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Form 3160-3
(March 2012)

FORM APPROVED
OMB No. 1004-0137
Expires October 31, 2014

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No. NMNM12280	
6. If Indian, Allotee or Tribe Name	
1a. Type of work: ☑ DRILL ☐ REENTER	7. If Unit or CA Agreement, Name and No.
1b. Type of Well: ☑ Oil Well ☐ Gas Well ☐ Other ☑ Single Zone ☐ Multiple Zone	8. Lease Name and Well No. (319941) TATANKA FEDERAL 005H
2. Name of Operator ROSEHILL OPERATING COMPANY LLC (372320)	9. API Well No. 30-025- 44571
3a. Address 16200 Park Row, Ste 300 Houston TX 77084	3b. Phone No. (include area code) (281)675-3420
	10. Field and Pool, or Exploratory 97088 BONE SPRING NC-025 G-08 S253534O; BS
4. Location of Well (Report location clearly and in accordance with any State requirements.*) At surface SWSW / 230 FSL / 411 FEL / LAT 32.0511523 / LONG -103.3310939 At proposed prod. zone NWNW / 200 FNL / 411 FEL / LAT 32.0644905 / LONG -103.3310335	11. Sec., T. R. M. or Blk. and Survey or Area SEC 11 / T26S / R35E / NMP
14. Distance in miles and direction from nearest town or post office*	12. County or Parish LEA / 13. State NM

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any) 230 feet	16. No. of acres in lease 1240	17. Spacing Unit dedicated to this well 160
18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. 30 feet	19. Proposed Depth 11932 feet / 16580 feet	20. BLM/BIA Bond No. on file FED: NMB001484
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 3030 feet	22. Approximate date work will start* 11/03/2018	23. Estimated duration 30 days

24. Attachments

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No.1, must be attached to this form:

1. Well plat certified by a registered surveyor.
2. A Drilling Plan.
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).
4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above).
5. Operator certification
6. Such other site specific information and/or plans as may be required by the BLM.

25. Signature (Electronic Submission)	Name (Printed/Typed) Lara Thompson / Ph: (505)254-1115	Date 01/11/2018
Title Assistant Project Manager		
Approved by (Signature) (Electronic Submission)	Name (Printed/Typed) Cody Layton / Ph: (575)234-5959	Date 02/27/2018
Title Supervisor Multiple Resources	Office CARLSBAD	

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.

(Continued on page 2)

GCP Rec 3/7/18

*(Instructions on page 2)

APPROVED WITH CONDITIONS

KZ 03/08/18

Approval Date: 02/27/2018

INSTRUCTIONS

GENERAL: This form is designed for submitting proposals to perform certain well operations, as indicated on Federal and Indian lands and leases for action by appropriate Federal agencies, pursuant to applicable Federal laws and regulations. Any necessary special instructions concerning the use of this form and the number of copies to be submitted, particularly with regard to local, area, or regional procedures and practices, either are shown below or will be issued by, or may be obtained from local Federal offices.

ITEM 1: If the proposal is to redrill to the same reservoir at a different subsurface location or to a new reservoir, use this form with appropriate notations. Consult applicable Federal regulations concerning subsequent work proposals or reports on the well.

ITEM 4: Locations on Federal or Indian land should be described in accordance with Federal requirements. Consult local Federal offices for specific instructions.

ITEM 14: Needed only when location of well cannot readily be found by road from the land or lease description. A plat, or plats, separate or on the reverse side, showing the roads to, and the surveyed location of, the well, and any other required information, should be furnished when required by Federal agency offices.

ITEMS 15 AND 18: If well is to be, or has been directionally drilled, give distances for subsurface location of hole in any present or objective productive zone.

ITEM 22: Consult applicable Federal regulations, or appropriate officials, concerning approval of the proposal before operations are started.

NOTICES

The Privacy Act of 1974 and regulation in 43 CFR 2.48(d) provide that you be furnished the following information in connection with information required by this application.
AUTHORITY: 30 U.S.C. 181 et seq., 25 U.S.C. 396; 43 CFR 3160
PRINCIPAL PURPOSES: The information will be used to: (1) process and evaluate your application for a permit to drill a new oil, gas, or service well or to reenter a plugged and abandoned well; and (2) document, for administrative use, information for the management, disposal and use of National Resource Lands and resources including (a) analyzing your proposal to discover and extract the Federal or Indian resources encountered; (b) reviewing procedures and equipment and the projected impact on the land involved; and (c) evaluating the effects of the proposed operation on the surface and subsurface water and other environmental impacts.
ROUTINE USE: Information from the record and/or the record will be transferred to appropriate Federal, State, and local or foreign agencies, when relevant to civil, criminal or regulatory investigations or prosecution, in connection with congressional inquiries and for regulatory responsibilities.
EFFECT OF NOT PROVIDING INFORMATION: Filing of this application and disclosure of the information is mandatory only if you elect to initiate a drilling or reentry operation on an oil and gas lease.

The Paperwork Reduction Act of 1995 requires us to inform you that:
The BLM collects this information to allow evaluation of the technical, safety, and environmental factors involved with drilling for oil and/or gas on Federal and Indian oil and gas leases. This information will be used to analyze and approve applications. Response to this request is mandatory only if the operator elects to initiate drilling or reentry operations on an oil and gas lease. The BLM would like you to know that you do not have to respond to this or any other Federal agency-sponsored information collection unless it displays a currently valid OMB control number.

BURDEN HOURS STATEMENT: Public reporting burden for this form is estimated to average 8 hours per response, including the time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding the burden estimate or any other aspect of this form to U.S. Department of the Interior, Bureau of Land Management (1004-0137), Bureau Information Collection Clearance Officer (WO-630), 1849 C Street, N.W., Mail Stop 401 LS, Washington, D.C. 20240.

(Continued on page 3)

Additional Operator Remarks

Location of Well

1. SHL: SWSW / 230 FSL / 411 FEL / TWSP: 26S / RANGE: 35E / SECTION: 11 / LAT: 32.0511523 / LONG: -103.3310939 (TVD: 0 feet, MD: 0 feet)
   PPP: SWSW / 330 FSL / 411 FEL / TWSP: 26S / RANGE: 35E / SECTION: 11 / LAT: 32.0514271 / LONG: -103.3310922 (TVD: 12298 feet, MD: 12400 feet)
   BHL: NWNW / 200 FNL / 411 FEL / TWSP: 26S / RANGE: 35E / SECTION: 11 / LAT: 32.0644905 / LONG: -103.3310335 (TVD: 11932 feet, MD: 16580 feet)

BLM Point of Contact

Name: Sipra Dahal
Title: Legal Instruments Examiner
Phone: 5752345983
Email: sdahal@blm.gov

Review and Appeal Rights

A person contesting a decision shall request a State Director review. This request must be filed within 20 working days of receipt of the Notice with the appropriate State Director (see 43 CFR 3165.3). The State Director review decision may be appealed to the Interior Board of Land Appeals, 801 North Quincy Street, Suite 300, Arlington, VA 22203 (see 43 CFR 3165.4). Contact the above listed Bureau of Land Management office for further information.

AFMSS

U.S. Department of the Interior
BUREAU OF LAND MANAGEMENT

Operator Certification Data Report

03/01/2018

Operator Certification

I hereby certify that I, or someone under my direct supervision, have inspected the drill site and access route proposed herein; that I am familiar with the conditions which currently exist; that I have full knowledge of state and Federal laws applicable to this operation; that the statements made in this APD package are, to the best of my knowledge, true and correct; and that the work associated with the operations proposed herein will be performed in conformity with this APD package and the terms and conditions under which it is approved. I also certify that I, or the company I represent, am responsible for the operations conducted under this application. These statements are subject to the provisions of 18 U.S.C. 1001 for the filing of false statements.

NAME: Lara Thompson **Signed on:** 12/27/2017

Title: Assistant Project Manager

Street Address: 5647 Jefferson Street NE

City: Albuquerque **State:** NM **Zip:** 87109

Phone: (505)254-1115

Email address: Lara.Thompson@swca.com

Field Representative

Representative Name:

Street Address:

City: **State:** **Zip:**

Phone:

Email address:

AFMSS

U.S. Department of the Interior
BUREAU OF LAND MANAGEMENT

Application Data Report
03/01/2018

APD ID: 10400025876
Submission Date: 01/11/2018
Operator Name: ROSEHILL OPERATING COMPANY LLC
Well Name: TATANKA FEDERAL
Well Number: 005H
Well Type: OIL WELL
Well Work Type: Drill

Highlighted data reflects the most recent changes

Show Final Text

Section 1 - General

APD ID: 10400025876
Tie to previous NOS? 10400022931
Submission Date: 01/11/2018
BLM Office: CARLSBAD
User: Lara Thompson
Title: Assistant Project Manager
Federal/Indian APD: FED
Is the first lease penetrated for production Federal or Indian? FED
Lease number: NMNM12280
Lease Acres: 1240
Surface access agreement in place?
Allotted?
Reservation:
Agreement in place? NO
Federal or Indian agreement:
Agreement number:
Agreement name:
Keep application confidential? YES
Permitting Agent? YES
APD Operator: ROSEHILL OPERATING COMPANY LLC
Operator letter of designation:

Operator Info

Operator Organization Name: ROSEHILL OPERATING COMPANY LLC
Operator Address: 16200 Park Row, Ste 300
Zip: 77084
Operator PO Box:
Operator City: Houston
State: TX
Operator Phone: (281)675-3420
Operator Internet Address: afranco@rosehillres.com

Section 2 - Well Information

Well in Master Development Plan? NO
Mater Development Plan name:
Well in Master SUPO? NO
Master SUPO name:
Well in Master Drilling Plan? NO
Master Drilling Plan name:
Well Name: TATANKA FEDERAL
Well Number: 005H
Well API Number:
Field/Pool or Exploratory? Field and Pool
Field Name: BONE SPRING
Pool Name:
Is the proposed well in an area containing other mineral resources? OIL

Operator Name: ROSEHILL OPERATING COMPANY LLC

Well Name: TATANKA FEDERAL **Well Number:** 005H

Describe other minerals:

Is the proposed well in a Helium production area? N **Use Existing Well Pad?** NO **New surface disturbance?**

Type of Well Pad: MULTIPLE WELL **Multiple Well Pad Name:** TATANKA FEDERAL **Number:** G

Well Class: HORIZONTAL **Number of Legs:** 1

Well Work Type: Drill

Well Type: OIL WELL

Describe Well Type:

Well sub-Type: APPRAISAL

Describe sub-type:

Distance to town: **Distance to nearest well:** 30 FT **Distance to lease line:** 230 FT

Reservoir well spacing assigned acres Measurement: 160 Acres

Well plat: Tatanka_Fed__005H_Ownership_Map_1mi_radius_20171227151101.pdf

Tatanka_Federal__5H_Package_11_16_17_20171227151124.pdf

Tatanka_Federal_005H_Pad_20180102094730.pdf

Well work start Date: 11/03/2018 **Duration:** 30 DAYS

Section 3 - Well Location Table

Survey Type: RECTANGULAR

Describe Survey Type:

Datum: NAD83 **Vertical Datum:** NAVD88

Survey number:

	NS-Foot	NS Indicator	EW-Foot	EW Indicator	Twsp	Range	Section	Aliquot/Lot/Tract	Latitude	Longitude	County	State	Meridian	Lease Type	Lease Number	Elevation	MD	TVD
SHL Leg #1	230	FSL	411	FEL	26S	35E	11	Aliquot SWSW	32.0511523	-103.3310939	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 12280	3030	0	0
KOP Leg #1	230	FSL	411	FEL	26S	35E	11	Aliquot SWSW	32.0511523	-103.3310939	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 12280	-8425	11455	11455

Operator Name: ROSEHILL OPERATING COMPANY LLC

Well Name: TATANKA FEDERAL **Well Number:** 005H

	NS-Foot	NS Indicator	EW-Foot	EW Indicator	Twsp	Range	Section	Aliquot/Lot/Tract	Latitude	Longitude	County	State	Meridian	Lease Type	Lease Number	Elevation	MD	TVD
PPP Leg #1	330	FSL	411	FEL	26S	35E	11	Aliquot SWSW	32.0514271	-103.3310922	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 12280	-9268	12400	12298
EXIT Leg #1	330	FNL	411	FEL	26S	35E	11	Aliquot NWNW	32.0641332	-103.3310351	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 12280	-8902	16450	11932
BHL Leg #1	200	FNL	411	FEL	26S	35E	11	Aliquot NWNW	32.0644905	-103.3310335	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 12280	-8902	16580	11932

APD ID: 10400025876 **Submission Date:** 01/11/2018

Operator Name: ROSEHILL OPERATING COMPANY LLC

Well Name: TATANKA FEDERAL **Well Number:** 005H

Well Type: OIL WELL **Well Work Type:** Drill

Highlighted data reflects the most recent changes

Show Final Text

Section 1 - Geologic Formations

Formation ID	Formation Name	Elevation	True Vertical Depth	Measured Depth	Lithologies	Mineral Resources	Producing Formation
1	RUSTLER	3064	760	760		NONE	No
2	TOP SALT	1923	1140	1140		NONE	No
3	LAMAR	-2033	5096	5096		OIL	No
4	DELAWARE SAND	-2904	5967	5967		OIL	No
5	BONE SPRING 1ST	-6917	9980	9980		OIL	No
6	BONE SPRING 2ND	-7438	10502	10502		OIL	No
7	BONE SPRING 3RD	-8759	11823	11875		OIL	Yes

Section 2 - Blowout Prevention

Pressure Rating (PSI): 10M **Rating Depth:** 18000

Equipment: See attachments titled Rosehill Drilling Equipment Description, Cameron wellhead schematic, Connections Performance Properties Sheet, Choke Hose Test Certificate, Proposed WBD
Requesting Variance? YES

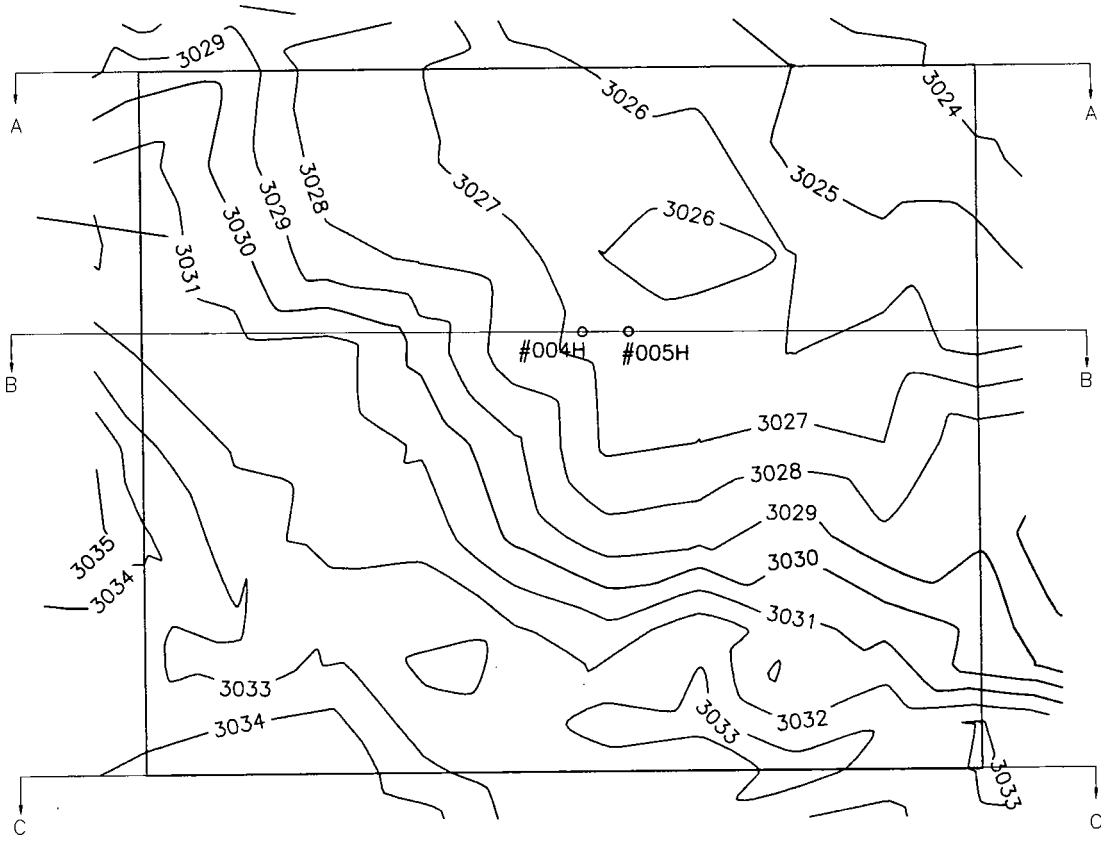
Variance request: Variance is requested to use a co-flex line between the BOP and choke manifold instead of using a 4" OD steel line. Variance is also requested to use a 5,000 psi WP annular preventer.
Testing Procedure: All BOPE will be tested in accordance with Onshore Oil and Gas Order No. 2 using a conventional test plug. Not a cup or J-packer type. BOP/BOPE system will be tested to 250 psi low, followed by a 10,000 psi pressure test, to be repeated every 30 days.

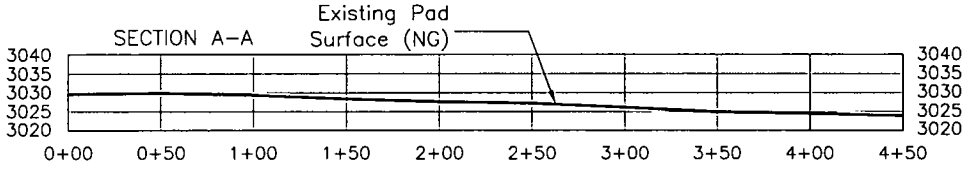
Choke Diagram Attachment:

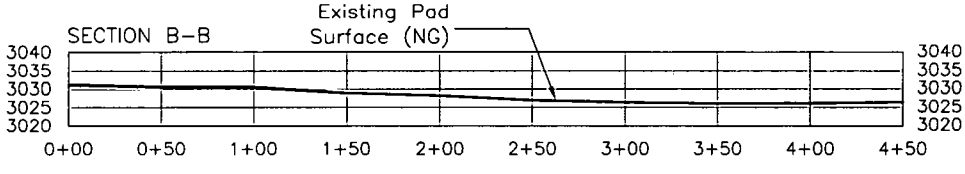
Choke_manifold_Diagram___updated_2_20180212164123.pdf

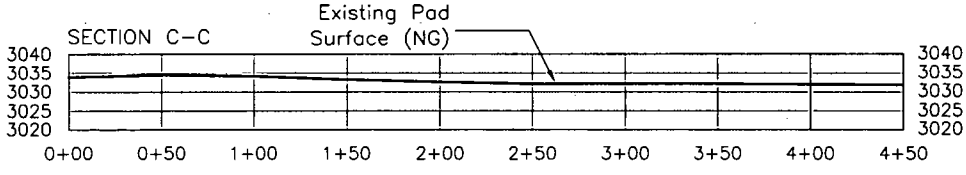
BOP Diagram Attachment:

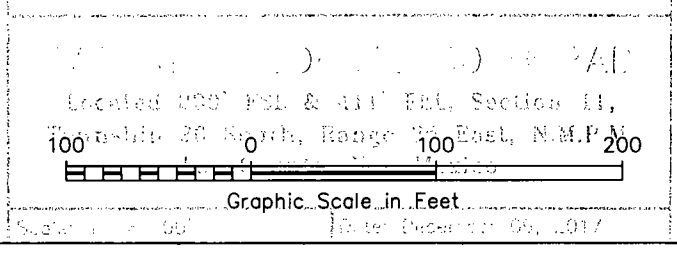
BOP_stack_Diagram_20171204105722.pdf











ROSEHILL OPERATING COMPANY, LLC

TATANKA FEDERAL 005H PAD

Located 230' FSL & 411' FEL, Section 11,
Township 26 South, Range 35 East, N.M.P.M.
Lea County, New Mexico

Scale: 1" = 100'	Date: December 09, 2017

Operator Name: ROSEHILL OPERATING COMPANY LLC

Well Name: TATANKA FEDERAL **Well Number:** 005H

Section 3 - Casing

Casing ID	String Type	Hole Size	Csg Size	Condition	Standard	Tapered String	Top Set MD	Bottom Set MD	Top Set TVD	Bottom Set TVD	Top Set MSL	Bottom Set MSL	Calculated casing length MD	Grade	Weight	Joint Type	Collapse SF	Burst SF	Joint SF Type	Joint SF	Body SF Type	Body SF
1	SURFACE	17.5	13.375	NEW	API	N	0	925	0	925	0		925	J-55	54.5	STC	1.125	1.25	BUOY	1.6	BUOY	1.6
2	INTERMEDIATE	12.25	10.75	NEW	NON API	N	0	5100	0	5100	0		5100	HCL-80	45.5	OTHER - SFII	1.125	1.25	BUOY	2	BUOY	2
3	INTERMEDIATE	9.875	7.625	NEW	NON API	N	0	11600	0	11600	0		11600	HCP-110	29.7	OTHER - GBCD	1.125	1.25	BUOY	1.6	BUOY	1.6
4	PRODUCTION	6.75	5.0	NEW	NON API	N	0	16580	0	11932	0		16580	HCP-110	18	OTHER - DQX	1.125	1.25	BUOY	1.6	BUOY	1.6

Casing Attachments

Casing ID: 1 **String Type:** SURFACE

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Tatanka_Federal__5H_Casing_Assumptions_Worksheet_20180110154611.docx

Operator Name: ROSEHILL OPERATING COMPANY LLC

Well Name: TATANKA FEDERAL **Well Number:** 005H

Casing Attachments

Casing ID: 2 **String Type:** INTERMEDIATE

Inspection Document:

Spec Document:

Technical_Data_Sheet_TMK_UP_SFII_10.75_x_45.5_L80_HC_20171205125101.pdf

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Tatanka_Federal__5H_Casing_Assumptions_Worksheet_20180110154624.docx

Casing ID: 3 **String Type:** INTERMEDIATE

Inspection Document:

Spec Document:

SpecSheet_GBCD_20171214093036.pdf

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Tatanka_Federal__5H_Casing_Assumptions_Worksheet_20180110154638.docx

Casing ID: 4 **String Type:** PRODUCTION

Inspection Document:

Spec Document:

5in_18__HCP110_DQX_20171205125147.pdf

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Tatanka_Federal__5H_Casing_Assumptions_Worksheet_20180110154652.docx

Section 4 - Cement

Operator Name: ROSEHILL OPERATING COMPANY LLC

Well Name: TATANKA FEDERAL **Well Number:** 005H

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
SURFACE	Lead		0	925	400	1.75	13.5	700	15	Class C	4% bentonite, 6% CD-32, 5% CaCl2 (TOC @ Surface)
SURFACE	Tail		0	925	300	1.34	14.8	402	15	Class C	0.1 %C-45 econolite
INTERMEDIATE	Lead		0	5100	500	2.3	12.4	1150	15	Class C	5.0% Bentonite + 5.28#/sk salt + 1.25% C-45 econolite + .75% defoamer + .2% C-49 expansive additive (TOC @ Surface)
INTERMEDIATE	Tail		0	5100	200	1.34	14.8	268	15	Class C	0.1%C-45 econolite + .2% C-49 expansive additive
INTERMEDIATE	Lead		0	11600	640	2.73	11.5	1747.2	15	50:50 (Class C:Poz)	8% gel + .25% C-45 + .3% Citric Acid + .125% CSA-1000 + 6 lb/sk kol seal + 1 lb/sk phenoseal + 4 lb/sk gypsum + 1% NaCl
INTERMEDIATE	Tail		0	11600	200	1.18	15.6	236	15	Class H	.1% C-51 suspension agent + .45% C-20 retarder
PRODUCTION	Lead		0	16580	635	1.25	14.2	794	15	50:50 Class H:Poz	.08% CSA-1000 fluid loss + .3% C-47B fluid loss + .2% C-20 retarder

Section 5 - Circulating Medium

Mud System Type: Closed

Will an air or gas system be Used? NO

Description of the equipment for the circulating system in accordance with Onshore Order #2: An electronic pit volume totalizer will be utilized on the circulating system to monitor pit volume, flow rate, pump pressure and stroke rate. See drilling doc for additional details.

Diagram of the equipment for the circulating system in accordance with Onshore Order #2:

Describe what will be on location to control well or mitigate other conditions: Sufficient materials to maintain mud properties and meet minimum lost circulation and weight increase requirements will be kept at the well site at all times. A kelly cock will be kept in the drill string at all times. A full opening drill pipe-stabbing valve (inside BOP) with proper drill pipe connections will be on the rig floor at all times.

Operator Name: ROSEHILL OPERATING COMPANY LLC

Well Name: TATANKA FEDERAL **Well Number:** 005H

Describe the mud monitoring system utilized: An electronic pit volume totalizer (PVT) will be utilized on the circulating system to monitor pit volume, flow rate, pump pressure and stroke rate.

Circulating Medium Table

Top Depth	Bottom Depth	Mud Type	Min Weight (lbs/gal)	Max Weight (lbs/gal)	Density (lbs/cu ft)	Gel Strength (lbs/100 sqft)	PH	Viscosity (CP)	Salinity (ppm)	Filtration (cc)	Additional Characteristics
0	925	OTHER : fresh gel	8.6	8.8							
925	11600	SALT SATURATED	8.8	10							
11300	16580	OIL-BASED MUD	10	14							

Section 6 - Test, Logging, Coring

List of production tests including testing procedures, equipment and safety measures:

NA

List of open and cased hole logs run in the well:

CNL/FDC,GR

Coring operation description for the well:

NA

Section 7 - Pressure

Anticipated Bottom Hole Pressure: 9085 **Anticipated Surface Pressure:** 6379.44

Anticipated Bottom Hole Temperature(F): 190

Anticipated abnormal pressures, temperatures, or potential geologic hazards? NO

Describe:

Contingency Plans geoharzards description:

Contingency Plans geohazards attachment:

Hydrogen Sulfide drilling operations plan required? YES

Hydrogen sulfide drilling operations plan:

H2S_Plan_Summary_CC_20171110165855.docx

Section 8 - Other Information

Proposed horizontal/directional/multi-lateral plan submission:

Tatanka_Federal__5H_final_directional_20180110154918.pdf

Other proposed operations facets description:

Other proposed operations facets attachment:

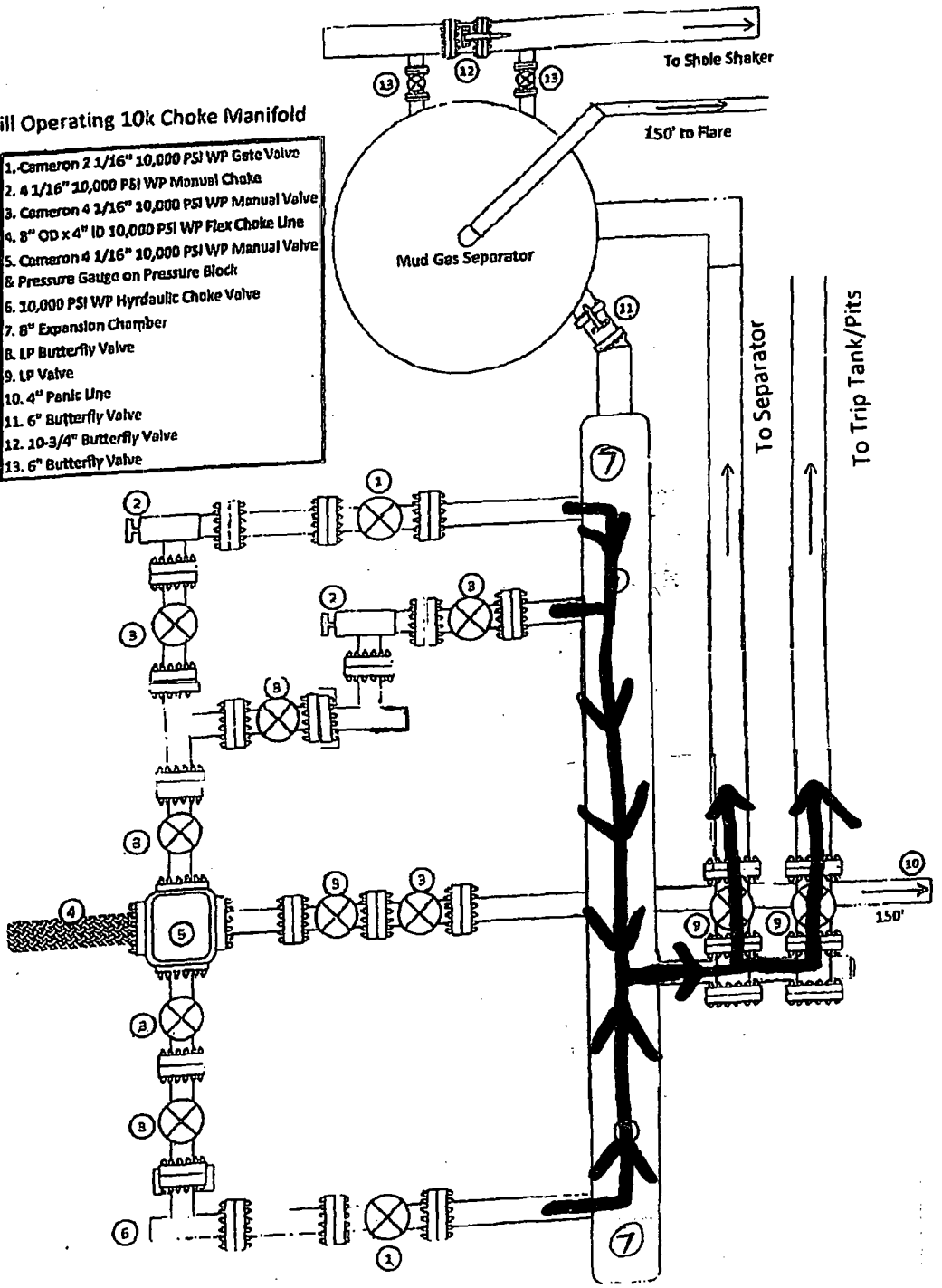
HP416_Choke_Hose_Test_Certificate_20171204124450.pdf
Cameron_wellhead_schematic_20171204124448.docx
Well_Control_Plan_20171201145640.docx
Rosehill_Drilling_Equipment_Description_20171122115201.docx
Tatanka_Federal__5H_proposed_WBD_20180110155218.pdf
Tatanka_Federal__5H_BLM_plan_LTedits_toBLM_20180208145636.docx

Other Variance attachment:

Additional_Variance_Requests_20171114145159.docx

Rosehill Operating 10k Choke Manifold

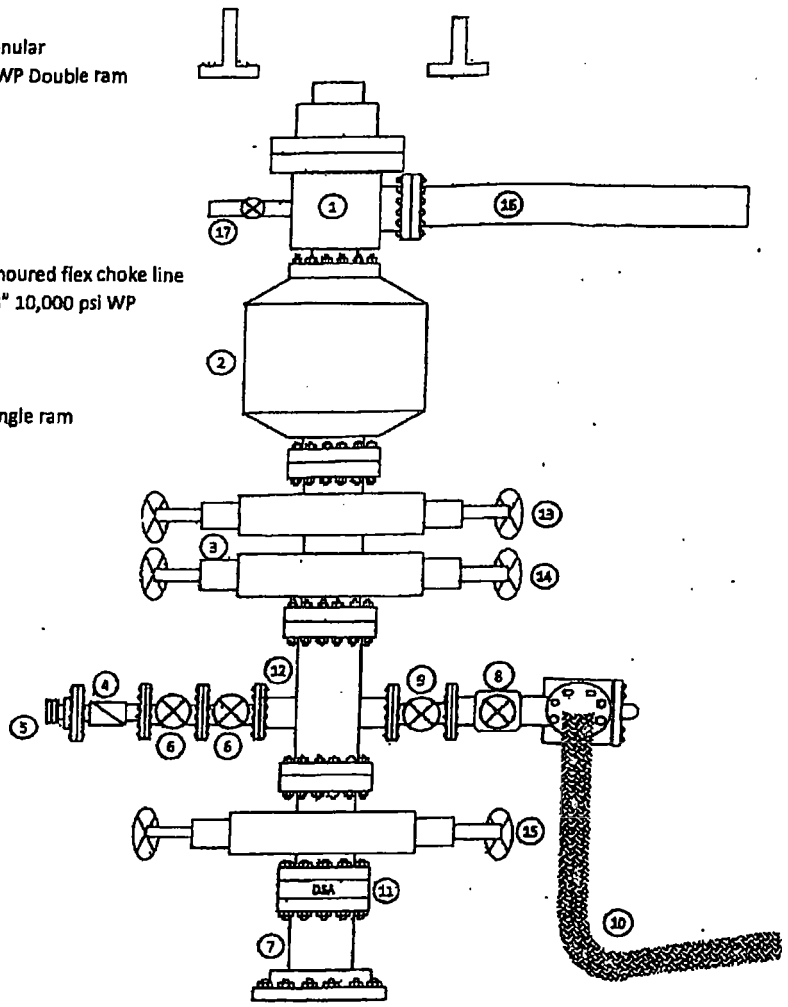
1. Cameron 2 1/16" 10,000 PSI WP Gate Valve
2. 4 1/16" 10,000 PSI WP Manual Choke
3. Cameron 4 1/16" 10,000 PSI WP Manual Valve
4. 8" OD x 4" ID 10,000 PSI WP Flex Choke Line
5. Cameron 4 1/16" 10,000 PSI WP Manual Valve & Pressure Gauge on Pressure Block
6. 10,000 PSI WP Hyrdaulic Choke Valve
7. 8" Expansion Chamber
8. LP Butterfly Valve
9. LP Valve
10. 4" Panic Line
11. 6" Butterfly Valve
12. 10-3/4" Butterfly Valve
13. 6" Butterfly Valve



Rosehill Operating 10k BOP Stack

Rig Floor

1. 13 5/8" rotating head
2. 13 5/8" 5000 psi WP Shaffer style Annular
3. 13 5/8" Cameron U Type 10,000 psi WP Double ram
4. 2 1/16" 10,000 psi check valve
5. 10,000 psi WP 1502 Union to kill line
6. 2 1/16" 10,000 psi WP manual valves
7. 13 5/8" 10,000 psi WP spacer spool
8. 4 1/16" 10,000 psi WP HCR valve
9. 4 1/16" 10,000 psi WP manual valve
10. 6" OD X 3" ID 10,000 psi WP steel armoured flex choke line
11. DSA – 13 5/8" 10,000 psi WP X 13 5/8" 10,000 psi WP
12. 13 5/8" 10,000 psi WP mud cross
13. 4 ½" – 7" variable bore pipe rams
14. Blind rams
15. 13 5/8" Cameron U Type 10,000 psi single ram
16. 10" flow line
17. 2" fillup line



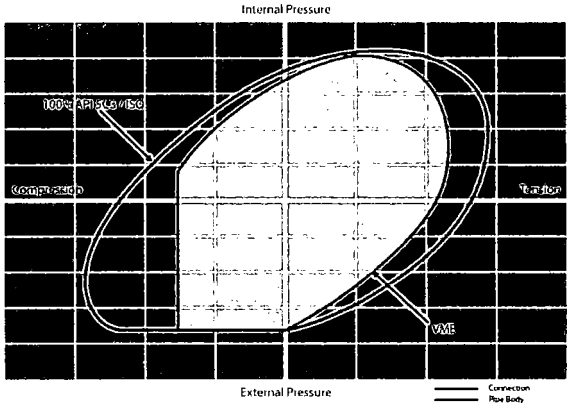
TECHNICAL DATA SHEET TMK UP SFII 10.75 X 45.5 L80 HC

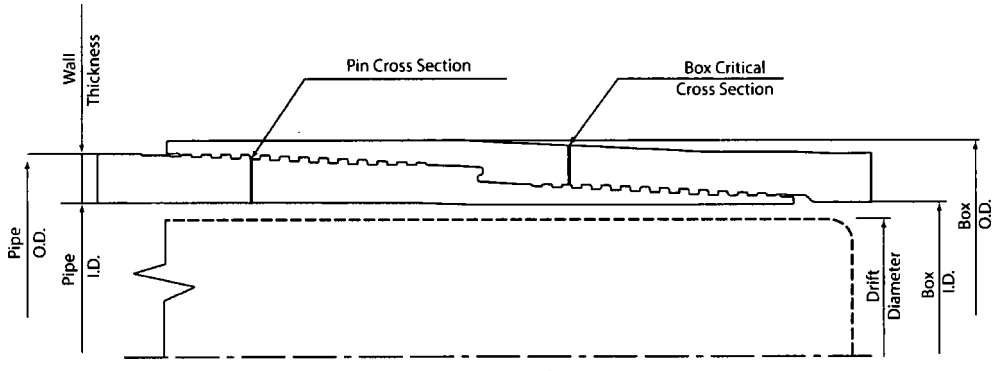
TUBULAR PARAMETERS	
Nominal OD, (inch)	10.750
Wall Thickness, (inch)	0.400
Pipe Grade	L80 HC
Drift	Special

CONNECTION PARAMETERS	
Connection OD (inch)	10.94
Connection ID, (inch)	9.927
Make-Up Loss, (inch)	5.763
Connection Critical Area, (sq inch)	9.475
Yield Strength in Tension, (klbs)	861
Yeld Strength in Compression, (klbs)	685
Tension Efficiency	83%
Compression Efficiency	66%
Min. Internal Yield Pressure, (psi)	5 210
Collapse Pressure, (psi)	2 850
Uniaxial Bending (deg/100ft)	28.3

MAKE-UP TORQUES	
Yield Torque, (ft-lb)	40 200
Minimum Make-Up Torque, (ft-lb)	26 800
Optimum Make-Up Torque, (ft-lb)	28 100
Maximum Make-Up Torque, (ft-lb)	32 300

PIPE BODY PROPERTIES	
PE Weight, (lbs/ft)	44.22
Nominal Weight, (lbs/ft)	45.50
Nominal ID, (inch)	9.950
Drift Diameter, (inch)	9.875
Nominal Pipe Body Area, (sq inch)	13.006
Yield Strength in Tension, (klbs)	1 040
Min. Internal Yield Pressure, (psi)	5 210
Collapse Pressure, (psi)	2 850





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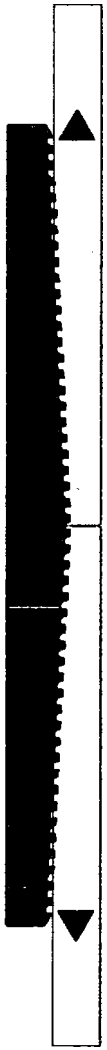
GB tubulars
Casings & Connections

GB Connection Performance Properties Sheet

Rev. 1 (02/18/2014)

ENGINEERING THE RIGHT CONNECTIONS™



Casing:	**7.625 OD, 29.7 ppf**	Connection:	**GB CD BUTT 8.500**
Grade:	**P-110**	Grade:	**API P-110**

PIPE BODY GEOMETRY					
Nominal OD (in.)	7 5/8	Wall Thickness (in.)	0.375	Drift Diameter (in.)	6.750
Nominal Weight (ppf)	29.70	Nominal ID (in.)	6.875	API Alternate Drift Dia. (in.)	-
Plain End Weight (ppf)	29.06	Plain End Area (in.^{2})	8.541		

PIPE BODY PERFORMANCE					
Material Specification	P-110	Min. Yield Str. (psi)	110,000	Min. Ultimate Str. (psi)	125,000
Collapse		**Tension**		**Pressure**	
API (psi)	5,350	Pl. End Yield Str. (kips)	940	Min. Int. Yield Press. (psi)	9,470
High Collapse (psi)	7,150	**Torque**		**Bending**	
		Yield Torque (ft-lbs)	156,220	Build Rate to Yield (°/100 ft)	66.1

GB CD BUTT 8.500 COUPLING GEOMETRY			
Coupling OD (in.)	8.500	Makeup Loss (in.)	4.8125
Coupling Length (in.)	9.625	Critical Cross-Sect. (in.^{2})	13.130

GB CD BUTT 8.500 CONNECTION PERFORMANCE RATINGS/EFFICIENCIES					
Material Specification	API P-110	Min. Yield Str. (psi)	110,000	Min. Ultimate Str. (psi)	125,000
Tension		**Efficiency**		**Bending**	
Thread Str. (kips)	960	Internal Pressure (%)	100%	Build Rate to Yield (°/100 ft)	59.3
Min. Tension Yield (kips)	1,372	External Pressure (%)	100%	**Yield Torque**	
Min. Tension Ult. (kips)	1,559	Tension (%)	100%	Yield Torque (ft-lbs)	43,230
Joint Str. (kips)	960	Compression (%)	100%		
		Ratio of Areas (Cplg/Pipe)	1.54		

MAKEUP TORQUE					
Min. MU Tq. (ft-lbs)	10,000	Max. MU Tq. (ft-lbs)	20,000	Running Tq. (ft-lbs)	See GBT RP
				Max. Operating Tq. (ft-lbs)*	41,070

Units: US Customary (lbm, in., °F, lbf)

1 kip = 1,000 lbs

* See Running Procedure for description and limitations.

See attached: Notes for GB Connection Performance Properties.

GBT Running Procedure (GBT RP): www.gbtubulars.com/pdf/RP_GB_DWC_Connections.pdf

Blanking Dimensions: www.gbtubulars.com/pdf/GB_DWC_Blanking_Dimensions.pdf

GB tubulars
Casings & Connections

Notes for GB Connection Performance Properties

Rev. 0; (Oct., 2013)

ENGINEERING THE RIGHT CONNECTIONS™

1. All dimensions shown are nominal. Plain end weight is calculated in accordance with API TR 5C3. Performance properties are empirical, based on nominal dimensions, minimum material yield and ultimate strengths, and calculated in general accordance with industry standard formula(s) assuming uniaxial loading. All properties are calculated on the basis of materials at room temperature. NOTE: Material properties change with temperature.
2. Joint strength is the lesser of pipe thread strength and minimum coupling tension as calculated in accordance with API TR 5C3. Tensile efficiency is calculated using coupling strength based on ultimate material strength per API TR 5C3 divided by plain end yield strength of the casing. Minimum Coupling Tension based on material *yield* strength is provided *for information only*. Performance values presented for tension do not account for failure by pull-out (which can occur for casing with larger D/t ratios), effects of internal and external pressure, thermally induced axial loads, casing curvature (bending), and/or other static and dynamic loads that may occur singularly or in combination during downhole deployment and with subsequent well operations.
3. Drift diameters are based on Standard and Alternate drift sizes per API 5CT. Drift diameters are not specified for API 5L pipe. Drift diameters shown on GB Connection Performance Property Sheets represent the diameter of the drift mandrel used for end-drifting after coupling buck on. When shown, the alternate drift diameter is used for end drifting. Drift testing is performed in accordance with currently applicable API Specifications.
4. Minimum Internal Yield Pressure Performance values for Casing (API 5CT), Line Pipe (API 5L), and mill casing proprietary grades are based on API TR 5C3 formulas and assume 87.5% minimum wall thicknesses. Minimum Internal Yield Pressure efficiency for GB Connections is the lesser of the Minimum Internal Yield Pressure of the coupling and Leak Resistance divided by pipe body Minimum Internal Yield Pressure (all based on API TR 5C3 formulas). GB Connections typically demonstrate pressure resistance exceeding the mating pipe body unless otherwise noted with a pressure efficiency < 100%. Pressure efficiency can only be achieved when connections are properly assembled in strict accordance with GB Tubulars' Running Procedures (www.gbtubulars.com/pdf/RP-GB-DWC-Connections.pdf and www.gbtubulars.com/pdf/RP-20-GB-Butt-and-GB-3P.pdf.
5. Compression efficiency of the Casing/Connection combinations does not consider the axial load that causes pipe body buckling. The compressive load that causes buckling is usually less than the pipe body compressive yield strength and is dependent on a number of factors including, but not limited to, string length (or slenderness ratio; L/D), thermally induced axial loads, and annular clearance that may (or may not) lend side support to the casing string.
6. Bending values assume a constant radius of curvature where the casing is in uniformly intimate contact with the wall of the wellbore (i.e. when the upset at the coupling OD is small compared with wellbore wall irregularities). When the radius of curvature is not constant due to large wellbore wall irregularities, varying trajectory, micro doglegs, wash-outs, rock ledges, and other downhole conditions, unpredictable excessive bending stresses can occur that may be detrimental to casing and connection performance.
7. Fatigue failures are a function of material properties, stress range, and number of stress reversal cycles. API 5CT, API 5L, and mill proprietary casing/coupling materials have a finite fatigue life. Higher stress ranges yield lower fatigue life. So as a general rule of thumb, casing should never be rotated at higher RPMs than needed for task accomplishment. For the same stress range, casing rotated at 25 RPMs will generally last 4 times longer (more rotating hours) than casing rotated at 100 RPMs. However with fatigue, there are opportunities for unexpected higher stress reversal levels associated with vibration, thermally induced axial loads, and bending (see above) in addition to all other stress reversals imparted during running, rotating, reciprocating, pressure testing, pumping, etc. The extent and quality of the cement job is also a factor. Under aggressive, high-volume, multi-stage hydraulic fracturing operations, the casing string (including the connections) is severely taxed such that local stress range(s) and actual number of applied cycles cannot be precisely determined without full string instrumentation.
8. External pressure efficiency (expressed in percent) is the ratio of the lesser of Minimum Internal Yield Pressure and Leak Resistance for coupling (calculated per API TR 5C3) divided by the API collapse rating of the casing. External pressure efficiency has not been verified by testing and does not consider other applied loads. External pressure efficiency does not account for any high collapse rating that may be shown on GB Connection Performance Property Sheets.
9. Maximum Makeup Torque is provided for guidance only. This value is not the same as the Connection Yield Torque shown. Connection Yield Torque is the lesser of yield torque rating for the critical cross-section of pipe body, connector body, and pin nose and the threadform load flank bearing area. Connection Yield Torque does not consider radial buckling of the pipe or connection due to excessive jaw pressure during torque application. Torque in connections can increase or decrease over that applied at makeup (connection tightening/loosening) with rotating and stimulation operations due to slip-stick, shock loads, bending, tight spots, vibration(s), temperature, and other downhole factors that may occur individually or in combination. Due to circumstances beyond the control of GB Tubulars, User accepts all risks associated with casing and connection related issues that occur during and after rotating operations.
10. **Every** GB Connection requires the proper amount and distribution of thread compound to all pin and coupling threads and careful field make up in strict accordance with GB Tubulars' Running Procedures to provide expected levels of performance in service.
11. Reactions among water, drilling muds and other fluids, and chemicals introduced by User with downhole formation fluids may result in an environment detrimental to casing and connection performance. User should carefully consider all aspects of the string design including material compatibility with respect to possible corrosion, sour conditions, and other factors that may result in unexpected casing and/or connection failure at or below published ratings.
12. Performance Properties are subject to change without notice. User is advised to obtain the current GB Connection Performance Property Sheet for each application.

Limitations

Data presented in GB Performance Property Sheets and Running Procedures ("GB Information") is provided for informational purposes only and intended to be supplemented by the professional judgment of qualified personnel during design, field handling, deployment, and all subsequent well operations. The use of GB Information is at the User's sole risk.

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GB tubulars	**Running Procedure for Casing with GB *Drilling with Casing* Connections**	October 29, 2007 Rev. 12 (11/25/2013)

OVERVIEW

This field running procedure applies to makeup of **GB *Drilling with Casing*** (GB DwC) Connections which include GB CD, GB WS, GB HB, GB CDE, GB WSE, and GB HBE Connections with GB Butt (Buttress), GB 4P, and GB 3P thread forms. All of these connections are suitable for ***Running*** (standard casing applications), ***Rotating*** (to aid string advancement), ***Drilling*** (Drilling with Casing/Drilling with Liners) and ***Driving***. This procedure also applies to the legacy GB Connections known as GB Butt and GB 3P.

Numerous factors impact the makeup torque of Buttress (GB Butt) and Modified Buttress Threads (such as GB 4P and GB 3P). Some of these factors include but are not limited to: allowable threading tolerances, joint characteristics (OD, straightness, and weight), vertical alignment (derrick, top drive, and elevator alignment relative to rotary table), thread compound (amount and distribution), snub line (location and orientation), distance between tongs and backups, temperature/weather, equipment type, efficiencies (electrical, hydraulic and mechanical), grips/dies (type, orientation, location, contact area, and distribution), measurement equipment, gauge calibration, personnel, etc. The nature of these types of connections makes it impossible to provide makeup torque values that will yield proper power tight makeup on every rig under all circumstances with the wide variety of existing connection makeup equipment. This procedure has been designed to determine the ***Running Torque*** required for proper power tight makeup of GB Connections under the circumstances and with the actual equipment, set up conditions, weather, etc. that exist at the time of running. With proper execution of this procedure, GB Connections will be properly and consistently assembled. This GB Running Procedure provides the basic recommended practices and is intended to be supplemented by the professional judgment of qualified personnel based on observation of actual makeups throughout the casing run.

DEFINITIONS

1. Minimum Makeup (MU) Torque: Connections must have at least this amount of torque applied.
2. Shoulder Torque: MU torque required to achieve shoulder engagement.
3. Running Torque: Developed at start of casing run per GB Running Procedure and once established, used for the rest of the joints in the string. The ***Running Torque*** will likely vary with each job due to the factors listed in the Overview section.
4. Delta Torque: Difference between shoulder torque and final makeup torque.
5. Maximum MU Torque: Assembly torque shall not exceed the Maximum Makeup Torque shown on size, weight, and grade-specific GB Performance Property Sheets during routine assembly.
6. Yield Torque: Torque that causes yielding in the connection (usually yielding of the pin nose). Yield torque rating does **NOT** consider the torque that may radially buckle the pipe body at the grip points.
7. Maximum Operating Torque: Yield Torque with 5% Safety Factor. The Maximum Operating Torque is **NOT** the Maximum Makeup Torque and is **NOT** a sustainable rotating torque. Operating at the Maximum Operating Torque for any length of time may damage the connection. User should carefully consider this value to determine if more than a 5% Safety Factor on yield torque is suitable for the application.

KEY INFORMATION

Thread Compound: Best-O-Life 2000, API Modified, API Modified Hi-Pressure, or any industry recognized equivalent to these products. Thread compound may also be referred to as "dope".

Torque Values: See individual GB Connection Performance Property Sheets available at the following link; http://www.gbtubulars.com/connection_selector.php.

Continuous Makeup: Makeup of GB Connections **SHALL START AND CONTINUE WITHOUT STOPPING** until full power tight makeup is achieved.

Makeup Speed: Use of high gear at no more than 20 RPMs is permissible once proper starting thread engagement has occurred. **THE FINAL TWO (2) TURNS, AT A MINIMUM, SHALL BE COMPLETED IN LOW GEAR AT LESS THAN 6 RPMS**.

Shoulder Engagement: Pin nose engagement. Shoulder engagement is indicated by a spike on an analog torque gauge or a sharp vertical spike on a torque vs. turn plot. As a secondary check, proper power tight makeup is achieved when the coupling covers approximately half of the API Triangle Stamp on the pin.

Acceptance Criteria: All GB Connections must exhibit shoulder engagement (achieve pin-to-pin or pin-to-shoulder engagement) with a minimum delta torque ≥ 10% of the shoulder torque.

It is imperative that the following procedure be executed carefully at the beginning of the run to determine the ***Running Torque*** (torque to be used for the rest of the string). The ***Running Torque*** is determined while running the first 10 joints exclusive of joints assembled with threadlocking compounds. Sometimes more than the first 10 joints will be needed to establish the ***Running Torque*** due to erratic results and/or rig-specific conditions. The ***Running Torque*** may have to be re-established during the casing run under certain conditions[1]. Use the size-specific GB Connection Performance Property Sheets (http://www.gbtubulars.com/connection_selector.php) for physical properties and torque values.

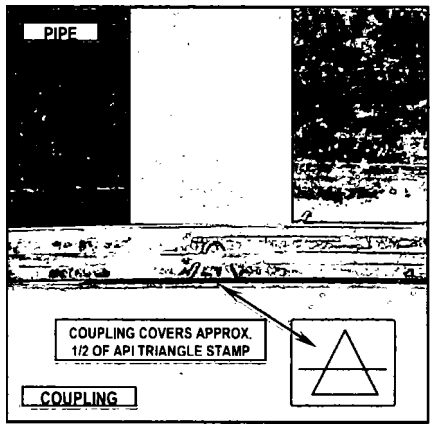
Each GB Connection Performance Property Sheet presents calculated Yield Torque values for the pipe body and connection which are based on nominal dimensions and minimum material yield strength. The Maximum Operating Torque shown on the GB Connection Performance Property Sheets includes a 5% safety factor on Yield Torque. As such, it represents the limiting torque ***spike*** that can be applied to the connection during rotating operations. The Maximum Operating Torque is **NOT** the Maximum Makeup Torque and is **NOT** a sustainable rotating torque. Operating at the Maximum Operating Torque for any length of time will likely damage the connection.

Connections shall be made up until shoulder engagement with delta torque ≥ 10% of the shoulder torque (not to exceed the maximum makeup torque, see procedure below) using the ***Running Torque*** value established in this procedure. The Maximum Makeup Torque at the beginning and throughout the run shall be limited to the value shown on the applicable GB Connection Performance Property Sheet. The maximum torque value is given as a practical limit for avoidance of thread galling, connection damage, and possible tube damage due to excessive jaw pressure that can occur with application of extreme makeup torque. Contact GB Tubulars if more than the Maximum Makeup Torque value is required for shoulder engagement and/or final make up, or if torque exceeding the Maximum Operating Torque value is required for the intended service.

[1] Examples include but are not limited to more than an occasional low delta torque, string of mixed mills, equipment change, large temperature change, and wobbling or noticeable vibration when joint is turning.

PROCEDURE FOR ESTABLISHING *RUNNING TORQUE*

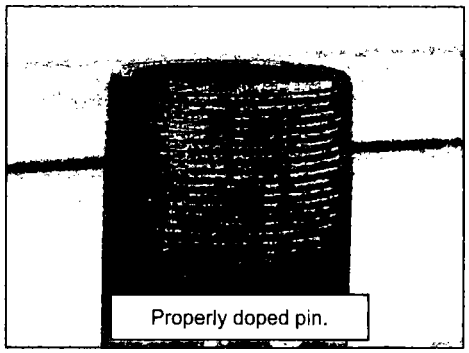
1. Remove coupling thread protectors only after casing is set in V-Door.
2. ***Always apply fresh thread compound to coupling threads and internal shoulder (where applicable).*** See Comment No. 1 (below) for discussion on proper amount of thread compound.
3. Remove pin thread protectors only after joint is raised in the derrick. Visually inspect pin threads for sufficient thread compound as described in Comment No. 1; ***add fresh compound to pin threads and pin nose***.
4. Fresh thread compound should **NEVER** be added on top of dope contaminated with dust, dirt, and/or debris. Threads observed to have contaminated thread compound shall be thoroughly cleaned and dried before applying fresh thread compound.
5. Stab the pin carefully into the coupling of the joint hanging in the rotary table. A stabbing guide is recommended to protect the pin nose and leading thread from physical damage that may contribute to thread galling. Make up each connection until shoulder engagement plus delta torque ≥ 10% of the shoulder torque without exceeding the Maximum Makeup Torque. Record the shoulder torque observed for the first 10 joints (excluding threadlocked accessory joints). The ***Running Torque*** is (a) the Minimum Makeup Torque shown on the GB Connection Performance Property Sheets ***or*** (b) the Maximum Shoulder Torque recorded from the first 10 makeups + 10%, ***whichever is higher*** (rounded to the next highest 500 ft.-lbs.) When making up the initial joints for establishing the ***Running Torque*** carefully watch the torque gauge for the shoulder torque and try to manually shut down the tongs before reaching Maximum Makeup Torque shown on the GB Connection Performance Property Sheets. Alternately, the dump valve should be set to the Maximum Makeup Torque during this initial process.



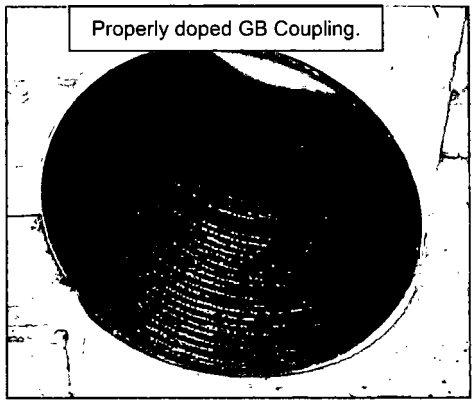
6. After the first 10 makeups (more if necessary due to conditions at the time of the run), use the ***"Running Torque"*** established in Step 5 for the remainder of the string. A dump valve is strongly recommended to stop makeup once the established ***Running Torque*** is achieved.
7. All connections made up with the established ***Running Torque*** should achieve shoulder engagement with the minimum amount of delta torque. Carefully watch for the spike on the torque gauge during each makeup to verify shoulder engagement. As a ***secondary*** verification, randomly check the makeup position relative to the API Triangle Stamp during the run. Proper power tight makeup position is achieved when the coupling covers approximately half of the API Triangle Stamp on the pin (see accompanying photo).

COMMENTS, TROUBLESHOOTING

1. GB Connections are thread compound friendly. Thread compounds shall be handled, mixed, and applied in strict accordance with the manufacturer's instructions. **THREAD COMPOUND SHALL BE APPLIED TO BOTH PIN AND COUPLING THREADS AND SHOULDER OF EVERY CONNECTION**. Sufficient thread compound has been applied when all threads (pin and coupling), pin nose, and coupling ID surfaces are completely covered **WITH NO GAPS OR BARE SPOTS**. The thread form should be discernible beneath the compound; i.e. when the thread valleys appear half full. Be generous with the thread compound; but avoid over-doping to the point where ***excessive*** amounts are squeezed out during assembly.


Properly doped pin.

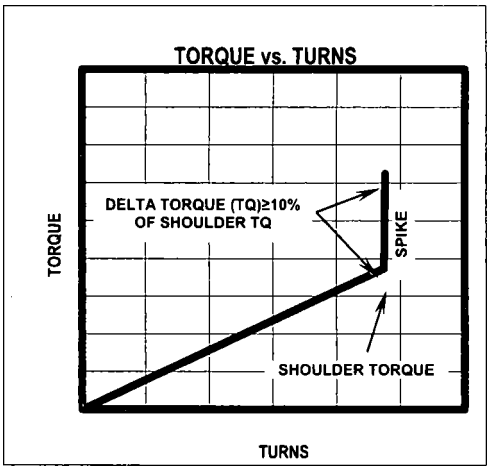
Use of a mustache brush is the preferred method for applying and distributing thread compounds to GB Connections.


Properly doped GB Coupling.

2. If threads are cleaned on racks, new dope shall be applied in a light, even coat to both pin and coupling threads. See Comment No. 1 above for description of sufficient thread compound. Clean thread protectors shall be re-applied to freshly doped pin and coupling threads unless the casing run is imminent (no more than a few hours) to avoid contaminating exposed thread compound.
3. All connections should achieve shoulder engagement before reaching the "***Running Torque***" value determined by this procedure. Any connection that does not achieve shoulder engagement at the established "***Running Torque***" value shall be visually inspected for position relative to the API Triangle Stamp.
   a) If the coupling is shy of the API Triangle Stamp Base, the connection shall be broken out, cleaned and inspected visually for thread damage, re-doped, and made-up again (or laid down if threads are damaged). Connections that have not achieved shoulder engagement **SHALL NEVER** be backed up a couple of turns and remade. They shall be completely broken out, cleaned and inspected as described above.
   b) If the coupling covers the API Triangle base but does not cover approximately half of the Triangle Stamp, add additional torque to achieve shouldering and finish the makeup. It is common to see high torque (possibly exceeding the recommended maximum torque) to initiate connection turning. This is acceptable as long as the torque drops off once movement starts and then spikes with shoulder engagement. If acceptable makeup doesn't occur with one additional torque application, the connection shall be broken out (as described in 3a above).
   c) Any connection not properly assembled (i.e. not meeting the acceptance criteria) in two (2) attempts (provided threads pass a visual inspection each time) is reject and shall be laid down.
4. At the established ***Running Torque***, the connections will generally shoulder with at least 10% delta torque. High interference connections will tend to have a higher shoulder torque and less delta torque (at least 10% of the shoulder torque is required). Low interference connections will tend to have lower shoulder torque and more delta torque. In general, the GB Connections makeup consistently but will vary due to any of the factors enumerated in the second paragraph of the Overview section of this procedure. However, wide variability on more than a few joints should be investigated for a root cause and, if necessary, a new ***Running Torque*** should be established following the same procedure used at the start of the casing run.
5. It is recommended to have a few spare, loose couplings available in the event coupling threads become damaged on the rig. This allows changing out a coupling without having to lay a joint(s) down. Pin threads shall be cleaned and inspected visually for thread damage and re-doped before installing a replacement coupling (or the joint shall be laid down if pin threads under the removed coupling are damaged and cannot be field repaired).
   - For GB CDE (and other GB Connections with internal shoulders) install the coupling hand tight (use of strap wrenches to assist is permitted) and then make up with power tongs to shoulder engagement using the above established ***Running Torque***.
   - GB CD Connections are made up to a precise position at the threading plant (mill side). Prior to removing a damaged coupling, a radial paint band should be applied to the pipe body to mark the position of the existing coupling. After removal, install the new coupling hand tight (use of strap wrenches to assist is permitted) and then make

up with power tongs to the exact same position using the previously applied paint band as the indicator.

6. ***Torque vs. Turn monitoring systems are recommended for field makeup of GB Connections.*** While Torque vs. Turn plots provide good information about makeup, they **SHALL NOT BE SUBSTITUTED FOR DIRECT VISUAL OBSERVATION OF THE CONNECTION DURING ASSEMBLY**. There is no second chance to watch field assembly of a connection. Torque vs. Turn plots can always be viewed for verification purposes once a makeup is finished. When available, torque vs. turn plots shall finish with a clearly defined spike as shown in the graphic to the right. The general character of torque vs. turn plots for good makeups will become evident after the first ten (10) makeups (again, more may be necessary due to rig- and/or equipment-specific conditions). Any makeup that results in a plot that is "out-of-character"[2] when compared with the majority of plots from previous good makeups should be checked carefully.



When using Torque vs. Turn monitoring equipment, GB recommends setting a reference torque value of 500 ft.-lbs. or 10% of the minimum makeup torque (whichever is lower) to normalize the resulting plots. Plot scales should be set so data spans at least 2/3 of the turns scale on each plot (10 turns will usually be sufficient at the start and can be reduced based on data from the first few joints). **UNDER NO CIRCUMSTANCE SHOULD MAKEUP BE STARTED UNTIL THE MONITORING SYSTEM IS READY TO RECORD DATA**.

7. Occasionally the mill side of a GB Connection may turn during field makeup. When observed, the makeup should continue without stopping per this procedure. It may be helpful to scribe a vertical line across the coupling-pipe interface to aid estimation of mill side turning if it is observed with some frequency. The amount of mill side turn should be carefully observed and estimated. If the mill side turns less than ½ turn and all other aspects of the makeup are good, the connection is acceptable. If the mill side turns more than ½ turn trouble-shooting should be initiated paying particular attention to amount and distribution of thread compound, vertical alignment, weight of joint, hooked end on pipe, and other possible factors that may contribute to possible high torque during field makeup. It should be noted that mill side turning during field makeup occurs occasionally and should not be concerning. Frequent or persistent mill side turning is a symptom that needs troubleshooting and appropriate corrective action.
8. A double wrap of the pick-up sling should be used when raising casing into the derrick when single joint, side-door, or slip elevators are not being used.
9. Higher torque may be required to achieve shoulder engagement when threadlock compounds are applied. User is advised to carefully follow the manufacturer's instructions with respect to mixing, application, temperature, and time. Torque ranges with threadlock compounds cannot be estimated due to many variables including but not limited to temperature, time, connection tolerances, and surface finish. In these cases, carefully monitor makeup to be sure shouldering occurs. The only exception to the shouldering requirement is with float equipment (float shoe and float collar) that will be assembled with a threadlocking compound. In this case, makeup to a position that covers the base of API Triangle Stamp is considered satisfactory.
10. Manual and automated dump valves can miss the established ***Running Torque*** due to a number of factors. Slightly overshooting the ***Running Torque*** is not cause for concern as long as the final "dump" torque is not excessive and the equipment used is generally consistent joint-to-joint.

[2] An "out-of-character" plot may initiate with a high torque, show significantly steeper slope from the start of makeup, wide torque undulations as makeup progresses, no clearly defined spike, insufficient/inconsistent turns, etc.

11. Attached is a "Worksheet for determining GB Connection ***Running Torque*** at the beginning of a Casing Run" for use at the start of any casing run using GB Connections. GB recommends that this worksheet be filled out and maintained with the casing run records.

PROCEDURE SUMMARY

1. Remove coupling protectors after casing is set in V-Door and apply fresh thread compound to coupling threads.
2. Raise joint in derrick, remove pin protectors, and apply fresh thread compound to pin threads and pin nose.
3. Carefully stab pin into coupling and makeup to pin nose engagement. Try to stop makeup without exceeding the Maximum Makeup Torque (shown on GB Connection Performance Property Sheets). Carefully watch for and note the Shoulder Torque.
4. Record Shoulder Torque and Final Torque values, and position relative to API Triangle Stamp for first ten (10) connections, more if necessary due to run/rig-specific conditions.
5. The ***Running Torque*** is (a) the Minimum Makeup Torque shown on the GB Connection Performance Property Sheet or (b) the Maximum Torque required for shoulder engagement + 10% delta torque determined from the first 10 makeups, ***whichever is higher***. Use the attached Worksheet to record this data and determine the ***Running Torque***.
6. Make up the rest of the string at the ***Running Torque*** determined in the previous step.

NOTES:

- *This summary is provided for quick reference and is not a substitute for the comprehensive procedure provided above.*
- *Does not apply to threadlock connections.*

DO's and DONT's

1. **DO** check vertical alignment.
2. **DO** apply thread compound to all pin and coupling threads, pin nose and coupling shoulder area.
3. **DO** establish the ***Running Torque*** in accordance with GB Procedures.
4. **DO** make adjustments to ***Running Torque*** if indicated by inconsistent makeups during the casing run.
5. **DO** check every makeup for a clear indication of shouldering with a minimum delta torque ≥ 10% of the shoulder torque.
6. **DO** reject any coupling that is not properly made up after two (2) attempts.
7. **DO** carefully stab pins into coupling (use a stabbing guide for casing smaller than 9 5/8" OD).
8. **DO** finish the makeup with at least two (2) full turns in low gear at 6 RPMs or less.
9. **DO** make up every connection continuously to pin nose engagement without stopping.
10. **DO NOT** over dope.
11. **DO NOT** exceed the Maximum Makeup Torque as shown on the GB Connection Performance Property Sheets during assembly.

12. **DO NOT** make up any misaligned connection.
13. **DO NOT** exceed 20 RPMs in high gear and 6 RPMs in low gear.
14. **DO NOT** remove pin thread protectors until pipe is hanging in the derrick.
15. **DO NOT** ever back a connection up a couple of turns and remake. Any connection requiring this type of attention **SHALL** be broken out completely, cleaned, visually inspected, and if OK, re-doped and remade.
16. **DO NOT** hesitate to contact GB Tubulars with questions before and during any casing run.

RECOMMENDED EQUIPMENT

- Stabbing Guide
- Mustache Brush
- Torque vs. Turn Monitoring Equipment or Dump Valve

Worksheet for determining GB Connection Running Torque at the beginning of a Casing Run

Ignore joints that are assembled with threadlock compounds. See "Addendum Procedure for GB Connections Assembled with Threadlocking Compounds" available at www.gbtubulars.com.

Pertinent Excerpt from GB Running Procedure

5. Stab the pin carefully into the coupling of the joint hanging in the rotary table. A stabbing guide is recommended to protect the pin nose and leading thread from physical damage that may contribute to thread galling. Make up each connection until shoulder engagement plus delta torque ≥ 10% of the shoulder torque without exceeding the Maximum Makeup Torque. Record the shoulder torque observed for the first 10 joints (excluding threadlocked accessory joints). The Running Torque is (a) the Minimum Makeup Torque shown on the GB Connection Performance Property Sheets or (b) the Maximum Shoulder Torque recorded from the first 10 makeups + 10%, whichever is higher (rounded to the next highest 500 ft.-lbs.) When making up the initial joints for establishing the Running Torque carefully watch the torque gauge for the shoulder torque and try to manually shut down the tongs before reaching Maximum Makeup Torque shown on the GB Connection Performance Property Sheets. Alternately, the dump valve should be set to the Maximum Makeup Torque during this initial process.

6. After the first 10 makeups (more if necessary due to conditions at the time of the run), use the "Running Torque" established in Step 5 for the remainder of the string. A dump valve is strongly recommended to stop makeup once the established Running Torque is achieved.

Casing Data		Comment
OD (in)		See GB Connection Data Sheet
Weight (ppf)		See GB Connection Data Sheet
Grade		See GB Connection Data Sheet
Min MU Torque (ft-lbs)		See GB Connection Data Sheet
Max MU Torque (ft-lbs)		(2 X Min MU Tq)
Max Operating Torque (ft-lbs)		The Maximum Operating Torque is **NOT** the Maximum Makeup Torque and is **NOT** a sustainable rotating torque. Operating at the Maximum Operating Torque for any length of time will likely damage the connection.

Notes	Joint No.	Shoulder Torque (ft-lbs)	Final Torque (ft-lbs)	Triangle Stamp Position Sketch (△)
Required	1			
Required	2			
Required	3			
Required	4			
Required	5			
Required	6			
Required	7			
Required	8			
Required	9			
Required	10			
Optional	11			
Optional	12			
Optional	13			
Optional	14			
Optional	15			
Max. Shoulder Torque				
A Max. Shoulder Torque + 10%				
B Min. Makeup Torque (from GB Conn. Data Sheet)				
Running Torque (ft-lbs)			**A** or **B**, whichever is greater.	

Optional joints should be added if there is wide variability in shoulder torques recorded during the initial 10 joints. Judgement should be used to determine if more than 10 joints are needed for the purpose of establishing the Running Torque and, if so, how many more should be added.

Wide variations in Shoulder Torque during the first ten (10) joints suggest other issues requiring attention such as poor alignment, improper amount and distribution of thread compound, etc. Refer to 2nd paragraph of GB Running Procedure for possible contributing factors to aid troubleshooting.

GB Tubulars
950 Threadneedle, Suite 130
Houston TX 77079
Toll Free: 1-888-245-3848
Main: 713-465-3585
Fax: 713-984-1529

For Techincal Information, contact:
Gene Mannella
genem@gbtubulars.com
Qing Lu
qingl@gbtubulars.com

Rev. 12 (11/25/2013)

GB tubulars

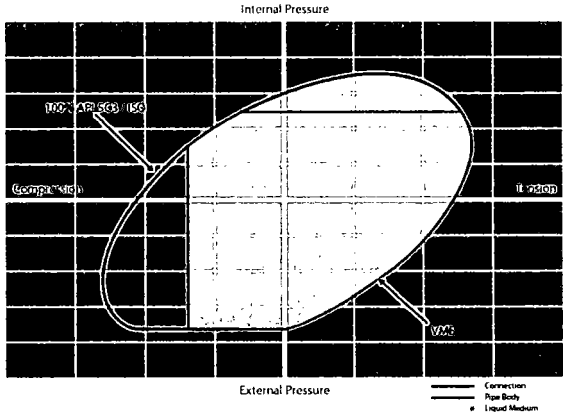
Technical Data Sheet TMK UP DQX 5 x 18 P110 HC

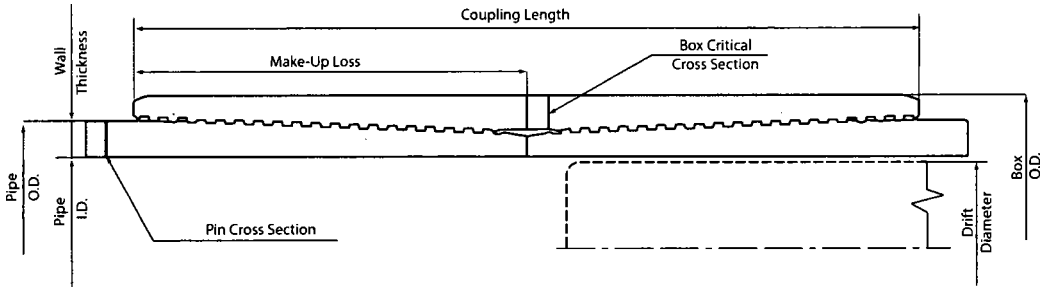
TUBULAR PARAMETERS	
Nominal OD, (inch)	5.000
Wall Thickness, (inch)	0.362
Pipe Grade	P110 HC
Coupling	Regular
Coupling Grade	P110 HC
Drift	Standard

CONNECTION PARAMETERS	
Connection OD (inch)	5.56
Connection ID, (inch)	4.276
Make-Up Loss, (inch)	4.097
Pin Critical Area, (sq inch)	5.275
Yield Strength in Tension, (klbs)	580
Yeld Strength in Compression, (klbs)	580
Tension Efficiency	100%
Compression Efficiency	100%
Min. Internal Yield Pressure, (psi)	13 940
Collapse Pressure, (psi)	14 820
Uniaxial Bending (deg/100ft)	100.9

MAKE-UP TORQUES	
Yield Torque, (ft-lb)	17 500
Minimum Make-Up Torque, (ft-lb)	9 800
Optimum Make-Up Torque, (ft-lb)	10 900
Maximum Make-Up Torque, (ft-lb)	11 900

PIPE BODY PROPERTIES	
PE Weight, (lbs/ft)	17.93
Nominal Weight, (lbs/ft)	18.00
Nominal ID, (inch)	4.276
Drift Diameter, (inch)	4.151
Nominal Pipe Body Area, (sq inch)	5.275
Yield Strength in Tension, (klbs)	580
Min. Internal Yield Pressure, (psi)	13 940
Collapse Pressure, (psi)	14 820





NOTE: The content of this Technical Data Sheet is for general information only and does not guarantee performance or imply fitness for a particular purpose, which only a competent drilling professional can determine considering the specific installation and operation parameters. This information supersede all prior versions for this connection. Information that is printed or downloaded is no longer controlled by TMK and might not be the latest information. Anyone using the information herein does so at their own risk. To verify that you have the latest technical information, please contact PAO "TMK" Technical Sales in Russia (Tel: +7 (495) 775-76-00, Email: techsales@tmk-group.com) and TMK IPSCO in North America (Tel: +1 (281)949-1044, Email: techsales@tmk-ipsco.com).

Print date: 06/16/2017 18:45

Casing Assumptions Worksheet

The below table illustrates the proposed casing design, as well as the minimum acceptable design factors for casing loads per Rosehill Operating Standards.

Csg Type	Hole Size	Interval	Csg OD	Weight	Grade	Conn	DF_{min} Collapse	DF_{min} Burst	DF_{min} Tension	DF_{min} Coupling
Surface	17.5"	0 – 925'	13.375 "	54.5#	J55	STC	1.125	1.25	1.60	1.6
Intermediate	12.25"	0 – 5100'	10.75"	45.5#	HCL-80	SFII	1.125	1.25	2.0	2.0
Intermediate	9.875"	0' – 11,300'	7.625"	29.7#	HCP110	GBCD	1.125	1.25	1.60	1.6
Production	6.75"	0'- 16,580'	5"	18#	HCP110	DQX	1.125	1.25	1.60	1.6

The actual safety factors specific to the Tatanka Federal #5H well are listed in the table below.

Csg Type	DF_{min} Collapse	DF_{min} Burst	DF_{min} Tension	DF_{min} Coupling
Surface	2.8	1.8	9.2	5.5
Intermediate	2.4	3.5	3.5	2.9
Intermediate	1.32	1.25	2.1	2.1
Production	1.57	1.27	1.48	1.48

These design factors are derived based on the following assumptions:

Surface:
Collapse – full evacuation
Burst – 1500 psi casing test
Tension – buoyant weight of casing at depth + 50,000 lb allowable overpull
Coupling– buoyant weight of casing at depth + 50,000 lb allowable overpull

First Intermediate:
Collapse – half evacuation with minimum mud weight of 10#
Burst – 1500 psi casing test
Tension – buoyant weight of casing at depth + 100,000 lb allowable overpull
Coupling– buoyant weight of casing at depth + 100,000 lb allowable overpull

Second Intermediate:
Collapse – half evacuation with minimum mud weight of 10#
Burst – max expected pore pressure minus gas column to surface
Tension – buoyant weight of casing at depth + 150,000 lb allowable overpull
Coupling - buoyant weight of casing at depth + 150,000 lb allowable overpull

Production
Collapse – full evacuation
Burst – 11,000 psi frac pressure
Tension – buoyant weight of casing at depth + 200,000 lb allowable overpull
Coupling - buoyant weight of casing at depth + 200,000 lb allowable overpull

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Intermediate	9.875"	0' – 11,300'	7.625"	29.7#	HCP110	GBCD	1.125	1.25	1.60	1.6
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Tension – buoyant weight of casing at depth + 150,000 lb allowable overpull
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Tension – buoyant weight of casing at depth + 200,000 lb allowable overpull
Coupling - buoyant weight of casing at depth + 200,000 lb allowable overpull

Rosehill Operating Company, LLC

Hydrogen Sulfide Plan Summary

A. All personnel shall receive proper H2S training

B. Briefing Area: two perpendicular areas will be designated by signs and readily accessible.

C. Required Emergency Equipment:

- Well control equipment
  a. Flare line 150' from wellhead to be ignited by flare gun.
  b. Choke manifold with a remotely operated choke.
  c. Mud/gas separator

- Protective equipment for essential personnel.

  Breathing apparatus:
  a. Rescue Packs (SCBA) — 1 unit shall be placed at each briefing area, 2 shall be stored in the safety trailer.
  b. Work/Escape packs —4 packs shall be stored on the rig floor with sufficient air hose not to restrict work activity.
  c. Emergency Escape Packs —4 packs shall be stored in the doghouse for emergency evacuation.

  Auxiliary Rescue Equipment:
  a. Stretcher
  b. Two OSHA full body harness
  c. 100 ft 5/8 inch OSHA approved rope
  d. 1-20# class ABC fire extinguisher

- H2S detection and monitoring equipment:
  The stationary detector with three sensors will be placed in the upper dog house if equipped, set to visually alarm @ 10 ppm and audible @ 14 ppm. Calibrate a minimum of every 30 days or as needed. The sensors will be placed in the following places: Rig floor / Bell nipple / End of flow line or where well bore fluid is being discharged.
  (Gas sample tubes will be stored in the safety trailer)

- Visual warning systems.
  a. One color code condition sign will be placed at the entrance to the site reflecting the possible conditions at the site.
  b. A colored condition flag will be on display, reflecting the current condition at the site at the time.
  c. Two wind socks will be placed in strategic locations, visible from all angles.

- Mud program:
  The mud program has been designed to minimize the volume of H2S circulated to surface. The operator will have the necessary mud products to minimize hazards while drilling in H2S bearing zones.

- Metallurgy:
  All drill strings, casings, tubing, wellhead, blowout preventer, drilling spool, kill lines, choke manifold and lines, and valves shall be suitable for H2S service.

- Communication:
  Communication will be via cell phones and land lines where available.

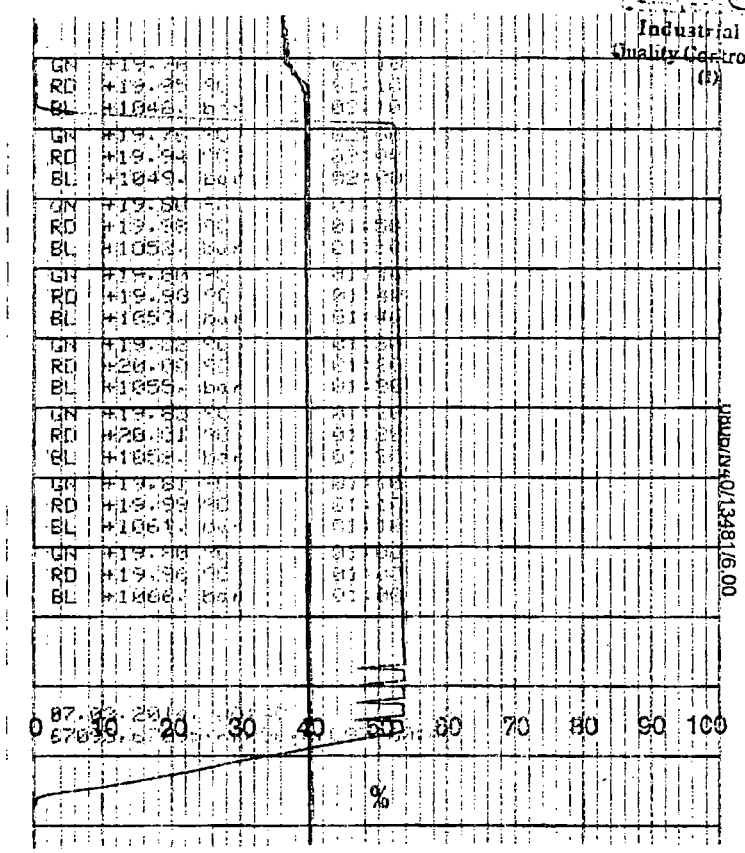
Rosehill Operating Company, LLC

Emergency Assistance Telephone List

PUBLIC SAFETY:		**911 or**
Lea County Sheriff's Department		(575) 396-3611
Fire Department:		
Carlsbad		(575) 885-3125
Artesia		(575) 746-5050
Hospitals:		
Carlsbad		(575) 887-4121
Artesia		(575) 748-3333
Hobbs		(575) 392-1979
Dept. of Public Safety/Carlsbad		(575) 748-9718
Highway Department		(575) 885-3281
New Mexico Oil Conservation		(575) 476-3440
U.S. Dept. of Labor		(575) 887-1174
Rosehill Operating Company, LLC		
Midland	Office	(432)684-2605
Houston	Office	(281)675-3400
Company Drilling Consultants:		
TBA		
Drilling Engineer		
Robert Brosig	Office	(432) 686-3609
	Cell	(432) 894-1256
Drilling Superintendent		
Jason Richey	Cell	(940) 531-2470
H&P Drilling		
H&P Drilling	Office	(432) 563-5757
Safety		
Chris Colston (HSE Manager)	Office	(281) 675-3400
	Cell	(832) 823-8995

ATTACHMENT OF QUALITY CONTROL INSPECTION AND TEST CERTIFICATE *No: 376, 378, 379, 380*

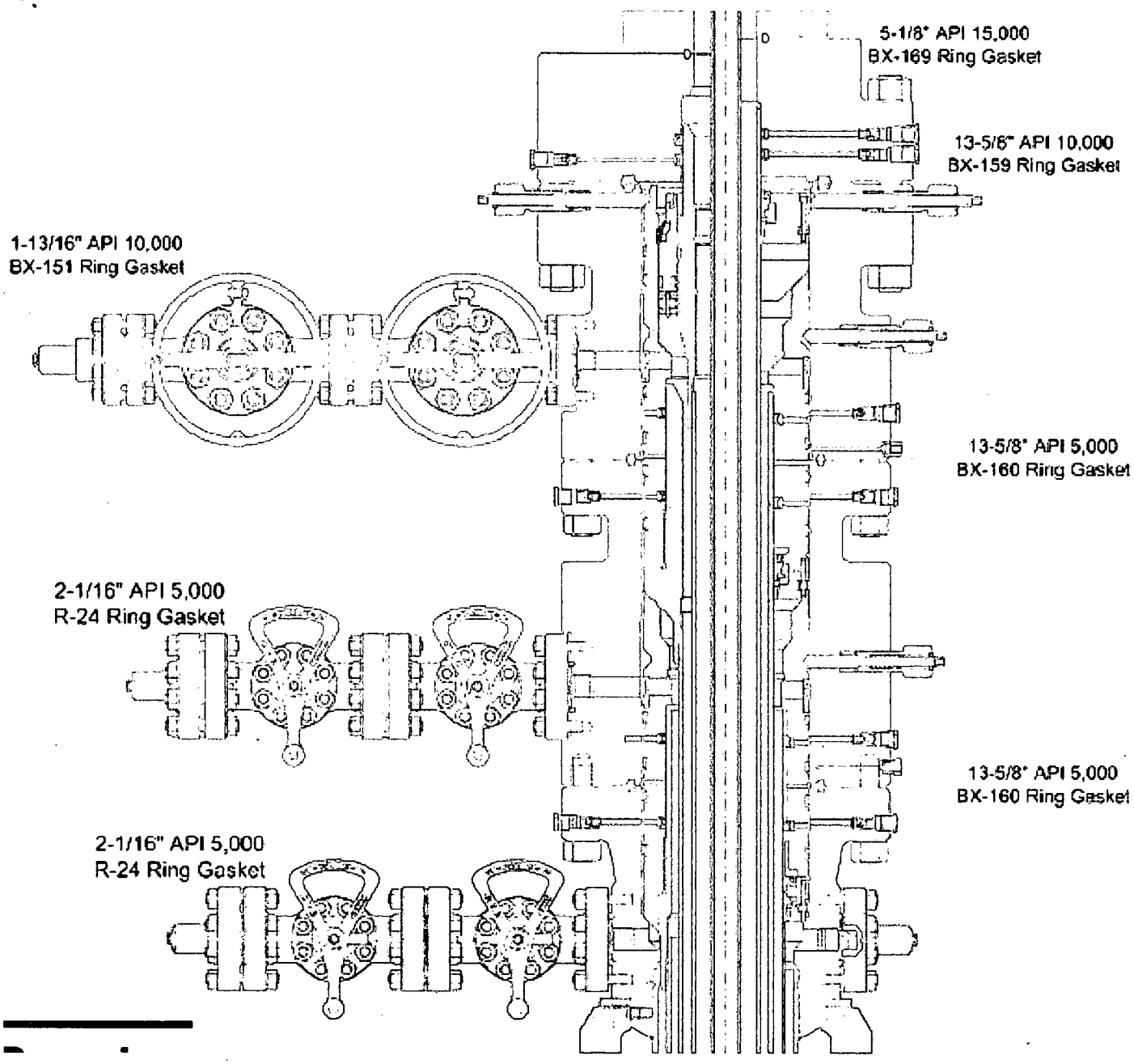
Industrial Kft.
Quality Control Dept.



Continental
CONTITECH

Hose Data Sheet

CRI Order No.	538079
Customer	ContiTech Oil & Marine Corp.
Customer Order No	4500398355
Item No.	1
Hose Type	Flexible Hose
Standard	**API SPEC 16 C**
Inside dia in inches	3
Length	35 ft
Type of coupling one end	FLANGE 4.1/16" 10K API SPEC 6A TYPE 6BX FLANGE C/W BX155 R.GR.SOUR
Type of coupling other end	FLANGE 4.1/16" 10K API SPEC 6A TYPE 6BX FLANGE C/W BX155 R.GR.SOUR
H2S service NACE MR0175	Yes
Working Pressure	10 000 psi
Design Pressure	10 000 psi
Test Pressure	15 000 psi
Safety Factor	2,25
Marking	USUAL PHOENIX
Cover	NOT FIRE RESISTANT
Outside protection	St.steel outer wrap
Internal stripwound tube	No
Lining	OIL + GAS RESISTANT SOUR
Safety clamp	No
Lifting collar	No
Element C	No
Safety chain	No
Safety wire rope	No
Max.design temperature [°C]	100
Min.design temperature [°C]	-20
Min. Bend Radius operating [m]	0,90
Min. Bend Radius storage [m]	0,90
Electrical continuity	The Hose is electrically continuous
Type of packing	WOODEN CRATE ISPM-15


5-1/8" API 15,000
BX-169 Ring Gasket
13-5/8" API 10,000
BX-159 Ring Gasket
1-13/16" API 10,000
BX-151 Ring Gasket
13-5/8" API 5,000
BX-160 Ring Gasket
2-1/16" API 5,000
R-24 Ring Gasket
13-5/8" API 5,000
BX-160 Ring Gasket
2-1/16" API 5,000
R-24 Ring Gasket

Rosehill Operating Well Control Plan

A. **Component and Preventer Compatibility Table**

The tables below outline the tubulars and compatible well control devices used in each hole section. A minimum of two barriers for well control will be in place at all times during the drilling of each hole section.

First Intermediate Hole Section (12 ¼"): (<5M MASP)

Component	OD	Preventer	RWP
Drillpipe	5"	Upper 4.5-7" VBR Lower 4.5-7" VBR	10M
HWDP	5"	Upper 4.5-7" VBR Upper 4.5-7" VBR	10M
Drill collars	6.5"	Upper 4.5-7" VBR Upper 4.5-7" VBR	10M
Drill collars	8"	Annular	5M
Mud Motor/NMDC	8"	Annular	5M
First Intermediate Casing	10.75"	Annular	5M
ALL	0-13-5/8"	Annular	5M
Open-hole	-	Blind Rams	10M

Second Intermediate Hole Section (9 7/8"): (<5M MASP)

Component	OD	Preventer	RWP
Drillpipe	5"	Upper 4.5-7" VBR Lower 4.5-7" VBR	10M
HWDP	5"	Upper 4.5-7" VBR Lower 4.5-7" VBR	10M
Drill collars	6.5"	Upper 4.5-7" VBR Lower 4.5-7" VBR	10M
Drill collars	8"	Annular	5M
Mud Motor/NMDC	8"	Annular	5M
Second Intermediate Casing	7.625"	Annular	5M
ALL	0-13-5/8"	Annular	5M
Open-hole	-	Blind Rams	10M

Production Hole Section (6 3/4"): (+-9M MASP)

Component	OD	Preventer	RWP
Drillpipe	4.5"	Upper 4.5-7" VBR Lower 4.5-7" VBR	10M
HWDP	4.5"	Upper 4.5-7" VBR Lower 4.5-7" VBR	10M
Drill collars	4.75"	Upper 4.5-7" VBR Lower 4.5-7" VBR	10M
Mud Motor/NMDC	4.75"	Upper 4.5-7" VBR Lower 4.5-7" VBR	10M
Production Casing	5"	Upper 4.5-7" VBR Lower 4.5-7" VBR	10M
ALL	0-13-5/8"	Annular	5M
Open-hole	-	Blind Rams	10M

VBR = Variable Bore Ram. Compatible range listed in chart.
HWDP = Heavy Weight Drill Pipe
NMDC = Non magnetic drill collar

B. Well Control Procedures

These steps outline the proper method for shutting the well in during a well control event, based on the current activity.

General Procedure While Drilling

1. Space out drill string.
2. Shut down pumps and rotary.
3. Open HCR.
4. Close annular preventer. (choke already closed)
5. Confirm shut-in.
6. Notify tool pusher/company representative.
7. Read and record the following:
    a. SIDPP and SICP
    b. Pit gain
    c. Time
8. Regroup and identify forward plan.
9. If pressure has built or is anticipated during the kill to reach 3500 psi, confirm spacing and swap to the upper pipe ram.

General Procedure While Tripping

1. Space out (get closest available tool joint to floor).
2. Stab full opening safety valve and close same.
3. Open HCR.
4. Close annular preventer. (choke already closed.)
5. Confirm shut-in.
6. Notify tool pusher/company representative.
7. Read and record the following
    a. SIDPP and SICP
    b. Pit gain
    c. Time
    d. Regroup and identify forward plan.
    e. If pressure has built or is anticipated during the kill to reach 3500 psi, confirm spacing and swap to the upper pipe ram.

General Procedure While Running Casing

1. Space out (get closest available tool joint to floor).
2. Stab crossover and safety valve and close same.
3. Open HCR
4. Close annular preventer. (choke already closed)
5. Confirm shut-in.
6. Notify tool pusher/company representative.
7. Read and record the following:
    a. SIDPP and SICP
    b. Pit gain
    c. Time
    d. Regroup and identify forward plan.
    e. **Only if running 5" casing**- If pressure has built or is anticipated during the kill to reach 3500 psi, confirm spacing and swap to the upper pipe ram.

General Procedure With No Pipe In Hole (Open Hole)

1. Open HCR
2. Shut-in with blind rams. (choke already closed)
3. Confirm shut-in
4. Notify tool pusher/company representative
5. Read and record the following:
    a. SICP
    b. Pit gain
    c. Time
6. Regroup and identify forward plan

General Procedures While Pulling BHA thru Stack

1. PRIOR to pulling last joint of drill pipe thru the stack.
    a. Perform flow check, if flowing:

b. Stab full opening safety valve and close same.
c. Open HCR.
d. Space out drill string with tool joint just beneath the upper pipe ram.
e. Shut-in using upper pipe ram. (choke already closed)
f. Confirm shut-in.
g. Notify tool pusher/company representative.
h. Read and record the following:
    h.i. SIDPP and SICP
    h.ii. Pit gain
    h.iii. Time
    h.iv. Regroup and identify forward plan

2. With BHA in the stack and compatible ram preventer and pipe combo immediately available.
    a. Stab crossover and full opening safety valve and close
    b. Space out drill string with upset just beneath the compatible pipe ram.
    c. Open HCR
    d. Shut-in using compatible pipe ram. (choke already closed)
    e. Confirm shut-in.
    f. Notify tool pusher/company representative
    g. Read and record the following:
        g.i. SIDPP and SICP
        g.ii. Pit gain
        g.iii. Time
        g.iv. Regroup and identify forward plan

3. With BHA in the stack and NO compatible ram preventer and pipe combo immediately available.
    a. If possible to pick up high enough, pull string clear of the stack and follow "Open Hole" scenario.
    b. If impossible to pick up high enough to pull the string clear of the stack.
    c. Stab crossover, make up one joint/stand of drill pipe, and full opening safety valve and close.
    d. Space out drill string with tool joint just beneath the upper pipe ram.
    e. Open HCR
    f. Shut-in using upper pipe ram. (choke already closed).
    g. Confirm shut-in.
    h. Notify tool pusher/company representative.
    i. Read and record the following:
        i.i. SIDPP and SICP
        i.ii. Pit gain
        iii. Time
    j. Regroup and identify forward plan

Rosehill Drilling Equipment Description

Auxilliary Well Control and Monitoring Equipment

1. A kellycock will be kept in the drill string at all times
2. A full opening drill pip-stabbing valve (inside BOP) with proper drill pipe connections will be on the rig floor at all times

Wellhead

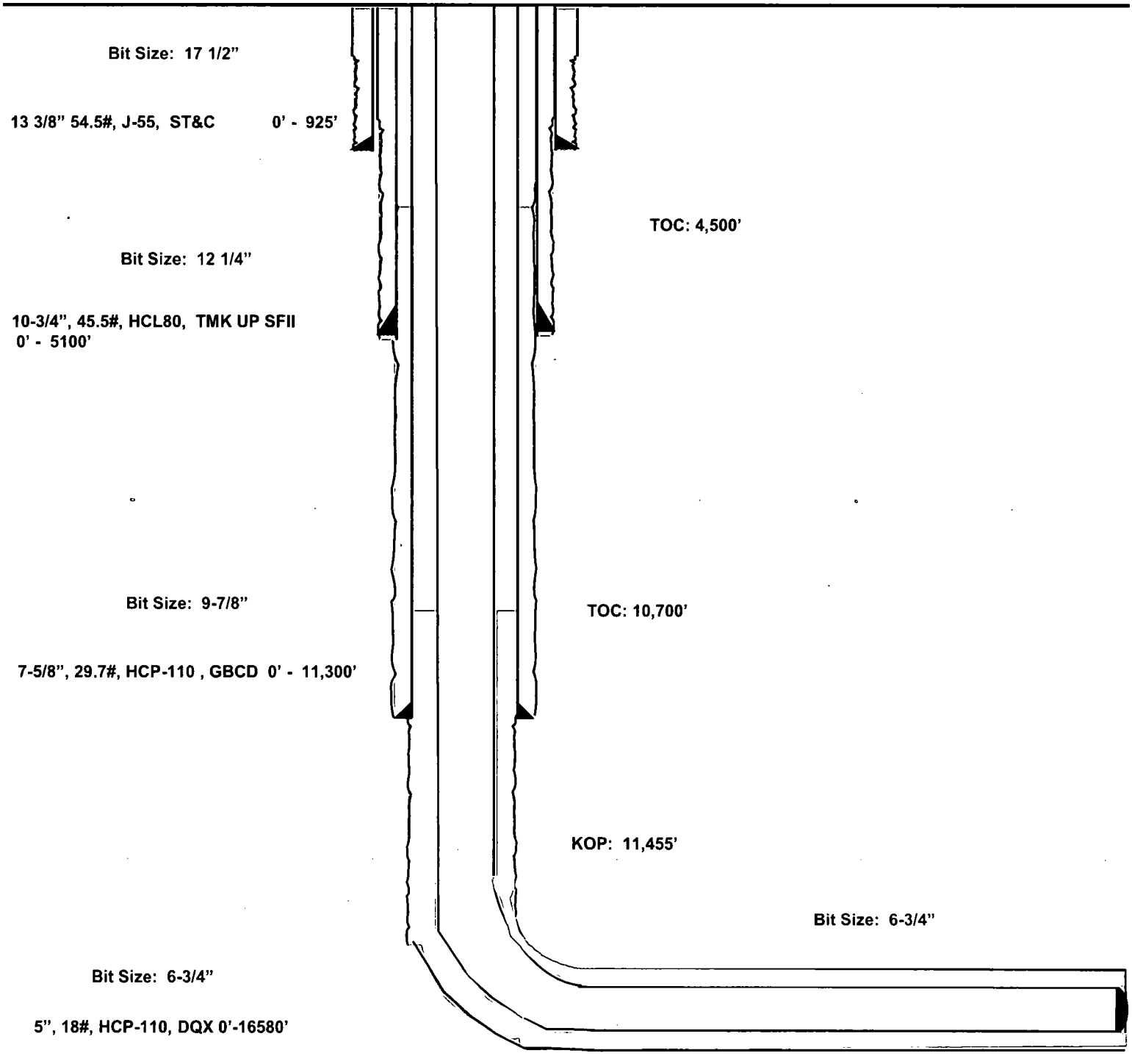
1. A multi-bowl wellhead system will be utilized.
2. After running the 13 3/8" surface casing, a 13-5/8" BOP/BOPE system with a minimum working pressure of 10,000 psi will be installed on the wellhead system and will be pressure tested to 250 psi low followed by a 10,000 psi pressure test. This pressure test will be repeated at least every 30 days, as per Onshore Order No. 2
3. The minimum working pressure of the BOP and related BOPE required for drilling below the surface casing shoe shall be 10,000 psi.
4. The multi-bowl wellhead will be installed by vendor's representative(s). A copy of the installation instructions for the Cameron Multi-Bowl WH system will be sent to the NM BLM office upon request.
5. The wellhead will be installed by a third party welder while being monitored by WH vendor's representative.
6. All BOP equipment will be tested utilizing a conventional test plug. Not a cup or J-packer type.
7. A solid steel body pack-off will be utilized after running and cementing the intermediate casing. After installation the pack-off and lower flange will be pressure tested to 5000 psi.
8. Both the surface and intermediate casing strings will be tested as per Onshore Order No. 2 to at least 0.22 psi/ft or 1500 psi, whichever is greater.

Tatanka Federal #5H

Lea County, New Mexico
Proposed Wellbore

API: 30-025-***

230' FSL
411' FEL
Section 11
T-26-S, R-35-E



Lateral: 16580' MD / 11932' TVD
FTP: 411' FWL & 330' FSL
LTP: 411' FWL & 330' FNL

Rosehill Operating
Tatanka Federal #005H

1. GEOLOGIC NAME OF SURFACE FORMATION:

Permian

2. ESTIMATED TOPS OF IMPORTANT GEOLOGICAL MARKERS:

Formation	TVD	MD
Rustler	760'	760'
Top salt	1140'	1140'
Lamar	5,096'	5096'
Top Delaware	5,967'	5967'
Top 1st Bone Spring	9,980'	9980'
Top 2nd Bone Spring	10,502'	10502'
Top 3rd Bone Spring	11,823'	11875'
Target	11,932'	12205'

3. ESTIMATED DEPTHS OF ANTICIPATED FRESH WATER, OIL OR GAS:

Upper Permian Sands	0- 400'	Fresh Water
Delaware Sands	5,967'	Oil
Bone Spring	9,980'	Oil
Wolfcamp	12,109'	Oil

No other Formations are expected to give up oil, gas or fresh water in measurable quantities. Surface fresh water sands will be protected by setting 13.375" casing at 925' and circulating cement back to surface.

4. CASING PROGRAM - NEW

Rosehill Operating
Tatanka Federal #005H

Csg Type	Hole Size	Interval	Csg OD	Weight	Grade	Conn	DF_{min} Collapse	DF_{min} Burst	DF_{min} Tension	DF_{min} Coupling
Surface	17.5"	0 – 925'	13.375"	54.5#	J55	STC	1.125	1.25	1.60	1.6
Intermediate	12.25"	0 – 5100'	10.75"	45.5#	HCL-80	SFII	1.125	1.25	2.0	2.0
Intermediate	9.875"	0' – 11,600'	7.625"	29.7#	HCP110	GBCD	1.125	1.25	1.60	1.6
Production	6.75"	0'- 16,773'	5"	18#	HCP110	DQX	1.125	1.25	1.60	1.6

Cementing Program:

Depth	No. Sacks	Wt. ppg	Yld Ft^3/ft	Mix Water Gal/sk	Slurry Description
13 3/8" 925'	400	13.5	1.75	9.13	Class C + 4% bentonite + .6% CD-32 + .5% CaCl2 (TOC @ Surface)
	300	14.8	1.34	6.34	Class C + 0.1%C-45 econolite
10 ¾" 5100	500	12.4	2.3	12.74	Class C + 5.0% Bentonite + 5.28#/sk salt + 1.25% C-45 econolite + .75% defoamer + .2% C-49 expansive additive (TOC @ Surface)
	200	14.8	1.34	6.35	Class C + 0.1%C-45 econolite + .2% C-49 expansive additive
7-5/8" 11,600'	640	11.5	2.73	15.72	50:50 (Class C:Poz) + 8% gel + .25% C-45 + .3% Citric Acid + .125% CSA-1000 + 6 lb/sk kol seal + 1 lb/sk phenoseal + 4 lb/sk gypsum + 1% NaCl
	200	15.6	1.18	5.23	Class H + .1% C-51 suspension agent + .45% C-20 retarder
5" 16,773'	635	14.2	1.25	5.89	50:50 (Class H:Poz) + .08% CSA-1000 fluid loss + .3% C-47B fluid loss + .2% C-20 retarder

Note: Cement volumes based on bit size plus at least 15% excess.

5. MINIMUM SPECIFICATIONS FOR PRESSURE CONTROL:

Variance is requested to use a co-flex line between the BOP and choke manifold (instead of using a 4" OD steel line).

Variance is also requested to use a 5,000 psi WP annular preventer.
The minimum blowout preventer equipment (BOPE) shown in Exhibit #1 will consist of a single ram, mud cross and double ram-type (10,000 psi WP) preventer and an annular preventer (5,000-psi WP). Both units will be hydraulically operated and the ram-type will be equipped with blind rams on bottom and 4 ½" x 7" variable pipe rams on top. All BOPE will be tested in accordance with Onshore Oil & Gas order No. 2.

Before drilling out of the surface casing, the ram-type BOP and accessory equipment will be tested to 5,000/250 psig and the annular preventer to 5,000/250 psig. The surface casing will be tested to 1500 psi for 30 minutes.

Before drilling out of the second intermediate casing, the ram-type BOP and accessory equipment will be tested to 10,000/250 psig and the annular preventer to 5,000/250 psig. The second intermediate casing will be tested to 2000 psi for 30 minutes prior to drillout.

Pipe rams will be operationally checked each 24-hour period. Blind rams will be operationally checked on each trip out of the hole. These checks will be noted on the daily tour sheets.

A hydraulically operated choke will be installed prior to drilling out of the intermediate casing shoe.

6. TYPES AND CHARACTERISTICS OF THE PROPOSED MUD SYSTEM:

During this procedure we plan to use a Closed-Loop System and haul contents to the required disposal.
The applicable depths and properties of the drilling fluid systems are as follows.

Depth	Type	Weight (ppg)	Viscosity	Water Loss
0 – 925'	Fresh - Gel	8.6-8.8	28-34	N/c
925' – 11,600'	Brine	8.8-10.0	28-34	N/c
11,600' – 16,773' Lateral	Oil Base	10.0-14.0	58-68	3 - 6

The highest mud weight needed to balance formation is expected to be 11.5 ppg. In order to maintain hole stability, mud weights up to 14.0 ppg may be utilized.

An electronic pit volume totalizer (PVT) will be utilized on the circulating system, to monitor pit volume, flow rate, pump pressure and stroke rate.
Sufficient mud materials to maintain mud properties and meet minimum lost circulation and weight increase requirements will be kept at the wellsite at all times.

7. AUXILIARY WELL CONTROL AND MONITORING EQUIPMENT:

(A) A kelly cock will be kept in the drill string at all times.

(B) A full opening drill pipe-stabbing valve (inside BOP) with proper drill pipe connections will be on the rig floor at all times.

(C) H_2S monitoring and detection equipment will be utilized from surface casing point to TD.

(D) A wear bushing will be installed in the wellhead prior to drilling out of the surface casing.

8 **8. LOGGING, TESTING AND CORING PROGRAM:**

GR–CCL-CNL Will be run in cased hole during completions phase of operations.

Open-hole logs are not planned for this well.

9. ABNORMAL CONDITIONS, PRESSURES, TEMPERATURES AND POTENTIAL HAZARDS:

The estimated bottom-hole temperature (BHT) at TD is 190 degrees F with an estimated maximum bottom-hole pressure (BHP) at TD of 9085 psig (based on 14 ppg MW). No hydrogen sulfide or other hazardous gases or fluids have been encountered, reported or are known to exist at this depth in this area

10. ANTICIPATED STARTING DATE AND DURATION OF OPERATIONS:

The drilling operation should be finished in approximately one month. If the well is productive, an additional 60-90 days will be required for completion and testing before a decision is made to install permanent facilities.

11. DISPOSAL/ENVIRONMENTAL CONCERNS

(A) Drilled cuttings will be hauled to and disposed of in a state-certified disposal site.

(B) Non-hazardous waste mud/cement from the drilling process will be also be hauled to and disposed of in a state-certified disposal site.

(C) Garbage will be hauled to the Pecos City Landfill.

(D) Sewage (grey water) will be hauled to the Carlsbad City Landfill.

12. WELLHEAD:

A multi-bowl wellhead system will be utilized.

After running the 13 3/8" surface casing, a 13-5/8" BOP/BOPE system with a minimum working pressure of 10,000 psi will be installed on the wellhead system and will be pressure tested to 250 psi low followed by a 5,000 psi pressure test. This pressure test will be repeated at least every 30 days, as per Onshore Order No. 2

The minimum working pressure of the BOP and related BOPE required for drilling below the surface casing shoe shall be 5,000 psi.

After running the 2nd intermediate casing, and before drilling out, the wellhead, BOP, and related equipment will be tested to 10,000/250 psig.

The multi-bowl wellhead will be installed by vendor's representative(s). A copy of the installation instructions for the Cameron Multi-Bowl WH system has been sent to the BLM office in Carlsbad.

The wellhead will be installed by a third party welder while being monitored by WH vendor's representative.

All BOP equipment will be tested utilizing a conventional test plug. Not a cup or J-packer type.

A solid steel body pack-off will be utilized after running and cementing the intermediate casing strings. After installation of the first intermediate string the pack-off and lower flanges will be pressure tested to 5000 psi. After installation of the second intermediate string, the pack-off and upper flange will be pressure tested to 10,000 psi.

Both the surface and intermediate casing strings will be tested as per Onshore Order No. 2 to at least 0.22 psi/ft or 1500 psi, whichever is greater.

APD ID: 10400025876

Submission Date: 01/11/2018

Operator Name: ROSEHILL OPERATING COMPANY LLC

Well Name: TATANKA FEDERAL

Well Number: 005H

Well Type: OIL WELL

Well Work Type: Drill

Highlighted data reflects the most recent changes

Show Final Text

Section 1 - Existing Roads

Will existing roads be used? YES

Existing Road Map:

Existing_Roads_for_SUPO_20171205131528.pdf

Existing Road Purpose: ACCESS

Row(s) Exist? NO

ROW ID(s)

ID:

Do the existing roads need to be improved? YES

Existing Road Improvement Description: Grading

Existing Road Improvement Attachment:

Section 2 - New or Reconstructed Access Roads

Will new roads be needed? NO

Section 3 - Location of Existing Wells

Existing Wells Map? NO

Attach Well map:

Additional Variance Requests-Rosehill Talco Lease

Tatanka Federal Well #001H

1. Casing
    a. Variance is requested to wave the centralizer requirements for the 10.75" semi flush casing in the 12.25" hole size.
2. Pressure Control
    a. Variance is requested to use a co-flex line between the Bop and choke manifold, instead of using a 4" Od steel line
    b. Variance is also requested to use a 5,000 psi WP annular preventer

Operator Name: ROSEHILL OPERATING COMPANY LLC

Well Name: TATANKA FEDERAL **Well Number:** 005H

Existing Wells description: One capped well is on an existing pad in the middle of the lease. The pad will be reused as the site of the compressor. Top portion of the existing pad that is not being used will be reclaimed.

Section 4 - Location of Existing and/or Proposed Production Facilities

Submit or defer a Proposed Production Facilities plan? SUBMIT

Production Facilities description:

Production Facilities map:

Production_Facilities_Diagram_20171128155135.docx

Section 5 - Location and Types of Water Supply

Water Source Table

Water source use type: INTERMEDIATE/PRODUCTION CASING, STIMULATION, SURFACE CASING

Water source type: OTHER

Describe type: Lined Mega pit holding ground water

Source latitude:

Source longitude:

Source datum:

Water source permit type: PRIVATE CONTRACT

Source land ownership: PRIVATE

Water source transport method: PIPELINE

Source transportation land ownership: PRIVATE

Water source volume (barrels): 400000

Source volume (acre-feet): 51.55724

Source volume (gal): 16800000

Water source and transportation map:

Tatanka_Facilities_Plan_1_10_2018_20180111110820.pdf

Water source comments: Operator will use established or constructed oil and gas roads to transport water to well site. Operator will try to utilize the identified access route in the surface use plan.

New water well? NO

New Water Well Info

Well latitude: **Well Longitude:** **Well datum:**

Well target aquifer:

Est. depth to top of aquifer(ft): **Est thickness of aquifer:**

Aquifer comments:

Aquifer documentation:

Well depth (ft): **Well casing type:**

Well casing outside diameter (in.): **Well casing inside diameter (in.):**

New water well casing? **Used casing source:**

Drilling method: **Drill material:**

Grout material: **Grout depth:**

Casing length (ft.): **Casing top depth (ft.):**

Well Production type: **Completion Method:**

Water well additional information:

State appropriation permit:

Additional information attachment:

Section 6 - Construction Materials

Construction Materials description: Clean caliche from BLM or third party source will be used

Construction Materials source location attachment:

Section 7 - Methods for Handling Waste

Waste type: GARBAGE

Waste content description: Garbage and trash produced during drilling and competion operations

Amount of waste:

Waste disposal frequency : Weekly

Safe containment description: Collected in trash containers

Safe containmant attachment:

Waste disposal type: HAUL TO COMMERCIAL FACILITY **Disposal location ownership:** OTHER
Disposal type description:

Disposal location description: Pecos City Sanitary Landfill

Waste type: SEWAGE

Waste content description: Human waste and grey water

Amount of waste:

Waste disposal frequency : Weekly

Safe containment description: Above-ground poly tanks provided by trailerhouse rental company

Safe containmant attachment:

Waste disposal type: HAUL TO COMMERCIAL FACILITY **Disposal location ownership:** PRIVATE
Disposal type description:

Disposal location description: Carlsbad City Landfill

Operator Name: ROSEHILL OPERATING COMPANY LLC

Well Name: TATANKA FEDERAL **Well Number:** 005H

Waste type: PRODUCED WATER

Waste content description: Produced water from well during drilling and completion operations

Amount of waste: 3000 barrels

Waste disposal frequency : Daily

Safe containment description: Stored in water tanks on lease before injection

Safe containmant attachment:

Waste disposal type: ON-LEASE INJECTION **Disposal location ownership:** FEDERAL

Disposal type description:

Disposal location description: On-lease injection well (SWD)

Waste type: DRILLING

Waste content description: Drilled cuttings

Amount of waste: 109066 gallons

Waste disposal frequency : Weekly

Safe containment description: Stored in steel tanks until taken to disposal location

Safe containmant attachment:

Waste disposal type: HAUL TO COMMERCIAL **Disposal location ownership:** PRIVATE FACILITY

Disposal type description:

Disposal location description: Sundance Services near Eunice, NM (state certified)

Waste type: COMPLETIONS/STIMULATION

Waste content description: Non-hazardous waste mud/cement from drilling process

Amount of waste: 10000 barrels

Waste disposal frequency : Weekly

Safe containment description: 500 bbl frac tanks

Safe containmant attachment:

Waste disposal type: HAUL TO COMMERCIAL **Disposal location ownership:** PRIVATE FACILITY

Disposal type description:

Disposal location description: Sundance Services near Eunice, NM

Reserve Pit

Reserve Pit being used? NO

Temporary disposal of produced water into reserve pit?

Operator Name: ROSEHILL OPERATING COMPANY LLC

Well Name: TATANKA FEDERAL **Well Number:** 005H

Reserve pit length (ft.) **Reserve pit width (ft.)**

Reserve pit depth (ft.) **Reserve pit volume (cu. yd.)**

Is at least 50% of the reserve pit in cut?

Reserve pit liner

Reserve pit liner specifications and installation description

Cuttings Area

Cuttings Area being used? NO

Are you storing cuttings on location? YES

Description of cuttings location Drill cuttings will be properly disposed of into steel tanks and taken to an NMOCD approved disposal facility.

Cuttings area length (ft.) **Cuttings area width (ft.)**

Cuttings area depth (ft.) **Cuttings area volume (cu. yd.)**

Is at least 50% of the cuttings area in cut?

WCuttings area liner

Cuttings area liner specifications and installation description

Section 8 - Ancillary Facilities

Are you requesting any Ancillary Facilities?: NO

Ancillary Facilities attachment:

Comments:

Section 9 - Well Site Layout

Well Site Layout Diagram:

Tatanka_Federal__5H_location_schematic_20171228111042.pdf

Comments:

Operator Name: ROSEHILL OPERATING COMPANY LLC

Well Name: TATANKA FEDERAL **Well Number:** 005H

Section 10 - Plans for Surface Reclamation

Type of disturbance: New Surface Disturbance **Multiple Well Pad Name:** TATANKA FEDERAL

Multiple Well Pad Number: G

Recontouring attachment:

Drainage/Erosion control construction: Reconstructed roads, on surface under the jurisdiction of the Bureau of Land Management, will be constructed as outlined in the BLM "Gold Book" and to meet the standards of the anticipated traffic flow and all anticipated weather requirements as needed. Construction will include ditching, draining, crowning and capping or sloping and dipping the roadbed as necessary to provide a well-constructed and safe road. Proper erosion control methods will be used on the area to control erosion, runoff and siltation of the surrounding area.

Drainage/Erosion control reclamation: The interim reclamation will be monitored periodically to ensure that vegetation has reestablished and that erosion is controlled. All disturbed areas, including pads and interim reclaimed areas will be recontoured to the contour existing prior to initial construction or a contour that blends indistinguishably with the surrounding landscape. Proper erosion control methods will be used on the entire area to control erosion, runoff and siltation of the surrounding area. All reclaimed areas will be monitored periodically to ensure that revegetation occurs, that the area is not redisturbed, and that erosion is controlled.

Well pad proposed disturbance (acres): 3.9

Well pad interim reclamation (acres): 1.8

Well pad long term disturbance (acres): 2.1

Road proposed disturbance (acres): 4.8

Road interim reclamation (acres): 0

Road long term disturbance (acres): 0

Powerline proposed disturbance (acres): 0

Powerline interim reclamation (acres): 0

Powerline long term disturbance (acres): 0

Pipeline proposed disturbance (acres): 0

Pipeline interim reclamation (acres): 0

Pipeline long term disturbance (acres): 0

Other proposed disturbance (acres): 0

Other interim reclamation (acres): 0

Other long term disturbance (acres): 0

Total proposed disturbance: 8.7

Total interim reclamation: 1.8

Total long term disturbance: 2.1

Reconstruction method: All disturbed areas, including pads and interim reclaimed areas, will be recontoured to the contour existing prior to initial construction or a contour that blends indistinguishably with the surrounding landscape. After all the disturbed areas have been properly prepared, the areas will be seeded with the proper BLM seed mixture, free of noxious weeds. Final seedbed preparation will consist of contour cultivating to a depth of 4 to 6 inches within 24 hours prior to seeding, dozer tracking, or other imprinting in order to break the soil crust and create seed germination micro-sites.

Topsoil redistribution: Topsoil will be evenly respread and aggressively revegetated over the entire disturbed area not needed for all-weather operations including cuts & fills. Topsoil that was spread over the interim reclamation areas will be stockpiled prior to recontouring. The topsoil will be redistributed evenly over the entire disturbed site to ensure successful revegetation.

Soil treatment: None

Existing Vegetation at the well pad:

Existing Vegetation at the well pad attachment:

Existing Vegetation Community at the road:

Existing Vegetation Community at the road attachment:

Existing Vegetation Community at the pipeline:

Operator Name: ROSEHILL OPERATING COMPANY LLC

Well Name: TATANKA FEDERAL **Well Number:** 005H

Existing Vegetation Community at the pipeline attachment:

Existing Vegetation Community at other disturbances:

Existing Vegetation Community at other disturbances attachment:

Non native seed used? NO

Non native seed description:

Seedling transplant description:

Will seedlings be transplanted for this project? NO

Seedling transplant description attachment:

Will seed be harvested for use in site reclamation? NO

Seed harvest description:

Seed harvest description attachment:

Seed Management

Seed Table

Seed type: **Seed source:**

Seed name:

Source name: **Source address:**

Source phone:

Seed cultivar:

Seed use location:

PLS pounds per acre: **Proposed seeding season:**

Seed Summary

Total pounds/Acre:

Seed Type	Pounds/Acre

Seed reclamation attachment:

Operator Contact/Responsible Official Contact Info

First Name: **Last Name:**

Phone: **Email:**

Seedbed prep: After all the disturbed areas have been properly prepared, the areas will be seeded with the proper BLM seed mixture, free of noxious weeds. Final seedbed preparation will consist of contour cultivating to a depth of 4 to 6 inches within 24 hours prior to seeding, dozer tracking, or other imprinting in order to break the soil crust and create seed germination micro-sites.

Seed BMP:

Seed method:

Existing invasive species? NO

Existing invasive species treatment description:

Existing invasive species treatment attachment:

Weed treatment plan description: To BLM standards

Weed treatment plan attachment:

Monitoring plan description: To BLM standards

Monitoring plan attachment:

Success standards: To BLM standards

Pit closure description: NA

Pit closure attachment:

Section 11 - Surface Ownership

Disturbance type: WELL PAD

Describe:

Surface Owner: BUREAU OF LAND MANAGEMENT,BUREAU OF LAND MANAGEMENT

Other surface owner description:

BIA Local Office:

BOR Local Office:

COE Local Office:

DOD Local Office:

NPS Local Office:

State Local Office:

Military Local Office:

USFWS Local Office:

Other Local Office:

USFS Region:

USFS Forest/Grassland: **USFS Ranger District:**

Operator Name: ROSEHILL OPERATING COMPANY LLC

Well Name: TATANKA FEDERAL **Well Number:** 005H

Disturbance type: EXISTING ACCESS ROAD

Describe:

Surface Owner: BUREAU OF LAND MANAGEMENT,PRIVATE OWNERSHIP,STATE GOVERNMENT

Other surface owner description:

BIA Local Office:

BOR Local Office:

COE Local Office:

DOD Local Office:

NPS Local Office:

State Local Office: CARLSBAD, NM

Military Local Office:

USFWS Local Office:

Other Local Office:

USFS Region:

USFS Forest/Grassland: **USFS Ranger District:**

Section 12 - Other Information

Right of Way needed? NO **Use APD as ROW?**

ROW Type(s):

ROW Applications

SUPO Additional Information:

Use a previously conducted onsite? YES

Previous Onsite information: 11/2/17 with Jesse Bassett- Tatanka 001H, 002H, 003H, 004H, 005H and 006H; Nkatata 001

Other SUPO Attachment

Tatanka_Federal__005H_20171227153027.docx
55_Pipeline_Easement__11S_TB_to_Comp__Signed_12_22_17_20180203133730.pdf
55_Easement__N_end_of_lease__Signed_12_22_17_20180203133722.pdf
30_ROW_gas_line_running_N_from_compressor_20180203133819.pdf
150_ROW__main_east_west_facilities_corridor_20180203133843.pdf

Operator Name: ROSEHILL OPERATING COMPANY LLC

Well Name: TATANKA FEDERAL **Well Number:** 005H

Compressor_Pad_Signed_12_24_17_20180203133852.pdf

Section_12_Frac_Pond_Signed_11_20_17_20180208144206.pdf

Sec_11_CTB_Signed_02_20_18_20180221092135.pdf

Rosehill_Section_11_Easements_Signed_02_15_18_20180221092134.pdf

Sec_11_Easement_Signed_02_20_18_20180221092136.pdf

Section 3 - Unlined Pits

Would you like to utilize Unlined Pit PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner: **PWD disturbance (acres):**

Unlined pit PWD on or off channel:

Unlined pit PWD discharge volume (bbl/day):

Unlined pit specifications:

Precipitated solids disposal:

Decribe precipitated solids disposal:

Precipitated solids disposal permit:

Unlined pit precipitated solids disposal schedule:

Unlined pit precipitated solids disposal schedule attachment:

Unlined pit reclamation description:

Unlined pit reclamation attachment:

Unlined pit Monitor description:

Unlined pit Monitor attachment:

Do you propose to put the produced water to beneficial use?

Beneficial use user confirmation:

Estimated depth of the shallowest aquifer (feet):

Does the produced water have an annual average Total Dissolved Solids (TDS) concentration equal to or less than that of the existing water to be protected?

TDS lab results:

Geologic and hydrologic evidence:

State authorization:

Unlined Produced Water Pit Estimated percolation:

Unlined pit: do you have a reclamation bond for the pit?

Is the reclamation bond a rider under the BLM bond?

Unlined pit bond number:

Unlined pit bond amount:

Additional bond information attachment:

Section 4 - Injection

Would you like to utilize Injection PWD options? NO

Produced Water Disposal (PWD) Location: ONLEASE

PWD surface owner: BLM **PWD disturbance (acres):**

Injection PWD discharge volume (bbl/day):

Injection well mineral owner: FED

Injection well type: NEW

Injection well number: 001H

Injection well name: Nkatata

Assigned injection well API number?

Injection well API number:

Injection well new surface disturbance (acres):

Minerals protection information:

Mineral protection attachment:

Underground Injection Control (UIC) Permit?

UIC Permit attachment:

Section 5 - Surface Discharge

Would you like to utilize Surface Discharge PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner:

PWD disturbance (acres):

Surface discharge PWD discharge volume (bbl/day):

Surface Discharge NPDES Permit?

Surface Discharge NPDES Permit attachment:

Surface Discharge site facilities information:

Surface discharge site facilities map:

Section 6 - Other

Would you like to utilize Other PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner:

PWD disturbance (acres):

Other PWD discharge volume (bbl/day):

Other PWD type description:

Other PWD type attachment:

Have other regulatory requirements been met?

Other regulatory requirements attachment:

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U.S. Department of the Interior
BUREAU OF LAND MANAGEMENT

Bond Info Data Report

03/01/2018

Bond Information

Federal/Indian APD: FED

BLM Bond number: NMB001484

BIA Bond number:

Do you have a reclamation bond? NO

Is the reclamation bond a rider under the BLM bond?

Is the reclamation bond BLM or Forest Service?

BLM reclamation bond number:

Forest Service reclamation bond number:

Forest Service reclamation bond attachment:

Reclamation bond number:

Reclamation bond amount:

Reclamation bond rider amount:

Additional reclamation bond information attachment:

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U.S. Department of the Interior
BUREAU OF LAND MANAGEMENT

PWD Data Report
03/01/2018

Section 1 - General

Would you like to address long-term produced water disposal? NO

Section 2 - Lined Pits

Would you like to utilize Lined Pit PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner:

PWD disturbance (acres):

Lined pit PWD on or off channel:

Lined pit PWD discharge volume (bbl/day):

Lined pit specifications:

Pit liner description:

Pit liner manufacturers information:

Precipitated solids disposal:

Decribe precipitated solids disposal:

Precipitated solids disposal permit:

Lined pit precipitated solids disposal schedule:

Lined pit precipitated solids disposal schedule attachment:

Lined pit reclamation description:

Lined pit reclamation attachment:

Leak detection system description:

Leak detection system attachment:

Lined pit Monitor description:

Lined pit Monitor attachment:

Lined pit: do you have a reclamation bond for the pit?

Is the reclamation bond a rider under the BLM bond?

Lined pit bond number:

Lined pit bond amount:

Additional bond information attachment: