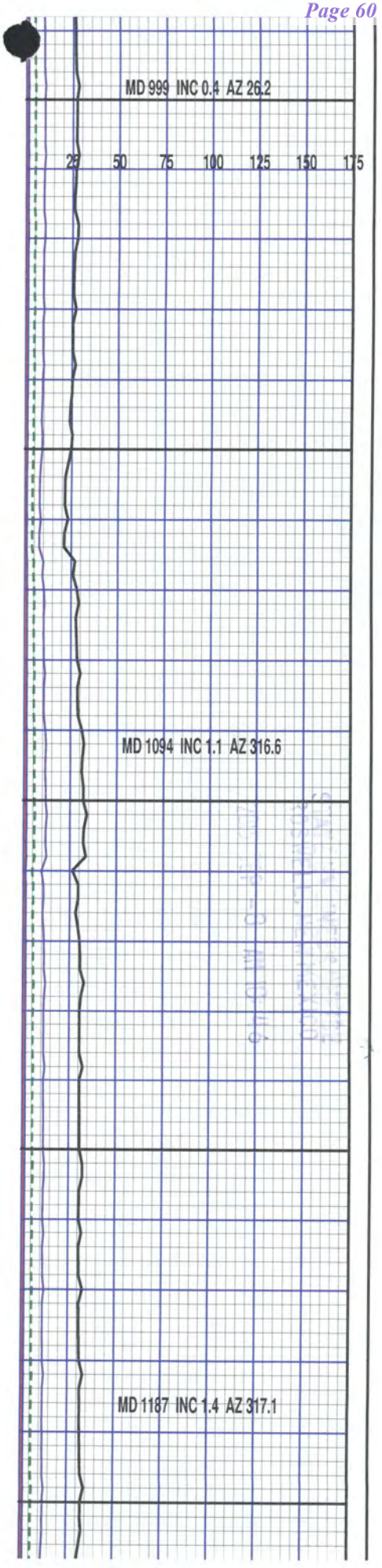
SS;CLR-FRSTD W/ORNG TINT IP,FG-MG,MOD SRTD SUBRDD-RDD,UNCONS;SOME WH-LTGRN,CONS,FG,WLL SRTD,FRIA,ANHY'IC.

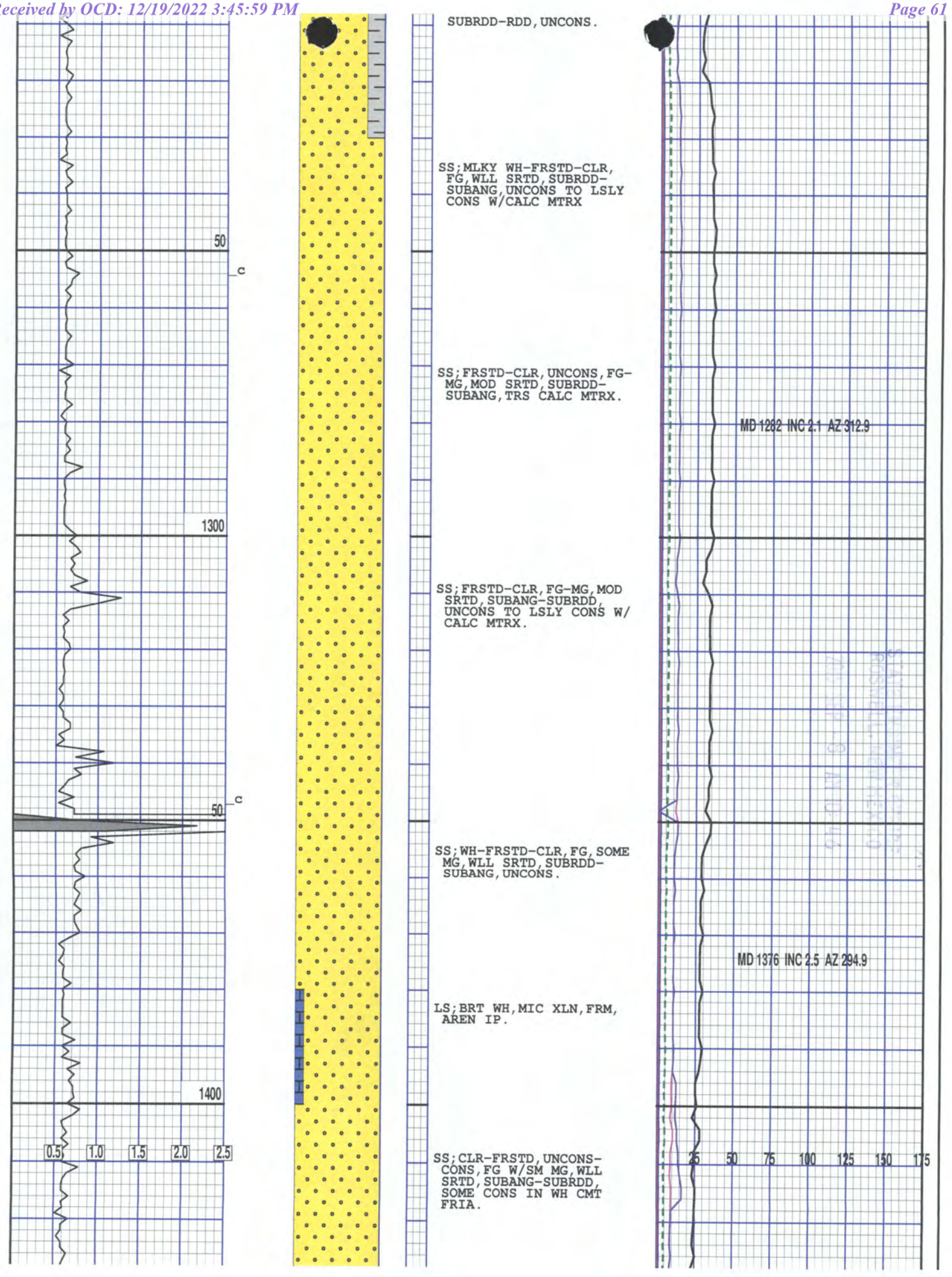
SH;RUST-ORNG,CSE TXT, SFT-FRM,BLKY,SLTY.

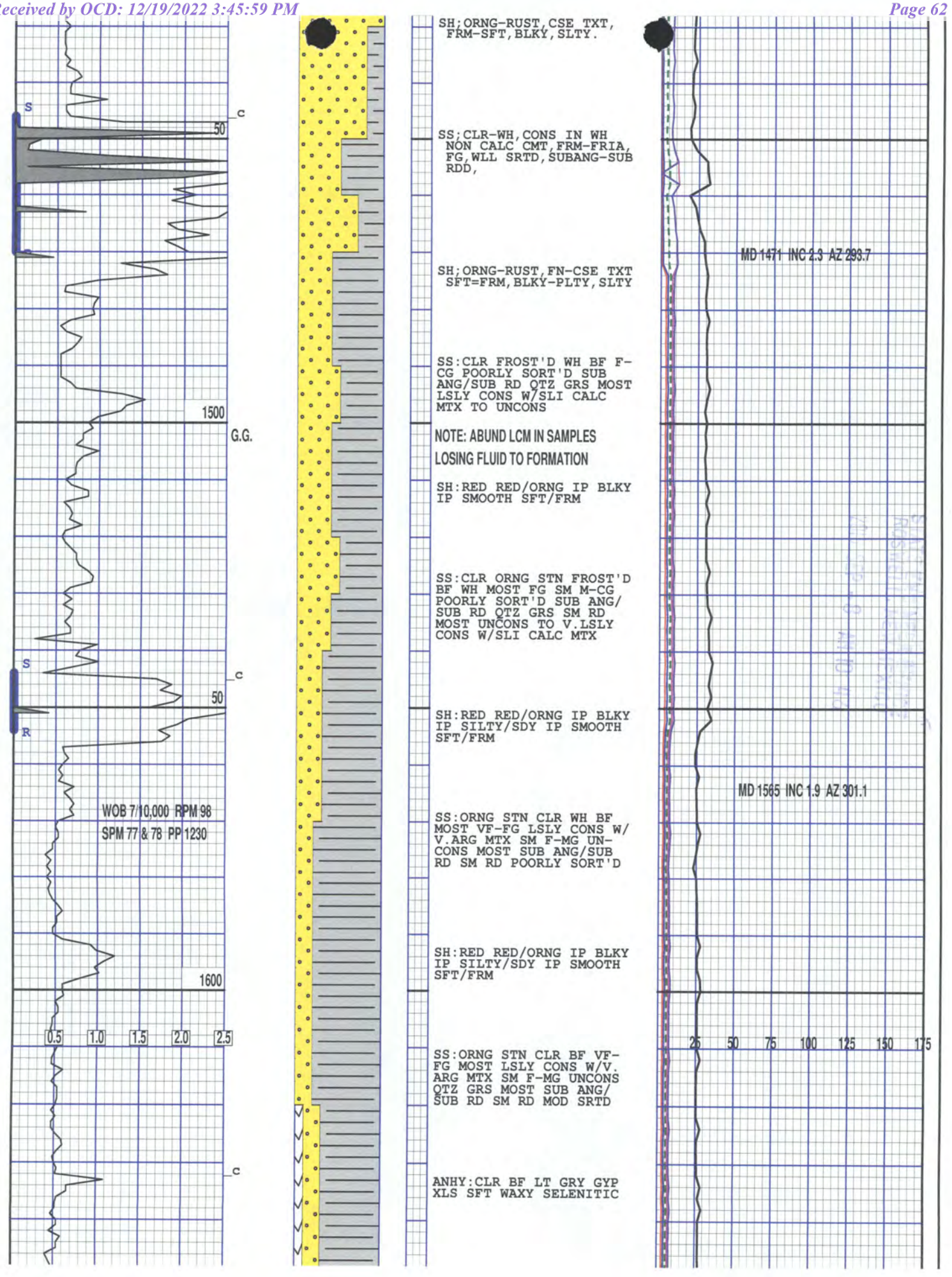
SS;CLR-FRSTD W/ORNG STN FG-MG,MOD SRTD,UNCONS, SUBRDD-RDD.

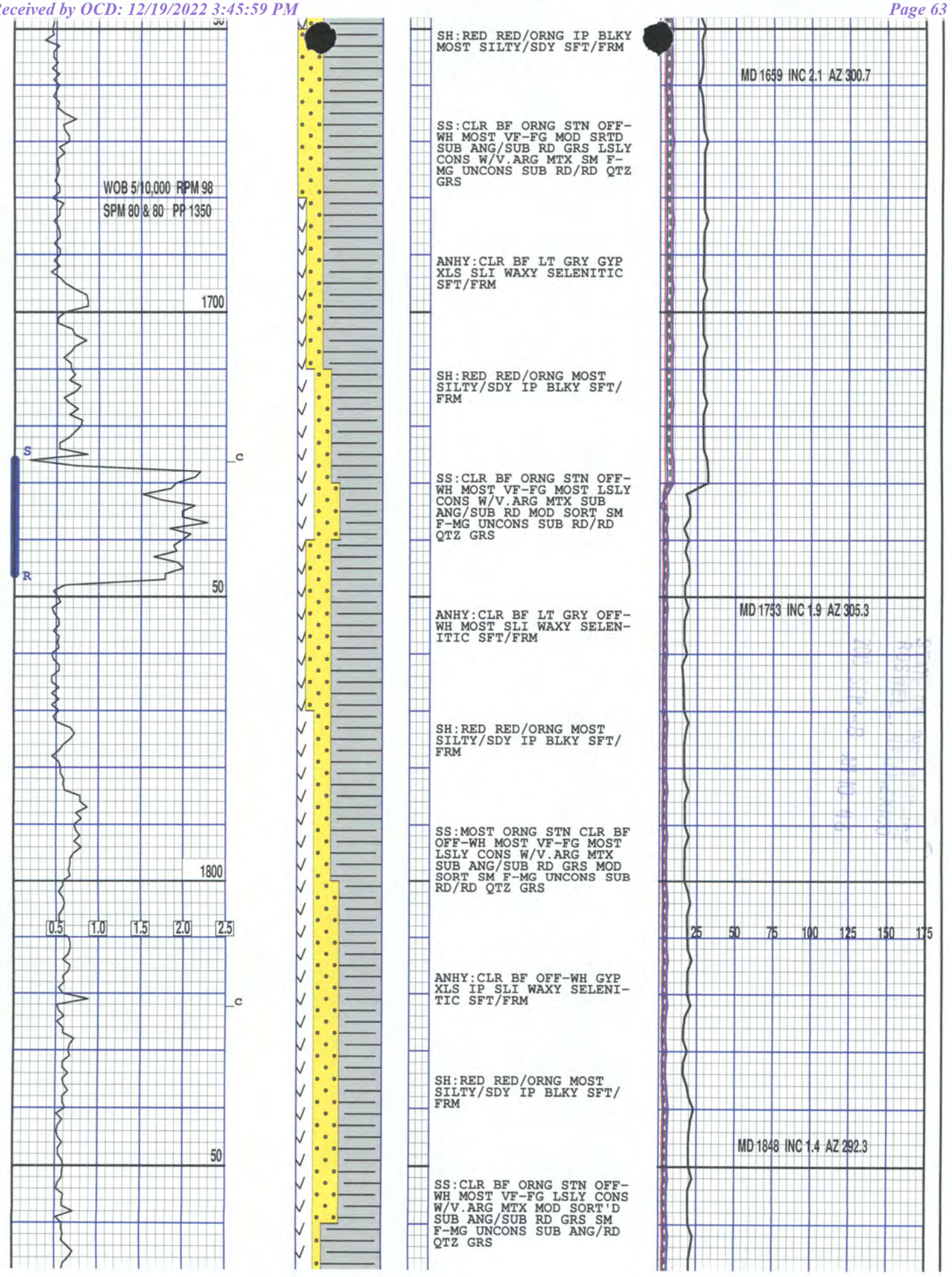
ABUND LCM

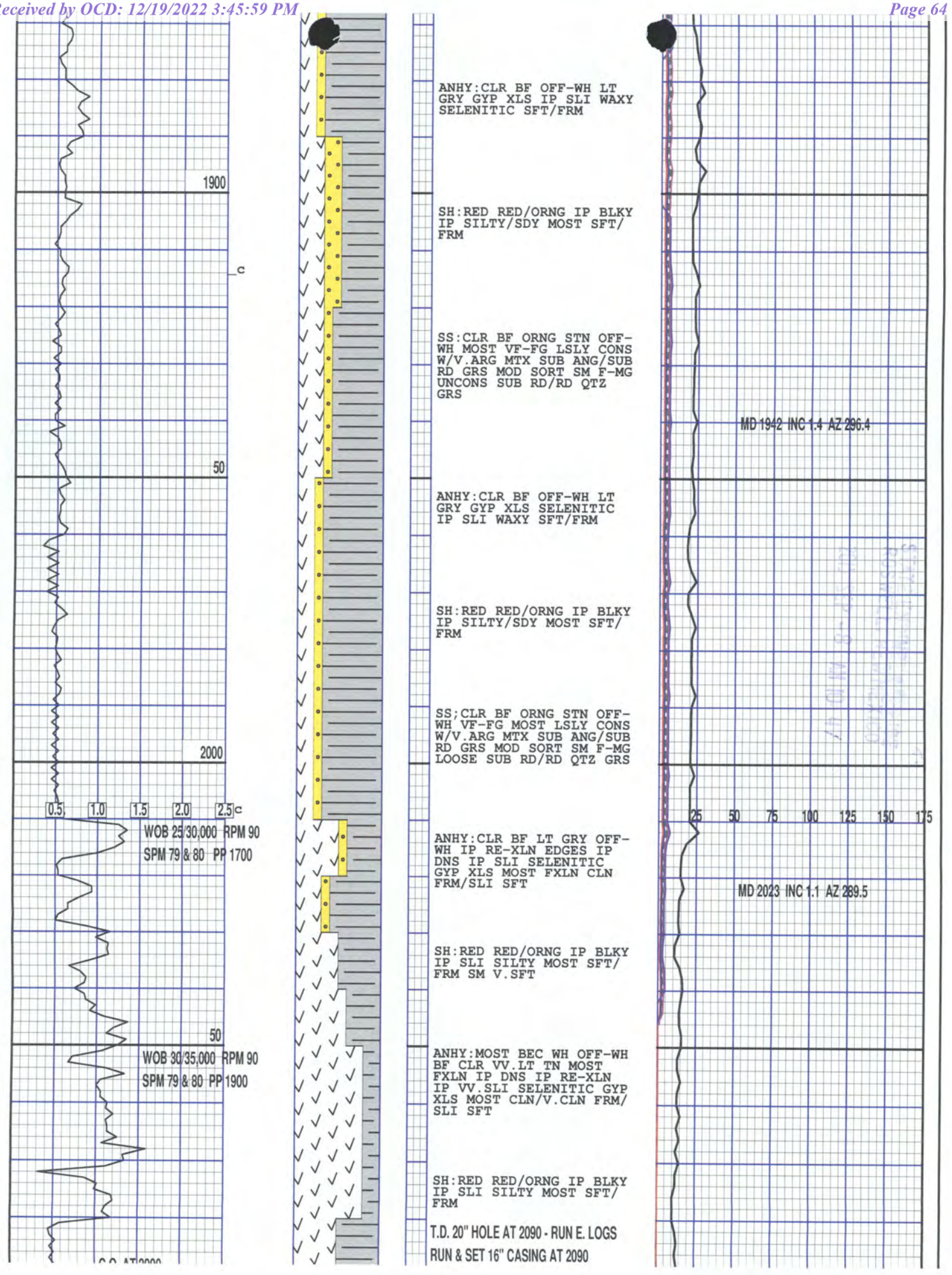
SS;CLR-MLKY W/ORNG TINT IP,FG,SOME MG,WLL SRTD

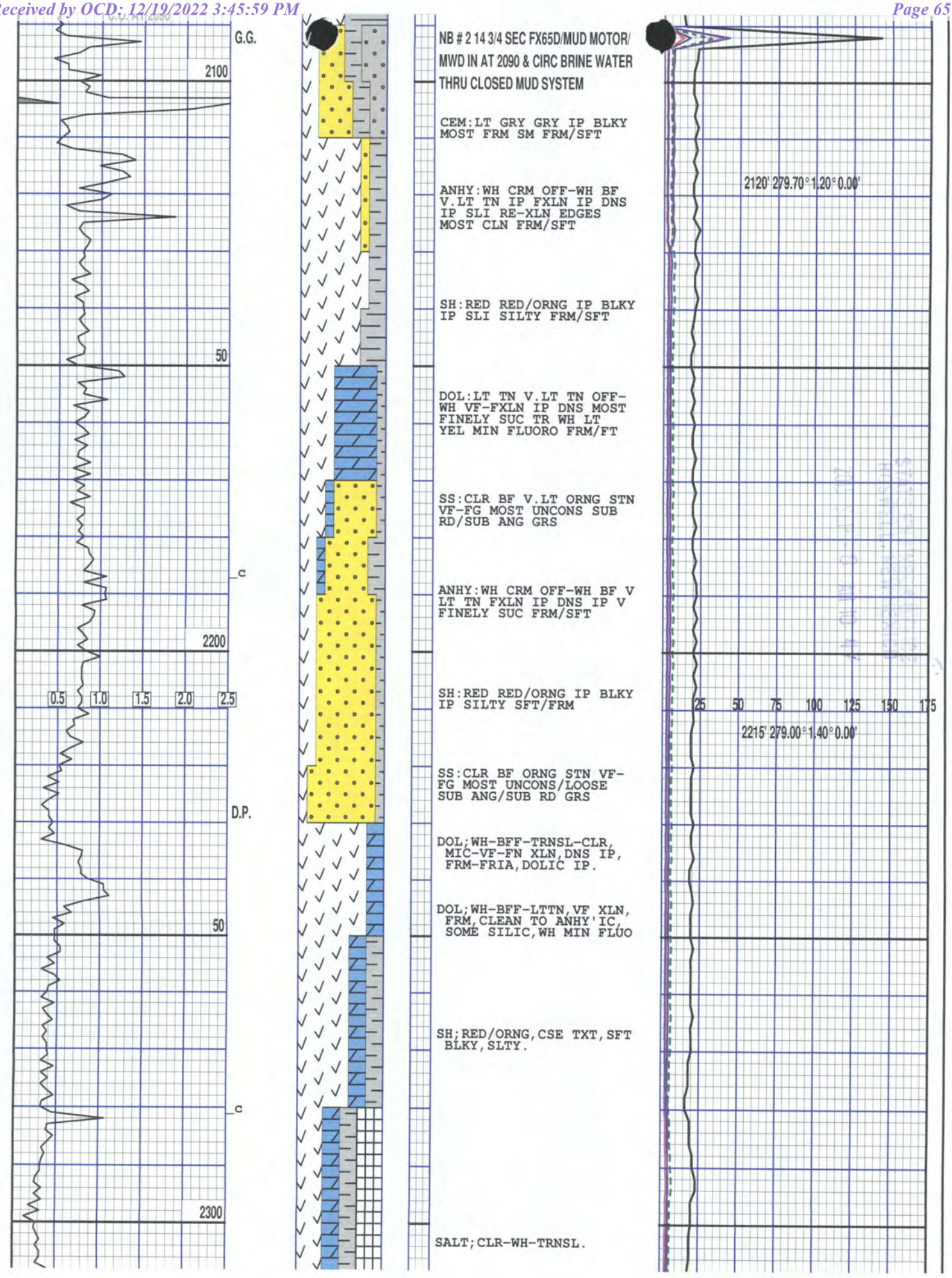


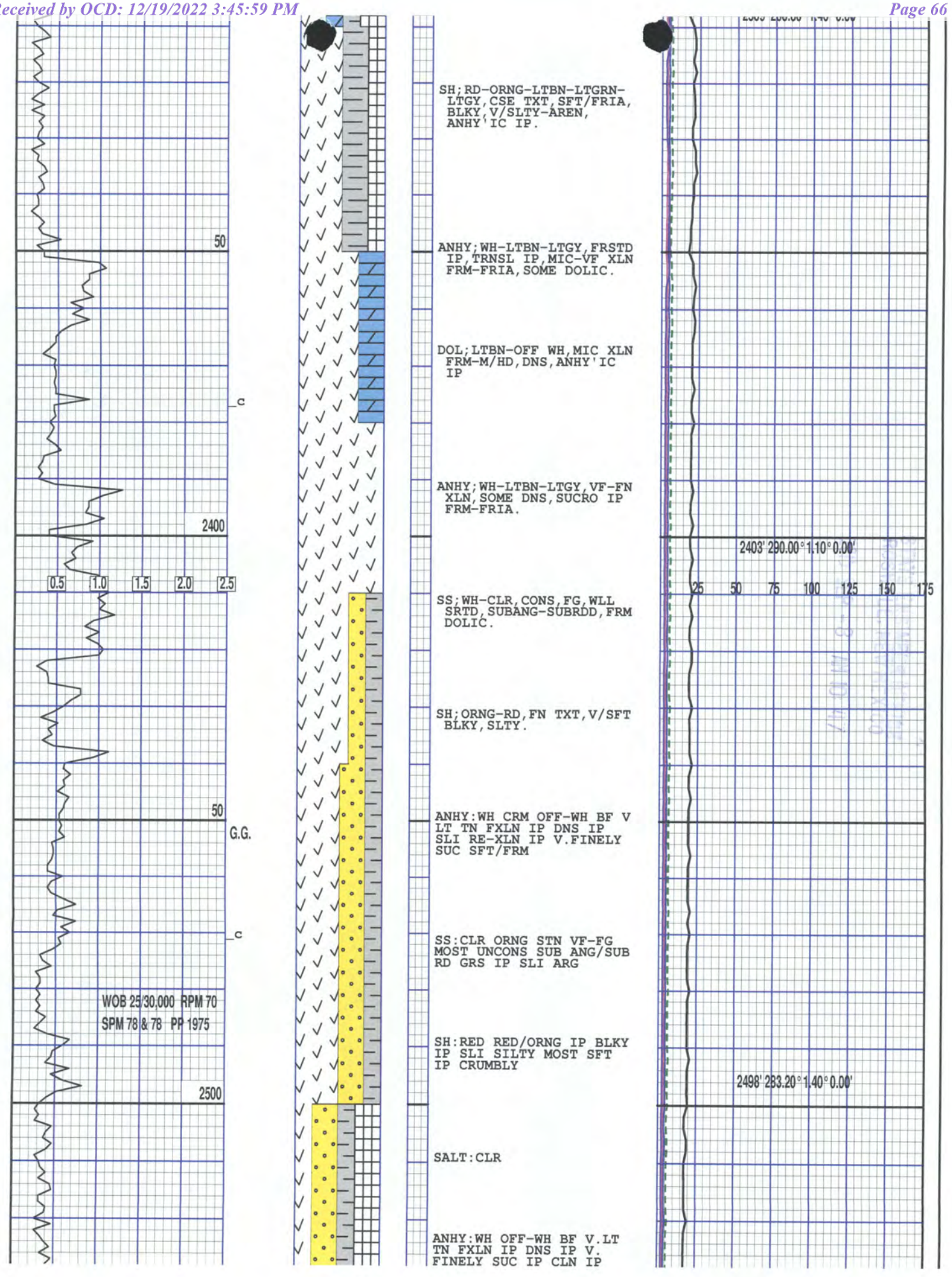

50
C
1300
50
C
1400
0.5
1.0
1.5
2.0
2.5
SUBRDD-RDD, UNCONS.
SS; MLKY WH-FRSTD-CLR, FG, WLL SRTD, SUBRDD-SUBANG, UNCONS TO LSLY CONS W/CALC MTRX
SS; FRSTD-CLR, UNCONS, FG-MG, MOD SRTD, SUBRDD-SUBANG, TRS CALC MTRX.
SS; FRSTD-CLR, FG-MG, MOD SRTD, SUBANG-SUBRDD, UNCONS TO LSLY CONS W/ CALC MTRX.
SS; WH-FRSTD-CLR, FG, SOME MG, WLL SRTD, SUBRDD-SUBANG, UNCONS.
LS; BRT WH, MIC XLN, FRM, AREN IP.
SS; CLR-FRSTD, UNCONS-CONS, FG W/SM MG, WLL SRTD, SUBANG-SUBRDD, SOME CONS IN WH CMT FRIA.
MD 1282 INC 2.1 AZ 312.9
MD 1376 INC 2.5 AZ 294.9
25
50
75
100
125
150
175

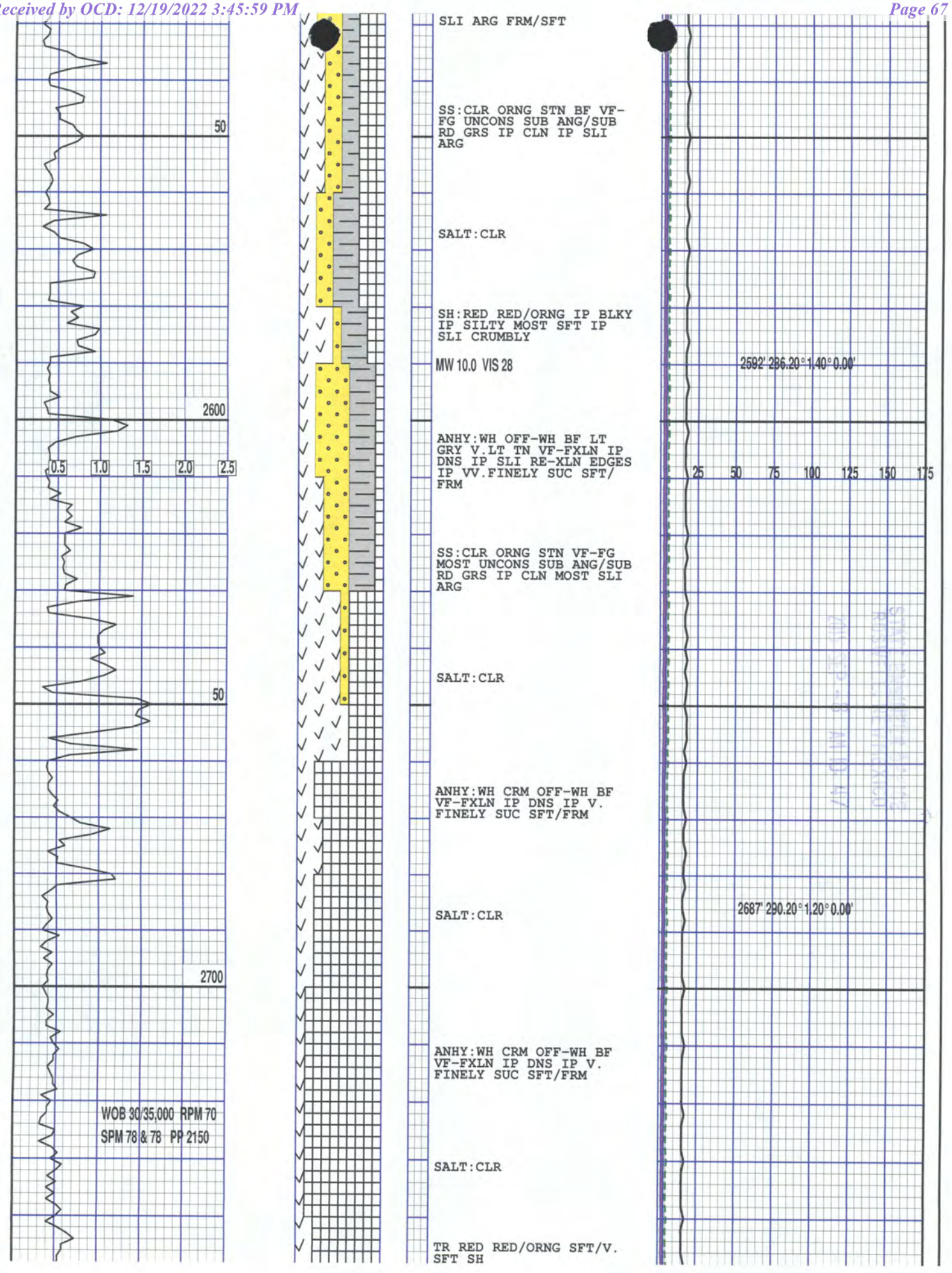

S
C
50
1500
G.G.
S
C
50
R
WOB 7/10,000 RPM 98
SPM 77 & 78 PP 1230
1600
0.5
1.0
1.5
2.0
2.5
C
SH;ORNG-RUST,CSE TXT, FRM-SFT,BLKY,SLTY.
SS;CLR-WH,CONS IN WH NON CALC CMT,FRM-FRIA, FG,WLL SRTD,SUBANG-SUB RDD,
SH;ORNG-RUST,FN-CSE TXT SFT=FRM,BLKY-PLTY,SLTY
SS:CLR FROST'D WH BF F-CG POORLY SORT'D SUB ANG/SUB RD QTZ GRS MOST LSLY CONS W/SLI CALC MTX TO UNCONS
NOTE: ABUND LCM IN SAMPLES
LOSING FLUID TO FORMATION
SH:RED RED/ORNG IP BLKY IP SMOOTH SFT/FRM
SS:CLR ORNG STN FROST'D BF WH MOST FG SM M-CG POORLY SORT'D SUB ANG/ SUB RD QTZ GRS SM RD MOST UNCONS TO V.LSLY CONS W/SLI CALC MTX
SH:RED RED/ORNG IP BLKY IP SILTY/SDY IP SMOOTH SFT/FRM
SS:ORNG STN CLR WH BF MOST VF-FG LSLY CONS W/ V.ARG MTX SM F-MG UN-CONS MOST SUB ANG/SUB RD SM RD POORLY SORT'D
SH:RED RED/ORNG IP BLKY IP SILTY/SDY IP SMOOTH SFT/FRM
SS:ORNG STN CLR BF VF-FG MOST LSLY CONS W/V. ARG MTX SM F-MG UNCONS QTZ GRS MOST SUB ANG/ SUB RD SM RD MOD SRTD
ANHY:CLR BF LT GRY GYP XLS SFT WAXY SELENITIC
MD 1471 INC 2.3 AZ 293.7
MD 1565 INC 1.9 AZ 301.1
25
50
75
100
125
150
175

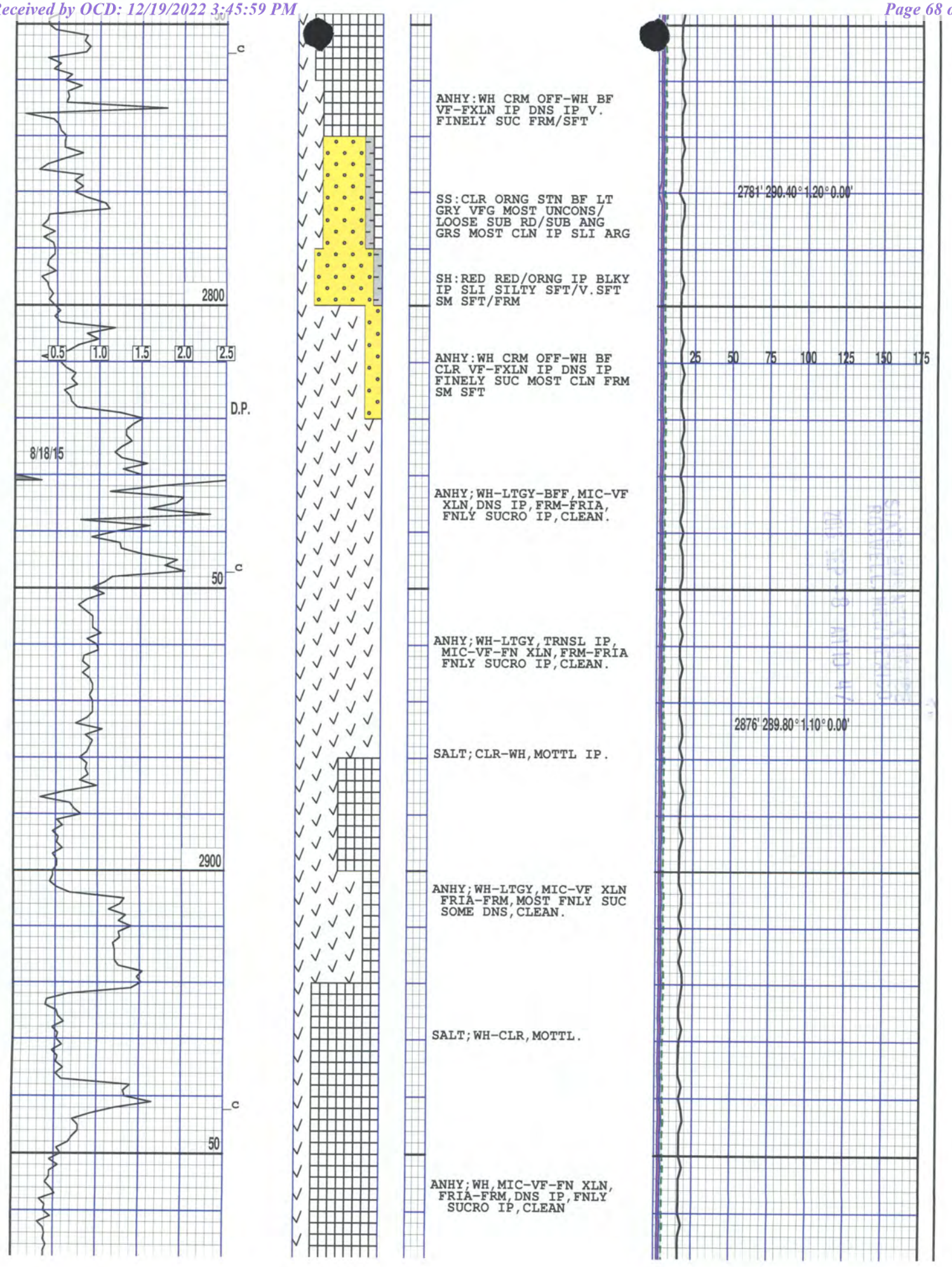

WOB 5/10,000 RPM 98
SPM 80 & 80 PP 1350
1700
1800
50
50
S
R
C
C
0.5
1.0
1.5
2.0
2.5
SH:RED RED/ORNG IP BLKY MOST SILTY/SDY SFT/FRM
SS:CLR BF ORNG STN OFF-WH MOST VF-FG MOD SRTD SUB ANG/SUB RD GRS LSLY CONS W/V.ARG MTX SM F-MG UNCONS SUB RD/RD QTZ GRS
ANHY:CLR BF LT GRY GYP XLS SLI WAXY SELENITIC SFT/FRM
SH:RED RED/ORNG MOST SILTY/SDY IP BLKY SFT/FRM
SS:CLR BF ORNG STN OFF-WH MOST VF-FG MOST LSLY CONS W/V.ARG MTX SUB ANG/SUB RD MOD SORT SM F-MG UNCONS SUB RD/RD QTZ GRS
ANHY:CLR BF LT GRY OFF-WH MOST SLI WAXY SELEN-ITIC SFT/FRM
SH:RED RED/ORNG MOST SILTY/SDY IP BLKY SFT/FRM
SS:MOST ORNG STN CLR BF OFF-WH MOST VF-FG MOST LSLY CONS W/V.ARG MTX SUB ANG/SUB RD GRS MOD SORT SM F-MG UNCONS SUB RD/RD QTZ GRS
ANHY:CLR BF OFF-WH GYP XLS IP SLI WAXY SELENI-TIC SFT/FRM
SH:RED RED/ORNG MOST SILTY/SDY IP BLKY SFT/FRM
SS:CLR BF ORNG STN OFF-WH MOST VF-FG LSLY CONS W/V.ARG MTX MOD SORT'D SUB ANG/SUB RD GRS SM F-MG UNCONS SUB ANG/RD QTZ GRS
MD 1639 INC 2.1 AZ 300.7
MD 1753 INC 1.9 AZ 305.3
MD 1848 INC 1.4 AZ 292.3
25
50
75
100
125
150
175

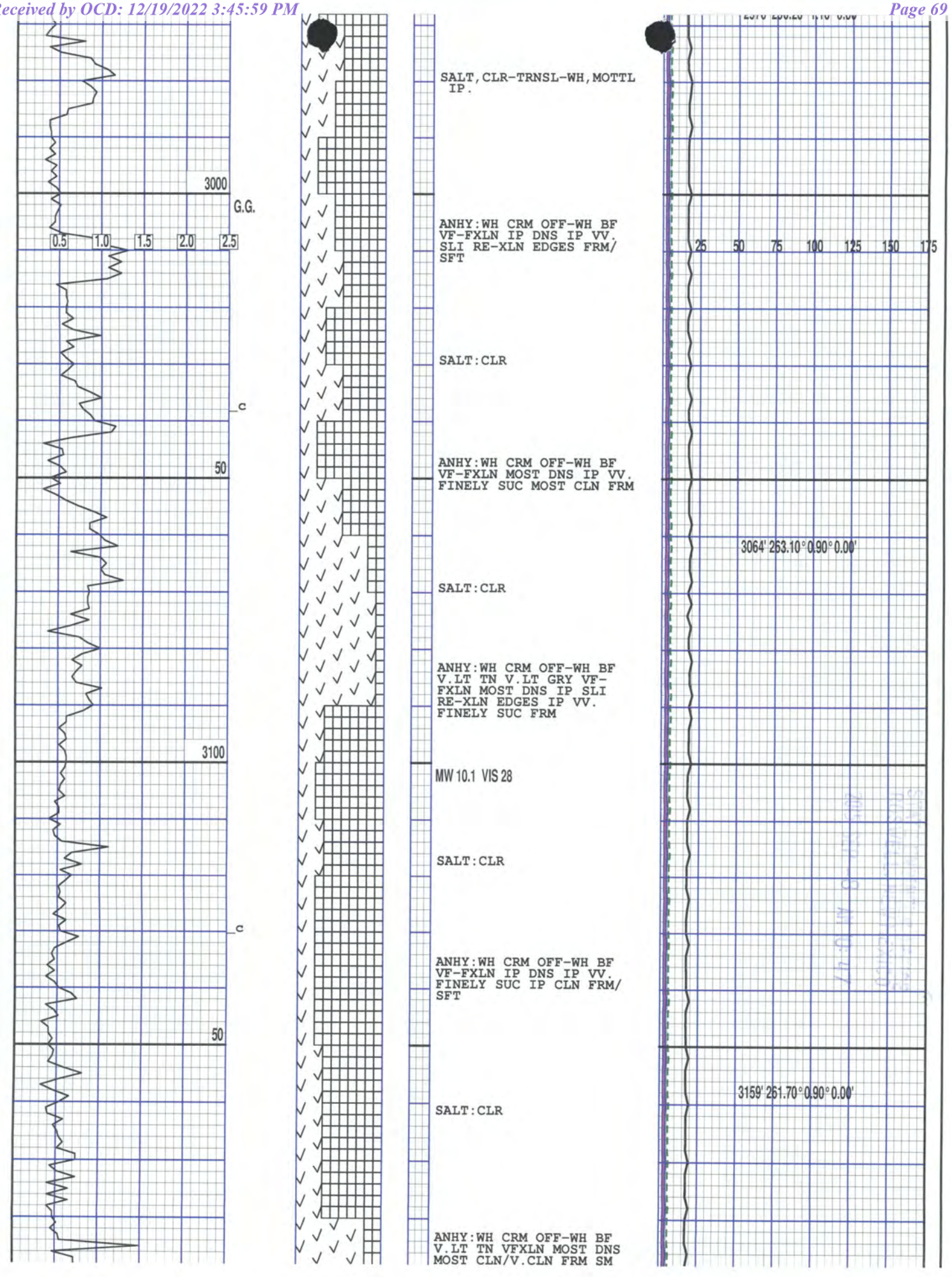

1900
50
2000
0.5
1.0
1.5
2.0
2.5
WOB 25/30,000 RPM 90
SPM 79 & 80 PP 1700
50
WOB 30/35,000 RPM 90
SPM 79 & 80 PP 1900
ANHY:CLR BF OFF-WH LT GRY GYP XLS IP SLI WAXY SELENITIC SFT/FRM
SH:RED RED/ORNG IP BLKY IP SILTY/SDY MOST SFT/ FRM
SS:CLR BF ORNG STN OFF-WH MOST VF-FG LSLY CONS W/V.ARG MTX SUB ANG/SUB RD GRS MOD SORT SM F-MG UNCONS SUB RD/RD QTZ GRS
ANHY:CLR BF OFF-WH LT GRY GYP XLS SELENITIC IP SLI WAXY SFT/FRM
SH:RED RED/ORNG IP BLKY IP SILTY/SDY MOST SFT/ FRM
SS;CLR BF ORNG STN OFF-WH VF-FG MOST LSLY CONS W/V.ARG MTX SUB ANG/SUB RD GRS MOD SORT SM F-MG LOOSE SUB RD/RD QTZ GRS
ANHY:CLR BF LT GRY OFF-WH IP RE-XLN EDGES IP DNS IP SLI SELENITIC GYP XLS MOST FXLN CLN FRM/SLI SFT
SH:RED RED/ORNG IP BLKY IP SLI SILTY MOST SFT/ FRM SM V.SFT
ANHY:MOST BEC WH OFF-WH BF CLR VV.LT TN MOST FXLN IP DNS IP RE-XLN IP VV.SLI SELENITIC GYP XLS MOST CLN/V.CLN FRM/ SLI SFT
SH:RED RED/ORNG IP BLKY IP SLI SILTY MOST SFT/ FRM
T.D. 20" HOLE AT 2090 - RUN E. LOGS
RUN & SET 16" CASING AT 2090
MD 1942 INC 1.4 AZ 296.4
MD 2023 INC 1.1 AZ 289.5
25
50
75
100
125
150
175

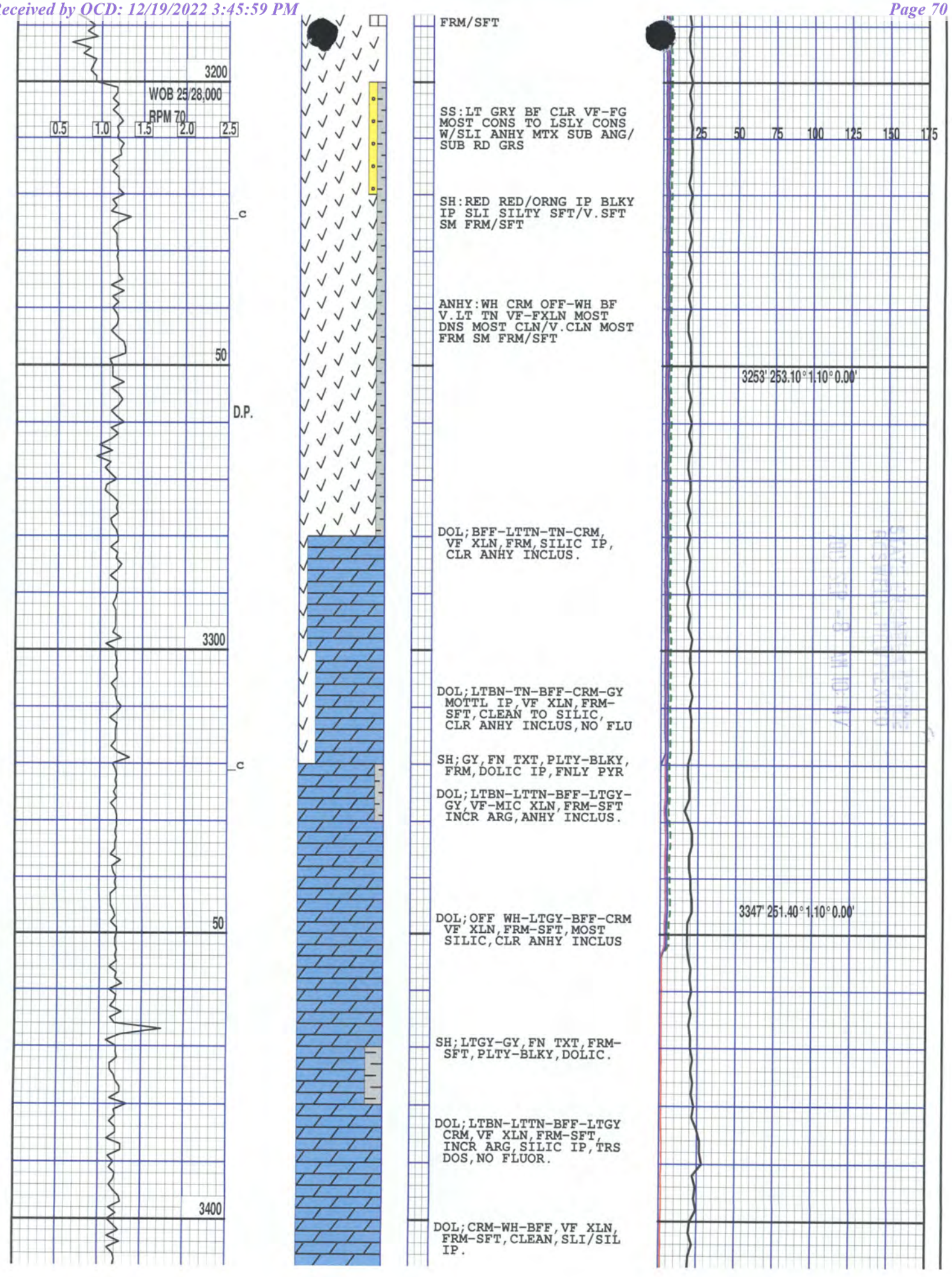

G.G.
2100
50
c
2200
0.5
1.0
1.5
2.0
2.5
D.P.
50
c
2300
NB # 2 14 3/4 SEC FX65D/MUD MOTOR/ MWD IN AT 2090 & CIRC BRINE WATER THRU CLOSED MUD SYSTEM
CEM:LT GRY GRY IP BLKY MOST FRM SM FRM/SFT
ANHY:WH CRM OFF-WH BF V.LT TN IP FXLN IP DNS IP SLI RE-XLN EDGES MOST CLN FRM/SFT
SH:RED RED/ORNG IP BLKY IP SLI SILTY FRM/SFT
DOL:LT TN V.LT TN OFF-WH VF-FXLN IP DNS MOST FINELY SUC TR WH LT YEL MIN FLUORO FRM/FT
SS:CLR BF V.LT ORNG STN VF-FG MOST UNCONS SUB RD/SUB ANG GRS
ANHY:WH CRM OFF-WH BF V LT TN FXLN IP DNS IP V FINELY SUC FRM/SFT
SH:RED RED/ORNG IP BLKY IP SILTY SFT/FRM
SS:CLR BF ORNG STN VF-FG MOST UNCONS/LOOSE SUB ANG/SUB RD GRS
DOL;WH-BFF-TRNSL-CLR, MIC-VF-FN XLN,DNS IP, FRM-FRIA,DOLIC IP.
DOL;WH-BFF-LTTN,VF XLN, FRM,CLEAN TO ANHY'IC, SOME SILIC,WH MIN FLUO
SH;RED/ORNG,CSE TXT,SFT BLKY,SLTY.
SALT;CLR-WH-TRNSL.
2120' 279.70° 1.20° 0.00'
25
50
75
100
125
150
175
2215' 279.00° 1.40° 0.00'

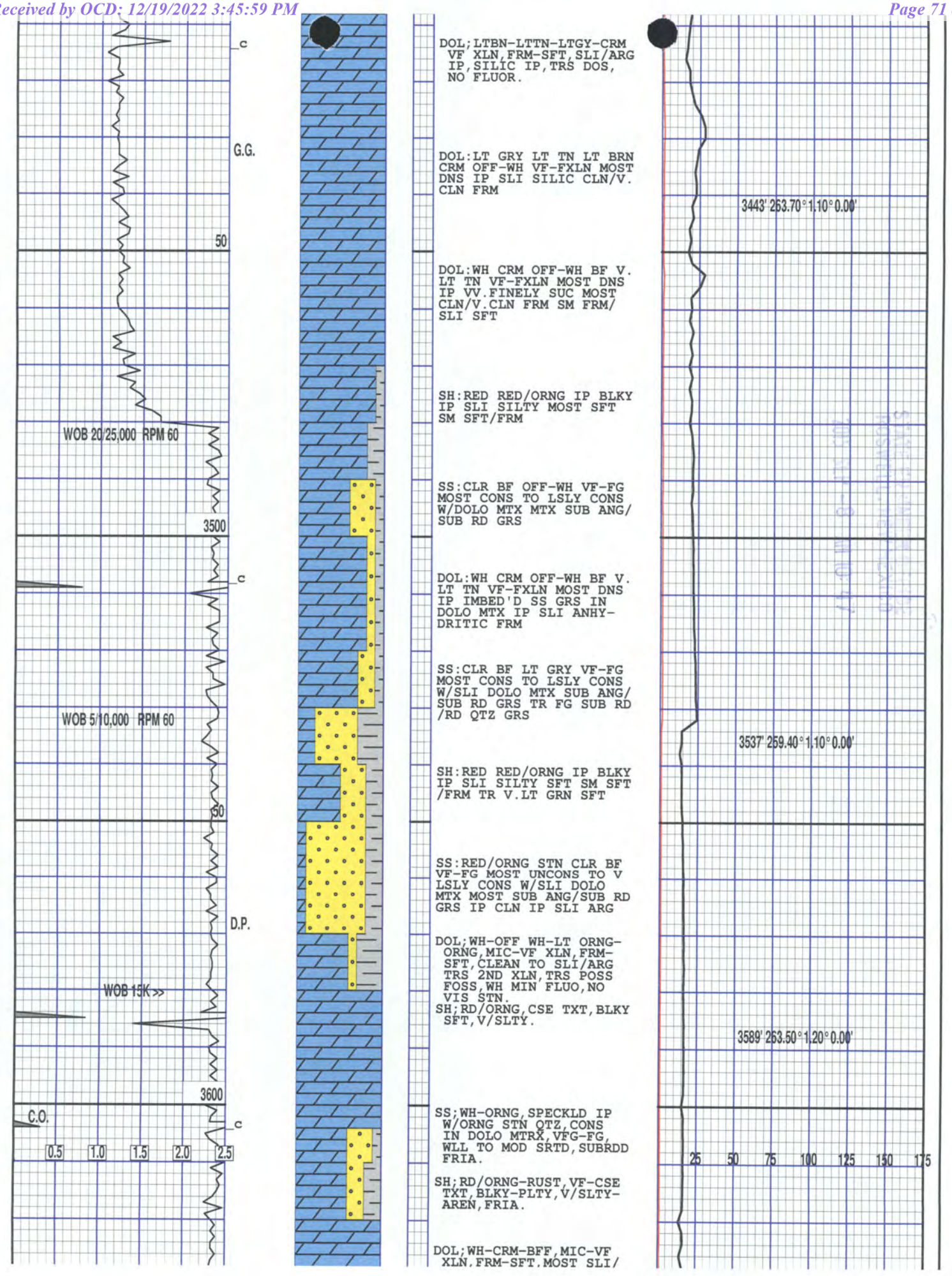

50
c
2400
0.5
1.0
1.5
2.0
2.5
50
G.G.
c
WOB 25/30,000 RPM 70
SPM 78 & 78 PP 1975
2500
SH;RD-ORNG-LTBN-LTGRN-LTGY,CSE TXT,SFT/FRIA, BLKY,V/SLTY-AREN, ANHY'IC IP.
ANHY;WH-LTBN-LTGY,FRSTD IP,TRNSL IP,MIC-VF XLN FRM-FRIA,SOME DOLIC.
DOL;LTBN-OFF WH,MIC XLN FRM-M/HD,DNS,ANHY'IC IP
ANHY;WH-LTBN-LTGY,VF-FN XLN,SOME DNS,SUCRO IP FRM-FRIA.
SS;WH-CLR,CONS,FG,WLL SRTD,SUBANG-SUBRDD,FRM DOLIC.
SH;ORNG-RD,FN TXT,V/SFT BLKY,SLTY.
ANHY:WH CRM OFF-WH BF V LT TN FXLN IP DNS IP SLI RE-XLN IP V.FINELY SUC SFT/FRM
SS:CLR ORNG STN VF-FG MOST UNCONS SUB ANG/SUB RD GRS IP SLI ARG
SH:RED RED/ORNG IP BLKY IP SLI SILTY MOST SFT IP CRUMBLY
SALT:CLR
ANHY:WH OFF-WH BF V.LT TN FXLN IP DNS IP V. FINELY SUC IP CLN IP
2403' 290.00° 1.10° 0.00'
25
50
75
100
125
150
175
2498' 283.20° 1.40° 0.00'

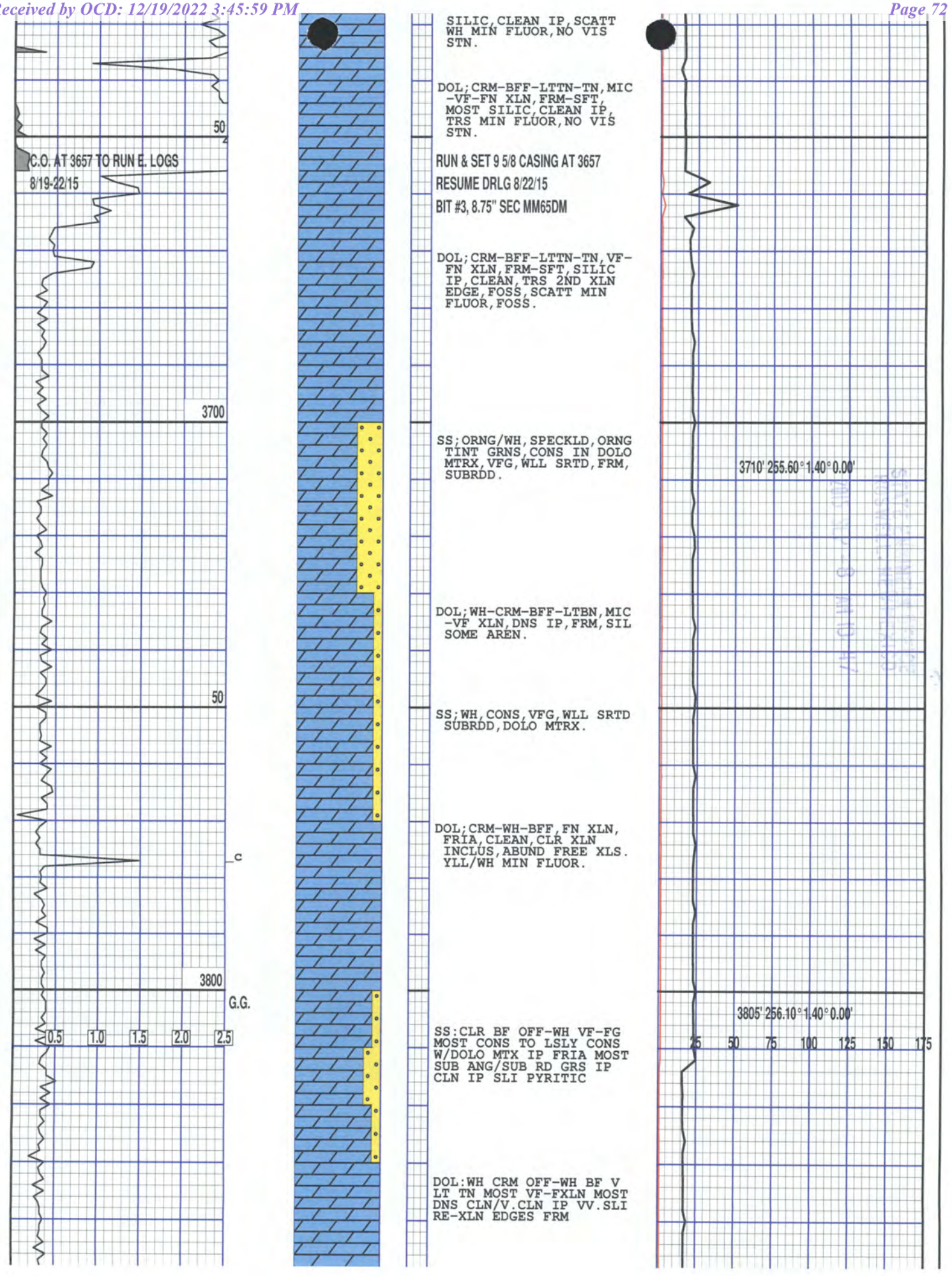

50
2600
0.5
1.0
1.5
2.0
2.5
50
2700
WOB 30/35,000 RPM 70
SPM 78 & 78 PP 2150
SLI ARG FRM/SFT
SS:CLR ORNG STN BF VF-FG UNCONS SUB ANG/SUB RD GRS IP CLN IP SLI ARG
SALT:CLR
SH:RED RED/ORNG IP BLKY IP SILTY MOST SFT IP SLI CRUMBLY
MW 10.0 VIS 28
ANHY:WH OFF-WH BF LT GRY V.LT TN VF-FXLN IP DNS IP SLI RE-XLN EDGES IP VV.FINELY SUC SFT/ FRM
SS:CLR ORNG STN VF-FG MOST UNCONS SUB ANG/SUB RD GRS IP CLN MOST SLI ARG
SALT:CLR
ANHY:WH CRM OFF-WH BF VF-FXLN IP DNS IP V. FINELY SUC SFT/FRM
SALT:CLR
ANHY:WH CRM OFF-WH BF VF-FXLN IP DNS IP V. FINELY SUC SFT/FRM
SALT:CLR
TR RED RED/ORNG SFT/V. SFT SH
2592' 286.20° 1.40° 0.00'
25
50
75
100
125
150
175
2687' 290.20° 1.20° 0.00'

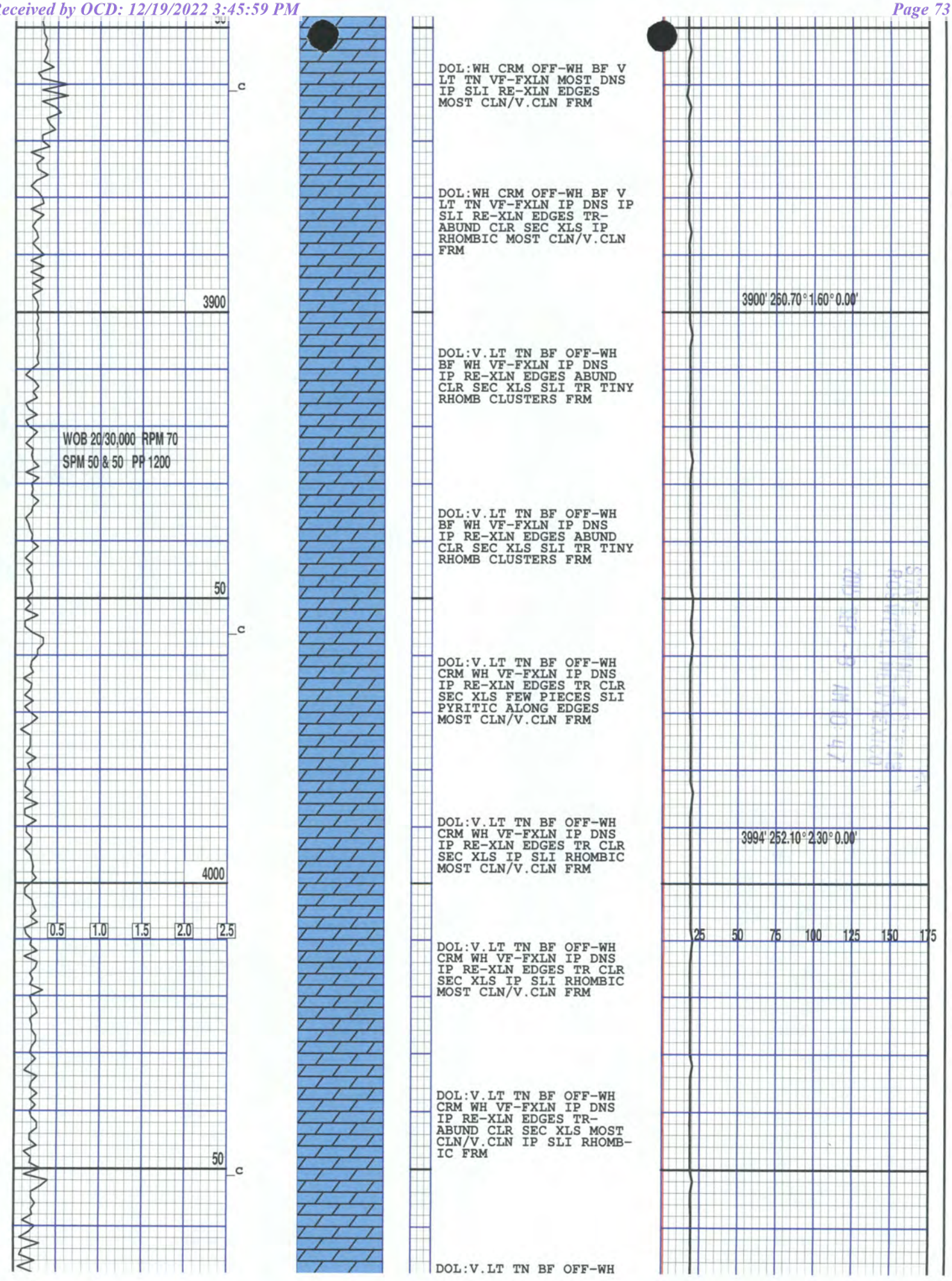

c
2800
0.5
1.0
1.5
2.0
2.5
D.P.
8/18/15
50
c
2900
c
50
ANHY:WH CRM OFF-WH BF VF-FXLN IP DNS IP V. FINELY SUC FRM/SFT
SS:CLR ORNG STN BF LT GRY VFG MOST UNCONS/ LOOSE SUB RD/SUB ANG GRS MOST CLN IP SLI ARG
SH:RED RED/ORNG IP BLKY IP SLI SILTY SFT/V.SFT SM SFT/FRM
ANHY:WH CRM OFF-WH BF CLR VF-FXLN IP DNS IP FINELY SUC MOST CLN FRM SM SFT
ANHY;WH-LTGY-BFF,MIC-VF XLN,DNS IP,FRM-FRIA, FNLY SUCRO IP,CLEAN.
ANHY;WH-LTGY,TRNSL IP, MIC-VF-FN XLN,FRM-FRIA FNLY SUCRO IP,CLEAN.
SALT;CLR-WH,MOTTL IP.
ANHY;WH-LTGY,MIC-VF XLN FRIA-FRM,MOST FNLY SUC SOME DNS,CLEAN.
SALT;WH-CLR,MOTTL.
ANHY;WH,MIC-VF-FN XLN, FRIA-FRM,DNS IP,FNLY SUCRO IP,CLEAN
2781' 290.40° 1.20° 0.00'
25
50
75
100
125
150
175
2876' 289.80° 1.10° 0.00'

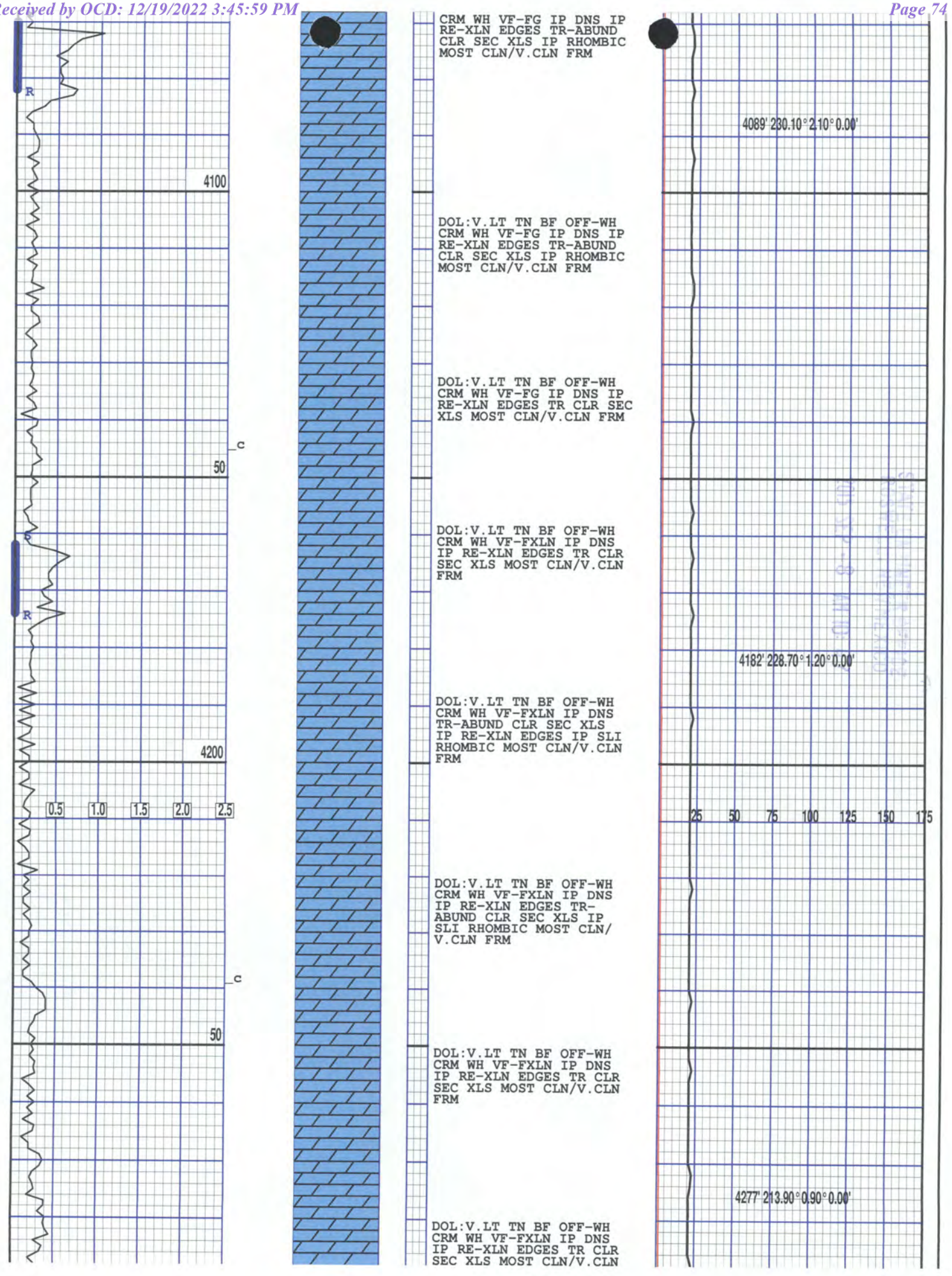

3000
G.G.
0.5
1.0
1.5
2.0
2.5
c
50
3100
c
50
SALT, CLR-TRNSL-WH, MOTTL IP.
ANHY:WH CRM OFF-WH BF VF-FXLN IP DNS IP VV. SLI RE-XLN EDGES FRM/ SFT
SALT:CLR
ANHY:WH CRM OFF-WH BF VF-FXLN MOST DNS IP VV. FINELY SUC MOST CLN FRM
SALT:CLR
ANHY:WH CRM OFF-WH BF V.LT TN V.LT GRY VF-FXLN MOST DNS IP SLI RE-XLN EDGES IP VV. FINELY SUC FRM
MW 10.1 VIS 28
SALT:CLR
ANHY:WH CRM OFF-WH BF VF-FXLN IP DNS IP VV. FINELY SUC IP CLN FRM/ SFT
SALT:CLR
ANHY:WH CRM OFF-WH BF V.LT TN VFXLN MOST DNS MOST CLN/V.CLN FRM SM
25
50
75
100
125
150
175
3064' 263.10° 0.90° 0.00'
3159' 261.70° 0.90° 0.00'


3200
WOB 25/28,000
RPM 70
0.5
1.0
1.5
2.0
2.5
c
50
D.P.
3300
c
50
3400
FRM/SFT
SS:LT GRY BF CLR VF-FG MOST CONS TO LSLY CONS W/SLI ANHY MTX SUB ANG/ SUB RD GRS
SH:RED RED/ORNG IP BLKY IP SLI SILTY SFT/V.SFT SM FRM/SFT
ANHY:WH CRM OFF-WH BF V.LT TN VF-FXLN MOST DNS MOST CLN/V.CLN MOST FRM SM FRM/SFT
DOL;BFF-LTTN-TN-CRM, VF XLN,FRM,SILIC IP, CLR ANHY INCLUS.
DOL;LTBN-TN-BFF-CRM-GY MOTTL IP,VF XLN,FRM-SFT,CLEAN TO SILIC, CLR ANHY INCLUS,NO FLU
SH;GY,FN TXT,PLTY-BLKY, FRM,DOLIC IP,FNLY PYR
DOL;LTBN-LTTN-BFF-LTGY-GY,VF-MIC XLN,FRM-SFT INCR ARG,ANHY INCLUS.
DOL;OFF WH-LTGY-BFF-CRM VF XLN,FRM-SFT,MOST SILIC,CLR ANHY INCLUS
SH;LTGY-GY,FN TXT,FRM-SFT,PLTY-BLKY,DOLIC.
DOL;LTBN-LTTN-BFF-LTGY CRM,VF XLN,FRM-SFT, INCR ARG,SILIC IP,TRS DOS,NO FLUOR.
DOL;CRM-WH-BFF,VF XLN, FRM-SFT,CLEAN,SLI/SIL IP.
25
50
75
100
125
150
175
3253' 253.10° 1.10° 0.00'
3347' 251.40° 1.10° 0.00'


C
G.G.
50
WOB 20/25,000 RPM 60
3500
C
WOB 5/10,000 RPM 60
50
D.P.
WOB 15K >>
3600
C.O.
C
0.5
1.0
1.5
2.0
2.5
DOL;LTBN-LTTN-LTGY-CRM VF XLN,FRM-SFT,SLI/ARG IP,SILIC IP,TRS DOS, NO FLUOR.
DOL:LT GRY LT TN LT BRN CRM OFF-WH VF-FXLN MOST DNS IP SLI SILIC CLN/V. CLN FRM
DOL:WH CRM OFF-WH BF V. LT TN VF-FXLN MOST DNS IP VV.FINELY SUC MOST CLN/V.CLN FRM SM FRM/ SLI SFT
SH:RED RED/ORNG IP BLKY IP SLI SILTY MOST SFT SM SFT/FRM
SS:CLR BF OFF-WH VF-FG MOST CONS TO LSLY CONS W/DOLO MTX MTX SUB ANG/ SUB RD GRS
DOL:WH CRM OFF-WH BF V. LT TN VF-FXLN MOST DNS IP IMBED'D SS GRS IN DOLO MTX IP SLI ANHY-DRITIC FRM
SS:CLR BF LT GRY VF-FG MOST CONS TO LSLY CONS W/SLI DOLO MTX SUB ANG/ SUB RD GRS TR FG SUB RD /RD QTZ GRS
SH:RED RED/ORNG IP BLKY IP SLI SILTY SFT SM SFT /FRM TR V.LT GRN SFT
SS:RED/ORNG STN CLR BF VF-FG MOST UNCONS TO V LSLY CONS W/SLI DOLO MTX MOST SUB ANG/SUB RD GRS IP CLN IP SLI ARG
DOL;WH-OFF WH-LT ORNG-ORNG,MIC-VF XLN,FRM-SFT,CLEAN TO SLI/ARG TRS 2ND XLN,TRS POSS FOSS,WH MIN FLUO,NO VIS STN.
SH;RD/ORNG,CSE TXT,BLKY SFT,V/SLTY.
SS;WH-ORNG,SPECKLD IP W/ORNG STN QTZ,CONS IN DOLO MTRX,VFG-FG, WLL TO MOD SRTD,SUBRDD FRIA.
SH;RD/ORNG-RUST,VF-CSE TXT,BLKY-PLTY,V/SLTY-AREN,FRIA.
DOL;WH-CRM-BFF,MIC-VF XLN.FRM-SFT.MOST SLI/
3443' 263.70° 1.10° 0.00'
3537' 259.40° 1.10° 0.00'
3589' 263.50° 1.20° 0.00'
25
50
75
100
125
150
175


50
C.O. AT 3657 TO RUN E. LOGS
8/19-22/15
3700
50
3800
G.G.
0.5
1.0
1.5
2.0
2.5
SILIC, CLEAN IP, SCATT WH MIN FLUOR, NO VIS STN.
DOL; CRM-BFF-LTTN-TN, MIC -VF-FN XLN, FRM-SFT, MOST SILIC, CLEAN IP, TRS MIN FLUOR, NO VIS STN.
RUN & SET 9 5/8 CASING AT 3657
RESUME DRLG 8/22/15
BIT #3, 8.75" SEC MM65DM
DOL; CRM-BFF-LTTN-TN, VF-FN XLN, FRM-SFT, SILIC IP, CLEAN, TRS 2ND XLN EDGE, FOSS, SCATT MIN FLUOR, FOSS.
SS; ORNG/WH, SPECKLD, ORNG TINT GRNS, CONS IN DOLO MTRX, VFG, WLL SRTD, FRM, SUBRDD.
DOL; WH-CRM-BFF-LTBN, MIC -VF XLN, DNS IP, FRM, SIL SOME AREN.
SS; WH, CONS, VFG, WLL SRTD SUBRDD, DOLO MTRX.
DOL; CRM-WH-BFF, FN XLN, FRIA, CLEAN, CLR XLN INCLUS, ABUND FREE XLS. YLL/WH MIN FLUOR.
SS: CLR BF OFF-WH VF-FG MOST CONS TO LSLY CONS W/DOLO MTX IP FRIA MOST SUB ANG/SUB RD GRS IP CLN IP SLI PYRITIC
DOL: WH CRM OFF-WH BF V LT TN MOST VF-FXLN MOST DNS CLN/V. CLN IP VV. SLI RE-XLN EDGES FRM
3710' 255.60° 1.40° 0.00'
3805' 256.10° 1.40° 0.00'
25
50
75
100
125
150
175


C
3900
WOB 20/30,000 RPM 70
SPM 50 & 50 PP 1200
50
C
4000
0.5
1.0
1.5
2.0
2.5
50
C
DOL:WH CRM OFF-WH BF V LT TN VF-FXLN MOST DNS IP SLI RE-XLN EDGES MOST CLN/V.CLN FRM
DOL:WH CRM OFF-WH BF V LT TN VF-FXLN IP DNS IP SLI RE-XLN EDGES TR-ABUND CLR SEC XLS IP RHOMBIC MOST CLN/V.CLN FRM
3900' 250.70° 1.60° 0.00'
DOL:V.LT TN BF OFF-WH BF WH VF-FXLN IP DNS IP RE-XLN EDGES ABUND CLR SEC XLS SLI TR TINY RHOMB CLUSTERS FRM
DOL:V.LT TN BF OFF-WH BF WH VF-FXLN IP DNS IP RE-XLN EDGES ABUND CLR SEC XLS SLI TR TINY RHOMB CLUSTERS FRM
DOL:V.LT TN BF OFF-WH CRM WH VF-FXLN IP DNS IP RE-XLN EDGES TR CLR SEC XLS FEW PIECES SLI PYRITIC ALONG EDGES MOST CLN/V.CLN FRM
DOL:V.LT TN BF OFF-WH CRM WH VF-FXLN IP DNS IP RE-XLN EDGES TR CLR SEC XLS IP SLI RHOMBIC MOST CLN/V.CLN FRM
3994' 252.10° 2.30° 0.00'
25
50
75
100
125
150
175
DOL:V.LT TN BF OFF-WH CRM WH VF-FXLN IP DNS IP RE-XLN EDGES TR CLR SEC XLS IP SLI RHOMBIC MOST CLN/V.CLN FRM
DOL:V.LT TN BF OFF-WH CRM WH VF-FXLN IP DNS IP RE-XLN EDGES TR-ABUND CLR SEC XLS MOST CLN/V.CLN IP SLI RHOMB-IC FRM
DOL:V.LT TN BF OFF-WH


R
4100
50
R
4200
0.5
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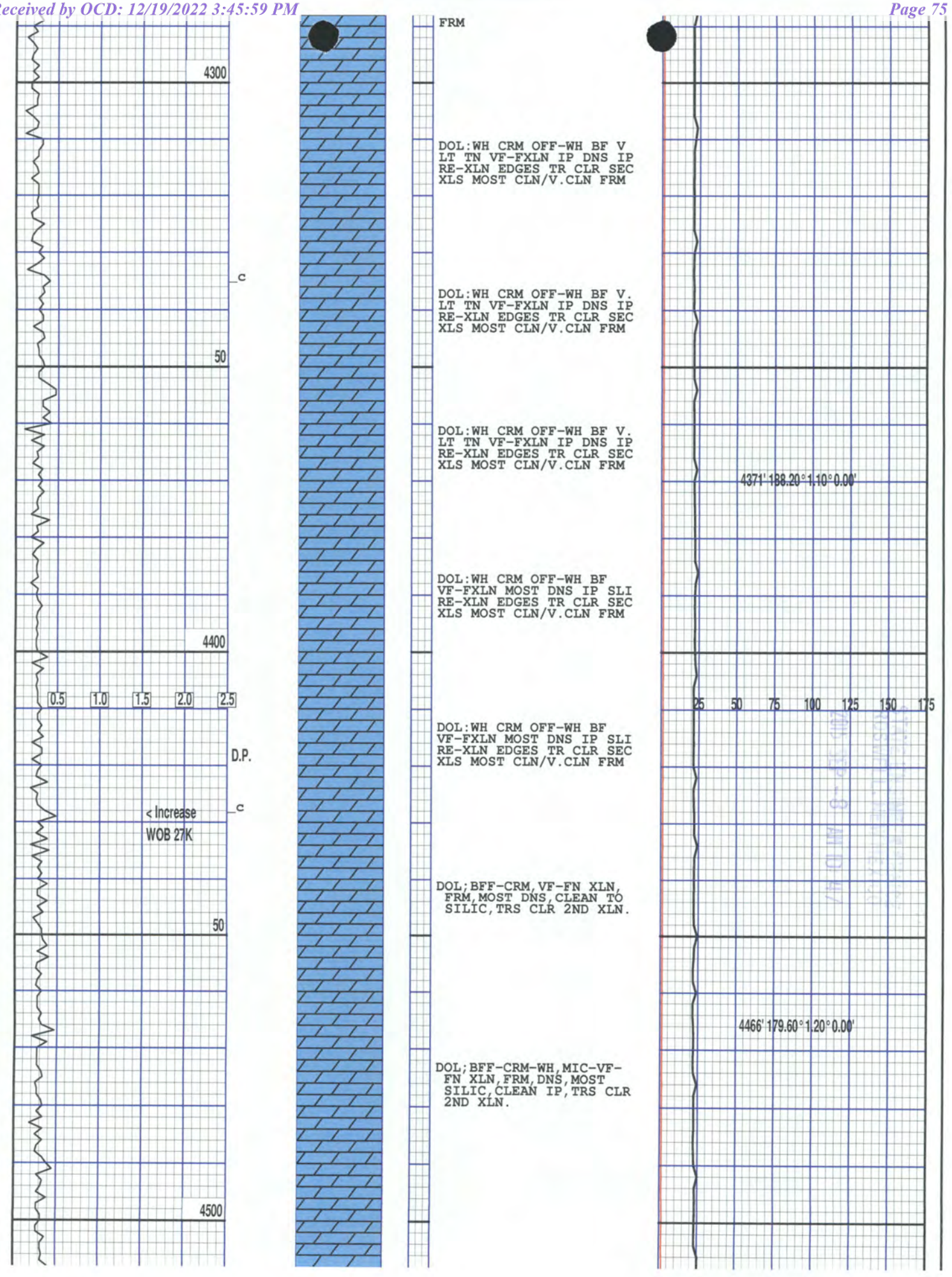
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DOL;BFF-CRM-WH,MIC-VF-FN XLN,FRM,DNS,MOST SILIC,CLEAN IP,TRS CLR 2ND XLN.
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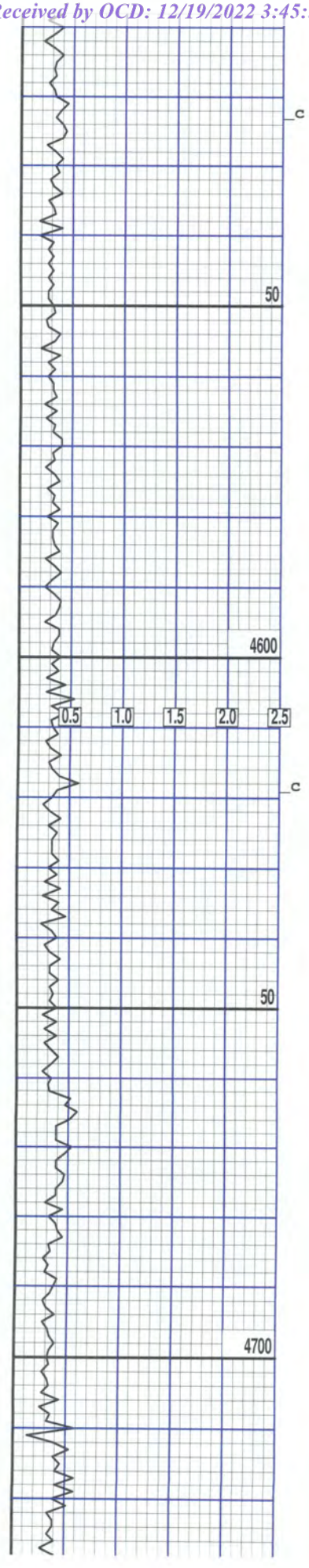

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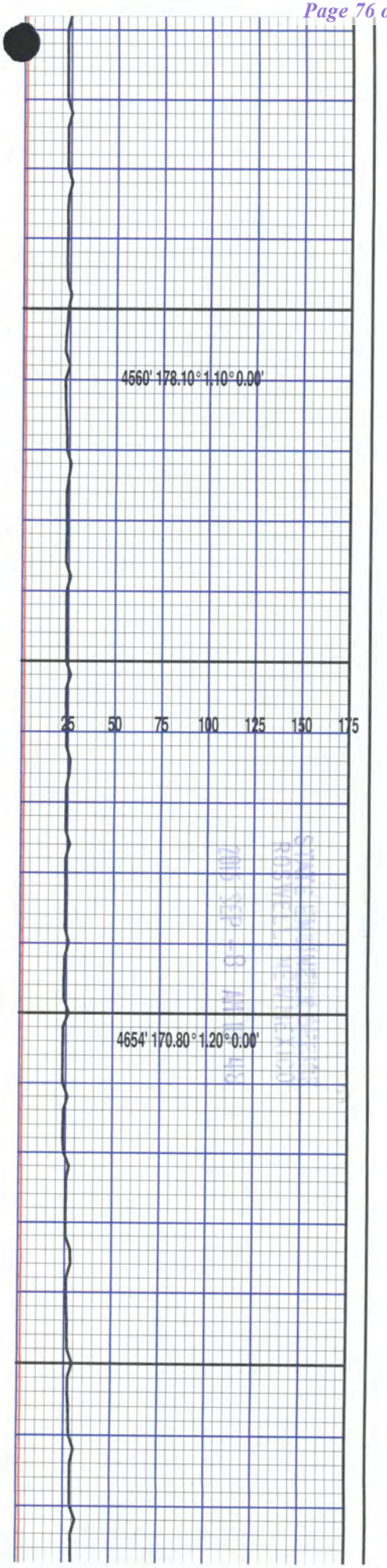

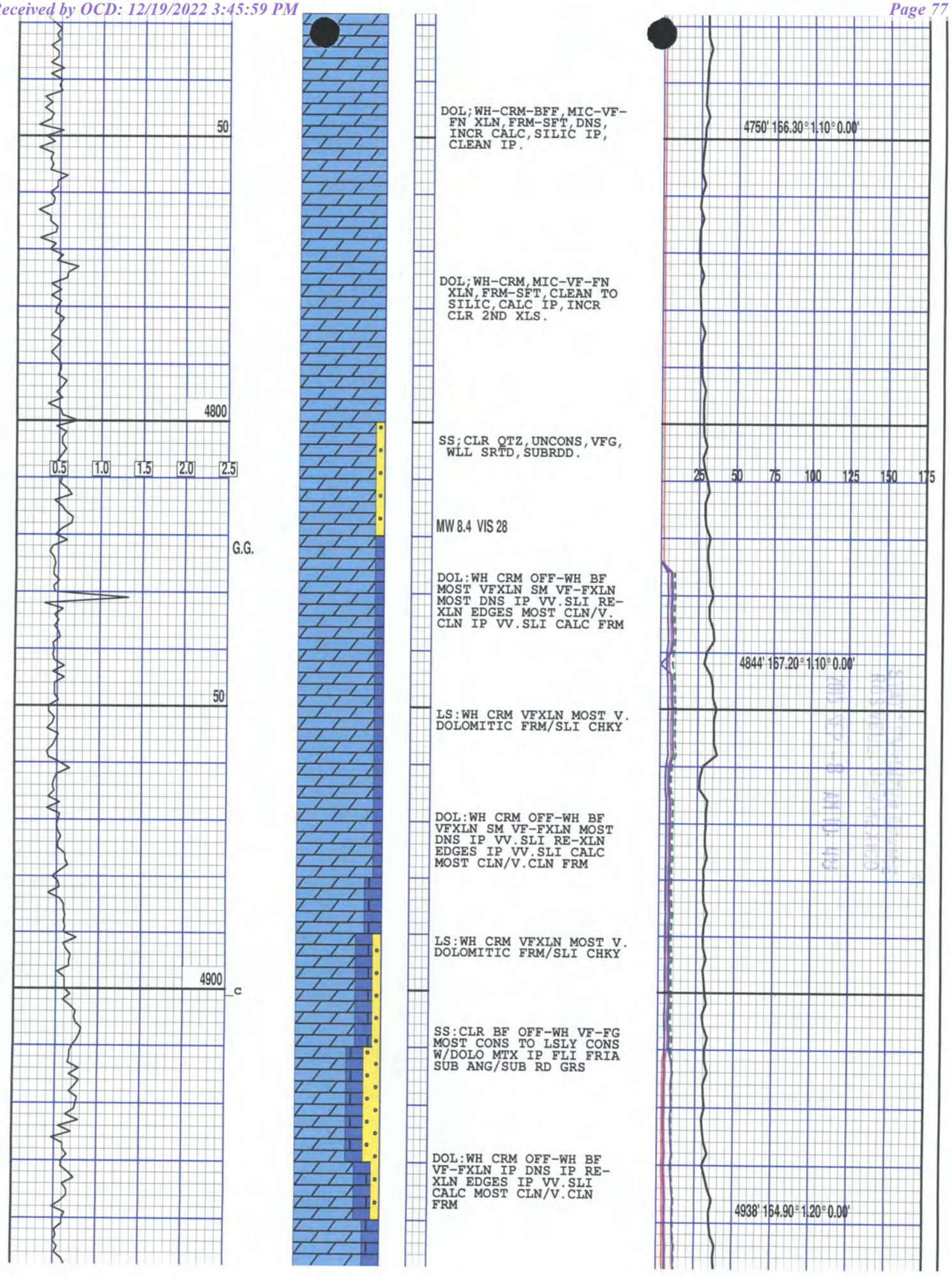
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DOL;WH-CRM,MIC-VF-FN XLN,FRM-SFT,CLEAN TO SILIC,CALC IP,INCR CLR 2ND XLS.
SS;CLR QTZ,UNCONS,VFG, WLL SRTD,SUBRDD.
MW 8.4 VIS 28
DOL:WH CRM OFF-WH BF MOST VFXLN SM VF-FXLN MOST DNS IP VV.SLI RE-XLN EDGES MOST CLN/V. CLN IP VV.SLI CALC FRM
LS:WH CRM VFXLN MOST V. DOLOMITIC FRM/SLI CHKY
DOL:WH CRM OFF-WH BF VFXLN SM VF-FXLN MOST DNS IP VV.SLI RE-XLN EDGES IP VV.SLI CALC MOST CLN/V.CLN FRM
LS:WH CRM VFXLN MOST V. DOLOMITIC FRM/SLI CHKY
SS:CLR BF OFF-WH VF-FG MOST CONS TO LSLY CONS W/DOLO MTX IP FLI FRIA SUB ANG/SUB RD GRS
DOL:WH CRM OFF-WH BF VF-FXLN IP DNS IP RE-XLN EDGES IP VV.SLI CALC MOST CLN/V.CLN FRM
4750' 166.30° 1.10° 0.00'
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175
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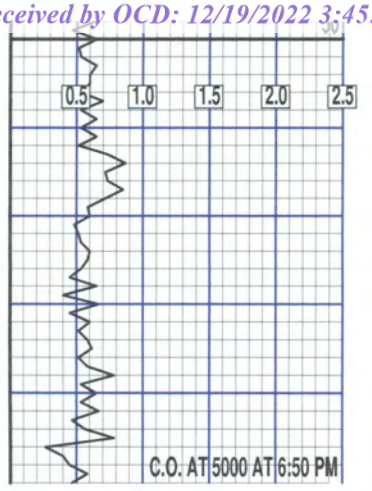

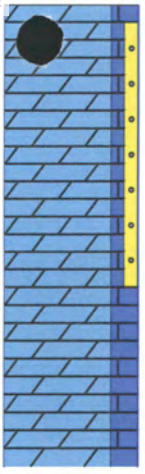

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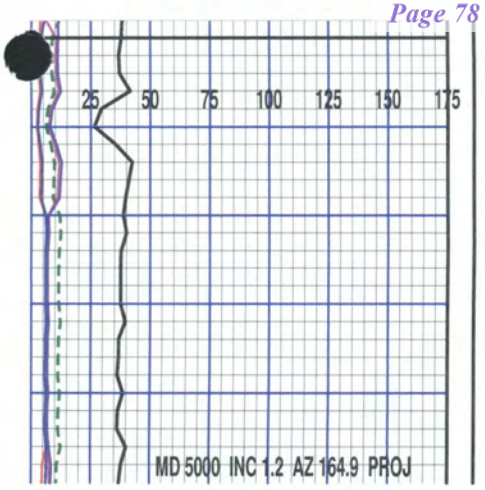
DOL:WH CRM OFF-WH BF V. LT TN VFXLN SM VF-FXLN MOST DNS IP V.SLI RE-XLN CLN FRM

T.D. 8 3/4" HOLE AT 5000'- E.LOGS



STATE ENGINEER OFFICE
ROSWELL, NEW MEXICO
2013 SEP -8 AM 10: 48

Cement Blend Calculations

CONDUCTOR

DESIRED CEMENT DENSITY	WATER DENSITY FRESH - 8.34 SEA - 8.55	YIELD CU.FT./SK	MIX WATER GPS	TOTAL MIX FLUID - GPS	% WATER - BWOC
14.80	8.34	1.34	6.35	6.35	56.30%

CEMENTS	% CU.FT.	LBS/SK	ABS VOL	GALS		
Class C	100	94.00	0.0382	3.5908	674.76	GRAMS
		0.00	0.0000	0.0000	0.00	GRAMS
		0.00	0.0000	0.0000	0.00	GRAMS
		0.00	0.0000	0.0000	0.00	GRAMS
TOTAL BASE	100	94.00		3.5908		

Dry adds.	%	LBS	ABS VOL	GALS/SK		
CaCl2	1.50	1.410	0.0612	0.0863	10.12	GRAMS
		0.000	0.0000	0.0000	0.00	GRAMS
		0.000	0.0000	0.0000	0.00	GRAMS
		0.000	0.0000	0.0000	0.00	GRAMS
		0.000	0.0000	0.0000	0.00	GRAMS
		0.000	0.0000	0.0000	0.00	GRAMS
		0.000	0.0000	0.0000	0.00	GRAMS
		0.000	0.0000	0.0000	0.00	GRAMS
TOTAL DRY		1.410		0.0863		

Liquid Adds	gps	LBS	ABS VOL	GALS/SK				
		0.000	0.0000	0.0000	0.00	GRAMS	0.00	MLS
		0.000	0.0000	0.0000	0.00	GRAMS	0.00	MLS
		0.000	0.0000	0.0000	0.00	GRAMS	0.00	MLS
		0.000	0.0000	0.0000	0.00	GRAMS	0.00	MLS
		0.000	0.0000	0.0000	0.00	GRAMS	0.00	MLS
		0.000	0.0000	0.0000	0.00	GRAMS	0.00	MLS
TOTAL LIQUIDS		0.000		0.0000				

SALTS	% BWOW	LBS/SK	ABS VOL	GALS/SK		
SALT	0	0.000	0.0000	0.0000	0.00	GRAMS
KCL	0	0.000	0.0000	0.0000	0.00	GRAMS
TOTAL SALT		0.000		0.0000		

684.89	GRAMS TOTAL DRY ADDS

WATER TYPE	WEIGHT	SP.GR.
FRESH	8.34	1.000

379.86	GRAMS	WATER TYPE	
379.86	MLS	FRESH	

6.35	GPS
1.34	YIELD

POUNDS DRY	95.41
GALLONS DRY	3.677092
POUNDS LIQUID	0
GALLONS LIQUID	0
TOTAL POUNDS	148.3277369

LAB TOTAL WT	1064.748201

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Received by OCD: 12/19/2022 3:45:59 PM

EOG Capitan WSW #4 Surface Casing Lead Cement

ABSOLUTE VOLUME CALCULATOR

DESIRED SLURRY WEIGHT	13.5	WATER	9.16	YIELD	1.75

MATERIAL	WEIGHT	FACTOR	GALLONS
CEMENT	94	0.0382	3.5908
Coletta C Pozmix		0.0487	0
TXI Light Weight		0.0429	0
MC-500		0.0414	0

	% BWOC	Lbs/Sk	ABS Volume	Gals/Sk
Gel	4	3.76	0.0453	0.170328
Calcium Chloride	2	1.88	0.0612	0.1151481
CFL 100		0	0.1009	0
C-35		0	0.0649	0
C 37		0	0.0923	0
C 51		0	0.0857	0
C-47A		0	0.0747	0
SSA-1		0	0.0453	0
C-45		0	0.055	0
Citric Acid		0	0.072	0
C-49		0	0.0462	0
C-20		0	0.078	0
C-24		0	0.078	0
C 41P		0	0.0444	0
CCR-550		0	0.09306	0
Mag Ox		0	0.0353	0
C-19		0	0.0875	0
C-14A		0	0.081	0
CSA-1000		0	0.1	0
C-16A		0	0.0903	0
Statfree	0.01	0.0094	0.1275	0.0011985
C-43P		0	0.0517	0
		#/SK		
GypSeal			0.0445	0
Gilsonite			0.1122	0
KCL			0.0443	0
Salt			0.03645	0
SFA			0.0521	0
Silica Fume			0.0538	0
STE			0.0393	0
KolSeal			0.09234	0
Polyflake	0.25		0.0844	0.0211
Phenoseal			0.0923	0
100 mesh Sand			0.0453	0
Hematite			0.02265	0
Barite			0.0284	0
Calcium Carbinate			0.0443	0
		99.8994		3.8985746

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Received by OCD: 12/19/2022 3:45:59 PM

EOG Capitan WSW #4 Surface Casing Tail Cement

ABSOLUTE VOLUME CALCULATOR

DESIRED SLURRY WEIGHT		14.8	WATER	6.34	YIELD	1.34

MATERIAL	WEIGHT	FACTOR	GALLONS
CEMENT	94	0.0382	3.5908
Coletta C Pozmix		0.0487	0
TXI Light Weight		0.0429	0
MC-500		0.0414	0

	% BWOC	Lbs/Sk	ABS Volume	Gals/Sk
Gel		0	0.0453	0
Calcium Chloride	1.5	1.41	0.0612	0.086361075
CFL 100		0	0.1009	0
C-35		0	0.0649	0
C 37		0	0.0923	0
C 51		0	0.0857	0
C-47A		0	0.0747	0
SSA-1		0	0.0453	0
C-45		0	0.055	0
Citric Acid		0	0.072	0
C-49		0	0.0462	0
C-20		0	0.078	0
C-24		0	0.078	0
C 41P		0	0.0444	0
CCR-550		0	0.09306	0
Mag Ox		0	0.0353	0
C-19		0	0.0875	0
C-14A		0	0.081	0
CSA-1000		0	0.1	0
C-16A		0	0.0903	0
Statfree	0.01	0.0094	0.1275	0.0011985
C-43P		0	0.0517	0
		#/SK		
GypSeal			0.0445	0
Gilsonite			0.1122	0
KCL			0.0443	0
Salt			0.03645	0
SFA			0.0521	0
Silica Fume			0.0538	0
STE			0.0393	0
KolSeal			0.09234	0
Polyflake			0.0844	0
Phenoseal			0.0923	0
100 mesh Sand			0.0453	0
Hematite			0.02265	0
Barite			0.0284	0
Calcium Carbinate			0.0443	0
		95.4194		3.678359575

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Received by OCD: 12/19/2022 3:45:59 PM

EOG Capitan WSW #4 Production Casing Lead Cement

ABSOLUTE VOLUME CALCULATOR

DESIRED SLURRY WEIGHT	12.7	WATER	11.88	YIELD	2.22

MATERIAL	WEIGHT	FACTOR	GALLONS
CEMENT	94	0.0382	3.5908
Coletta C Pozmix		0.0487	0
TXI Light Weight		0.0429	0
MC-500		0.0414	0

	% BWOC	Lbs/Sk	ABS Volume	Gals/Sk
Gel		0	0.0453	0
Calcium Chloride		0	0.0612	0
CFL 100		0	0.1009	0
C-35		0	0.0649	0
C 37		0	0.0923	0
C 51		0	0.0857	0
C-47A		0	0.0747	0
SSA-1		0	0.0453	0
C-45	2	1.88	0.055	0.1034
Citric Acid		0	0.072	0
C-49		0	0.0462	0
C-20	0.7	0.658	0.078	0.051324
C-24		0	0.078	0
C 41P		0	0.0444	0
CCR-550		0	0.09306	0
Mag Ox		0	0.0353	0
C-19		0	0.0875	0
C-14A		0	0.081	0
CSA-1000		0	0.1	0
C-16A		0	0.0903	0
Statfree	0.01	0.0094	0.1275	0.0011985
C-43P		0	0.0517	0

	#/SK		
GypSeal		0.0445	0
Gilsonite	5	0.1122	0.561
KCL		0.0443	0
Salt	9.9	0.0391	0.38709
SFA		0.0521	0
Silica Fume		0.0538	0
STE		0.0393	0
KolSeal		0.09234	0
Polyflake	0.25	0.0844	0.0211
Phenoseal		0.0923	0
100 mesh Sand		0.0453	0
Hematite		0.02265	0
Barite		0.0284	0
Calcium Carbinate		0.0443	0
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Released to Imaging: 12/19/2022 3:55:54 PM

Received by OCD: 12/19/2022 3:45:59 PM

EOG Capitan WSW #4 Production Casing Tail Cement

ABSOLUTE VOLUME CALCULATOR

DESIRED SLURRY WEIGHT: 14.8 WATER: 6.37 YIELD: 1.35

MATERIAL	WEIGHT	FACTOR	GALLONS
CEMENT	94	0.0382	3.5908
Coletta C Pozmix		0.0487	0
TXI Light Weight		0.0429	0
MC-500		0.0414	0

	% BWOC	Lbs/Sk	ABS Volume	Gals/Sk
Gel	[redacted]	0	0.0453	0
Calcium Chloride		0	0.0612	0
CFL 100		0	0.1009	0
C-35	[redacted]	0.47	0.0649	0.030503
C 37		0	0.0923	0
C 51		0	0.0857	0
C-47A		0	0.0747	0
SSA-1		0	0.0453	0
C-45		0	0.055	0
Citric Acid		0	0.072	0
C-49		0	0.0462	0
C-20	[redacted]	0.141	0.078	0.010998
C-24		0	0.078	0
C 41P		0	0.0444	0
CCR-550		0	0.09306	0
Mag Ox		0	0.0353	0
C-19		0	0.0875	0
C-14A		0	0.081	0
CSA-1000		0	0.1	0
C-16A	[redacted]	0.564	0.0903	0.0509292
Statfree	[redacted]	0.0094	0.1275	0.0011985
C-43P		0	0.0517	0

	#/SK		
GypSeal	[redacted]	0.0445	0
Gilsonite		0.1122	0
KCL		0.0443	0
Salt	[redacted]	0.03645	0.03867345
SFA		0.0521	0
Silica Fume		0.0538	0
STE		0.0393	0
KolSeal		0.09234	0
Polyflake		0.0844	0
Phenoseal		0.0923	0
100 mesh Sand		0.0453	0
Hematite		0.02265	0
Barite		0.0284	0
Calcium Carbinate		0.0443	0
	96.2454		3.72310215

Venegas, Victoria, EMNRD

From: Venegas, Victoria, EMNRD
Sent: Monday, December 19, 2022 2:59 PM
To: Laura Parker; Andrew Parker
Subject: 1RF-498 - DESOTO SPRINGS #3 FACILITY ID [fVV2234954815]. Conditions of Approval
Attachments: C-147 1RF-498 - DESOTO SPRINGS #3 FACILITY ID [fVV2234954815].pdf

1RF-498 - DESOTO SPRINGS #3 FACILITY ID [fVV2234954815]. Conditions of Approval

Good afternoon Ms. Parker,
NMOCD has reviewed the recycling containment permit application and related documents, submitted by AMEREDEV OPERATING, LLC [372224] on August 24, 2018, for 1RF-498 - DESOTO SPRINGS #3 FACILITY ID [fVV2234954815] in Unit Letter G, Section 05, Township 26S, Range 36E, Lea County, New Mexico.
The form C-147 and related documents for the 1RF-498 - DESOTO SPRINGS #3 FACILITY ID [fVV2234954815] is approved with the following conditions of conditions of approval:

- The purpose of this permit is for oil and gas activities regulated under the NMAC 19.15.34.3 STATUTORY AUTHORITY: 19.15.34 NMAC is adopted pursuant to the Oil and Gas Act, Paragraph (15) of Section 70-2-12(B) NMSA 1978, which authorizes the division to regulate the disposition of water produced or used in connection with the drilling for or producing of oil and gas or both and Paragraph (21) of Section 70-2-12(B) NMSA 1978 which authorizes the regulation of the disposition of nondomestic wastes from the exploration, development, production or storage of crude oil or natural gas.
- AMEREDEV OPERATING, LLC [372224] shall construct, operate, maintain, close, and reclaim the 1RF-498 - DESOTO SPRINGS #3 FACILITY ID [fVV2234954815] in compliance with 19.15.34 NMAC.
- 1RF-498 - DESOTO SPRINGS #3 FACILITY ID [fVV2234954815] is approved for five years of operation from the date of permit application. **1RF-498 - DESOTO SPRINGS #3 FACILITY ID [fVV2234954815] permit expires on August 24, 2023.**
- Water reuse and recycling from 1RF-498 - DESOTO SPRINGS #3 FACILITY ID [fVV2234954815] is limited to wells owned or operated by AMEREDEV OPERATING, LLC [372224].
- AMEREDEV OPERATING, LLC [372224] shall notify NMOCD when recycling operations cease at 1RF-498 - DESOTO SPRINGS #3 FACILITY ID [fVV2234954815].
- A minimum of 3-feet freeboard must be maintained in 1RF-498 - DESOTO SPRINGS #3 FACILITY ID [fVV2234954815] recycling containment, at all times during operations.
- If less than 20% of the total fluid capacity is utilized every six months, beginning from the first withdrawal, operation of the facility is considered ceased and a notification of cessation of operations should be sent electronically to OCD Online. An extension to extend the cessation of operation, not to exceed six months, may be submitted using a C-147 form through OCD Online.
- AMEREDEV OPERATING, LLC [372224] shall submit monthly reports of recycling and reuse of produced water, drilling fluids, and liquid oil field waste on NMOCD form C-148 through OCD Online even if there is zero activity.
- **Please note that NMOCD has updated Form C-148. The new Form C-148 can be found at: https://www.emnrd.nm.gov/ocd/wp-content/uploads/sites/6/Revised-C-148-Form-January-2022.pdf.**
- AMEREDEV OPERATING, LLC [372224] must submit all C-148s for 1RF-498 - DESOTO SPRINGS #3 FACILITY ID [fVV2234954815] Administrative Order No. pVV2234954175, from 2018 through November 2022. AMEREDEV OPERATING, LLC [372224] may consolidate all C148s into one PDF document per annual year, that is, one PDF document that includes all C-148 forms for the year 2018, one for the year 2019 through the year 2022. AMEREDEV OPERATING, LLC [372224] should use Administrative Order No. pVV2234954175 to upload the documents to ePermitting.

- AMEREDEV OPERATING, LLC [372224] shall comply with 19.15.29 NMAC Releases in the event of any release of produced water or other oil field wastes at 1RF-498 - DESOTO SPRINGS #3 FACILITY ID [fVV2234954815].
- **NMOCD has updated Form C-147. The new Form C-147 can be found at: https://www.emnrd.nm.gov/ocd/wp-content/uploads/sites/6/Updated_C-147LongFINAL4-3-17.pdf**

Please reference number 1RF-498 - DESOTO SPRINGS #3 FACILITY ID [fVV2234954815] in all future communications.
Regards,

Victoria Venegas ● Environmental Specialist
Environmental Bureau
EMNRD - Oil Conservation Division
(575) 909-0269 | Victoria.Venegas@emnrd.nm.gov
https://www.emnrd.nm.gov/ocd/

District I
1625 N. French Dr., Hobbs, NM 88240
Phone:(575) 393-6161 Fax:(575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone:(575) 748-1283 Fax:(575) 748-9720
District III
1000 Rio Brazos Rd., Aztec, NM 87410
Phone:(505) 334-6178 Fax:(505) 334-6170
District IV
1220 S. St Francis Dr., Santa Fe, NM 87505
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State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

CONDITIONS

Action 168497

CONDITIONS

Operator: AMEREDEV OPERATING, LLC 2901 Via Fortuna Austin, TX 78746	OGRID: 372224
	Action Number: 168497
	Action Type: [C-147] Water Recycle Long (C-147L)

CONDITIONS

Created By	Condition	Condition Date
vvenegas	Approved with Conditions on 12.19.2022. Application received by OCD on 08.24.2018	12/19/2022