State of New Mexico
Energy, Minerals and Natural Resources Department

Susana Martinez
Governor

Ken McQueen
Cabinet Secretary

Matthias Sayer
Deputy Cabinet Secretary

David R. Catanach, 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 3160-4 or 3160-5 form.

Operator Signature Date: 5/31/2017
Well information:

API WELL #	Well Name	Well #	Operator Name	Type	Stat	County	Surf_Owner	UL	Sec	Twp	N/S	Rng	W/E
30-039-24338-00-00	SAN JUAN 32 5 UNIT NP	101	SOUTHLAND ROYALTY COMPANY LLC	G	A	Rio Arriba	F	H	23	32	N	6	W

Drilling/Casing Change

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

✓ Notify Aztec OCD 24hrs prior to casing & cement.

✓ Hold C-104 for directional survey & "As Drilled" Plat

✓ Hold C-104 for ✓ NSL, ☐ NSP, ☐ DHC

☐ Spacing rule violation. Operator must follow up with change of status notification on other well to be shut in or abandoned

☐ Ensure compliance with 19.15.17

☐ 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

✓ 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.

Additional requirements

*File C104 and completion report for Basin Fruitland Coal before returning to production.

Kathleen Allen

NMOCD Approved by Signature

6/16/17
Date

Form 3160-5
(June 2015)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

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

SUNDRY NOTICES AND REPORTS ON WELLS

Do not use this form for proposals to drill or to re-enter an abandoned well. Use form 3160-3 (APD) for such proposals.

SUBMIT IN TRIPLICATE - Other instructions on page 2

5. Lease Serial No.
NMSF079011

6. If Indian, Allottee or Tribe Name

7. If Unit or CA/Agreement, Name and/or No.

1. Type of Well
☐ Oil Well ☐ Gas Well ☒ Other: COAL BED METHANE

8. Well Name and No.
SAN JUAN 32-5 UNIT 101

2. Name of Operator
ENERGEN RESOURCES CORPORATION
Contact: ROBBIE A GRIGG
E-Mail: rgrigg@mspartners.com

9. API Well No.
30-039-24338-00-S1

3a. Address
2010 AFTON PLACE
FARMINGTON, NM 87401

3b. Phone No. (include area code)
Ph: 817.334.7842

10. Field and Pool or Exploratory Area
BASIN FRUITLAND COAL

4. Location of Well *(Footage, Sec., T., R., M., or Survey Description)*
Sec 23 T32N R6W SENE 2325FNL 1010FEL
36.966740 N Lat, 107.420850 W Lon

11. County or Parish, State
RIO ARRIBA COUNTY, NM

12. CHECK THE APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION			
☒ Notice of Intent	☐ Acidize	☐ Deepen	☐ Production (Start/Resume)	☐ Water Shut-Off
☐ Subsequent Report	☐ Alter Casing	☐ Hydraulic Fracturing	☐ Reclamation	☐ Well Integrity
☐ Final Abandonment Notice	☐ Casing Repair	☐ New Construction	☒ Recomplete	☐ Other
	☐ Change Plans	☐ Plug and Abandon	☐ Temporarily Abandon	
	☐ Convert to Injection	☐ Plug Back	☐ Water Disposal	

13. Describe Proposed or Completed Operation: Clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recomplete horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports must be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompletion in a new interval, a Form 3160-4 must be filed once testing has been completed. Final Abandonment Notices must be filed only after all requirements, including reclamation, have been completed and the operator has determined that the site is ready for final inspection.

Southland Royalty Company LLC would like to recomplete this well by drilling a horizontal lateral off the existing vertical mainbore as indicated on the proposed attached C-102 and directional well plan.
The existing vertical mainbore is a sidetracked vertical wellbore. It also has 1 existing lateral in the Fruitland Coal (2689'MD-4846'MD).
A cast iron bridge plug will be set at approximately 2750' to isolate the vertical sidetrack mainbore. A composite bridge plug will be set at approximately 2470' to isolate the existing lateral and serve as a base for the whipstock assembly.
A window will be milled in the existing 7" casing from approximately 2450'-2460'. The lateral will be drilled to 5477'MD/2990'TVD. A 2.875" 6.5#/ft J-55 pre-perforated liner will be ran and set from 2450'MD-5477'MD.
A 2.375 production tubing string will be run to 2450' in the mainbore 7" casing.

OIL CONS. DIV DIST. 3

JUN 15 2017

PLEASE APPROVAL OR ACCEPTANCE OF THIS ACTION DOES NOT RELIEVE THE LESSEE AND OPERATOR FROM OBTAINING ANY OTHER AUTHORIZATION REQUIRED FOR OPERATIONS ON FEDERAL AND INDIAN LANDS

14. I hereby certify that the foregoing is true and correct.
Electronic Submission #377524 verified by the BLM Well Information System
For ENERGEN RESOURCES CORPORATION, sent to the Farmington
Committed to AFMSS for processing by JACK SAVAGE on 06/12/2017 (17JWS0121SE)

Name *(Printed/Typed)* ROBBIE A GRIGG — Title SUPVR REGULATORY REPORTING

Signature (Electronic Submission) — Date 05/31/2017

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved By JACK SAVAGE — Title PETROLEUM ENGINEER — Date 06/12/2017

Conditions of approval, if any, are attached. Approval of this notice 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.

Office Farmington

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.

(Instructions on page 2)

**** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ****

NMOCD

DISTRICT I
1625 N. French Dr., Hobbs, N.M. 88240
Phone: (575) 393-6161 Fax: (575) 393-0720
DISTRICT II
811 S. First St., Artesia, N.M. 88210
Phone: (575) 748-1283 Fax: (575) 748-9720
DISTRICT III
1000 Rio Brazos 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

Form C-102
Revised August 1, 2011

Submit one copy to appropriate District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

[1] API Number	[2] Pool Code	[3] Pool Name
30-039-24338	71629	BASIN FRUITLAND COAL

[4] Property Code	[5] Property Name	[6] Well Number
22045	SAN JUAN 32-5 UNIT NP	101

[7] OGRID No.	[8] Operator Name	[9] Elevation
162928	SOUTHLAND ROYALTY CO., LLC	6404'

[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
H	23	32N	6W		2325'	NORTH	1010'	EAST	RIO ARRIBA

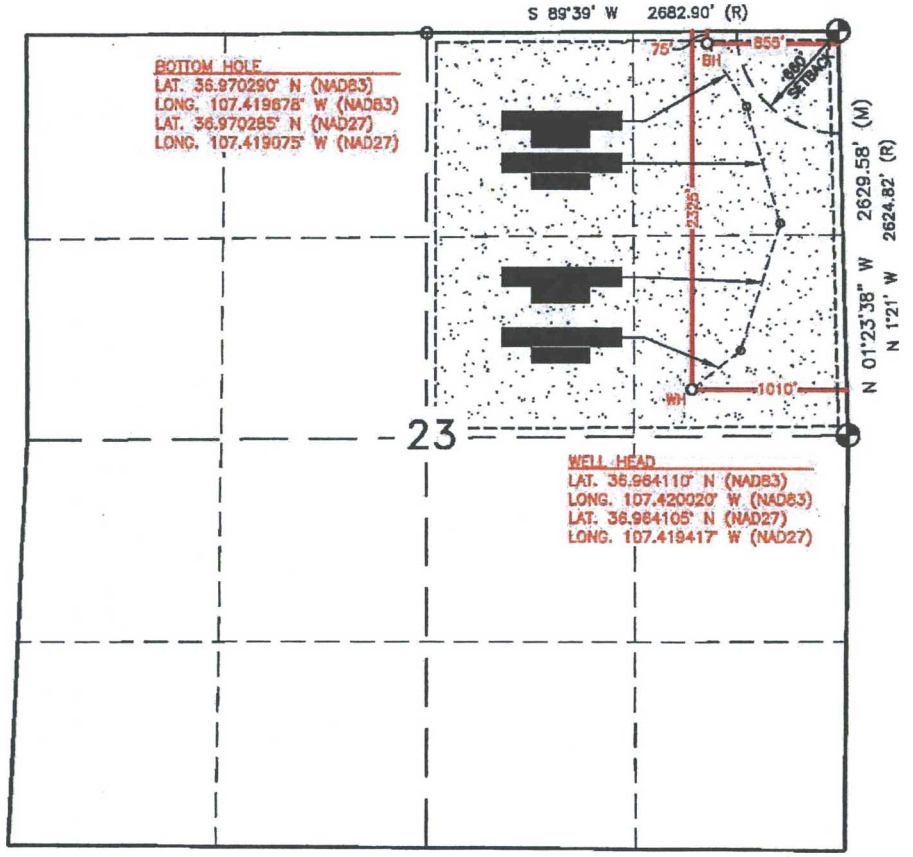
[11] Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
A	23	32N	6W		75'	NORTH	855'	EAST	RIO ARRIBA

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No.
160 ACRES - NE/4			

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

16



18

[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 unleased 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.

Signature Date

Printed Name

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.

MAY 26, 2017

Date of Survey

Signature and Seal of Professional Surveyor:

Certificate Number 11393

Application for Permit to Drill
Drilling Plan
REVISED: 05/30/2017

SOUTHLAND ROYALITY COMPANY LLC

SAN JUAN 32-5 UNIT NP 101
Re-enter Existing Well
API No. 30-039-24338
Originally Drilled June 08, 1989
Existing Well Surface Location: 2325' FNL & 1010' FEL
Section 23, T32N, R06W
Existing Well GL Elev = 6404'
Lat. = 36.96673° N
Long. = 107.42149° W
NAD83
Rio Arriba County, New Mexico
Existing Well Bottomhole Location (Pilot): same as surface, TD – 3124'
Existing Casing Window: 2841'-53'
Existing Sidetrack Vertical TD – 3181'
Existing Upper Coal Lateral Casing Window: 2681'-2694'
Existing Well Upper Coal Lateral #1– BH Location: 111' FNL & 2485' FEL
Section 23, T32N, R06W
TD – 5534'MD/2995'TVD
Proposed Casing Window: 2450'-60'MD
Proposed New Upper Coal Lateral #2 - Location: 75' FNL & 910' FEL
Section 23, T32N, R06W
TD – 5477'MD/2990'TVD

Drilling program written in compliance with onshore Oil and Gas Order No. 1
(III.D.3, effective May 2007) and Onshore Order No. 2 Dated November 18, 1988

A. Names and estimated tops of all geologic groups, formations, members or zones.

Depths referenced to GL of 6404' and RKB 12' @ 6416' – Pilot Hole		
Marker	**TVD**	**MD**
San Jose	0	0
Nacimiento	1,224 ft	1,224 ft
Ojo Alamo Ss	2,234 ft	2,234 ft
Kirtland Sh	2,352 ft	2,352 ft
Fruitland Fm	2,923 ft	2,923 ft
Top Fruitland Coal	2,947 ft	2,947 ft
Target Coal Base	3,039 ft	3,039 ft
Pictured Cliffs Ss	3,112 ft	3,112 ft
Original Pilot Well TD	3,124 ft	3,124 ft

B. Estimated depth and thickness of formations, members or zones potentially containing useable water, oil, gas or prospectively valuable deposits of other minerals that the operator expects to encounter, and the operator's plans for protecting such resources.

Depths referenced to GL of 6404' and RKB 12' @ 6416' – Pilot Hole			
Marker	**TVD**	**MD**	
San Jose	0	0	Water – usable
Nacimiento	1,224 ft	1,224 ft	Water – usable
Ojo Alamo Ss	2,234 ft	2,234 ft	Water
Kirtland Sh	2,352 ft	2,352 ft	Gas & Water
Fruitland Fm	2,923 ft	2,923 ft	Gas & Water
Top Fruitland Coal	2,947 ft	2,947 ft	Gas, Water, & Coal
Target Coal Base	3,039 ft	3,039 ft	Gas, Water, & Coal
Pictured Cliffs Ss	3,112 ft	3,112 ft	Gas & Water
Original Pilot Well TD	3,124 ft	3,124 ft	Gas & Water

Conductor: No conductor casing is necessary and none was set.

Surface Casing: Protection of shallow fresh water shall be accomplished by setting surface casing 50' below known fresh water sources and cemented to surface with 9-5/8" surface casing.

Surface casing - 9-5/8" 36 ppf, K-55 was set at 508' and 37 bbls of cement was circulated to surface in 1989.

Possible Aquifers: Base 150'

Production Casing: Protection for all other formations will be accomplished by setting 7" casing and cementing to surface. The 7" production casing will be fracture stimulated prior to re-entry for the lateral open hole section.

Production casing - 7" 23 ppf, K-55 was set at 2,982' in 1989 and 52 bbls of cement was circulated to the surface in 1989.

Production Liner: Will be pre-perforated, uncemented, unstimulated liner to maintain hole stability.

C. The operator's minimum specifications for blowout prevention equipment and diverter systems to be used, including size, pressure rating, configuration and the testing procedure and frequency. Blowout prevention equipment must meet the minimum standards outlined in Order 2.

BOP equipment and accessories will meet or exceed BLM requirements outlined in 43 CFR Part 3160.

The working pressure of all BOPE shall exceed the anticipated surface pressure to which it may be subjected, assuming a partially evacuated hole with a pressure gradient of 0.22 psi/ft.

Expected Maximum Bottom Hole pressure = 1346 psi, which is less than 2,000 psi working pressure. Therefore, a 2000 psi Class 2 BOPE system is required that consists of the following:

- 2 preventers with either double ram (blind and pipe) or annular preventer and blind rams.
- Kill line (2" minimum)
- 1 Kill line valve (2" minimum)
- 1 choke line valve
- 2 chokes (refer to diagram in Attachment 1)
- Upper Kelly cock valve with handle available
- Safety valve and subs to fit all drill strings in use
- Pressure gauge on choke manifold
- 2" minimum choke manifold
- Fill-up line above the uppermost preventer

See attached diagram for the proposed BOP system. Stack #1 will be nippled-up on the 7-1/16" 5,000 psi B section for the lateral re-entry. The BOP will be hydraulically operated.

All ram preventers and related equipment will be tested to 2,000 psi for 10 minutes. Annular preventers will be tested to 70% of rated working pressure for 10 minutes. BOP equipment will be tested when initially installed, whenever any seal subject to test pressure is broken, following related repairs and at least once every 30 days. Annular preventers will be functionally operated at least once per week. Rams preventers will be activated each trip, not to exceed once per day.

D. The operator's proposed casing program, including size, grade, weight, type of thread and coupling, the setting depth of each string, and it's condition. The operator must include the minimum design criteria, including casing loading assumptions and corresponding safety factors for burst, collapse, and tensions (body yield and joint strength). The operator must also include the lengths and setting depth of each casing when a tapered casing string is proposed. The hole size for each wellbore section of hole drilled must be included. Special casing designs such as the use of coil tubing or expandable casing may necessitate additional information.

Casing & Hole Size	Grade	Weight	Coupling	Setting Depth (MD)	Condition
9-5/8" (12-1/4")	K-55	36 ppf	ST&C	0' - 508'	Existing casing, set in 1989
7" (8-3/4")	K-55	23 ppf	LT&C	0' - 2982'	Existing casing, set in 1989
Existing vertical sidetrack 5-1/2" (9-1/2" under-reamed cavitated)	J-55	15.5 ppf	LT&C	2762'-3167' 4spf 2982'-3111'	Perforated uncemented liner. Perforations will be isolated with CIBP at 2750' while drilling
Existing perforations Lateral #1 4-1/2" (6-1/2")	J-55	11.6 ppf	LT&C	2677'-5460' 8 SPF, 0.5" holes 3144'-5417'	Perforations will be isolated with a CBP at approximately 2470' while drilling
2-7/8" (4-3/4") Proposed Lateral #2	J-55	6.5 ppf	EUE 8RD	2450'-5477'	Used or new casing – perforated liner no cement

2-7/8" Liner - ½" holes, 1 hole/ft at 90-degree phasing. Leave 5' of the perforated joint blank on either end.

Production casing liner will be uncemented, unstimulated and not tested. The purpose of the existing liners and proposed 2-7/8" liner is to keep the open hole from collapsing. Isolation for the 6-1/2" and 4-3/4" laterals will be maintained by the cased and cemented pilot hole with 7" casing and cement to surface.

E. The estimated amount and type(s) of cement expected to be used in the setting of each casing string. If stage cementing will be used, provide the setting depth of the stage tool(s) and the amount and type of cement including additives, to be used for each stage. Provide the yield of each cement slurry and the expected top of cement, with excess, for each cemented string or stage.

The proposed cementing program has been designed to protect and/or isolate all usable water zones, potentially productive zones, lost circulation zones, abnormally pressured zones, and any prospectively valuable deposits of minerals. All indications of useable water shall be reported.

The surface casing WAS cemented back to surface.
The 7" production casing strings WAS tested to .22 psi per foot of the casing string length or 1200 psi, not exceed 70% of the minimum internal yield.

The 7" production casing WAS cemented to surface. The production liners were installed uncemented. The 2-7/8" production liner will be installed uncemented.

Surface Casing Single Stage Job – (0-508'MD):
EXISTING SURFACE CASING CEMENTED TO SURFACE IN 1989. 37 bbls of cement circulated to surface.

Production Casing Single Stage Job – (0-2982'MD):
EXISTING PRODUCTION CASING CEMENTED TO SURFACE IN 1989. 52 bbls of cement circulated to surface.

F. Type and characteristics of the proposed circulating medium or mediums proposed for the drilling of each well bore section, the quantities and types of mud and weighting material to be maintained, and the monitoring equipment to be used on the circulating system. The operator must submit the detailed information when air or gas drill is proposed.

Interval (MD)	Hole Section	Hole Size	Type	MW (ppg)	VIS (s/qt)	FL (mL/30 min)	PV (cP)	YP (lbs/100ft²)	Max Salinity (mg/L)	pH
2450'-5477'	Lat #2	4-3/4"	Brine	9.0-10	28-34	NC	1	4	188,000	8-9.1

Sufficient weighting material will be on hand to weight mud up to 10.5 PPG, if required.
The formula for weight up with barite is listed below:
Sacks of Barite per 100 bbl of mud = 1470 x (W2 – W1) ÷ (35 – W2)
Where; W1 = current mud weight, W2 = new mud weight
Sacks = 1470 x (10.5 – 9.0)/ (35-10.5) = 90 sx * 3 (300bbls minimum) = 270sx

Mud Product	Estimated Quantity on Location
Baroid 41	270 sx
Aquagel Gold Seal	250 sx
Lime	4 sx
Caustic Soda	8 sx
EZ-Mud	20 buckets
Barazan D Plus	20 sx
Pac R	20 sx
Filter-Chek	30 sx
LCM	120 sx

Pit Volume Totalizer (PVT) equipment (or equivalent) will be on each pit to monitor pit levels. A trip tank equipped with a PVT sensor will be used to monitor trip volumes. Possible lost circulation in the Fruitland Coal and Pictured Cliffs Sand. Lost circulation has been successfully mitigated with lost circulation materials.

There will not be a reserve pit for this well. A closed-loop system will be used to recover drilling fluid and dry cuttings during drilling operation. Above-ground tanks will be utilized to hold cuttings and fluids for rig operations. Frac tanks will be on location to store fresh water, produced water, drilling mud and brine.

G. The testing, logging, and coring procedures proposed, including drill stem testing procedures, equipment, and safety measures.

Testing: None planned.
Open Hole Logging: LWD gamma ray for lateral hole section (from casing exit to TD).
Mud Logging: Lateral hole section from 2450'-5477'. Samples taken every 30'.
Coring: None planned.
Cased Hole Logging: A CCL – CBL will be run to check cement bond across window area and to locate casing collars to set isolation bridge plug.

H. The expected bottom-hole pressure and any anticipated abnormal pressures, temperatures, or potential hazards that the operator expects to encounter, such as lost circulation and hydrogen sulfide. A description or the operators plans for mitigating such hazards must be included.

Maximum expected BHP @ TD 5477'MD / 2990' TVD (0.45 psi/ft): 1346 psi
Maximum expected BHT @ 2990' TVD: ~140° F
The maximum anticipated bottom hole pressure will be controlled with mud weight and BOP equipment.

No hydrogen sulfide gas is anticipated, however, if H_2S is encountered, the guidelines in Onshore Order No. 6 will be followed.

I. Any other facets of the proposed operation that the operator would like the BLM to considered in reviewing the application. Examples include, but are not limited to: For directional wells, proposed directional designs, plan view, and vertical section in true vertical and measured depths: Horizontal drilling; and Coil tubing Operations.

Timing:
The operation is expected to start July 2017. A bridge plug will bet set to isolate the sidetrack vertical in the 7" casing. Another bridge plug will be set in the 7" production casing isolating Lateral #1, a whipstock set, and the 4-3/4" sidetrack lateral hole section drilled. Upon completion of the open hole lateral, the drilling rig will move off and the completion rig will be on location approximately two to three weeks to run tubing and set artificial lift.

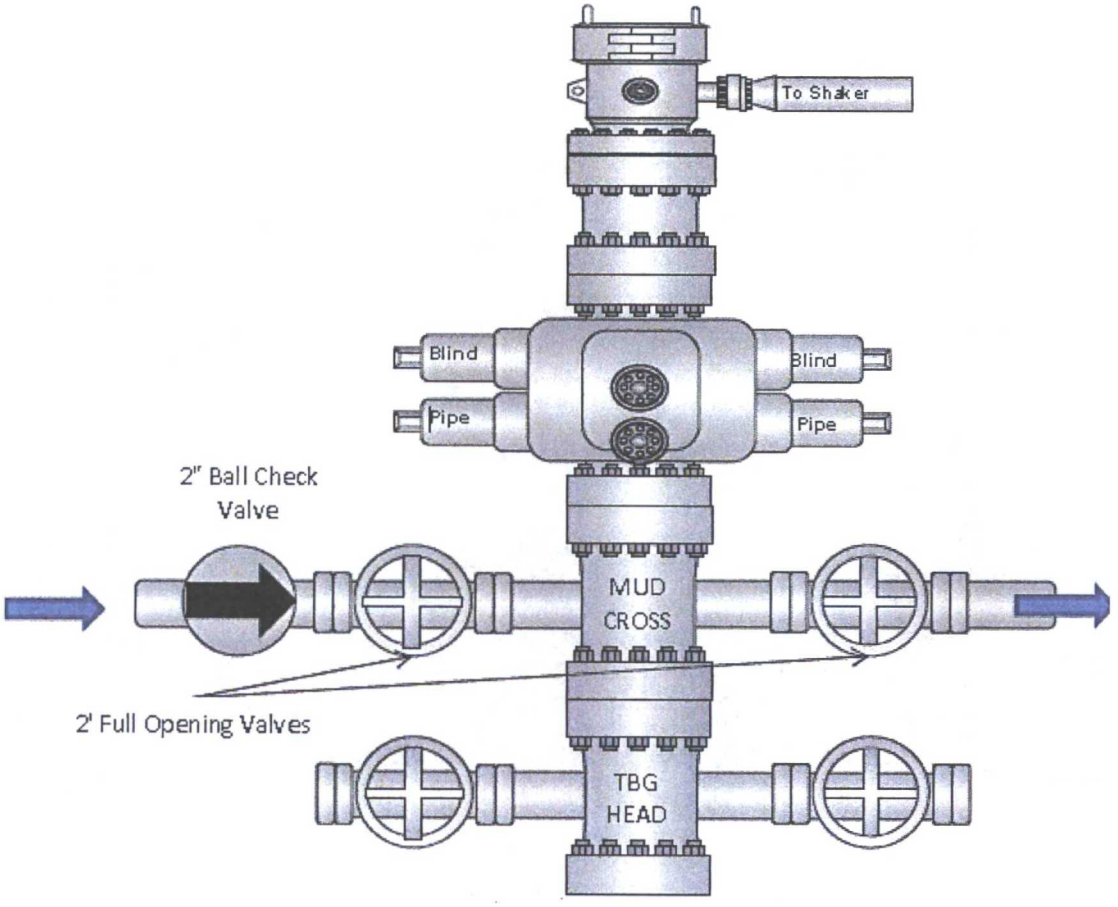
Directional Plans:
Lateral #2 directional plans attached.

Completion:
The existing sidetrack vertical well has perforations in the mainbore from 2982'-3111', and has one existing lateral in the Fruitland Coal 3144'-5417'. A cast iron bridge plug (CIBP) will be set at approximately 2750' to isolate the vertical sidetrack from the rest of the wellbore. A composite bridge plug (CBP) will be set at approximately 2470' to isolate the lateral during sidetrack drilling operations and to serve as a base for the whipstock assembly. The lateral will be cased with 2-7/8" pre-perforated uncemented tubing to maintain hole stability for natural open hole completion.

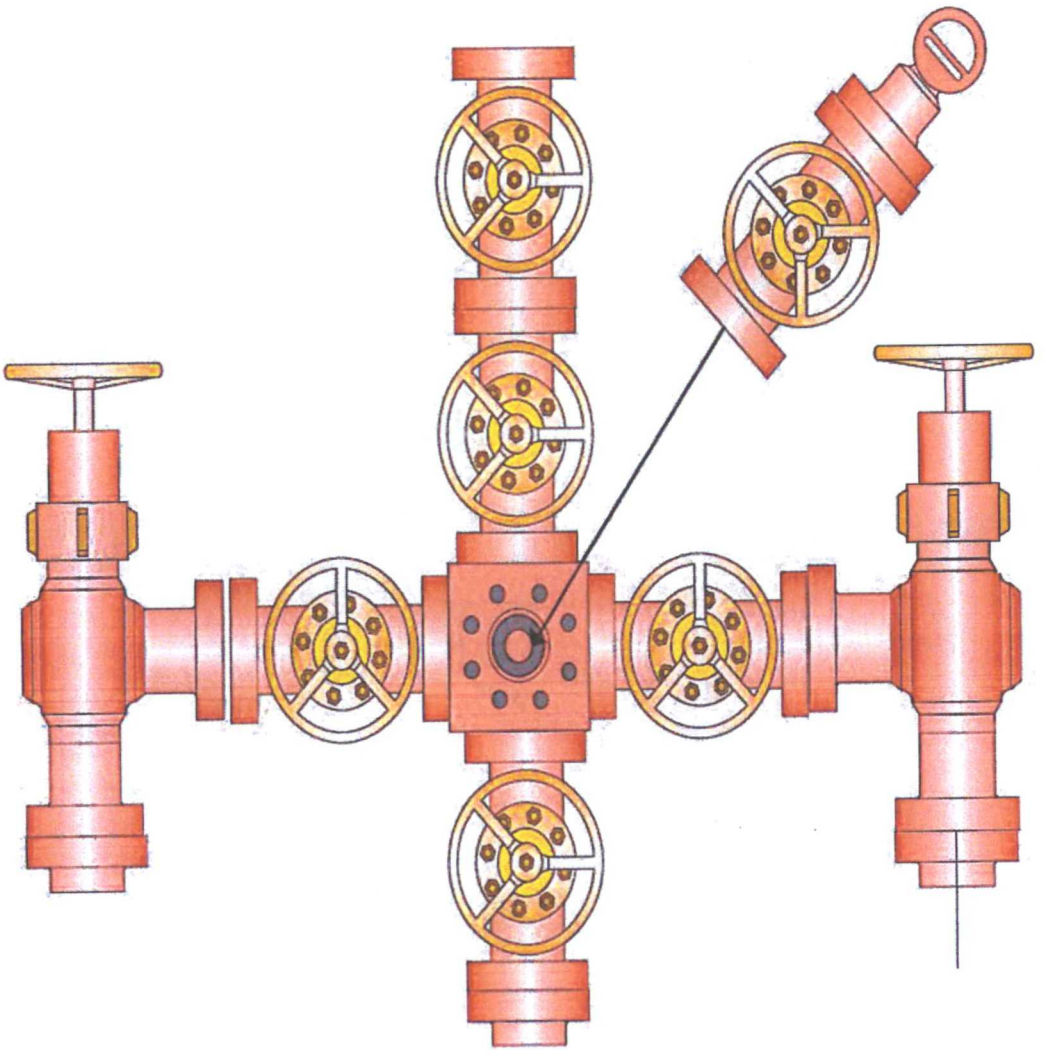
Horizontal Re-entry Procedure:

- Prepare existing well for drilling operations with a service unit.
- Pull tubing and rods.
- Run CBL and check bond across whipstock window area KOP 3440'MD.
- Run gyro survey if needed (determined off previous gyro survey accessibility).
- Set CIBP at approximately 2750', below Lateral #1 and above the sidetrack vertical isolating Lateral #1 from the rest of the wellbore.
- Set CBP at approximately 2470', below proposed window area to set whipstock and isolate existing Lateral #1.
- Load hole and pressure test casing.
- Move in and rig up drilling rig on completed pilot hole
- Run gyro survey, orient and set whipstock for casing exit @ +/-2450'.
- Mill window and TOOH for curve BHA.
- Planned KOP @ 2450' (pilot well).
- Drill 4-3/4" from 2450' to 5477' MD / 2990' TVD at 90°, 327.8° azimuth.
- TOOH and run 2-7/8" pre-perforated liner from approximately 2450' MD to 5477' MD.
- TOOH and retrieve whipstock.
- Secure well, rig down and move off location.

NOTE: Depths and directional plans are based on estimated formation tops. Corrections for KOP and landing points will be made based on actual formation tops from logs.



Proposed Class 2 BOP Stack - STACK #1 (LATERAL RE-ENTRY)



(Minimum 2")

Proposed 2,000 psi Choke Manifold Stack

Southland Royalty Company

Southland Royalty Co.

Rio Arriba County, NM
T32N - R06W - Sec. 23
San Juan 32-5 Unit NP 101

ST04

Plan: Rev 1

Standard Planning Report - Geographic

23 May, 2017

SEIDEL

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well San Juan 32-5 Unit NP 101
Company:	Southland Royalty Co.	**TVD Reference:**	KB @ 6416.00ft (AWS 289)
Project:	Rio Arriba County, NM	**MD Reference:**	KB @ 6416.00ft (AWS 289)
Site:	T32N - R06W - Sec. 23	**North Reference:**	True
Well:	San Juan 32-5 Unit NP 101	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	ST04		
Design:	Rev 1		

Project	Rio Arriba County, NM		
Map System:	US State Plane 1983	**System Datum:**	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Central Zone		

Site	T32N - R06W - Sec. 23				
Site Position:		**Northing:**	2,172,329.10 usft	**Latitude:**	36.964110°N
From:	Lat/Long	**Easting:**	1,298,599.86 usft	**Longitude:**	107.420020°W
Position Uncertainty:	0.00 ft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	-0.70 °

Well	San Juan 32-5 Unit NP 101, Sec 23 Twn 32N Rng 06W					
Well Position	**+N/-S**	0.00 ft	**Northing:**	2,172,329.10 usft	**Latitude:**	36.964110°N
	+E/-W	0.00 ft	**Easting:**	1,298,599.86 usft	**Longitude:**	107.420020°W
Position Uncertainty		0.00 ft	**Wellhead Elevation:**		**Ground Level:**	6,404.00 ft

Wellbore	ST04			
Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	IGRF2010	4/26/2017	9.05	63.57	50,326

Design	Rev 1				
Audit Notes:					
Version:		**Phase:**	PLAN	**Tie On Depth:**	2,400.00
Vertical Section:	**Depth From (TVD) (ft)**	**+N/-S (ft)**	**+E/-W (ft)**	**Direction (°)**	
	0.00	0.00	0.00	2.54	

Plan Sections

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
2,400.00	0.75	0.00	2,399.85	0.00	0.00	0.00	0.00	0.00	0.00	
2,450.00	0.75	0.00	2,449.85	0.65	0.00	0.00	0.00	0.00	0.00	
2,758.90	15.00	125.26	2,755.32	-20.53	32.84	5.00	4.61	40.55	127.48	
3,213.92	90.97	35.00	3,031.99	174.70	261.65	20.00	16.70	-19.84	-90.00	
3,313.92	90.97	35.00	3,030.30	256.60	319.00	0.00	0.00	0.00	0.00	
4,993.94	90.97	327.79	2,998.15	1,841.17	357.57	4.00	0.00	-4.00	-89.36	
5,477.21	90.97	327.79	2,990.00	2,250.00	100.00	0.00	0.00	0.00	0.00	

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well San Juan 32-5 Unit NP 101
Company:	Southland Royalty Co.	**TVD Reference:**	KB @ 6416.00ft (AWS 289)
Project:	Rio Arriba County, NM	**MD Reference:**	KB @ 6416.00ft (AWS 289)
Site:	T32N - R06W - Sec. 23	**North Reference:**	True
Well:	San Juan 32-5 Unit NP 101	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	ST04		
Design:	Rev 1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
2,400.00	0.75	0.00	2,399.85	0.00	0.00	2,172,329.10	1,298,599.86	36.964110°N	107.420020°W
Tie-On, Orig Hole									
2,450.00	0.75	0.00	2,449.85	0.65	0.00	2,172,329.76	1,298,599.87	36.964112°N	107.420020°W
KOP, Build 5°/100 DLS									
2,500.00	2.13	111.25	2,499.83	0.65	0.87	2,172,329.74	1,298,600.74	36.964112°N	107.420017°W
2,600.00	7.07	122.68	2,599.48	-3.35	7.78	2,172,325.65	1,298,607.60	36.964101°N	107.419994°W
2,700.00	12.06	124.69	2,698.06	-12.63	21.56	2,172,316.21	1,298,621.26	36.964075°N	107.419946°W
2,758.90	15.00	125.26	2,755.32	-20.53	32.84	2,172,308.17	1,298,632.45	36.964054°N	107.419908°W
Build 20°/100 DLS									
2,800.00	17.06	96.09	2,794.88	-24.25	43.20	2,172,304.33	1,298,642.76	36.964044°N	107.419872°W
2,900.00	31.67	61.01	2,886.17	-12.96	81.13	2,172,315.14	1,298,680.83	36.964074°N	107.419743°W
2,945.39	39.79	54.03	2,923.00	1.37	103.35	2,172,329.21	1,298,703.22	36.964114°N	107.419667°W
Fruitland									
3,000.00	49.94	48.28	2,961.67	25.62	133.18	2,172,353.08	1,298,733.35	36.964180°N	107.419564°W
3,100.00	69.00	41.16	3,012.28	86.85	193.08	2,172,413.58	1,298,794.00	36.964349°N	107.419359°W
3,200.00	88.28	35.72	3,031.90	163.35	253.60	2,172,489.32	1,298,855.45	36.964559°N	107.419152°W
3,213.92	90.97	35.00	3,031.99	174.70	261.65	2,172,500.57	1,298,863.64	36.964590°N	107.419125°W
LP, Hold									
3,300.00	90.97	35.00	3,030.54	245.20	311.02	2,172,570.46	1,298,913.87	36.964784°N	107.418956°W
3,313.92	90.97	35.00	3,030.30	256.60	319.00	2,172,581.77	1,298,921.99	36.964815°N	107.418928°W
Turn 4°/100 DLS									
3,400.00	91.01	31.56	3,028.82	328.54	366.22	2,172,653.12	1,298,970.09	36.965012°N	107.418767°W
3,500.00	91.04	27.56	3,027.03	415.50	415.53	2,172,739.47	1,299,020.47	36.965251°N	107.418598°W
3,600.00	91.08	23.56	3,025.17	505.68	458.65	2,172,829.11	1,299,064.69	36.965499°N	107.418450°W
3,700.00	91.11	19.55	3,023.27	598.65	495.38	2,172,921.62	1,299,102.56	36.965754°N	107.418325°W
3,800.00	91.13	15.55	3,021.32	693.96	525.53	2,173,016.55	1,299,133.88	36.966016°N	107.418222°W
3,900.00	91.14	11.55	3,019.33	791.13	548.96	2,173,113.43	1,299,158.49	36.966283°N	107.418141°W
4,000.00	91.16	7.55	3,017.33	889.71	565.54	2,173,211.80	1,299,176.29	36.966554°N	107.418085°W
4,100.00	91.16	3.55	3,015.30	989.20	575.22	2,173,311.16	1,299,187.18	36.966827°N	107.418051°W
4,200.00	91.16	359.55	3,013.27	1,089.12	577.92	2,173,411.04	1,299,191.12	36.967101°N	107.418042°W
4,300.00	91.16	355.55	3,011.25	1,188.99	573.65	2,173,510.95	1,299,188.07	36.967376°N	107.418057°W
4,400.00	91.14	351.55	3,009.24	1,288.31	562.42	2,173,610.41	1,299,178.06	36.967648°N	107.418095°W
4,500.00	91.13	347.55	3,007.26	1,386.62	544.29	2,173,708.93	1,299,161.14	36.967918°N	107.418157°W
4,600.00	91.11	343.55	3,005.31	1,483.41	519.34	2,173,806.02	1,299,137.38	36.968184°N	107.418243°W
4,700.00	91.08	339.55	3,003.41	1,578.24	487.70	2,173,901.23	1,299,106.91	36.968445°N	107.418351°W
4,800.00	91.04	335.55	3,001.55	1,670.62	449.53	2,173,994.07	1,299,069.87	36.968698°N	107.418482°W
4,900.00	91.01	331.55	2,999.76	1,760.12	404.99	2,174,084.11	1,299,026.44	36.968944°N	107.418634°W
4,993.94	90.97	327.79	2,998.15	1,841.17	357.57	2,174,165.74	1,298,980.02	36.969167°N	107.418796°W
EOT, Hold to TD									
5,000.00	90.97	327.79	2,998.04	1,846.30	354.34	2,174,170.91	1,298,976.85	36.969181°N	107.418807°W
5,100.00	90.97	327.79	2,996.36	1,930.89	301.04	2,174,256.15	1,298,924.60	36.969413°N	107.418990°W
5,106.06	90.97	327.79	2,996.26	1,936.02	297.81	2,174,261.31	1,298,921.43	36.969427°N	107.419001°W
tgt									
5,200.00	90.97	327.79	2,994.67	2,015.49	247.74	2,174,341.40	1,298,872.34	36.969645°N	107.419172°W
5,300.00	90.97	327.79	2,992.99	2,100.09	194.45	2,174,426.64	1,298,820.09	36.969878°N	107.419355°W
5,400.00	90.97	327.79	2,991.30	2,184.68	141.15	2,174,511.88	1,298,767.83	36.970110°N	107.419537°W
5,476.31	90.97	327.79	2,990.02	2,249.24	100.48	2,174,576.93	1,298,727.96	36.970287°N	107.419676°W
PBHL/TD									
5,477.21	90.97	327.79	2,990.00	2,250.00	100.00	2,174,577.70	1,298,727.49	36.970290°N	107.419678°W
San Juan 32-5 Unit NP 101 PBHL									

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well San Juan 32-5 Unit NP 101
Company:	Southland Royalty Co.	**TVD Reference:**	KB @ 6416.00ft (AWS 289)
Project:	Rio Arriba County, NM	**MD Reference:**	KB @ 6416.00ft (AWS 289)
Site:	T32N - R06W - Sec. 23	**North Reference:**	True
Well:	San Juan 32-5 Unit NP 101	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	ST04		
Design:	Rev 1		

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
tgt	0.00	0.00	0.00	2,325.00	1,010.00	2,174,641.52	1,299,638.34	36.970495°N	107.416563°W
- plan misses target center by 3104.20ft at 5106.06ft MD (2996.26 TVD, 1936.02 N, 297.81 E) - Circle (radius 660.00)									
San Juan 32-5 Unit NP 1 - plan hits target center - Point	0.00	0.00	2,990.00	2,250.00	100.00	2,174,577.70	1,298,727.49	36.970290°N	107.419678°W

Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
511.00	510.99	9 5/8" Csg	9-5/8	12-1/4

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
2,945.39	2,923.00	Fruitland		0.00	

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	Local Coordinates +E/-W (ft)	Comment
2,400.00	2,399.85	0.00	0.00	Tie-On, Orig Hole
2,450.00	2,449.85	0.65	0.00	KOP, Build 5°/100 DLS
2,758.90	2,755.32	-20.53	32.84	Build 20°/100 DLS
3,213.92	3,031.99	174.70	261.65	LP, Hold
3,313.92	3,030.30	256.60	319.00	Turn 4°/100 DLS
4,993.94	2,998.15	1,841.17	357.57	EOT, Hold to TD
5,476.31	2,990.02	2,249.24	100.48	PBHL/TD

Southland Royalty Company LLC

Prepared by: Savage
Date: 04/13/2017

KB = 12 ft
GL = 6,404 ft
KB = 6,416 ft
API# 30-039-24338

Spud Date: 06/08/1989
Sidetrack Mainbore: 10/21/2002
Sidetrack Lateral: 04/24/2008

San Juan 32-5 Unit 101
Rio Arriba County, NM

TD – 3,124 ft MD Abandoned Mainbore
TD – 3,181 ft MD Sidetrack Mainbore
TD – 5,534 ft MD Sidetrack Lateral

12 ¼" hole to 515'.
Surface Csg: 11 jts 9 5/8" 36# lb/ft K-55
Setting Depth: 508 ft kb

Cement
380sx Class B (448 ft^3)
Circulate 37 bbls to surface

8 ¾ hole to 2,985'.
Production Csg: 73 jts 7" 23# K-55
Setting Depth: 2,982 ft

Cement
Lead: 490sx 65/35 Class B. Tail: 100sx Class B
Total cement 926 ft^3.
Circulate 52 bbls to surface.

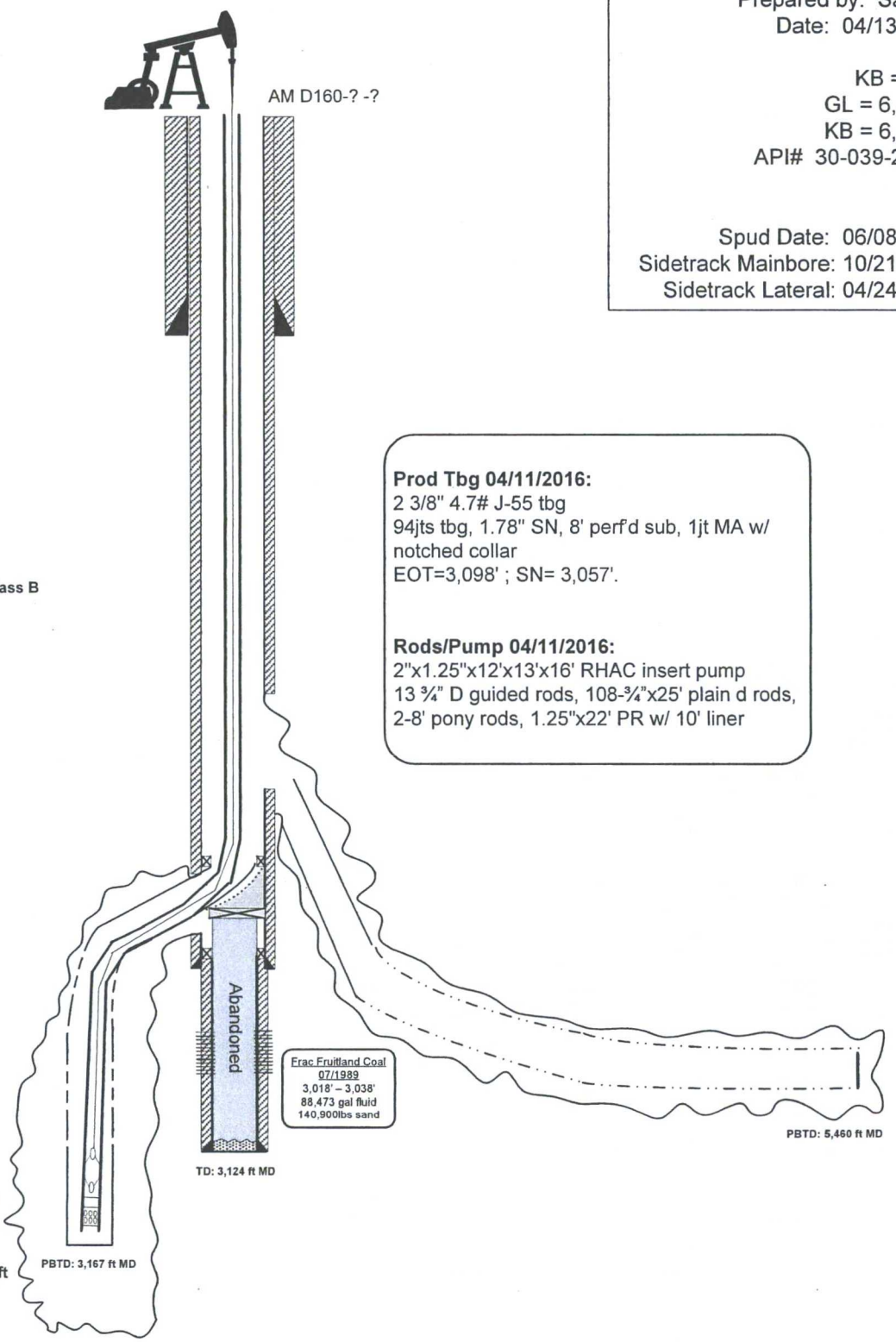
6 ¼" hole to 3,124 ft MD
Liner Csg: 6 jts 4.5" 10.5# K-55 casing
Setting depth: 3,121 ft MD
Liner top: 2,891 ft MD (91' overlap in 7")
Perfs 3spf: 3,018 ft – 3,038 ft

Cement
Lead: 20sx 65/35 Class B. Tail: 50sx Class B
Total 98 ft3.
Reverse circulate 10bbls to surface
RIH tbg pump 50sx Class B (59 ft3) on top
Reverse circulate 15 bbls to surface.

Set CIBP at 2850 ft.
Set Whipstock at 2850 ft.

Mill Window: 2841 ft – 2853 ft
Drill and Under Ream 9 ½" hole to 3,121
Cavitate Well
Drill to TD of 3,181 ft.
Liner casing: 9jts 5.5" 15.5# J-55
Setting Depth (PBTD): 3,167 ft.
Top of Liner: 2,762 ft
Perfs 4spf: 2,982 ft – 3,111 ft

Mill Window: 2,681 ft – 2,694 ft
6 ½" lateral hole to 5,534 ft MD
Liner Csg: 4.5" 11.6# J-55 preperf'd liner
Setting Depth (PBTD): 5,460 ft MD.
Top of Liner: 2,677 ft MD (Baker 4.5"x7" Model B Pos. II Hook Hangar)
Perfs 8spf, 18,184 holes: 3,144 ft – 5,417 ft



Prod Tbg 04/11/2016:
2 3/8" 4.7# J-55 tbg
94jts tbg, 1.78" SN, 8' perf'd sub, 1jt MA w/ notched collar
EOT=3,098' ; SN= 3,057'.

Rods/Pump 04/11/2016:
2"x1.25"x12'x13'x16' RHAC insert pump
13 ¾" D guided rods, 108-¾"x25' plain d rods, 2-8' pony rods, 1.25"x22' PR w/ 10' liner

Southland Royalty Company

Southland Royalty Co.

SEIDEL

Well: San Juan 32-5 Unit NP 101 Plan: Rev 1	Field: Rio Arriba County, NM	Site: T32N - R06W - Sec. 23	Rig: AWS 289
Bore: 6404 Plan Date: May 23 2017 VSect: 2.54deg Grid Conv: -0.70	System: US State Plane 1983 KB: 6416.00ft Zone: New Mexico Central Zone GL: 6404.00ft	Latitude: 36.964110°N Longitude: 107.420020°W Northing / Y: 2172329.10 Easting / X: 1298599.87	Model: IGRF2010 Date: 26-Apr-17 DEC: 9.05° DIP: 63.57° FS: 50326 North Ref: True

Critical Points

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Annotation
1	2400.00	0.75	0.00	2399.85	0.00	0.00	0.00	0.00	0.00	Tie-On, Orig Hole
2	2450.00	0.75	0.00	2449.85	0.65	0.00	0.00	0.00	0.65	KOP, Build 5°/100 DLS
3	2758.90	15.00	125.26	2755.32	-20.53	32.84	5.00	127.48	-19.05	Build 20°/100 DLS
4	3213.92	90.97	35.00	3031.99	174.70	261.65	20.00	-90.00	186.14	LP, Hold
5	3313.92	90.97	35.00	3030.30	256.60	319.00	0.00	0.00	270.51	Turn 4°/100 DLS
6	4993.94	90.97	327.79	2998.15	1841.17	357.57	4.00	-89.36	1855.23	EOT, Hold to TD
7	5477.21	90.97	327.79	2990.00	2250.00	100.00	0.00	0.00	2252.22	PBHL/TD

Target Details

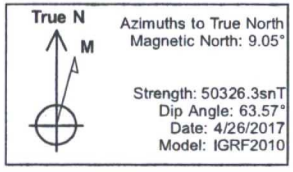
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
660ft Setback	0.00	2325.00	1010.00	2174641.52	1299638.34	36.970495°N	107.416563°W
SJ 32-5 Unit NP 101 PBHL	2990.00	2250.00	100.00	2174577.70	1298727.49	36.970289°N	107.419678°W

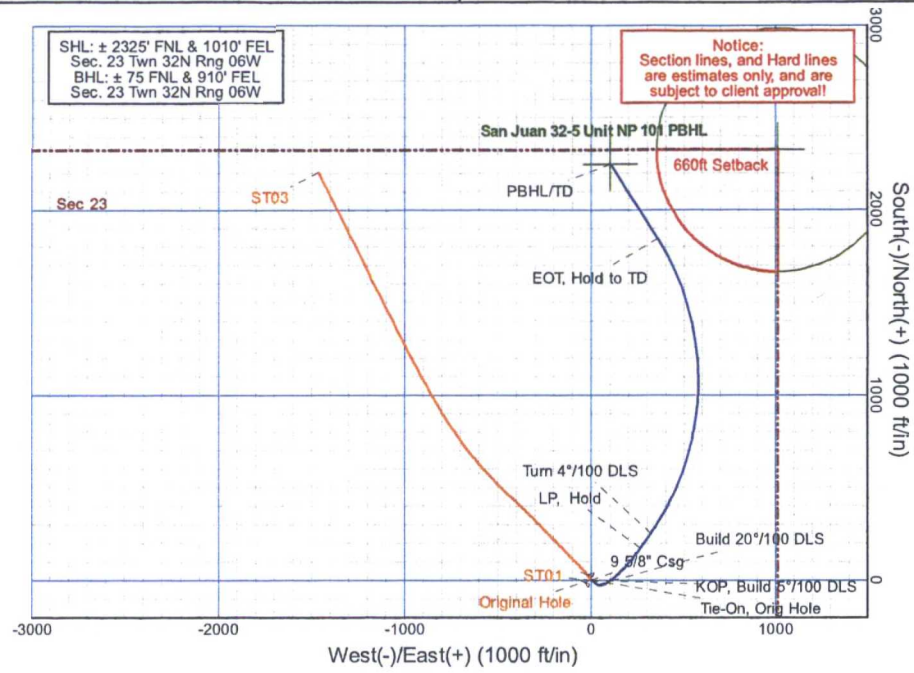
CASING DETAILS

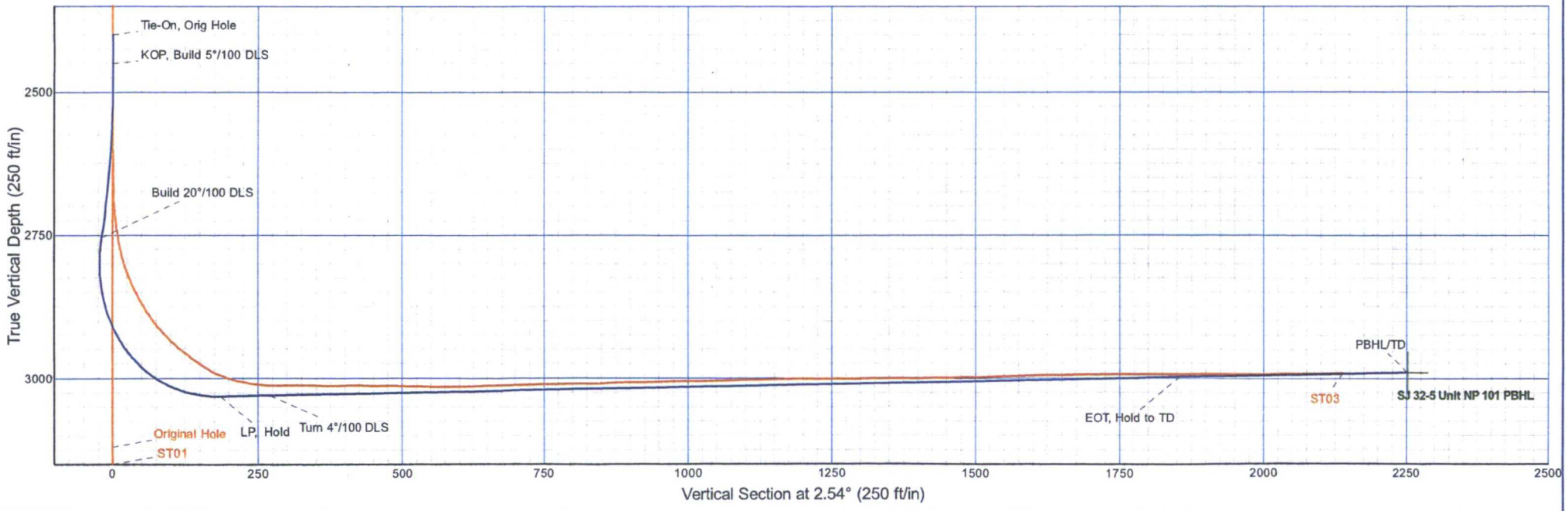
TVD	MD	Name	Size
510.99	511.00	9 5/8" Csg	9-5/8

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
2923.00	2945.39	Fruitland







Southland Royalty Company

Southland Royalty Co.

Rio Arriba County, NM
T32N - R06W - Sec. 23
San Juan 32-5 Unit NP 101

ST04

Plan: Rev 1

Standard Planning Report - Geographic

23 May, 2017

SEIDEL

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well San Juan 32-5 Unit NP 101
Company:	Southland Royalty Co.	**TVD Reference:**	KB @ 6416.00ft (AWS 289)
Project:	Rio Arriba County, NM	**MD Reference:**	KB @ 6416.00ft (AWS 289)
Site:	T32N - R06W - Sec. 23	**North Reference:**	True
Well:	San Juan 32-5 Unit NP 101	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	ST04		
Design:	Rev 1		

Project	Rio Arriba County, NM		
Map System:	US State Plane 1983	**System Datum:**	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Central Zone		

Site	T32N - R06W - Sec. 23				
Site Position:		**Northing:**	2,172,329.10 usft	**Latitude:**	36.964110°N
From:	Lat/Long	**Easting:**	1,298,599.86 usft	**Longitude:**	107.420020°W
Position Uncertainty:	0.00 ft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	-0.70 °

Well	San Juan 32-5 Unit NP 101, Sec 23 Twn 32N Rng 06W					
Well Position	**+N/-S**	0.00 ft	**Northing:**	2,172,329.10 usft	**Latitude:**	36.964110°N
	+E/-W	0.00 ft	**Easting:**	1,298,599.86 usft	**Longitude:**	107.420020°W
Position Uncertainty		0.00 ft	**Wellhead Elevation:**		**Ground Level:**	6,404.00 ft

Wellbore	ST04			
Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	IGRF2010	4/26/2017	9.05	63.57	50,326

Design	Rev 1				
Audit Notes:					
Version:		**Phase:**	PLAN	**Tie On Depth:**	2,400.00

Vertical Section:	**Depth From (TVD) (ft)**	**+N/-S (ft)**	**+E/-W (ft)**	**Direction (°)**
	0.00	0.00	0.00	2.54

Plan Sections

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
2,400.00	0.75	0.00	2,399.85	0.00	0.00	0.00	0.00	0.00	0.00	
2,450.00	0.75	0.00	2,449.85	0.65	0.00	0.00	0.00	0.00	0.00	
2,758.90	15.00	125.26	2,755.32	-20.53	32.84	5.00	4.61	40.55	127.48	
3,213.92	90.97	35.00	3,031.99	174.70	261.65	20.00	16.70	-19.84	-90.00	
3,313.92	90.97	35.00	3,030.30	256.60	319.00	0.00	0.00	0.00	0.00	
4,993.94	90.97	327.79	2,998.15	1,841.17	357.57	4.00	0.00	-4.00	-89.36	
5,477.21	90.97	327.79	2,990.00	2,250.00	100.00	0.00	0.00	0.00	0.00	

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well San Juan 32-5 Unit NP 101
Company:	Southland Royalty Co.	**TVD Reference:**	KB @ 6416.00ft (AWS 289)
Project:	Rio Arriba County, NM	**MD Reference:**	KB @ 6416.00ft (AWS 289)
Site:	T32N - R06W - Sec. 23	**North Reference:**	True
Well:	San Juan 32-5 Unit NP 101	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	ST04		
Design:	Rev 1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
2,400.00	0.75	0.00	2,399.85	0.00	0.00	2,172,329.10	1,298,599.86	36.964110°N	107.420020°W
Tie-On, Orig Hole									
2,450.00	0.75	0.00	2,449.85	0.65	0.00	2,172,329.76	1,298,599.87	36.964112°N	107.420020°W
KOP, Build 5°/100 DLS									
2,500.00	2.13	111.25	2,499.83	0.65	0.87	2,172,329.74	1,298,600.74	36.964112°N	107.420017°W
2,600.00	7.07	122.68	2,599.48	-3.35	7.78	2,172,325.65	1,298,607.60	36.964101°N	107.419994°W
2,700.00	12.06	124.69	2,698.06	-12.63	21.56	2,172,316.21	1,298,621.26	36.964075°N	107.419946°W
2,758.90	15.00	125.26	2,755.32	-20.53	32.84	2,172,308.17	1,298,632.45	36.964054°N	107.419908°W
Build 20°/100 DLS									
2,800.00	17.06	96.09	2,794.88	-24.25	43.20	2,172,304.33	1,298,642.76	36.964044°N	107.419872°W
2,900.00	31.67	61.01	2,886.17	-12.96	81.13	2,172,315.14	1,298,680.83	36.964074°N	107.419743°W
2,945.39	39.79	54.03	2,923.00	1.37	103.35	2,172,329.21	1,298,703.22	36.964114°N	107.419667°W
Fruitland									
3,000.00	49.94	48.28	2,961.67	25.62	133.18	2,172,353.08	1,298,733.35	36.964180°N	107.419564°W
3,100.00	69.00	41.16	3,012.28	86.85	193.08	2,172,413.58	1,298,794.00	36.964349°N	107.419359°W
3,200.00	88.28	35.72	3,031.90	163.35	253.60	2,172,489.32	1,298,855.45	36.964559°N	107.419152°W
3,213.92	90.97	35.00	3,031.99	174.70	261.65	2,172,500.57	1,298,863.64	36.964590°N	107.419125°W
LP, Hold									
3,300.00	90.97	35.00	3,030.54	245.20	311.02	2,172,570.46	1,298,913.87	36.964784°N	107.418956°W
3,313.92	90.97	35.00	3,030.30	256.60	319.00	2,172,581.77	1,298,921.99	36.964815°N	107.418928°W
Turn 4°/100 DLS									
3,400.00	91.01	31.56	3,028.82	328.54	366.22	2,172,653.12	1,298,970.09	36.965012°N	107.418767°W
3,500.00	91.04	27.56	3,027.03	415.50	415.53	2,172,739.47	1,299,020.47	36.965251°N	107.418598°W
3,600.00	91.08	23.56	3,025.17	505.68	458.65	2,172,829.11	1,299,064.69	36.965499°N	107.418450°W
3,700.00	91.11	19.55	3,023.27	598.65	495.38	2,172,921.62	1,299,102.56	36.965754°N	107.418325°W
3,800.00	91.13	15.55	3,021.32	693.96	525.53	2,173,016.55	1,299,133.88	36.966016°N	107.418222°W
3,900.00	91.14	11.55	3,019.33	791.13	548.96	2,173,113.43	1,299,158.49	36.966283°N	107.418141°W
4,000.00	91.16	7.55	3,017.33	889.71	565.54	2,173,211.80	1,299,176.29	36.966554°N	107.418085°W
4,100.00	91.16	3.55	3,015.30	989.20	575.22	2,173,311.16	1,299,187.18	36.966827°N	107.418051°W
4,200.00	91.16	359.55	3,013.27	1,089.12	577.92	2,173,411.04	1,299,191.12	36.967101°N	107.418042°W
4,300.00	91.16	355.55	3,011.25	1,188.99	573.65	2,173,510.95	1,299,188.07	36.967376°N	107.418057°W
4,400.00	91.14	351.55	3,009.24	1,288.31	562.42	2,173,610.41	1,299,178.06	36.967648°N	107.418095°W
4,500.00	91.13	347.55	3,007.26	1,386.62	544.29	2,173,708.93	1,299,161.14	36.967918°N	107.418157°W
4,600.00	91.11	343.55	3,005.31	1,483.41	519.34	2,173,806.02	1,299,137.38	36.968184°N	107.418243°W
4,700.00	91.08	339.55	3,003.41	1,578.24	487.70	2,173,901.23	1,299,106.91	36.968445°N	107.418351°W
4,800.00	91.04	335.55	3,001.55	1,670.62	449.53	2,173,994.07	1,299,069.87	36.968698°N	107.418482°W
4,900.00	91.01	331.55	2,999.76	1,760.12	404.99	2,174,084.11	1,299,026.44	36.968944°N	107.418634°W
4,993.94	90.97	327.79	2,998.15	1,841.17	357.57	2,174,165.74	1,298,980.02	36.969167°N	107.418796°W
EOT, Hold to TD									
5,000.00	90.97	327.79	2,998.04	1,846.30	354.34	2,174,170.91	1,298,976.85	36.969181°N	107.418807°W
5,100.00	90.97	327.79	2,996.36	1,930.89	301.04	2,174,256.15	1,298,924.60	36.969413°N	107.418990°W
5,106.06	90.97	327.79	2,996.26	1,936.02	297.81	2,174,261.31	1,298,921.43	36.969427°N	107.419001°W
tgt									
5,200.00	90.97	327.79	2,994.67	2,015.49	247.74	2,174,341.40	1,298,872.34	36.969645°N	107.419172°W
5,300.00	90.97	327.79	2,992.99	2,100.09	194.45	2,174,426.64	1,298,820.09	36.969878°N	107.419355°W
5,400.00	90.97	327.79	2,991.30	2,184.68	141.15	2,174,511.88	1,298,767.83	36.970110°N	107.419537°W
5,476.31	90.97	327.79	2,990.02	2,249.24	100.48	2,174,576.93	1,298,727.96	36.970287°N	107.419676°W
PBHL/TD									
5,477.21	90.97	327.79	2,990.00	2,250.00	100.00	2,174,577.70	1,298,727.49	36.970290°N	107.419678°W
San Juan 32-5 Unit NP 101 PBHL									

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well San Juan 32-5 Unit NP 101
Company:	Southland Royalty Co.	**TVD Reference:**	KB @ 6416.00ft (AWS 289)
Project:	Rio Arriba County, NM	**MD Reference:**	KB @ 6416.00ft (AWS 289)
Site:	T32N - R06W - Sec. 23	**North Reference:**	True
Well:	San Juan 32-5 Unit NP 101	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	ST04		
Design:	Rev 1		

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
tgt	0.00	0.00	0.00	2,325.00	1,010.00	2,174,641.52	1,299,638.34	36.970495°N	107.416563°W
- plan misses target center by 3104.20ft at 5106.06ft MD (2996.26 TVD, 1936.02 N, 297.81 E)									
- Circle (radius 660.00)									
San Juan 32-5 Unit NP 1	0.00	0.00	2,990.00	2,250.00	100.00	2,174,577.70	1,298,727.49	36.970290°N	107.419678°W
- plan hits target center									
- Point									

Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
511.00	510.99	9 5/8" Csg	9-5/8	12-1/4

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
2,945.39	2,923.00	Fruitland		0.00	

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	Local Coordinates +E/-W (ft)	Comment
2,400.00	2,399.85	0.00	0.00	Tie-On, Orig Hole
2,450.00	2,449.85	0.65	0.00	KOP, Build 5°/100 DLS
2,758.90	2,755.32	-20.53	32.84	Build 20°/100 DLS
3,213.92	3,031.99	174.70	261.65	LP, Hold
3,313.92	3,030.30	256.60	319.00	Turn 4°/100 DLS
4,993.94	2,998.15	1,841.17	357.57	EOT, Hold to TD
5,476.31	2,990.02	2,249.24	100.48	PBHL/TD