

State of New Mexico
Energy, Minerals and Natural Resources Department

Michelle Lujan Grisham
Governor

Sarah Cottrell Propst
Cabinet Secretary

Todd E. Leahy, JD, PhD
Deputy Secretary

Adrienne Sandoval, Division Director
Oil Conservation Division



New Mexico Oil Conservation Division approval and conditions listed below are made in accordance with OCD Rule 19.15.7.11 and are in addition to the actions approved by BLM on the following 3160-3 APD form.

Operator Signature Date: 11/13/2019

Well information;

Operator OJR, Well Name and Number North Alamo Unit 523H

API# 30-043-21341, Section 31, Township 23 N/S, Range 7 E/W

Conditions of Approval: (See the below checked and handwritten conditions)

- ☒ Notify Aztec OCD 24hrs prior to casing & cement.
- ☒ If cement doesn't circulate on any casing string or stage tool a CBL will be required. Contact the regulatory agencies prior to proceeding.
- ☒ Hold C-104 for directional survey & "As Drilled" Plat
- ☐ Hold C-104 for: NSL, NSP, DHC, 5.9 Compliance
- ☐ Spacing rule violation. Operator must follow up with change of status notification on other well to be shut in or abandoned
- ☐ Regarding the use of a pit, closed loop system or below grade tank, the operator must comply with the following as applicable:
 - A pit requires a complete C-144 be submitted and approved prior to the construction or use of the pit, pursuant to 19.15.17.8.A
 - A closed loop system requires notification prior to use, pursuant to 19.15.17.9.A
 - A below grade tank requires a registration be filed prior to the construction or use of the below grade tank, pursuant to 19.15.17.8.C
- ☐ Once the well is spud, to prevent ground water contamination through whole or partial conduits from the surface, the operator shall drill without interruption through the fresh water zone or zones and shall immediately set in cement the water protection string
- ☐ Submit Gas Capture Plan form prior to spudding or initiating recompletion operations
- ☒ Regarding Hydraulic Fracturing, review EPA Underground Injection Control Guidance 84
- ☒ Oil base muds are not to be used until fresh water zones are cased and cemented providing isolation from the oil or diesel. This includes synthetic oils. Oil based mud, drilling fluids and solids must be contained in a steel closed loop system.
- ☒ Well-bore communication is regulated under 19.15.29 NMAC. This requires well-bore Communication to be reported in accordance with 19.15.29.8.


NMOCD Approved by Signature

2/21/20
Date

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

FORM APPROVED
OMB No. 1004-0137
Expires: January 31, 2018

1a. Type of work: ☒ DRILL ☐ REENTER		5. Lease Serial No. NMNM006681
1b. Type of Well: ☒ Oil Well ☐ Gas Well ☐ Other		6. If Indian, Allottee or Tribe Name
1c. Type of Completion: ☐ Hydraulic Fracturing ☐ Single Zone ☒ Multiple Zone		7. If Unit or CA Agreement, Name and No. /1/NORTH ALAMITO UNIT / NMNM13522
2. Name of Operator DJR OPERATING LLC		8. Lease Name and Well No. NORTH ALAMITO UNIT 523H
3a. Address 1600 Broadway #1960 Denver CO 80202		9. API Well No. 30-043-21341
3b. Phone No. (include area code) (505)632-3476		10. Field and Pool, or Exploratory Wildcat Alamito Nj Mancos
4. Location of Well (Report location clearly and in accordance with any State requirements. *) At surface NWSEW / 1996 FSL / 694 FWL / LAT 36.181514 / LONG -107.622001 At proposed prod. zone SESW / 608 FSL / 2260 FWL / LAT 36.163064 / LONG -107.5991175		11. Sec., T. R. M. or Blk. and Survey or Area SEC 31 / T23N / R7W / NMP
14. Distance in miles and direction from nearest town or post office* 47 miles		12. County or Parish SANDOVAL
15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any) 713 feet		13. State NM
16. No of acres in lease 642.56		17. Spacing Unit dedicated to this well 562
18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. 2030 feet		20. BLM/BIA Bond No. in file FED: NMB001464
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 6964 feet		22. Approximate date work will start* 03/20/2020
		23. Estimated duration 10 days
24. Attachments		

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No. 1, and the Hydraulic Fracturing rule per 43 CFR 3162.3-3 (as applicable)

- | | |
|--|---|
| 1. Well plat certified by a registered surveyor. | 4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above). |
| 2. A Drilling Plan. | 5. Operator certification. |
| 3. A Surface Use Plan (if the location is on National Forest System Lands, the SUPO must be filed with the appropriate Forest Service Office). | 6. Such other site specific information and/or plans as may be requested by the BLM. |

25. Signature (Electronic Submission)	Name (Printed/Typed) Shaw-Marie N. Ford / Ph: (505)632-3476	Date 11/13/2019
Title Regulatory Specialist		
Approved by (Signature) (Electronic Submission)	Name (Printed/Typed) Dave Mankiewicz / Ph: (505)564-7761	Date 02/10/2020
Title AFM-Minerals		
Office FARMINGTON		

Application approval does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.
Conditions of approval, if any, are attached.

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

APPROVED WITH CONDITIONS
Approval Date: 02/10/2020

NMDCD

FEB 11 2020

DISTRICT III
*(Instructions on page 2)

DISTRICT I
1885 N. French Dr., Hobbs, N.M. 88240
Phone: (505) 983-6181 Fax: (505) 983-0780

DISTRICT II
811 S. First St., Artesia, N.M. 88210
Phone: (505) 946-1288 Fax: (505) 946-0780

DISTRICT III
1000 Rio Grande Blvd., Aztec, N.M. 87410
Phone: (505) 834-6170 Fax: (505) 834-6170

DISTRICT IV
1220 S. St. Francis Dr., Santa Fe, N.M. 87505
Phone: (505) 476-3480 Fax: (505) 476-3480

State of New Mexico
Energy, Minerals & Natural Resources Department

Form C-102
Revised August 1, 2011

Submit one copy to appropriate
District Office

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

¹ API Number 30-043-21341	² Pool Code 98174	³ Pool Name Alamito N; Mancos
⁴ Property Code 325267	⁵ Property Name NORTH ALAMITO UNIT	⁶ Well Number 523H
⁷ GRID No. 371838	⁸ Operator Name DJR OPERATING, LLC	⁹ Elevation 6964'

¹⁰ Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
L	31	23N	7W	3	1996'	SOUTH	694'	WEST	SANDOVAL

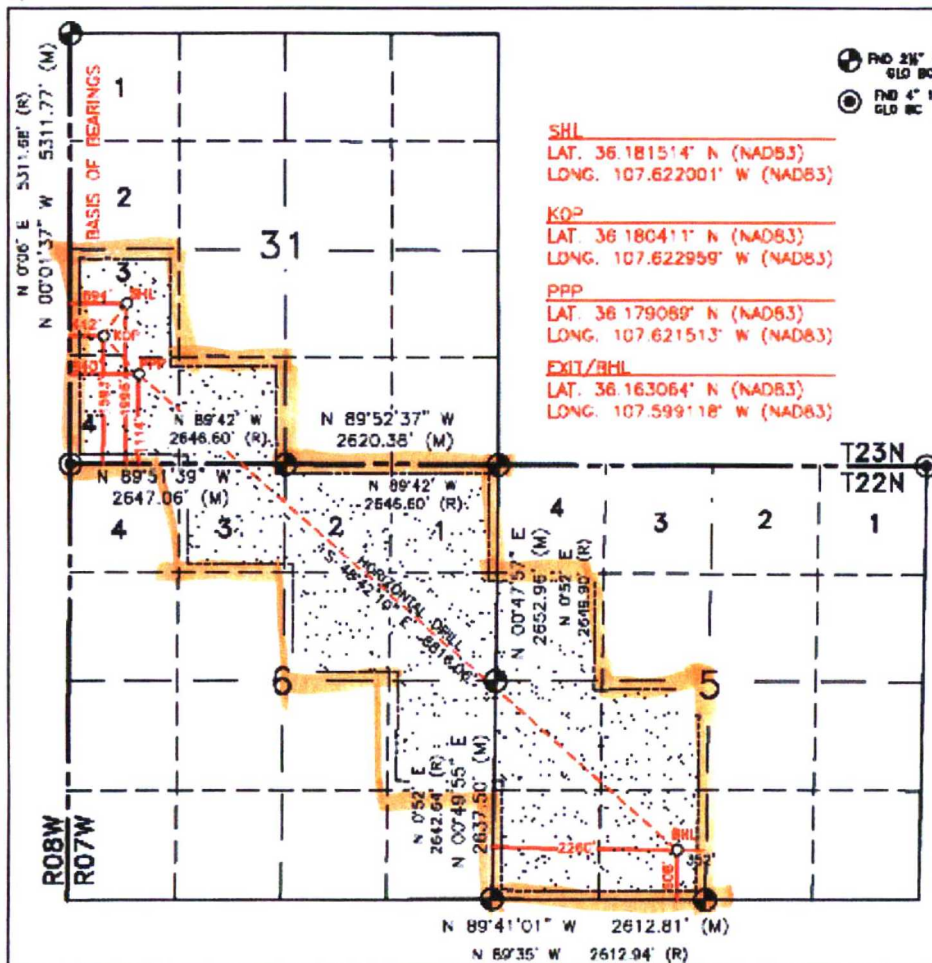
¹¹ Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
N	5	22N	7W		608'	SOUTH	2260'	WEST	SANDOVAL

¹² Dedicated Acres SEC. 31: LOT 3, LOT 4 & SE/4 (121.32 AC.); SEC. 31: LOT 1, LOT 2, LOT 3, SE/4, SW/4 & NE/SE (240.48 AC.); SEC. 31: SW/4 & SW/NW (200 AC.) = 561.77 ACRES TOTAL	¹³ Joint or Infill	¹⁴ Consolidation Code	¹⁵ Order No. R-14081, R-14081A
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NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED
OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

18



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¹⁷ OPERATOR CERTIFICATION

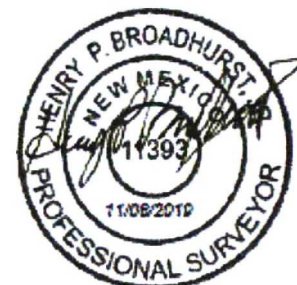
I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or an undivided mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Shaw-Marie Ford 11/11/19
Signature Date
Shaw-Marie Ford
Printed Name
stford@djrc.com
E-mail Address

SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.
MARCH 15, 2019

Date of Survey
Signature and Seal of Professional Surveyor:



Certificate Number 11393

DISTRICT I

1825 N. French Dr., Hobbs, N.M. 88240
Phone: (505) 393-6161 Fax: (505) 393-0720

DISTRICT II

611 S. First St., Artesia, N.M. 88210
Phone: (505) 748-1883 Fax: (505) 748-0720

DISTRICT III

1000 Rio Bravos Rd., Aztec, N.M. 87410
Phone: (505) 334-6178 Fax: (505) 334-6170

DISTRICT IV

1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department

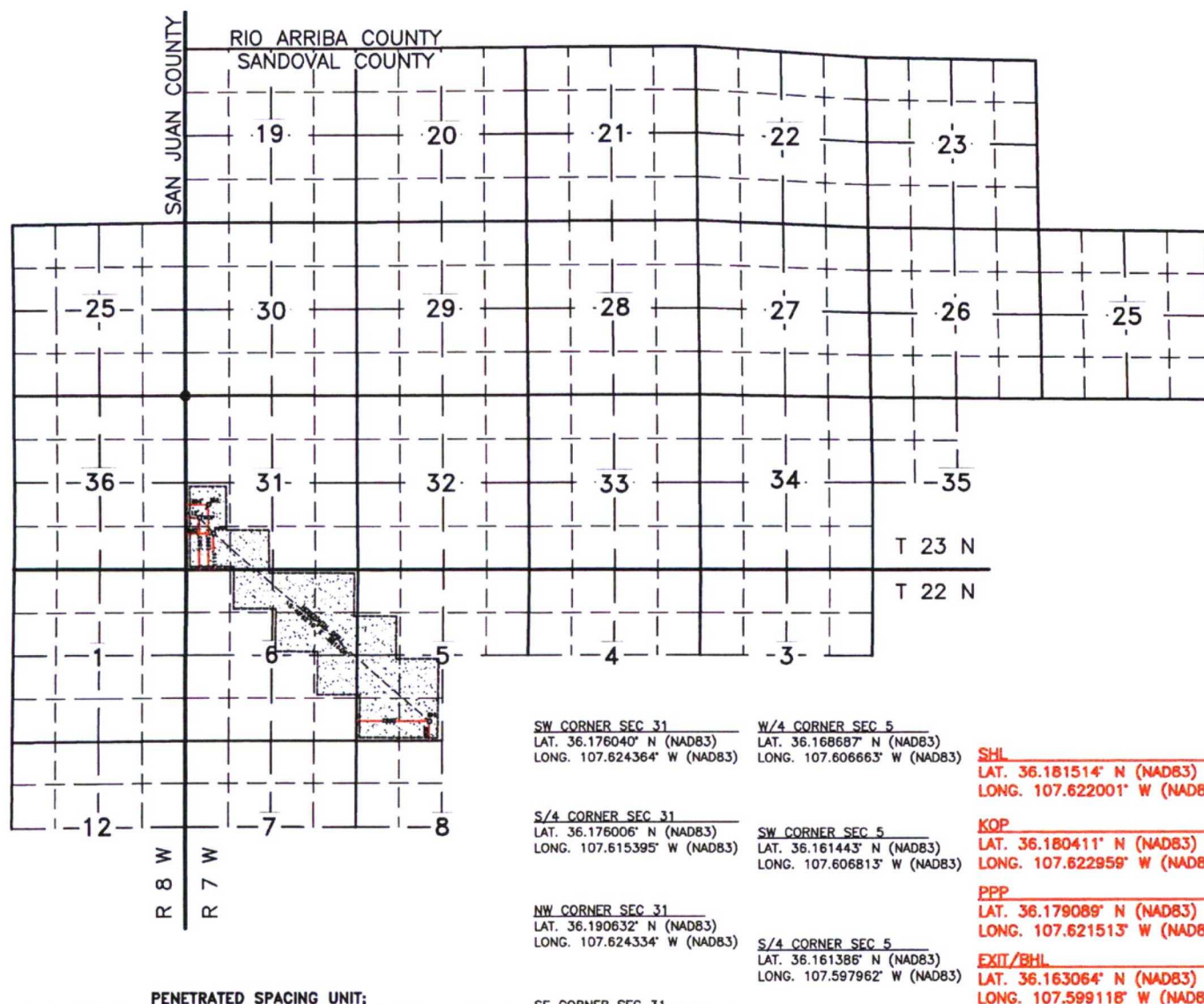
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

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☐ AMENDED REPORT

DJR OPERATING, LLC
NORTH ALAMITO UNIT #523H



DRILLING PLAN **NAU 523H** **Sandoval County, New Mexico**

Surface Location

713-ft FWL & 2002-ft FSL
 Sec 31 T23N R7W
 Graded Elevation 6964' MSL
 RKB Elevation 6978' (14' KB)

SHL Geographical Coordinates (NAD-83)

Latitude 36.1815140° N
 Longitude 107.6220010° W

Kick Off Point for Horizontal Build Curve

4471-ft MD
 4440-ft TVD

Local Coordinates (from SHL)

402-ft South
 282-ft West

Heel Location (Pay zone entry)

840-ft FWL & 1114-ft FSL
 Sec 31 T23N R7W

Heel Geographical Coordinates (NAD-83)

Latitude 36.1790892° N
 Longitude 107.62151330° W

Bottom Hole Location (TD)

2260-ft FWL & 608-ft FSL
 Sec 5 T22N R7W

BHL Geographical Coordinates (NAD-83)

Latitude 36.163064° N
 Longitude 107.5991175° W

Well objectives

This well is planned as a 8810-ft lateral in the Gallup C sand.

Bottom Hole temperature and pressure

The temperature in the Gallup C horizontal objective is 138°F. Bottom hole pressure in the Gallup C is forecast to be 1985 psi.

Formation Tops (Sd = Sand; Sh = Shale; Siltstone = Slt, Coal = C; W = water; O = oil; G = gas; NP = no penetration)

Name	MD (ft)	TVD (ft)	Lithology	Pore fluid	Expected Pore Pressure (ppg)	Planned Mud Weight (ppg)
Ojo Alamo	1047	1043	Sd	W	8.3	8.4 – 8.8
Kirtland	910	908	Sh	-	8.3	8.4 – 8.8
Fruitland	1165	1161	C	G	8.3	9.0 - 9.5
Pictured Cliffs	1422	1416	Sd	W	8.3	9.0 - 9.5
Lewis	1596	1588	Sh	-		9.0 - 9.5
Chacra	2183	2171	Sd	-	8.3	9.0 - 9.5
Menefee	2914	2896	Sd, C	G	8.3	9.0 - 9.5
Point Lookout	3832	3806	Sd	-	8.3	9.0 - 9.5
Mancos	3999	3972	Sh	-		9.0 - 9.5
Mancos Silt	4329	4300	Slt	O/G	6.6	9.0 - 9.5
Gallup A	4839	4784	Slt	O/G	6.6	9.0 - 9.5
Gallup B	4881	4818	Sd	O/G	6.6	8.8 -9.0
Gallup C	5011	4911	Sd	O/G	6.6	8.8 -9.0
Total Depth	14279	5048	Sd	O/G	6.6	8.8 -9.0

Casing Program

Casing OD	Hole Size	Weight (#/ft)	Grade	Coupling	MD Top	MD Bottom	TVD Top	TVD Bottom	Top of Cement
9-5/8"	12-1/4"	36	K-55	STC	surf	350	surf	350	surface
7"	8-3/4"	26	K-55	LTC	surf	5406	surf	5061	surface
4-1/2"	6-1/8"	11.6	P-110	BTC	5126	14279	4977	5048	5126

Note: all casing will be new

Casing Design Load Cases

		Casing String		
	Description	9-5/8" Surface	7" Intermediate	4-1/2" Production Liner
Collapse	Full internal evacuation ¹	✓	✓	✓
	Cementing	✓	✓	✓
Burst	Pressure test	✓ ²	✓ ²	✓
	Gas kick		✓ ³	
	Fracture at shoe, 1/3 BHP at surface		✓ ⁴	
	Injection down casing			✓ ⁵
Axial	Dynamic load on casing coupling ⁶	✓	✓	✓
Axial	Overpull ⁷	✓	✓	✓

Note

- 1 Fluid level at shoe, air column to surface, pore pressure outside
- 2 Tested to 80% of minimum internal yield with freshwater inside, pore pressure outside
- 3 50 bbl kick at TD, 0.50 ppg intensity, 4" drill pipe, 9.0 ppg mud, fracture gradient at shoe
- 4 2060 psi BHP, 687 psi surface pressure, 12.5 ppg EMW shoe integrity
- 5 Surface stimulation pressure of 8000 psi on 8.3 ppg fluid column. Stimulation will be down frac string, so load does not apply to 7" intermediate casing.
- 6 Shock load from abrupt pipe deceleration, evaluated against coupling rating
- 7 Overpull values as follows: Surface casing 20,000 lbs, Intermediate & Production 100,000 lbs

Casing Design Factors

		Design Factors			
Casing string	Casing OD	Burst	Collapse	Axial	Triaxial
Surface	9-5/8"	1.25	13.38	8.16	1.56
Intermediate	7"	1.25	1.50	1.68	1.34
Production liner	4-1/2"	1.37	3.68	1.88	1.69

Cement Design

Additives: A=Accelerator; B=Bond Enhancer; De=Defoamer; Di=Dispersant; Ex=Extender; FI=Fluid Loss L=Lost Circulation; R=Retarder; SA=Suspending Agent; THX=Thixotropic Additive; V=Viscosifier

9-5/8" Surface Casing

	Lead
Name	Redi-Mix
Type	I-II
Additives	20% Fly Ash
Planned top	Surface
Density (ppg)	14.50
Yield (cf/sx)	1.61
Mix water (gal/sx)	7.41
Volume (sx)	114
Volume (bbls)	33
Volume (cu. ft.)	185
Excess %	50

7" Intermediate Casing

	Lead	Tail
Name	BJ Services	BJ Services
Type	III	Poz/G
Additives	FI, De, R	De, FI, Ex
Planned top	Surface	3971-ft
Density (ppg)	12.30	13.50
Yield (cf/sx)	2.34	7.20
Mix water (gal/sx)	13.26	5.64
Volume (sx)	397	237

Volume (bbls)	166	63
Volume (cu.ft.)	929	354
Excess %	60	60

<u>4-1/2" Production Liner</u>	<u>Lead</u>
Name	BJ Services
Type	Poz/G
Additives	De, R, FI, Ex
Planned top	5126-ft
Density (ppg)	13.3
Yield (cf/sx)	1.56
Mix water (gal/sx)	7.71
Volume (sx)	770
Volume (bbls)	214
Volume (cu.ft)	1203
Excess %	40

Wellhead & Pressure Control

The well head will be an 11" 5M multi-bowl system. A 3M BOPE conforming to Onshore Order #2 will be installed on the surface casing. The BOP and accumulator will meet API 16D and 16E respectively.

A PVT mud monitoring system and a trip tank will be rigged up and operational for all hole intervals. An electronic geograph will be employed to monitor and record drilling data (ROP, WOB, SPM, Pressure, RPM and torque).

Mud Program

Surface hole will be drilled with a fresh water, native mud system. In intermediate hole, a low weight 7% KCl LSND drilling fluid will be used, with KCl providing chemical stability for the young shales and clays present in the interval. In production hole a LSND system with polymer and lubricant additives is programmed. Sufficient drill water and mud additives will be on hand to maintain adequate pit volumes and maintain well control.

Hole Section	Fluid type	Interval (MD)	Density (ppg)	Funnel Viscosity	Yield Point	Fluid Loss (cc/30 min)
Surface	Fresh water spud mud	0 – 350	8.4 – 8.8	32 – 44	2 – 12	NC
Intermediate	7% KCl Low solids, non-dispersed	350 – 5406	9.0 – 9.5	38 – 45	8 – 14	<20
Production	Low solids, non-dispersed	5406 – 14279	8.8 – 9.2	34 – 38	6 – 8	6 – 8

Cores, tests and logs

Wellbore surveying: Drift (inclination only) surveys will be obtained in surface hole. MWD directional surveys will be taken in intermediate and production hole.

Logging while drilling: None in surface hole. MWD GR in intermediate and production hole.

Mud logging: a two-person mud logging unit with C1 – C4 gas analysis will be operational in intermediate and production hole.

Electric logging: No open hole electric logs are programmed. A cased hole GR/CCL will be run during completions for perforating depth control.

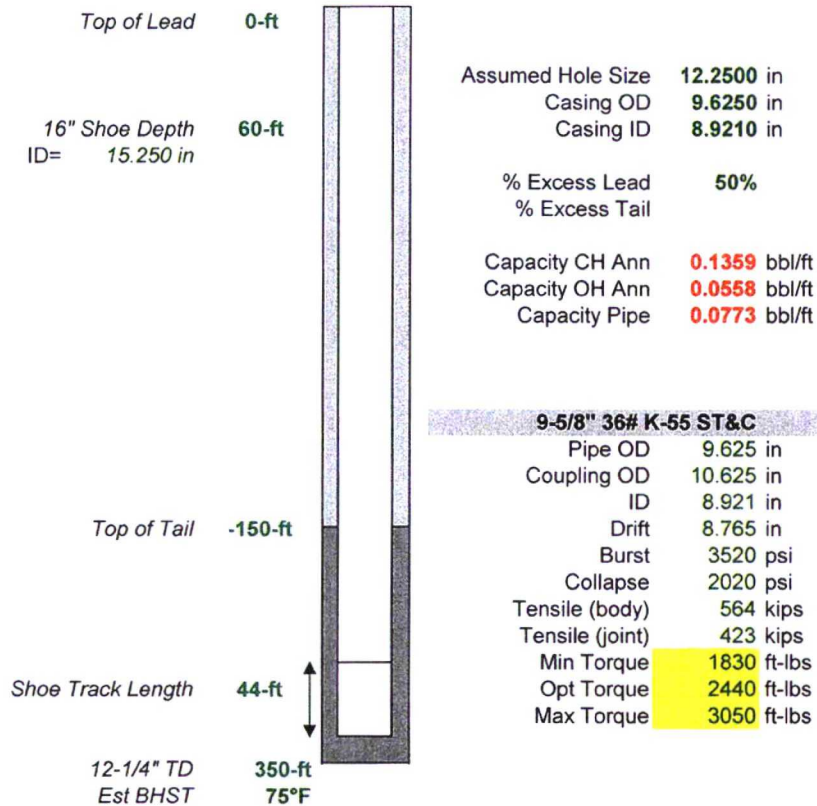
✓ Cuttings and drilling fluids management

A closed loop, steel tank-based circulating system will be used. In addition to the rig solids control equipment, a dewatering centrifuge and chemical flocculation system will be operational to strip solids from the whole mud. All solids will be collected in 3-sided bins and will then be put into transports with a bucket loader. Drying agents will be used if necessary. The solids will be taken to a licensed commercial disposal facility. Whole mud will be dewatered back to drill water and used as make up for subsequent wells or hauled off for disposal. A diagram of the closed loop system is included.

Completion

It is envisioned that this well will be completed with a multi-stage sand frac, using the plug and perf technique. After drilling out the plugs, the current plan is to install a 2-7/8" plunger-assisted gas lift tubing string. The stimulation and completion plan will be sundried at a later date.

9-5/8" Surface Casing & Cementing



Lead Slurry		Properties	
Redi Mix Type I/ii		Density	14.50 ppg
20% Fly Ash		Yield	1.61 cf/sk
		Total Mix Fluid	7.41 gal/sk
		Est pump time (70Bc)	NA
		8-hr compressive	475 psi
		24-hr compressive	1375 psi
Tail Slurry		Properties	
		Density	ppg
		Yield	cf/sk
		Total Mix Fluid	gal/sk
		Est pump time (70Bc)	
		50 psi strength in	
		24/72 hr strength	psi
Volumes			
Lead Volume	33 bbls	114 sx	
Tail Volume	bbls	sx	
Displacement	24 bbls		
Total Volume	56 bbls		

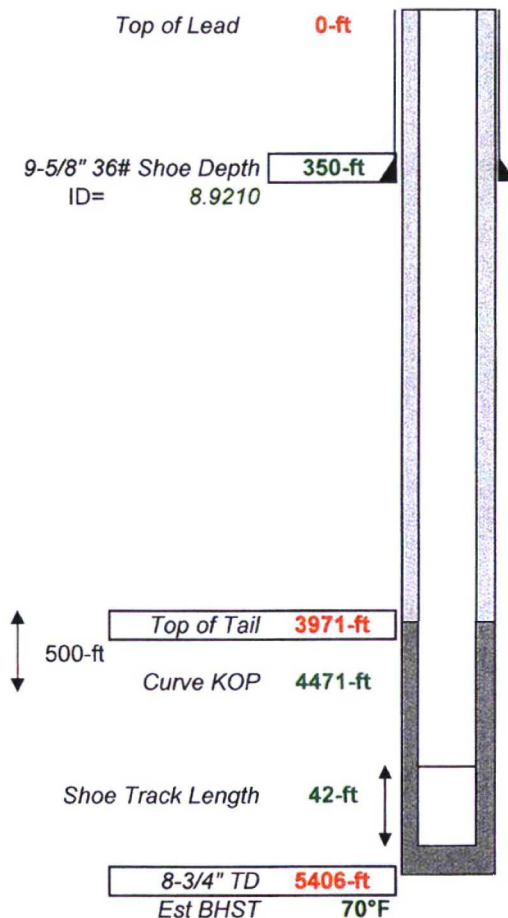
Casing Jewelry and Pump Schedule

Run guide shoe, 1 joint, then float collar. Centralize with 1 one bow spring per joint for the first 500-ft, then 1 every third joint to surface. Bottom centralizer to be 10-ft above guide shoe with stop collar above, thereafter around the coupling. Thread lock guide shoe, shoe track and float collar.

Pump schedule: 40 bbls fresh water, drop bottom plug, lead, tail, top plug, displace with water. Land wellhead housing on u-plate.

523H

7" Intermediate Casing & Cementing NAU 523H



Assumed Hole Size Lead	8.7500 in
Assumed Hole Size Tail	8.7500 in
Casing OD	7.0000 in
Casing ID	6.2760 in

% OH Excess Lead	60%
% OH Excess Tail	60%

Capacity CH Ann	0.0297 bbl/ft
Capacity OH Ann Lead	0.0268 bbl/ft
Capacity OH Ann Tail	0.0268 bbl/ft
Capacity Pipe	0.0383 bbl/ft

7" 26# K-55 LT&C	
Pipe OD	7.000 in
Weight	26 lbs/ft
Grade	K-55
Coupling	LTC
Coupling OD	7.656 in
ID	6.276 in
Drift	6.151 in
Burst	4980 psi
Collapse	4330 psi
Tensile (body)	415 kips
Tensile (joint)	367 kips
Min Torque	ft-lbs
Opt Torque	ft-lbs
Max Torque	ft-lbs

BJ Lead Slurry

Type III	
BA-90	5 lb/sx%
KCI	3.00%
GW-86	0.10%
FL-66	0.20%
R-3	0.50%
FP-25	0.30%

Properties

Density	12.30 ppg
Yield	2.3404 cf/sk
Total Mix Fluid	13.26 gal/sk
Thickening Time	3:11 hr:min
Time to 50 psi (80°F)	5:10 hr:min
24-hr UCA (80°F)	659 psi

BJ Tail Slurry

G+Pozz	50:50
BA-90	3 lb/sx
FL-66	0.40%
FP-25	0.30%
Sod. Met	0.50%
Gyp	3.00%

Properties

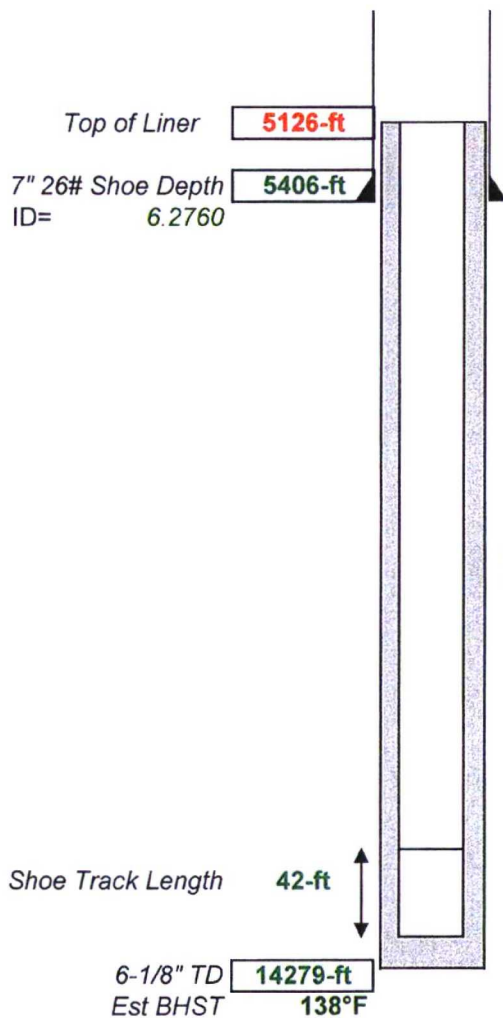
Density	13.50 ppg
Yield	1.4946 cf/sk
Total Mix Fluid	7.24 gal/sk
Thickening Time	3:26 hr:min
Time to 50 psi (135°F)	2:55 hr:min
Time to 500 psi (135°F)	6:40 hr:min

Volumes

Lead Volume	166 bbls	397 sx
Tail Volume	63 bbls	237 sx
Approx Displacement	205 bbls	
Total Volume	434 bbls	

523H

4-1/2" Liner Cementing NAU 523H

Assumed Hole Size **6.1250** inCasing OD **4.5000** inCasing ID **4.0000** in% Excess Open Hole **40%**Capacity CH Ann **0.0186** bbl/ftCapacity OH Ann **0.0168** bbl/ftCapacity Pipe **0.0155** bbl/ft

4-1/2" 11.6# P-110 LT&C

Pipe OD **4.500** inWeight **11.6** lbs/ftGrade **P-110**Coupling **LTC**Coupling OD **5.000** inID **4.000** inDrift **3.875** inBurst **10690** psiCollapse **7580** psiTensile (body) **367** kipsTensile (joint) **279** kipsMin Torque **ft-lbs**Opt Torque **ft-lbs**Max Torque **ft-lbs**

BJ Lead Slurry

G+Pozz 50:50
BA-90 3 lb/sx
GW-86 0.10%
R-3 0.40%
FP-25 30.00%
FL-24 0.40%
Gel 4.00%

Properties

Density **13.30** ppg
Yield **1.5629** cf/sk
Total Mix Fluid **7.70** gal/sk
Thickening Time **6:04** hr:min
Time to 50 psi (147°F) **7:15** hr:min
24-hr UCA (147°F) **1293** psi

Volumes

Lead Volume **214** bbls **770** sxApprox Displacement **154** bblsTotal Volume **369** bbls



Company: DJR Operating
Project: North Alamito Unit
Site: L31 2307
Well: NAU 523H
Wellbore: Original drilling
Design: APD Rev 1

PROJECT DETAILS: North Alamito Unit

Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: New Mexico Western Zone
System Datum: Mean Sea Level
Local North: True



Azimuths to True North
Magnetic North: 8.95°

Magnetic Field
Strength: 49531.4snT
Dip Angle: 62.86°
Date: 5/7/2019
Model: IGRF2015

WELL DETAILS: NAU 523H

GL 6964' & RKB 14' @ 6978.00usft (Aztec 920)
+N/-S +E/-W Northing Easting Latitude Longitude
0.00 0.00 1885436.08 2785457.59 36.1815140 -107.6220010

Plan: APD Rev 1 (NAU 523H/Original drilling)

Created By: Janie Collins Date: 10:32, November 04 2019

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
523H heel rev 1	5063.00	-882.68	143.93	1884553.72	2785603.44	36.1790892	-107.6215133
523H toe rev 1	5048.00	-6715.38	6754.72	1878735.43	2792226.91	36.1630640	-107.5991175

SECTION DETAILS

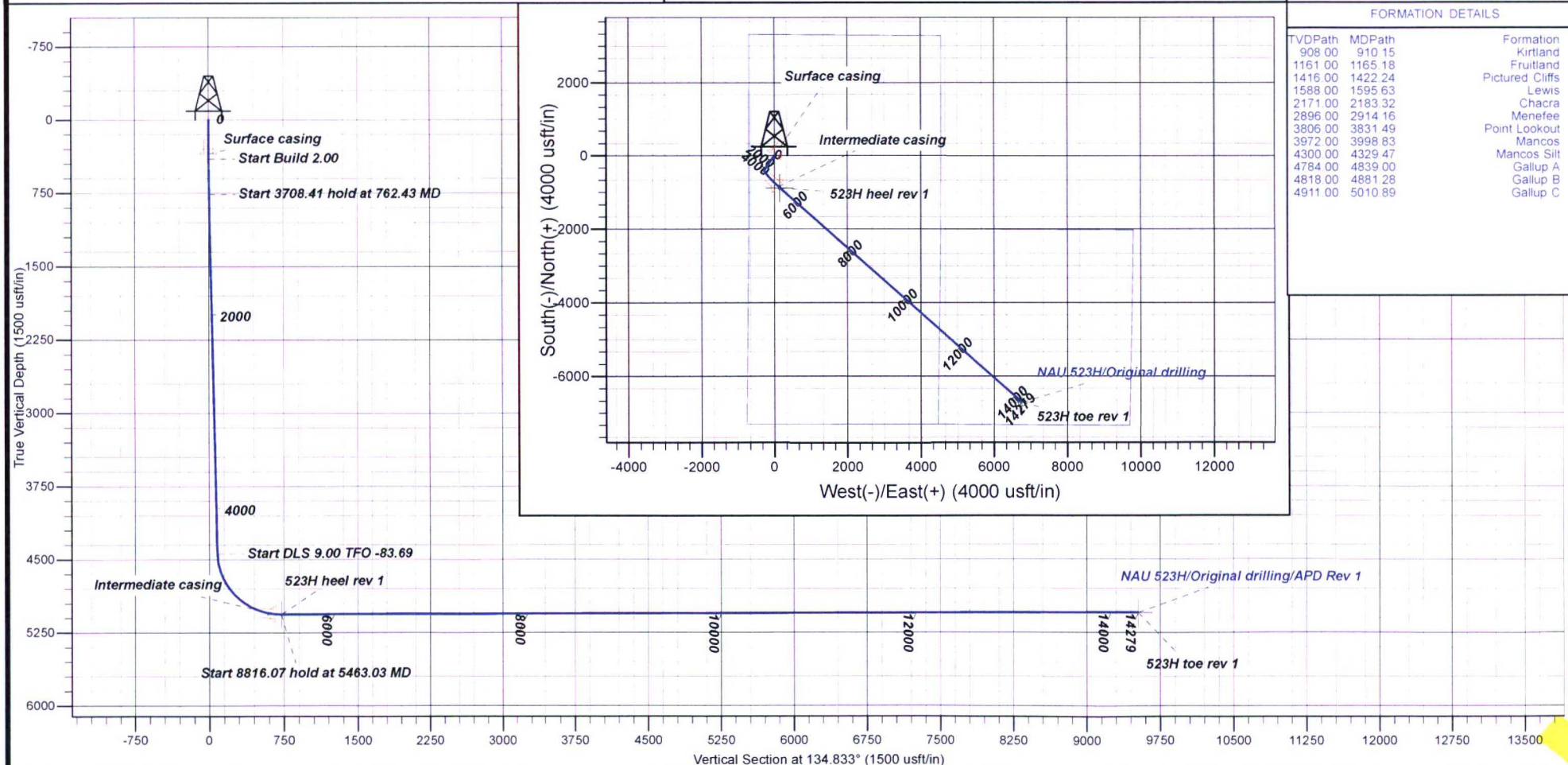
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSet	Target
0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.00	
400.00	0.00	0.000	400.00	0.00	0.00	0.00	0.00	0.00	
762.43	7.25	215.073	761.47	-18.74	-13.16	2.00	215.07	3.88	
4470.84	7.25	215.073	4440.24	-401.68	-282.03	0.00	0.00	83.20	
5463.03	90.10	131.422	5063.00	-882.68	143.93	9.00	-83.69	724.39	523H heel rev 1
14279.11	90.10	131.422	5048.00	-6715.38	6754.72	0.00	0.00	9524.84	523H toe rev 1

CASING DETAILS

TVD	MD	Name
350.00	350.00	Surface casing
5060.56	5405.94	Intermediate casing

FORMATION DETAILS

TVDPath	MDPath	Formation
908.00	910.15	Kirtland
1161.00	1165.18	Fruitland
1416.00	1422.24	Pictured Cliffs
1588.00	1595.63	Lewis
2171.00	2183.32	Chacra
2896.00	2914.16	Menefee
3806.00	3831.49	Point Lookout
3972.00	3998.83	Mancos
4300.00	4329.47	Mancos Silt
4784.00	4839.00	Gallup A
4818.00	4881.28	Gallup B
4911.00	5010.89	Gallup C





DJR Operating

North Alamito Unit

L31 2307

NAU 523H

Original drilling

Plan: APD Rev 1

Standard Planning Report

03 November, 2019



www.scientificdrilling.com

Database: Grand Junction District
Company: DJR Operating
Project: North Alamito Unit
Site: L31 2307
Well: NAU 523H
Wellbore: Original drilling
Design: APD Rev 1

Local Co-ordinate Reference: Well NAU 523H
TVD Reference: GL 6964' & RKB 14' @ 6978.00usft (Aztec 920)
MD Reference: GL 6964' & RKB 14' @ 6978.00usft (Aztec 920)
North Reference: True
Survey Calculation Method: Minimum Curvature

Project	North Alamito Unit		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Western Zone		

Site	L31 2307				
Site Position:		Northing:	1,885,429.49 usft	Latitude:	36.1814960
From:	Lat/Long	Easting:	2,785,438.72 usft	Longitude:	-107.6220650
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in	Grid Convergence:	0.12 °

Well	NAU 523H					
Well Position	+N/-S	6.55 usft	Northing:	1,885,436.09 usft	Latitude:	36.1815140
	+E/-W	18.89 usft	Easting:	2,785,457.59 usft	Longitude:	-107.6220010
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	6,964.00 usft

Wellbore	Original drilling				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	5/7/2019	8.95	62.86	49,531

Design	APD Rev 1				
Audit Notes:					
Version:	Phase:	PLAN	Tie On Depth:	0.00	
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	134.833	

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
400.00	0.00	0.000	400.00	0.00	0.00	0.00	0.00	0.00	0.00	
762.43	7.25	215.073	761.47	-18.74	-13.16	2.00	2.00	0.00	215.07	
4,470.84	7.25	215.073	4,440.24	-401.68	-282.03	0.00	0.00	0.00	0.00	
5,463.03	90.10	131.422	5,063.00	-882.68	143.93	9.00	8.35	-8.43	-83.69	523H heel rev 1
14,279.11	90.10	131.422	5,048.00	-6,715.38	6,754.72	0.00	0.00	0.00	0.00	523H toe rev 1

Database: Grand Junction District
Company: DJR Operating
Project: North Alamito Unit
Site: L31 2307
Well: NAU 523H
Wellbore: Original drilling
Design: APD Rev 1

Local Co-ordinate Reference: Well NAU 523H
TVD Reference: GL 6964' & RKB 14' @ 6978.00usft (Aztec 920)
MD Reference: GL 6964' & RKB 14' @ 6978.00usft (Aztec 920)
North Reference: True
Survey Calculation Method: Minimum Curvature

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.000	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.000	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.000	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.000	400.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	2.00	215.073	499.98	-1.43	-1.00	0.30	2.00	2.00	0.00
600.00	4.00	215.073	599.84	-5.71	-4.01	1.18	2.00	2.00	0.00
700.00	6.00	215.073	699.45	-12.84	-9.02	2.66	2.00	2.00	0.00
762.43	7.25	215.073	761.47	-18.74	-13.16	3.88	2.00	2.00	0.00
800.00	7.25	215.073	798.73	-22.62	-15.88	4.68	0.00	0.00	0.00
900.00	7.25	215.073	897.93	-32.94	-23.13	6.82	0.00	0.00	0.00
1,000.00	7.25	215.073	997.14	-43.27	-30.38	8.96	0.00	0.00	0.00
1,100.00	7.25	215.073	1,096.34	-53.60	-37.63	11.10	0.00	0.00	0.00
1,200.00	7.25	215.073	1,195.54	-63.92	-44.88	13.24	0.00	0.00	0.00
1,300.00	7.25	215.073	1,294.74	-74.25	-52.13	15.38	0.00	0.00	0.00
1,400.00	7.25	215.073	1,393.94	-84.58	-59.38	17.52	0.00	0.00	0.00
1,500.00	7.25	215.073	1,493.14	-94.90	-66.63	19.66	0.00	0.00	0.00
1,600.00	7.25	215.073	1,592.34	-105.23	-73.88	21.79	0.00	0.00	0.00
1,700.00	7.25	215.073	1,691.54	-115.56	-81.13	23.93	0.00	0.00	0.00
1,800.00	7.25	215.073	1,790.74	-125.88	-88.38	26.07	0.00	0.00	0.00
1,900.00	7.25	215.073	1,889.94	-136.21	-95.63	28.21	0.00	0.00	0.00
2,000.00	7.25	215.073	1,989.14	-146.53	-102.88	30.35	0.00	0.00	0.00
2,100.00	7.25	215.073	2,088.34	-156.86	-110.14	32.49	0.00	0.00	0.00
2,200.00	7.25	215.073	2,187.54	-167.19	-117.39	34.63	0.00	0.00	0.00
2,300.00	7.25	215.073	2,286.75	-177.51	-124.64	36.77	0.00	0.00	0.00
2,400.00	7.25	215.073	2,385.95	-187.84	-131.89	38.91	0.00	0.00	0.00
2,500.00	7.25	215.073	2,485.15	-198.17	-139.14	41.04	0.00	0.00	0.00
2,600.00	7.25	215.073	2,584.35	-208.49	-146.39	43.18	0.00	0.00	0.00
2,700.00	7.25	215.073	2,683.55	-218.82	-153.64	45.32	0.00	0.00	0.00
2,800.00	7.25	215.073	2,782.75	-229.15	-160.89	47.46	0.00	0.00	0.00
2,900.00	7.25	215.073	2,881.95	-239.47	-168.14	49.60	0.00	0.00	0.00
3,000.00	7.25	215.073	2,981.15	-249.80	-175.39	51.74	0.00	0.00	0.00
3,100.00	7.25	215.073	3,080.35	-260.13	-182.64	53.88	0.00	0.00	0.00
3,200.00	7.25	215.073	3,179.55	-270.45	-189.89	56.02	0.00	0.00	0.00
3,300.00	7.25	215.073	3,278.75	-280.78	-197.14	58.15	0.00	0.00	0.00
3,400.00	7.25	215.073	3,377.95	-291.11	-204.39	60.29	0.00	0.00	0.00
3,500.00	7.25	215.073	3,477.16	-301.43	-211.64	62.43	0.00	0.00	0.00
3,600.00	7.25	215.073	3,576.36	-311.76	-218.89	64.57	0.00	0.00	0.00
3,700.00	7.25	215.073	3,675.56	-322.08	-226.14	66.71	0.00	0.00	0.00
3,800.00	7.25	215.073	3,774.76	-332.41	-233.39	68.85	0.00	0.00	0.00
3,900.00	7.25	215.073	3,873.96	-342.74	-240.64	70.99	0.00	0.00	0.00
4,000.00	7.25	215.073	3,973.16	-353.06	-247.89	73.13	0.00	0.00	0.00
4,100.00	7.25	215.073	4,072.36	-363.39	-255.14	75.26	0.00	0.00	0.00
4,200.00	7.25	215.073	4,171.56	-373.72	-262.39	77.40	0.00	0.00	0.00
4,300.00	7.25	215.073	4,270.76	-384.04	-269.64	79.54	0.00	0.00	0.00
4,400.00	7.25	215.073	4,369.96	-394.37	-276.89	81.68	0.00	0.00	0.00
4,470.84	7.25	215.073	4,440.24	-401.68	-282.03	83.20	0.00	0.00	0.00
4,500.00	7.97	195.921	4,469.14	-405.14	-283.64	84.49	9.00	2.49	-65.68
4,600.00	14.33	161.083	4,567.31	-423.55	-281.53	98.97	9.00	6.36	-34.84
4,700.00	22.55	149.158	4,662.12	-451.79	-267.66	128.71	9.00	8.22	-11.93
4,800.00	31.19	143.488	4,751.26	-489.14	-242.37	172.98	9.00	8.64	-5.67
4,900.00	39.97	140.107	4,832.51	-534.68	-206.29	230.68	9.00	8.79	-3.38

Database: Grand Junction District
Company: DJR Operating

Project: North Alamito Unit

Site: L31 2307
Well: NAU 523H
Wellbore: Original drilling
Design: APD Rev 1

Local Co-ordinate Reference: Well NAU 523H
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MD Reference: GL 6964' & RKB 14' @ 6978.00usft (Aztec 920)
North Reference: True
Survey Calculation Method: Minimum Curvature

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,000.00	48.83	137.782	4,903.90	-587.31	-160.30	300.39	9.00	8.85	-2.33
5,100.00	57.71	136.015	4,963.65	-645.72	-105.55	380.40	9.00	8.89	-1.77
5,200.00	66.62	134.567	5,010.29	-708.47	-43.37	468.74	9.00	8.91	-1.45
5,300.00	75.54	133.302	5,042.68	-774.01	24.71	563.23	9.00	8.92	-1.26
5,400.00	84.47	132.136	5,060.01	-840.75	97.00	661.54	9.00	8.93	-1.17
5,463.03	90.10	131.422	5,063.00	-882.68	143.93	724.39	9.00	8.93	-1.13
5,500.00	90.10	131.422	5,062.94	-907.13	171.65	761.29	0.00	0.00	0.00
5,600.00	90.10	131.422	5,062.77	-973.29	246.63	861.12	0.00	0.00	0.00
5,700.00	90.10	131.422	5,062.60	-1,039.45	321.62	960.94	0.00	0.00	0.00
5,800.00	90.10	131.422	5,062.43	-1,105.61	396.61	1,060.76	0.00	0.00	0.00
5,900.00	90.10	131.422	5,062.26	-1,171.77	471.59	1,160.58	0.00	0.00	0.00
6,000.00	90.10	131.422	5,062.09	-1,237.93	546.58	1,260.41	0.00	0.00	0.00
6,100.00	90.10	131.422	5,061.92	-1,304.09	621.56	1,360.23	0.00	0.00	0.00
6,200.00	90.10	131.422	5,061.75	-1,370.25	696.55	1,460.05	0.00	0.00	0.00
6,300.00	90.10	131.422	5,061.58	-1,436.41	771.53	1,559.87	0.00	0.00	0.00
6,400.00	90.10	131.422	5,061.41	-1,502.57	846.52	1,659.70	0.00	0.00	0.00
6,500.00	90.10	131.422	5,061.24	-1,568.73	921.51	1,759.52	0.00	0.00	0.00
6,600.00	90.10	131.422	5,061.07	-1,634.89	996.49	1,859.34	0.00	0.00	0.00
6,700.00	90.10	131.422	5,060.90	-1,701.05	1,071.48	1,959.17	0.00	0.00	0.00
6,800.00	90.10	131.422	5,060.73	-1,767.21	1,146.46	2,058.99	0.00	0.00	0.00
6,900.00	90.10	131.422	5,060.56	-1,833.37	1,221.45	2,158.81	0.00	0.00	0.00
7,000.00	90.10	131.422	5,060.39	-1,899.53	1,296.43	2,258.63	0.00	0.00	0.00
7,100.00	90.10	131.422	5,060.21	-1,965.69	1,371.42	2,358.46	0.00	0.00	0.00
7,200.00	90.10	131.422	5,060.04	-2,031.85	1,446.41	2,458.28	0.00	0.00	0.00
7,300.00	90.10	131.422	5,059.87	-2,098.01	1,521.39	2,558.10	0.00	0.00	0.00
7,400.00	90.10	131.422	5,059.70	-2,164.17	1,596.38	2,657.92	0.00	0.00	0.00
7,500.00	90.10	131.422	5,059.53	-2,230.33	1,671.36	2,757.75	0.00	0.00	0.00
7,600.00	90.10	131.422	5,059.36	-2,296.49	1,746.35	2,857.57	0.00	0.00	0.00
7,700.00	90.10	131.422	5,059.19	-2,362.65	1,821.33	2,957.39	0.00	0.00	0.00
7,800.00	90.10	131.422	5,059.02	-2,428.81	1,896.32	3,057.22	0.00	0.00	0.00
7,900.00	90.10	131.422	5,058.85	-2,494.97	1,971.30	3,157.04	0.00	0.00	0.00
8,000.00	90.10	131.422	5,058.68	-2,561.13	2,046.29	3,256.86	0.00	0.00	0.00
8,100.00	90.10	131.422	5,058.51	-2,627.29	2,121.28	3,356.68	0.00	0.00	0.00
8,200.00	90.10	131.422	5,058.34	-2,693.45	2,196.26	3,456.51	0.00	0.00	0.00
8,300.00	90.10	131.422	5,058.17	-2,759.61	2,271.25	3,556.33	0.00	0.00	0.00
8,400.00	90.10	131.422	5,058.00	-2,825.77	2,346.23	3,656.15	0.00	0.00	0.00
8,500.00	90.10	131.422	5,057.83	-2,891.93	2,421.22	3,755.97	0.00	0.00	0.00
8,600.00	90.10	131.422	5,057.66	-2,958.09	2,496.20	3,855.80	0.00	0.00	0.00
8,700.00	90.10	131.422	5,057.49	-3,024.25	2,571.19	3,955.62	0.00	0.00	0.00
8,800.00	90.10	131.422	5,057.32	-3,090.41	2,646.18	4,055.44	0.00	0.00	0.00
8,900.00	90.10	131.422	5,057.15	-3,156.57	2,721.16	4,155.27	0.00	0.00	0.00
9,000.00	90.10	131.422	5,056.98	-3,222.73	2,796.15	4,255.09	0.00	0.00	0.00
9,100.00	90.10	131.422	5,056.81	-3,288.89	2,871.13	4,354.91	0.00	0.00	0.00
9,200.00	90.10	131.422	5,056.64	-3,355.05	2,946.12	4,454.73	0.00	0.00	0.00
9,300.00	90.10	131.422	5,056.47	-3,421.21	3,021.10	4,554.56	0.00	0.00	0.00
9,400.00	90.10	131.422	5,056.30	-3,487.37	3,096.09	4,654.38	0.00	0.00	0.00
9,500.00	90.10	131.422	5,056.13	-3,553.53	3,171.07	4,754.20	0.00	0.00	0.00
9,600.00	90.10	131.422	5,055.96	-3,619.69	3,246.06	4,854.02	0.00	0.00	0.00
9,700.00	90.10	131.422	5,055.79	-3,685.85	3,321.05	4,953.85	0.00	0.00	0.00
9,800.00	90.10	131.422	5,055.62	-3,752.01	3,396.03	5,053.67	0.00	0.00	0.00
9,900.00	90.10	131.422	5,055.45	-3,818.17	3,471.02	5,153.49	0.00	0.00	0.00
10,000.00	90.10	131.422	5,055.28	-3,884.33	3,546.00	5,253.32	0.00	0.00	0.00



Scientific Drilling, Intl
Planning Report



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Site: L31 2307
Well: NAU 523H
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Design: APD Rev 1

Local Co-ordinate Reference: Well NAU 523H
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MD Reference: GL 6964' & RKB 14' @ 6978.00usft (Aztec 920)
North Reference: True
Survey Calculation Method: Minimum Curvature

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
10,100.00	90.10	131.422	5,055.11	-3,950.49	3,620.99	5,353.14	0.00	0.00	0.00
10,200.00	90.10	131.422	5,054.94	-4,016.65	3,695.97	5,452.96	0.00	0.00	0.00
10,300.00	90.10	131.422	5,054.77	-4,082.81	3,770.96	5,552.78	0.00	0.00	0.00
10,400.00	90.10	131.422	5,054.60	-4,148.97	3,845.95	5,652.61	0.00	0.00	0.00
10,500.00	90.10	131.422	5,054.43	-4,215.13	3,920.93	5,752.43	0.00	0.00	0.00
10,600.00	90.10	131.422	5,054.26	-4,281.29	3,995.92	5,852.25	0.00	0.00	0.00
10,700.00	90.10	131.422	5,054.09	-4,347.45	4,070.90	5,952.07	0.00	0.00	0.00
10,800.00	90.10	131.422	5,053.92	-4,413.61	4,145.89	6,051.90	0.00	0.00	0.00
10,900.00	90.10	131.422	5,053.75	-4,479.77	4,220.87	6,151.72	0.00	0.00	0.00
11,000.00	90.10	131.422	5,053.58	-4,545.92	4,295.86	6,251.54	0.00	0.00	0.00
11,100.00	90.10	131.422	5,053.41	-4,612.08	4,370.85	6,351.37	0.00	0.00	0.00
11,200.00	90.10	131.422	5,053.24	-4,678.24	4,445.83	6,451.19	0.00	0.00	0.00
11,300.00	90.10	131.422	5,053.07	-4,744.40	4,520.82	6,551.01	0.00	0.00	0.00
11,400.00	90.10	131.422	5,052.90	-4,810.56	4,595.80	6,650.83	0.00	0.00	0.00
11,500.00	90.10	131.422	5,052.73	-4,876.72	4,670.79	6,750.66	0.00	0.00	0.00
11,600.00	90.10	131.422	5,052.56	-4,942.88	4,745.77	6,850.48	0.00	0.00	0.00
11,700.00	90.10	131.422	5,052.39	-5,009.04	4,820.76	6,950.30	0.00	0.00	0.00
11,800.00	90.10	131.422	5,052.22	-5,075.20	4,895.74	7,050.12	0.00	0.00	0.00
11,900.00	90.10	131.422	5,052.05	-5,141.36	4,970.73	7,149.95	0.00	0.00	0.00
12,000.00	90.10	131.422	5,051.88	-5,207.52	5,045.72	7,249.77	0.00	0.00	0.00
12,100.00	90.10	131.422	5,051.71	-5,273.68	5,120.70	7,349.59	0.00	0.00	0.00
12,200.00	90.10	131.422	5,051.54	-5,339.84	5,195.69	7,449.42	0.00	0.00	0.00
12,300.00	90.10	131.422	5,051.37	-5,406.00	5,270.67	7,549.24	0.00	0.00	0.00
12,400.00	90.10	131.422	5,051.20	-5,472.16	5,345.66	7,649.06	0.00	0.00	0.00
12,500.00	90.10	131.422	5,051.03	-5,538.32	5,420.64	7,748.88	0.00	0.00	0.00
12,600.00	90.10	131.422	5,050.86	-5,604.48	5,495.63	7,848.71	0.00	0.00	0.00
12,700.00	90.10	131.422	5,050.69	-5,670.64	5,570.62	7,948.53	0.00	0.00	0.00
12,800.00	90.10	131.422	5,050.52	-5,736.80	5,645.60	8,048.35	0.00	0.00	0.00
12,900.00	90.10	131.422	5,050.35	-5,802.96	5,720.59	8,148.17	0.00	0.00	0.00
13,000.00	90.10	131.422	5,050.18	-5,869.12	5,795.57	8,248.00	0.00	0.00	0.00
13,100.00	90.10	131.422	5,050.01	-5,935.28	5,870.56	8,347.82	0.00	0.00	0.00
13,200.00	90.10	131.422	5,049.84	-6,001.44	5,945.54	8,447.64	0.00	0.00	0.00
13,300.00	90.10	131.422	5,049.67	-6,067.60	6,020.53	8,547.47	0.00	0.00	0.00
13,400.00	90.10	131.422	5,049.50	-6,133.76	6,095.51	8,647.29	0.00	0.00	0.00
13,500.00	90.10	131.422	5,049.33	-6,199.92	6,170.50	8,747.11	0.00	0.00	0.00
13,600.00	90.10	131.422	5,049.16	-6,266.08	6,245.49	8,846.93	0.00	0.00	0.00
13,700.00	90.10	131.422	5,048.99	-6,332.24	6,320.47	8,946.76	0.00	0.00	0.00
13,800.00	90.10	131.422	5,048.82	-6,398.40	6,395.46	9,046.58	0.00	0.00	0.00
13,900.00	90.10	131.422	5,048.65	-6,464.56	6,470.44	9,146.40	0.00	0.00	0.00
14,000.00	90.10	131.422	5,048.47	-6,530.72	6,545.43	9,246.22	0.00	0.00	0.00
14,100.00	90.10	131.422	5,048.30	-6,596.88	6,620.41	9,346.05	0.00	0.00	0.00
14,200.00	90.10	131.422	5,048.13	-6,663.04	6,695.40	9,445.87	0.00	0.00	0.00
14,279.11	90.10	131.422	5,048.00	-6,715.38	6,754.72	9,524.84	0.00	0.00	0.00

Database: Grand Junction District
Company: DJR Operating
Project: North Alamito Unit
Site: L31 2307
Well: NAU 523H
Wellbore: Original drilling
Design: APD Rev 1

Local Co-ordinate Reference: Well NAU 523H
TVD Reference: GL 6964' & RKB 14' @ 6978.00usft (Aztec 920)
MD Reference: GL 6964' & RKB 14' @ 6978.00usft (Aztec 920)
North Reference: True
Survey Calculation Method: Minimum Curvature

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
523H toe rev 1 - plan hits target center - Circle (radius 100.00)	0.00	0.000	5,048.00	-6,715.38	6,754.72	1,878,735.44	2,792,226.91	36.1630640	-107.5991175
523H heel rev 1 - plan hits target center - Circle (radius 50.00)	0.00	0.000	5,063.00	-882.68	143.93	1,884,553.73	2,785,603.44	36.1790892	-107.6215133

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (in)	Hole Diameter (in)
350.00	350.00	Surface casing	9.63	12.25
5,405.94	5,060.56	Intermediate casing	7.00	8.75

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
910.15	908.00	Kirtland		0.00	0.000
1,165.18	1,161.00	Fruitland		0.00	0.000
1,422.24	1,416.00	Pictured Cliffs		0.00	0.000
1,595.63	1,588.00	Lewis		0.00	0.000
2,183.32	2,171.00	Chacra		0.00	0.000
2,914.16	2,896.00	Menefee		0.00	0.000
3,831.49	3,806.00	Point Lookout		0.00	0.000
3,998.83	3,972.00	Mancos		0.00	0.000
4,329.47	4,300.00	Mancos Silt		0.00	0.000
4,839.00	4,784.00	Gallup A		0.00	0.000
4,881.28	4,818.00	Gallup B		0.00	0.000
5,010.89	4,911.00	Gallup C		0.00	0.000

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
400.00	400.00	0.00	0.00	Start Build 2.00
762.43	761.47	-18.74	-13.16	Start 3708.41 hold at 762.43 MD
4,470.84	4,440.24	-401.68	-282.03	Start DLS 9.00 TFO -83.69
5,463.03	5,063.00	-882.68	143.93	Start 8816.07 hold at 5463.03 MD
14,279.11	5,048.00	-6,715.38	6,754.72	TD at 14279.11



DJR Operating

North Alamito Unit

L31 2307

NAU 523H

Original drilling

APD Rev 1

Anticollision Report

03 November, 2019



www.scientificdrilling.com

Company:	DJR Operating	Local Co-ordinate Reference:	Well NAU 523H
Project:	North Alamito Unit	TVD Reference:	GL 6964' & RKB 14' @ 6978.00usft (Aztec 920)
Reference Site:	L31 2307	MD Reference:	GL 6964' & RKB 14' @ 6978.00usft (Aztec 920)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	NAU 523H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Original drilling	Database:	Grand Junction District
Reference Design:	APD Rev 1	Offset TVD Reference:	Offset Datum

Reference	APD Rev 1		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	MD + Stations Interval 100.00usft	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 15,000.00 usft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Survey Tool Program	Date	11/3/2019		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.00	14,278.73	APD Rev 1 (Original drilling)	MWD+HDGM	OWSG MWD + HDGM

Summary						
Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
L31 2307						
NAU 334H - Original drilling - APD Rev 1	589.39	588.87	17.10	13.30	4.498 CC	
NAU 334H - Original drilling - APD Rev 1	600.00	599.37	17.14	13.26	4.415 ES	
NAU 334H - Original drilling - APD Rev 1	13,500.00	14,196.88	960.01	486.27	2.026 SF	
NAU 335H - Original drilling - APD Rev 1	400.00	400.00	19.87	17.42	8.082 CC, ES	
NAU 335H - Original drilling - APD Rev 1	600.00	599.84	25.80	21.95	6.686 SF	
NAU 524H - Original drilling - APD Rev 1	400.00	400.00	39.86	37.41	16.211 CC, ES	
NAU 524H - Original drilling - APD Rev 1	5,200.00	5,224.18	200.62	159.67	4.899 SF	

Offset Design L31 2307 - NAU 334H - Original drilling - APD Rev 1													
Survey Program: 0-MWD+HDGM													
Offset Site Error: 0.00 usft													
Offset Well Error: 0.00 usft													
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
0.00	0.00	0.00	0.00	0.00	0.00	-109.13	-6.55	-18.89	19.99				
100.00	100.00	100.00	100.00	0.15	0.15	-109.13	-6.55	-18.89	19.99	19.68	0.31	64.847	
200.00	200.00	200.00	200.00	0.51	0.51	-109.13	-6.55	-18.89	19.99	18.97	1.03	19.499	
300.00	300.00	300.00	300.00	0.87	0.87	-109.13	-6.55	-18.89	19.99	18.25	1.74	11.475	
400.00	400.00	400.00	400.00	1.23	1.23	-109.13	-6.55	-18.89	19.99	17.53	2.46	8.130	
500.00	499.98	499.94	499.93	1.57	1.59	41.95	-5.63	-19.21	18.68	15.52	3.16	5.911	
589.39	589.26	588.87	588.78	1.88	1.91	64.98	-2.13	-20.42	17.10	13.30	3.80	4.498 CC	
600.00	599.84	599.37	599.27	1.92	1.95	68.94	-1.54	-20.63	17.14	13.26	3.88	4.415 ES	
700.00	699.45	697.75	697.34	2.26	2.30	107.04	5.71	-23.14	23.41	18.67	4.74	4.942	
762.43	761.47	758.39	757.64	2.49	2.53	122.39	11.76	-25.24	33.02	27.76	5.26	6.274	
800.00	798.73	794.57	793.55	2.63	2.66	128.31	15.94	-26.69	40.38	34.81	5.57	7.255	
900.00	897.93	889.95	887.91	3.00	3.02	136.46	29.02	-31.22	63.29	56.94	6.34	9.978	
1,000.00	997.14	984.43	980.90	3.39	3.39	139.73	44.82	-36.70	89.80	82.72	7.08	12.686	
1,100.00	1,096.34	1,080.51	1,075.28	3.77	3.78	141.42	61.80	-42.59	117.40	109.67	7.73	15.184	
1,200.00	1,195.54	1,176.58	1,169.65	4.16	4.17	142.46	78.77	-48.47	145.06	136.66	8.40	17.264	
1,300.00	1,294.74	1,272.65	1,264.03	4.55	4.57	143.17	95.74	-54.36	172.75	163.67	9.08	19.016	
1,400.00	1,393.94	1,368.72	1,358.41	4.95	4.97	143.68	112.71	-60.24	200.46	190.68	9.78	20.505	
1,500.00	1,493.14	1,464.79	1,452.79	5.34	5.38	144.07	129.68	-66.13	228.18	217.71	10.48	21.783	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Company: DJR Operating
Project: North Alamito Unit
Site: L31 2307
Well: NAU 523H
Wellbore: Original drilling
Design: APD Rev 1

PROJECT DETAILS: North Alamito Unit

Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: New Mexico Western Zone
System Datum: Mean Sea Level
Local North: True



Azimuths to True North
Magnetic North: 8.95°

Magnetic Field
Strength: 49531.4snT
Dip Angle: 62.86°
Date: 5/7/2019
Model: IGRF2015

WELL DETAILS: NAU 523H

GL 6964' & RKB 14' @ 6978.00usft (Aztec 920)
+N/-S +E/-W Northing Easting Latitude Longitude
0.00 0.00 1885436.08 2785457.59 36.1815140 -107.6220010

Plan: APD Rev 1 (NAU 523H/Original drilling)

Created By: Janie Collins Date: 10:32, November 04 2019

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
523H heel rev 1	5063.00	-882.68	143.93	1884553.72	2785603.44	36.1790892	-107.6215133
523H toe rev 1	5048.00	-8715.38	6754.72	1878735.43	2792226.91	36.1630640	-107.5991175

SECTION DETAILS

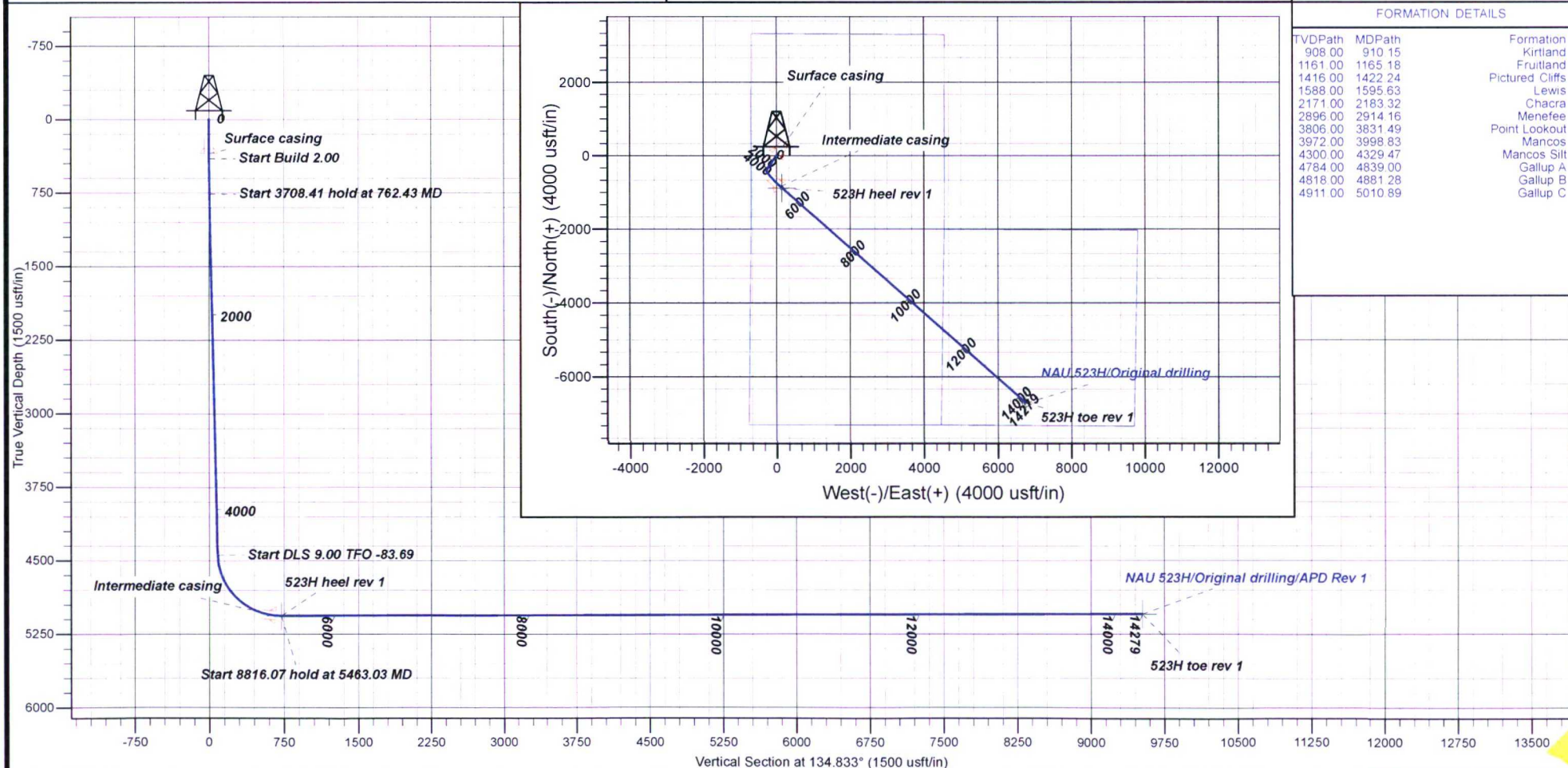
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Target
0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.00	
400.00	0.00	0.000	400.00	0.00	0.00	0.00	0.00	0.00	
762.43	7.25	215.073	761.47	-18.74	-13.16	2.00	215.07	3.88	
4470.84	7.25	215.073	4440.24	-401.68	-282.03	0.00	0.00	83.20	
5463.03	90.10	131.422	5063.00	-882.68	143.93	9.00	-83.69	724.39	523H heel rev 1
14279.11	90.10	131.422	5048.00	-8715.38	6754.72	0.00	0.00	9524.84	523H toe rev 1

CASING DETAILS

TVD	MD	Name
350.00	350.00	Surface casing
5060.56	5405.94	Intermediate casing

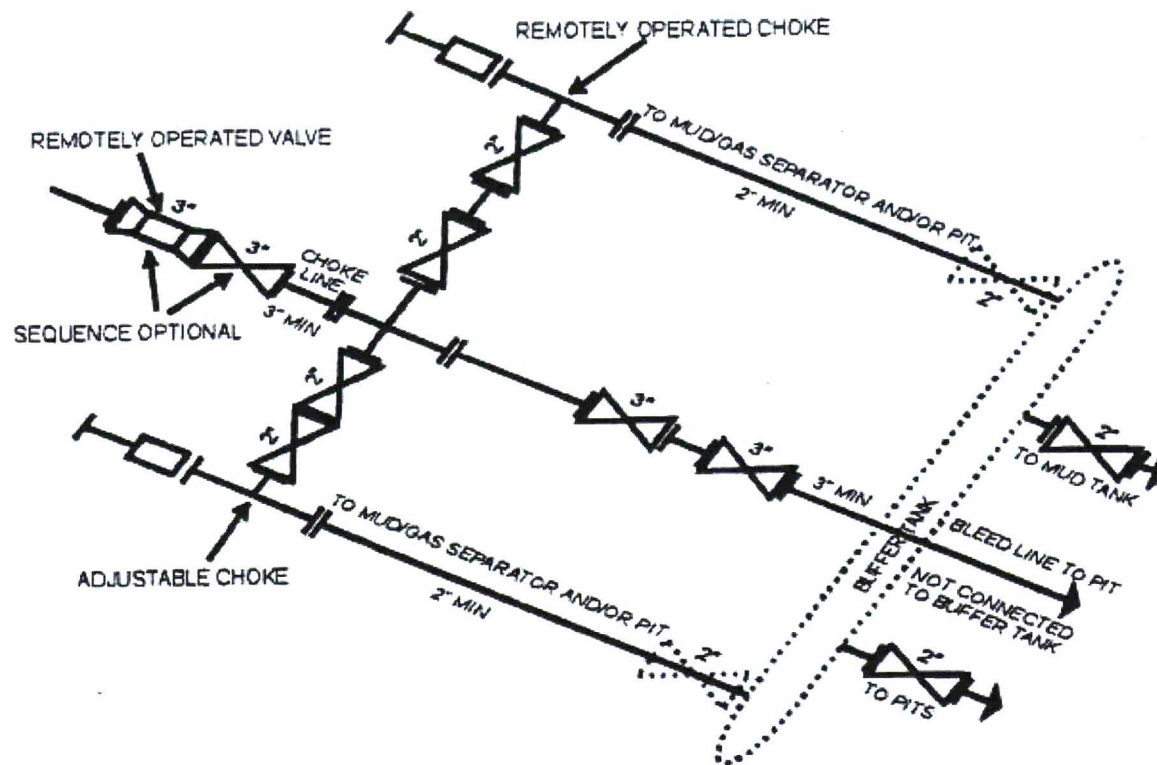
FORMATION DETAILS

TVDPath	MDPath	Formation
908.00	910.15	Kirtland
1161.00	1165.18	Fruitland
1416.00	1422.24	Pictured Cliffs
1588.00	1595.63	Lewis
2171.00	2183.32	Chacra
2896.00	2914.16	Menefee
3806.00	3831.49	Point Lookout
3972.00	3998.83	Mancos
4300.00	4329.47	Mancos Silt
4784.00	4839.00	Gallup A
4818.00	4881.28	Gallup B
4911.00	5010.89	Gallup C



Choke Manifold

Actual system to conform with Onshore Order 2



Proposed BOP stack
11" 5M RRA

