Form 3160-3
(June 2015)

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

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.
NMNM015321

6. If Indian, Allotee or Tribe Name

1a. Type of work: ☑ DRILL ☐ REENTER

1b. Type of Well: ☐ Oil Well ☑ Gas Well ☐ Other

1c. Type of Completion: ☐ Hydraulic Fracturing ☑ Single Zone ☐ Multiple Zone

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

8. Lease Name and Well No.
RED HILLS FEDERAL
502H (5467)

2. Name of Operator
KAISER FRANCIS OIL COMPANY (2361)

9. API Well No.
30-025-46743

3a. Address
6733 S. Yale Ave. Tulsa OK 74121

3b. Phone No. *(include area code)*
(918)491-0000

10. Field and Pool, or Exploratory (98158)
WC-025 G-09 S253236A / UPPER WOLF

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*
At surface NESW / 2364 FSL / 1795 FWL / LAT 32.0862927 / LONG -103.6141245
At proposed prod. zone LOT 4 / 330 FSL / 1266 FWL / LAT 32.0662012 / LONG -103.6157575

11. Sec., T. R. M. or Blk. and Survey or Area
SEC 31 / T25S / R33E / NMP

14. Distance in miles and direction from nearest town or post office*
25 miles

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)
276 feet

16. No of acres in lease
838.8

17. Spacing Unit dedicated to this well
478.8

18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft.
20 feet

19. Proposed Depth
12522 feet / 19849 feet

20. BLM/BIA Bond No. in file
FED: WYB000055

21. Elevations (Show whether DF, KDB, RT, GL, etc.)
3418 feet

22. Approximate date work will start*
07/01/2019

23. Estimated duration
30 days

24. Attachments

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

1. Well plat certified by a registered surveyor.
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 requested by the BLM.

25. Signature	Name *(Printed/Typed)*	Date
(Electronic Submission)	Stormi Davis / Ph: (918)491-4339	05/17/2019
Title: Regulatory Analyst		
Approved by *(Signature)* (Electronic Submission)	Name *(Printed/Typed)* Cody Layton / Ph: (575)234-5959	Date 12/16/2019
Title: Assistant Field Manager Lands & Minerals	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.

GCP Rec 01/10/2020

APPROVED WITH CONDITIONS

KA 01/17/2020

(Continued on page 2)

*(Instructions on page 2)

Approval Date: 12/16/2019

Additional Operator Remarks

Location of Well

1. SHL: NESW / 2364 FSL / 1795 FWL / TWSP: 25S / RANGE: 33E / SECTION: 31 / LAT: 32.0862927 / LONG: -103.6141245 (TVD: 0 feet, MD: 0 feet)
   PPP: NWSW / 2500 FSL / 1266 FWL / TWSP: 25S / RANGE: 33E / SECTION: 31 / LAT: 32.0866955 / LONG: -103.6158393 (TVD: 12253 feet, MD: 12300 feet)
   BHL: LOT 4 / 330 FSL / 1266 FWL / TWSP: 26S / RANGE: 33E / SECTION: 6 / LAT: 32.0662012 / LONG: -103.6157575 (TVD: 12522 feet, MD: 19849 feet)

BLM Point of Contact

Name: Deborah Ham
Title: Legal Landlaw Examiner
Phone: 5752345965
Email: dham@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.

PECOS DISTRICT
DRILLING OPERATIONS
CONDITIONS OF APPROVAL

OPERATOR'S NAME:	**Kaiser Francis Oil Company**
LEASE NO.:	**NMNM015321**
WELL NAME & NO.:	**Red Hills Federal 502H**
SURFACE HOLE FOOTAGE:	**2364' FSL & 1795' FWL**
BOTTOM HOLE FOOTAGE	**330' FSL & 1266' FWL**
LOCATION:	**Section 31, T 25S, R 33E, NMPM**
COUNTY:	**Lea County, New Mexico**

H2S	◉ Yes	○ No	
Potash	◉ None	○ Secretary	○ R-111-P
Cave/Karst Potential	○ Low	◉ Medium	○ High
Variance	○ None	◉ Flex Hose	○ Other
Wellhead	◉ Conventional	○ Multibowl	○ Both
Other	☐ 4 String Area	☐ Capitan Reef	☐ WIPP
Other	☐ Fluid Filled	☐ Cement Squeeze	☐ Pilot Hole
Special Requirements	☐ Water Disposal	☐ COM	☐ Unit

A. HYDROGEN SULFIDE

1. A Hydrogen Sulfide (H2S) Drilling Plan shall be activated **500 feet** prior to drilling into the **Wolfcamp** formation. As a result, the Hydrogen Sulfide area must meet Onshore Order 6 requirements, which includes equipment and personnel/public protection items. If Hydrogen Sulfide is encountered, please provide measured values and formations to the BLM.

B. CASING

1. The **10-3/4"** surface casing shall be set at approximately **932'** (a minimum of 25' into the Rustler Anhydrite and above the salt) and cemented to surface.
   a. **If cement does not circulate to surface,** the appropriate BLM office shall be notified and a temperature survey utilizing an electronic type temperature survey with surface log readout will be used or a cement bond log shall be run to verify the top of the cement. Temperature survey will be run a minimum of **6 hours** after pumping cement, ideally between 8-10 hours after.
   b. WOC time for a primary cement job will be a minimum of **8 hours** or **500 psi** compressive strength, whichever is greater. This is to include the lead cement.
   c. If cement falls back, remedial cementing will be done prior to drilling out the shoe.
   d. WOC time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 psi compressive strength, whichever is greater.

2. The **7-5/8"** intermediate casing shall cemented to surface.
   a. **If cement does not circulate to surface,** see B.1.a, c & d.
3. The **5-1/2"** production casing shall be cemented with at least **200' tie-back** into the previous casing. Operator shall provide method of verification.
   a. In Potash & Medium or High Cave/Karst & Capitan Reef Areas, if cement does not circulate to surface on the first two casing strings, the cement on the 3rd casing string must come to surface.

C. PRESSURE CONTROL

1. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **5000 (5M)** psi.
2. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the intermediate casing shoe shall be **10,000 (10M)** psi.

DR 12/16/2019

GENERAL REQUIREMENTS

1. The BLM is to be notified in advance for a representative to witness:
   a. Spudding the well (minimum of 24 hours)
   b. Setting and/or Cementing of all casing strings (minimum of 4 hours)
   c. BOP/BOPE tests (minimum of 4 hours)
      ☒ Eddy County: Call the Carlsbad Field Office, (575) 361-2822
      ☒ Lea County: Call the Hobbs Field Station, (575) 393-3612
2. Unless the production casing has been run and cemented or the well has been properly plugged, the drilling rig shall not be removed from over the hole without prior approval.
   a. In the event the operator has proposed to drill multiple wells utilizing a skid/walking rig. Operator shall secure the wellbore on the current well, after installing and testing the wellhead, by installing a blind flange of like pressure rating to the wellhead and a pressure gauge that can be monitored while drilling is performed on the other well(s).
   b. When the operator proposes to set surface casing with Spudder Rig:
      i. Notify the BLM when moving in and removing the Spudder Rig.
      ii. Notify the BLM when moving in the 2nd Rig. Rig to be moved in within 90 days of notification that Spudder Rig has left the location.
      iii. BOP/BOPE test to be conducted per Onshore Oil and Gas Order No. 2 as soon as 2nd Rig is rigged up on well.
3. Floor controls are required for 3M or Greater systems. These controls will be on the rig floor, unobstructed, readily accessible to the driller and will be operational at all times during drilling and/or completion activities. Rig floor is defined as the area immediately around the rotary table; the area immediately above the substructure on which the draw works are located, this does not include the dog house or stairway area.
4. The record of the drilling rate along with the GR/N well log run from TD to surface (horizontal well – vertical portion of hole) shall be available upon request. The Rustler top and top and bottom of Salt are to be recorded on the Completion Report.

A. CASING

1. Changes to the approved APD casing program need prior approval if the items substituted are of lesser grade or different casing size or are Non-API. The Operator can exchange the components of the proposal with that of superior strength (i.e. changing from J-55 to N-80, or from 36# to 40#). Changes to the approved cement program need prior approval if the altered cement plan has less volume or strength or if the changes are substantial (i.e. Multistage tool, ECP, etc.). The initial wellhead installed on the well will remain on the well with spools used as needed.

2. Wait on cement (WOC) for Potash Areas: After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi for all cement blends, 2) until cement has been in place at least 24 hours. WOC time will be recorded in the driller's log. The casing intergrity test can be done (prior to the cement setting up) immediately after bumping the plug.
3. Wait on cement (WOC) for Water Basin: After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi at the shoe, 2) until cement has been in place at least 8 hours. WOC time will be recorded in the driller's log. See individual casing strings for details regarding lead cement slurry requirements. The casing intergrity test can be done (prior to the cement setting up) immediately after bumping the plug.
4. Provide compressive strengths including hours to reach required 500 pounds compressive strength prior to cementing each casing string. Have well-specific cement details onsite prior to pumping the cement for each casing string.
5. No pea gravel permitted for remedial or fall back remedial without prior authorization from the BLM engineer.
6. On the portion of well approved for a 5M BOPE system or greater, a pressure integrity test of each casing shoe shall be performed. Formation at the shoe shall be tested to a minimum of the mud weight equivalent anticipated to control the formation pressure to the next casing depth or at total depth of the well. This test shall be performed before drilling more than 20 feet of new hole.
7. If hardband drill pipe is rotated inside casing, returns will be monitored for metal. If metal is found in samples, drill pipe will be pulled and rubber protectors which have a larger diameter than the tool joints of the drill pipe will be installed prior to continuing drilling operations.
8. Whenever a casing string is cemented in the R-111-P potash area, the NMOCD requirements shall be followed.

B. PRESSURE CONTROL

1. All blowout preventer (BOP) and related equipment (BOPE) shall comply with well control requirements as described in Onshore Oil and Gas Order No. 2 and API RP 53 Sec. 17.
2. If a variance is approved for a flexible hose to be installed from the BOP to the choke manifold, the following requirements apply: The flex line must meet the requirements of API 16C. Check condition of flexible line from BOP to choke manifold, replace if exterior is damaged or if line fails test. Line to be as straight as possible with no hard bends and is to be anchored according to Manufacturer's requirements. The flexible hose can be exchanged with a hose of equal size and equal or greater pressure rating. Anchor requirements, specification sheet and hydrostatic pressure test certification matching the hose in service, to be onsite for review. These documents shall be posted in the company man's trailer and on the rig floor.

3. If the operator has proposed a multi-bowl wellhead assembly in the APD. The following requirements must be met:
   a. Wellhead shall be installed by manufacturer's representatives, submit documentation with subsequent sundry.
   b. If the welding is performed by a third party, the manufacturer's representative shall monitor the temperature to verify that it does not exceed the maximum temperature of the seal.
   c. Manufacturer representative shall install the test plug for the initial BOP test.
   d. If the cement does not circulate and one inch operations would have been possible with a standard wellhead, the well head shall be cut off, cementing operations performed and another wellhead installed.
   e. Whenever any seal subject to test pressure is broken, all the tests in Onshore Order 2 III.A.2.i must be followed.
5. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness the BOP/BOPE tests.
   a. In a water basin, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. The casing cut-off and BOP installation can be initiated four hours after installing the slips, which will be approximately six hours after bumping the plug. For those casing strings not using slips, the minimum wait time before cut-off is eight hours after bumping the plug. BOP/BOPE testing can begin after cut-off or once cement reaches 500 psi compressive strength (including lead when specified), whichever is greater. However, if the float does not hold, cut-off cannot be initiated until cement reaches 500 psi compressive strength (including lead when specified).
   b. In potash areas, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. For all casing strings, casing cut-off and BOP installation can be initiated at twelve hours after bumping the plug. However, **no tests** shall commence until the cement has had a minimum of 24 hours setup time, except the casing pressure test which can be initiated immediately after bumping the plug (only applies to single-stage cement jobs).
   c. The tests shall be done by an independent service company utilizing a test plug. The results of the test shall be made available upon request.
   d. The test shall be run on a 5000 psi chart for a 2-3M BOP/BOP, on a 10000 psi chart for a 5M BOP/BOPE and on a 15000 psi chart for a 10M BOP/BOPE. If a linear chart is used, it shall be a one hour chart. A circular chart shall have a maximum 2 hour clock. If a twelve hour or twenty-four hour chart is used, tester shall make a notation that it is run with a two hour clock.
   e. The BOP/BOPE test shall include a low pressure test from 250 to 300 psi. The test will be held for a minimum of 10 minutes. This test shall be performed prior to the test at full stack pressure.

f. BOP/BOPE must be tested within 500 feet of the top of the Wolfcamp formation if the time between the setting of the intermediate casing and reaching this depth exceeds 20 days. This test does not exclude the test prior to drilling out the casing shoe as per Onshore Order No. 2.

C. DRILLING MUD

1. Mud system monitoring equipment, with derrick floor indicators and visual and audio alarms, shall be operating before drilling into the Wolfcamp formation, and shall be used until production casing is run and cemented.

D. WASTE MATERIAL AND FLUIDS

1. All waste (i.e. drilling fluids, trash, salts, chemicals, sewage, gray water, etc.) created as a result of drilling operations and completion operations shall be safely contained and disposed of properly at a waste disposal facility. No waste material or fluid shall be disposed of on the well location or surrounding area.
2. Porto-johns and trash containers will be on-location during fracturing operations or any other crew-intensive operations.

PECOS DISTRICT
SURFACE USE
CONDITIONS OF APPROVAL

OPERATOR'S NAME:	KAISER FRANCIS OIL COMPANY
WELL NAME & NO.:	RED HILLS 502H
SURFACE HOLE FOOTAGE:	2364'/S & 1795'/W
BOTTOM HOLE FOOTAGE	330'/S & 1266'/W
LOCATION:	Section 31, T.25 S., R.33 E., NMP
COUNTY:	Lea County, New Mexico

TABLE OF CONTENTS

Standard Conditions of Approval (COA) apply to this APD. If any deviations to these standards exist or special COAs are required, the section with the deviation or requirement will be checked below.

I. GENERAL PROVISIONS

The approval of the Application For Permit To Drill (APD) is in compliance with all applicable laws and regulations: 43 Code of Federal Regulations 3160, the lease terms, Onshore Oil and Gas Orders, Notices To Lessees, New Mexico Oil Conservation Division (NMOCD) Rules, National Historical Preservation Act As Amended, and instructions and orders of the Authorized Officer. Any request for a variance shall be submitted to the Authorized Officer on Form 3160-5, Sundry Notices and Report on Wells.

II. PERMIT EXPIRATION

If the permit terminates prior to drilling and drilling cannot be commenced within 60 days after expiration, an operator is required to submit Form 3160-5, Sundry Notices and Reports on Wells, requesting surface reclamation requirements for any surface disturbance. However, if the operator will be able to initiate drilling within 60 days after the expiration of the permit, the operator must have set the conductor pipe in order to allow for an extension of 60 days beyond the expiration date of the APD. (Filing of a Sundry Notice is required for this 60 day extension.)

III. ARCHAEOLOGICAL, PALEONTOLOGY & HISTORICAL SITES

Any cultural and/or paleontological resource discovered by the operator or by any person working on the operator's behalf shall immediately report such findings to the Authorized Officer. The operator is fully accountable for the actions of their contractors and subcontractors. The operator shall suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the Authorized Officer. An evaluation of the discovery shall be made by the Authorized Officer to determine the appropriate actions that shall be required to prevent the loss of significant cultural or scientific values of the discovery. The operator shall be held responsible for the cost of the proper mitigation measures that the Authorized Officer assesses after consultation with the operator on the evaluation and decisions of the discovery. Any unauthorized collection or disturbance of cultural or paleontological resources may result in a shutdown order by the Authorized Officer.

IV. NOXIOUS WEEDS

The operator shall be held responsible if noxious weeds become established within the areas of operations. Weed control shall be required on the disturbed land where noxious weeds exist, which includes the roads, pads, associated pipeline corridor, and adjacent land affected by the establishment of weeds due to this action. The operator shall consult with the Authorized Officer for acceptable weed control methods, which include following EPA and BLM requirements and policies.

V. SPECIAL REQUIREMENT(S)

Hydrology

The entire well pad(s) will be bermed to prevent oil, salt, and other chemical contaminants from leaving the well pad. The compacted berm shall be constructed at a minimum of 12 inches with impermeable mineral material (e.g. caliche). Topsoil shall not be used to construct the berm. No water flow from the uphill side(s) of the pad shall be allowed to enter the well pad. The integrity of the berm shall be maintained around the surfaced pad throughout the life of the well and around the downsized pad after interim reclamation has been completed. Any water erosion that may occur due to the construction of the well pad during the life of the well will be quickly corrected and proper measures will be taken to prevent future erosion. Stockpiling of topsoil is required. The top soil shall be stockpiled in an appropriate location to prevent loss of soil due to water or wind erosion and not used for berming or erosion control. If fluid collects within the bermed area, the fluid must be vacuumed into a safe container and disposed of properly at a state approved facility.

Tank battery locations will be lined and bermed. A 20 mil permanent liner will be installed with a 4 oz. felt backing to prevent tears or punctures. Tank battery berms must be large enough to contain 1 ½ times the content of the largest tank or 24 hour production, whichever is greater. Automatic shut off, check valves, or similar systems will be installed for tanks to minimize the effects of catastrophic line failures used in production or drilling.

Cave Karst

Construction Mitigation

In order to mitigate the impacts from construction activities on cave and karst resources, the following Conditions of Approval will apply to this APD or project:

General Construction:

- No blasting
- The BLM, Carlsbad Field Office, will be informed immediately if any subsurface drainage channels, cave passages, or voids are penetrated during construction, and no additional construction shall occur until clearance has been issued by the Authorized Officer.
- All linear surface disturbance activities will avoid sinkholes and other karst features to lessen the possibility of encountering near surface voids during construction, minimize changes to runoff, and prevent untimely leaks and spills from entering the karst drainage system.
- All spills or leaks will be reported to the BLM immediately for their immediate and proper treatment.

Pad Construction:

- The pad will be constructed and leveled by adding the necessary fill and caliche – no blasting.
- The entire perimeter of the well pad will be bermed to prevent oil, salt, and other chemical contaminants from leaving the well pad.
- The compacted berm shall be constructed at a minimum of 12 inches high with impermeable mineral material (e.g., caliche).
- No water flow from the uphill side(s) of the pad shall be allowed to enter the well pad.
- The topsoil stockpile shall be located outside the bermed well pad.
- Topsoil, either from the well pad or surrounding area, shall not be used to construct the berm.
- No storm drains, tubing or openings shall be placed in the berm.
- If fluid collects within the bermed area, the fluid must be vacuumed into a safe container and disposed of properly at a state approved facility.
- The integrity of the berm shall be maintained around the surfaced pad throughout the life of the well and around the downsized pad after interim reclamation has been completed.
- Any access road entering the well pad shall be constructed so that the integrity of the berm height surrounding the well pad is not compromised (i.e. an access road crossing the berm cannot be lower than the berm height).
- Following a rain event, all fluids will vacuumed off of the pad and hauled off-site and disposed at a proper disposal facility.

Road Construction:

- Turnout ditches and drainage leadoffs will not be constructed in such a manner as to alter the natural flow of water into or out of cave or karst features.
- Special restoration stipulations or realignment may be required if subsurface features are discovered during construction.

Buried Pipeline/Cable Construction:

- Rerouting of the buried line(s) may be required if a subsurface void is encountered during construction to minimize the potential subsidence/collapse of the feature(s) as well as the possibility of leaks/spills entering the karst drainage system.

Powerline Construction:

- Smaller powerlines will be routed around sinkholes and other karst features to avoid or lessen the possibility of encountering near surface voids and to minimize changes to runoff or possible leaks and spills from entering karst systems.
- Larger powerlines will adjust their pole spacing to avoid cave and karst features.
- Special restoration stipulations or realignment may be required if subsurface voids are encountered.

Surface Flowlines Installation:

- Flowlines will be routed around sinkholes and other karst features to minimize the possibility of leaks/spills from entering the karst drainage system.

Drilling Mitigation

Federal regulations and standard Conditions of Approval applied to all APDs require that adequate measures are taken to prevent contamination to the environment. Due to the extreme sensitivity of the cave and karst resources in this project area, the following additional Conditions of Approval will be added to this APD.

To prevent cave and karst resource contamination the following will be required:

- Closed loop system using steel tanks - all fluids and cuttings will be hauled off-site and disposed of properly at an authorized site
- Rotary drilling with fresh water where cave or karst features are expected to prevent contamination of freshwater aquifers.
- Directional drilling is only allowed at depths greater than 100 feet below the cave occurrence zone to prevent additional impacts resulting from directional drilling.
- Lost circulation zones will be logged and reported in the drilling report so BLM can assess the situation and work with the operator on corrective actions.
- Additional drilling, casing, and cementing procedures to protect cave zones and fresh water aquifers. See drilling COAs.

Production Mitigation

In order to mitigate the impacts from production activities and due to the nature of karst terrane, the following Conditions of Approval will apply to this APD:

- Tank battery locations and facilities will be bermed and lined with a 20 mil thick permanent liner that has a 4 oz. felt backing, or equivalent, to prevent tears or punctures. Tank battery berms must be large enough to contain 1 ½ times the content of the largest tank.
- Development and implementation of a leak detection system to provide an early alert to operators when a leak has occurred.
- Automatic shut off, check values, or similar systems will be installed for pipelines and tanks to minimize the effects of catastrophic line failures used in production or drilling.

Residual and Cumulative Mitigation

The operator will perform annual pressure monitoring on all casing annuli and reported in a sundry notice. If the test results indicated a casing failure has occurred, remedial action will be taken to correct the problem to the BLM's approval.

Plugging and Abandonment Mitigation

Upon well abandonment in high cave karst areas additional plugging conditions of approval may be required. The BLM will assess the situation and work with the operator to ensure proper plugging of the wellbore

VI. CONSTRUCTION

A. NOTIFICATION

The BLM shall administer compliance and monitor construction of the access road and well pad. Notify the Carlsbad Field Office at (575) 234-5909 at least 3 working days prior to commencing construction of the access road and/or well pad.

When construction operations are being conducted on this well, the operator shall have the approved APD and Conditions of Approval (COA) on the well site and they shall be made available upon request by the Authorized Officer.

B. TOPSOIL

The operator shall strip the top portion of the soil (root zone) from the entire well pad area and stockpile the topsoil along the edge of the well pad as depicted in the APD. The root zone is typically six (6) inches in depth. All the stockpiled topsoil will be redistributed over the interim reclamation areas. Topsoil shall not be used for berming the pad or facilities. For final reclamation, the topsoil shall be spread over the entire pad area for seeding preparation.

Other subsoil (below six inches) stockpiles must be completely segregated from the topsoil stockpile. Large rocks or subsoil clods (not evident in the surrounding terrain) must be buried within the approved area for interim and final reclamation.

C. CLOSED LOOP SYSTEM

Tanks are required for drilling operations: No Pits.

The operator shall properly dispose of drilling contents at an authorized disposal site.

D. FEDERAL MINERAL MATERIALS PIT

Payment shall be made to the BLM prior to removal of any federal mineral materials. Call the Carlsbad Field Office at (575) 234-5972.

E. WELL PAD SURFACING

Surfacing of the well pad is not required.

If the operator elects to surface the well pad, the surfacing material may be required to be removed at the time of reclamation. The well pad shall be constructed in a manner which creates the smallest possible surface disturbance, consistent with safety and operational needs.

F. EXCLOSURE FENCING (CELLARS & PITS)

Exclosure Fencing
The operator will install and maintain exclosure fencing for all open well cellars to prevent access to public, livestock, and large forms of wildlife before and after drilling operations until the pit is free of fluids and the operator initiates backfilling. (For examples of exclosure fencing design, refer to BLM's Oil and Gas Gold Book, Exclosure Fence Illustrations, Figure 1, Page 18.)

G. ON LEASE ACCESS ROADS

Road Width
The access road shall have a driving surface that creates the smallest possible surface disturbance and does not exceed fourteen (14) feet in width. The maximum width of surface disturbance, when constructing the access road, shall not exceed twenty-five (25) feet.

Surfacing
Surfacing material is not required on the new access road driving surface. If the operator elects to surface the new access road or pad, the surfacing material may be required to be removed at the time of reclamation.

Where possible, no improvements should be made on the unsurfaced access road other than to remove vegetation as necessary, road irregularities, safety issues, or to fill low areas that may sustain standing water.

The Authorized Officer reserves the right to require surfacing of any portion of the access road at any time deemed necessary. Surfacing may be required in the event the road deteriorates, erodes, road traffic increases, or it is determined to be beneficial for future field development. The surfacing depth and type of material will be determined at the time of notification.

Crowning
Crowning shall be done on the access road driving surface. The road crown shall have a grade of approximately 2% (i.e., a 1" crown on a 14' wide road). The road shall conform to Figure 1; cross section and plans for typical road construction.

Ditching
Ditching shall be required on both sides of the road.

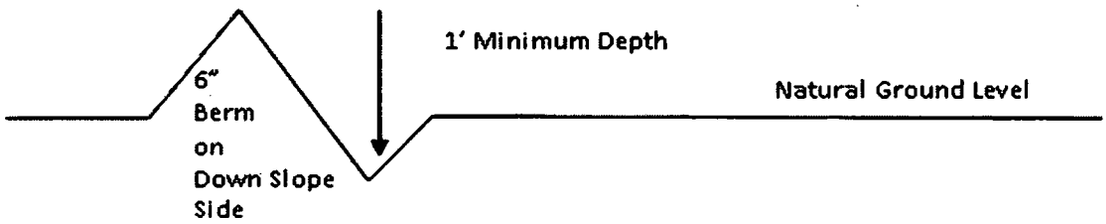
Turnouts
Vehicle turnouts shall be constructed on the road. Turnouts shall be intervisible with interval spacing distance less than 1000 feet. Turnouts shall conform to Figure 1; cross section and plans for typical road construction.

Drainage

Drainage control systems shall be constructed on the entire length of road (e.g. ditches, sidehill outsloping and insloping, lead-off ditches, culvert installation, and low water crossings).

A typical lead-off ditch has a minimum depth of 1 foot below and a berm of 6 inches above natural ground level. The berm shall be on the down-slope side of the lead-off ditch.

Cross Section of a Typical Lead-off Ditch



All lead-off ditches shall be graded to drain water with a 1 percent minimum to 3 percent maximum ditch slope. The spacing interval are variable for lead-off ditches and shall be determined according to the formula for spacing intervals of lead-off ditches, but may be amended depending upon existing soil types and centerline road slope (in %);

Formula for Spacing Interval of Lead-off Ditches

Example - On a 4% road slope that is 400 feet long, the water flow shall drain water into a lead-off ditch. Spacing interval shall be determined by the following formula:

$$\text{400 foot road with 4\% road slope: } \frac{400'}{4\%} + 100' = 200' \text{ lead-off ditch interval}$$

Cattle guards

An appropriately sized cattle guard sufficient to carry out the project shall be installed and maintained at fence/road crossings. Any existing cattle guards on the access road route shall be repaired or replaced if they are damaged or have deteriorated beyond practical use. The operator shall be responsible for the condition of the existing cattle guards that are in place and are utilized during lease operations.

Fence Requirement

Where entry is granted across a fence line, the fence shall be braced and tied off on both sides of the passageway prior to cutting. The operator shall notify the private surface landowner or the grazing allotment holder prior to crossing any fences.

Public Access

Public access on this road shall not be restricted by the operator without specific written approval granted by the Authorized Officer.

Construction Steps

1. Salvage topsoil
2. Construct road
3. Redistribute topsoil
4. Revegetate slopes

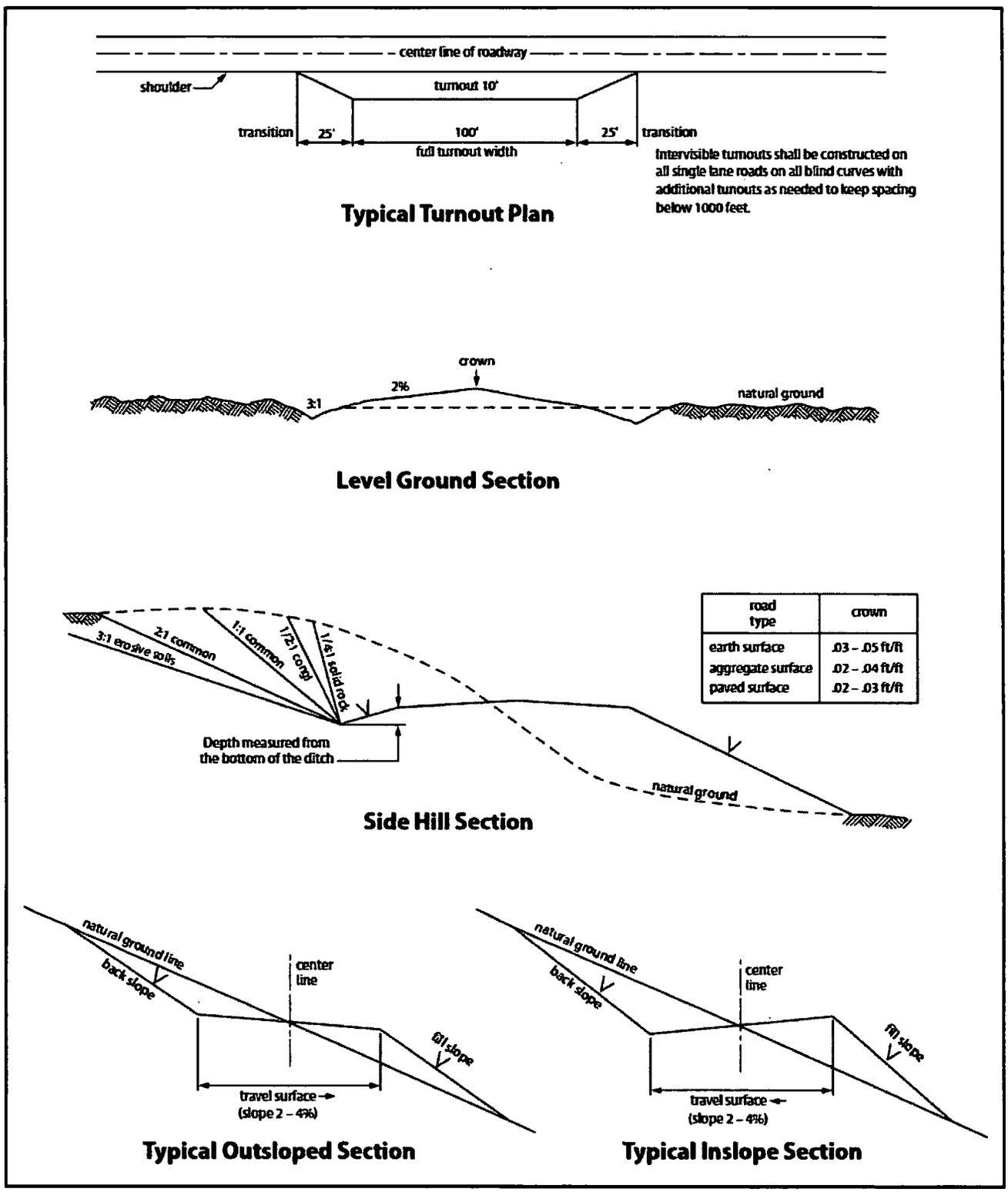


Figure 1. Cross-sections and plans for typical road sections representative of BLM resource or FS local and higher-class roads.

VII. PRODUCTION (POST DRILLING)

A. WELL STRUCTURES & FACILITIES

Placement of Production Facilities
Production facilities should be placed on the well pad to allow for maximum interim recontouring and revegetation of the well location.

Exclosure Netting (Open-top Tanks)
Immediately following active drilling or completion operations, the operator will take actions necessary to prevent wildlife and livestock access, including avian wildlife, to all open-topped tanks that contain or have the potential to contain salinity sufficient to cause harm to wildlife or livestock, hydrocarbons, or Resource Conservation and Recovery Act of 1976-exempt hazardous substances. At a minimum, the operator will net, screen, or cover open-topped tanks to exclude wildlife and livestock and prevent mortality. If the operator uses netting, the operator will cover and secure the open portion of the tank to prevent wildlife entry. The operator will net, screen, or cover the tanks until the operator removes the tanks from the location or the tanks no longer contain substances that could be harmful to wildlife or livestock. Use a maximum netting mesh size of 1 ½ inches. The netting must not be in contact with fluids and must not have holes or gaps.

Chemical and Fuel Secondary Containment and Exclosure Screening
The operator will prevent all hazardous, poisonous, flammable, and toxic substances from coming into contact with soil and water. At a minimum, the operator will install and maintain an impervious secondary containment system for any tank or barrel containing hazardous, poisonous, flammable, or toxic substances sufficient to contain the contents of the tank or barrel and any drips, leaks, and anticipated precipitation. The operator will dispose of fluids within the containment system that do not meet applicable state or U. S. Environmental Protection Agency livestock water standards in accordance with state law; the operator must not drain the fluids to the soil or ground. The operator will design, construct, and maintain all secondary containment systems to prevent wildlife and livestock exposure to harmful substances. At a minimum, the operator will install effective wildlife and livestock exclosure systems such as fencing, netting, expanded metal mesh, lids, and grate covers. Use a maximum netting mesh size of 1 ½ inches.

Open-Vent Exhaust Stack Exclosures
The operator will construct, modify, equip, and maintain all open-vent exhaust stacks on production equipment to prevent birds and bats from entering, and to discourage perching, roosting, and nesting. (*Recommended exclosure structures on open-vent exhaust stacks are in the shape of a cone.*) Production equipment includes, but may not be limited to, tanks, heater-treaters, separators, dehydrators, flare stacks, in-line units, and compressor mufflers.

Containment Structures

Proposed production facilities such as storage tanks and other vessels will have a secondary containment structure that is constructed to hold the capacity of 1.5 times the largest tank, plus freeboard to account for precipitation, unless more stringent protective requirements are deemed necessary.

Painting Requirement
All above-ground structures including meter housing that are not subject to safety requirements shall be painted a flat non-reflective paint color, **Shale Green** from the BLM Standard Environmental Color Chart (CC-001: June 2008).

VIII. INTERIM RECLAMATION

During the life of the development, all disturbed areas not needed for active support of production operations should undergo interim reclamation in order to minimize the environmental impacts of development on other resources and uses.

Within six (6) months of well completion, operators should work with BLM surface management specialists (Jim Amos: 575-234-5909) to devise the best strategies to reduce the size of the location. Interim reclamation should allow for remedial well operations, as well as safe and efficient removal of oil and gas.

During reclamation, the removal of caliche is important to increasing the success of revegetating the site. Removed caliche that is free of contaminants may be used for road repairs, fire walls or for building other roads and locations. In order to operate the well or complete workover operations, it may be necessary to drive, park and operate on restored interim vegetation within the previously disturbed area. Disturbing revegetated areas for production or workover operations will be allowed. If there is significant disturbance and loss of vegetation, the area will need to be revegetated. Communicate with the appropriate BLM office for any exceptions/exemptions if needed.

All disturbed areas after they have been satisfactorily prepared need to be reseeded with the seed mixture provided below.

Upon completion of interim reclamation, the operator shall submit a Sundry Notices and Reports on Wells, Subsequent Report of Reclamation (Form 3160-5).

IX. FINAL ABANDONMENT & RECLAMATION

At final abandonment, well locations, production facilities, and access roads must undergo "final" reclamation so that the character and productivity of the land are restored.

Earthwork for final reclamation must be completed within six (6) months of well plugging. All pads, pits, facility locations and roads must be reclaimed to a satisfactory revegetated, safe, and stable condition, unless an agreement is made with the landowner or BLM to keep the road and/or pad intact.

After all disturbed areas have been satisfactorily prepared, these areas need to be revegetated with the seed mixture provided below. Seeding should be accomplished by drilling on the contour whenever practical or by other approved methods. Seeding may need to be repeated until revegetation is successful, as determined by the BLM.

Operators shall contact a BLM surface protection specialist prior to surface abandonment operations for site specific objectives (Jim Amos: 575-234-5909).

Seed Mixture 2, for Sandy Sites

The holder shall seed all disturbed areas with the seed mixture listed below. The seed mixture shall be planted in the amounts specified in pounds of pure live seed (PLS)* per acre. There shall be no primary or secondary noxious weeds in the seed mixture. Seed will be tested and the viability testing of seed will be done in accordance with State law (s) and within nine (9) months prior to purchase. Commercial seed will be either certified or registered seed. The seed container will be tagged in accordance with State law(s) and available for inspection by the authorized officer.

Seed will be planted using a drill equipped with a depth regulator to ensure proper depth of planting where drilling is possible. The seed mixture will be evenly and uniformly planted over the disturbed area (smaller/heavier seeds have a tendency to drop the bottom of the drill and are planted first). The holder shall take appropriate measures to ensure this does not occur. Where drilling is not possible, seed will be broadcast and the area shall be raked or chained to cover the seed. When broadcasting the seed, the pounds per acre are to be doubled. The seeding will be repeated until a satisfactory stand is established as determined by the authorized officer. Evaluation of growth will not be made before completion of at least one full growing season after seeding.

Species to be planted in pounds of pure live seed* per acre:

Species	lb/acre
Sand dropseed (Sporobolus cryptandrus)	1.0
Sand love grass (Eragrostis trichodes)	1.0
Plains bristlegrass (Setaria macrostachya)	2.0

*Pounds of pure live seed:

Pounds of seed **x** percent purity **x** percent germination = pounds pure live seed

Red Hills 502H

Casing Assumptions

Interval	Length	Casing Size	Weight (#/ft)	Grade	Thread	Condition	Hole Size	TVD (ft)
Conductor	120	20"				New		120
Surface	932	10-3/4"	40.5	J-55	STC	New	14.75	932
Intermediate	11872	7-5/8"	29.7	HCP-110	LTC	New	9.875	11872
Production	19849	5-1/2"	20	P110	Eagle SF	New	6.75	12522

Mud Type	Mud Weight Hole Control	Depth	Viscosity	Fluid Loss
FW	8.4 - 9.0	910	32 - 34	NC
DBE	8.8 - 9.2	11872	34	NC
OBM	10 - 12.5	12522	48 - 52	<10

Anticipated Mud Weight (ppg)	Max Pore Pressure (psi)	Collapse (psi)	Burst (psi)	Body Tensile Strength	Joint Tensile Strength
9	436	1580	3130	629000	420000
9.2	5680	7150	9470	940000	922000
12.5	8139	11080	12640	641000	667000

Collapse Safety Factor (Min 1.1)	Burst Safety Factor (Min 1.0)	Body Tensile Safety Factor (Min 1.8)	Joint Tensile Safety Factor (Min 1.8)
3.6	7.2	16.7	11.1
1.3	1.7	2.7	2.6
1.4	1.6	2.6	2.7

APD ID: 10400041725
Submission Date: 05/17/2019
Operator Name: KAISER FRANCIS OIL COMPANY
Federal/Indian APD: FED
Well Name: RED HILLS FEDERAL
Well Number: 502H
Well Type: CONVENTIONAL GAS WELL
Well Work Type: Drill

Show Final Text

Application

Section 1 - General

APD ID: 10400041725
Tie to previous NOS?
Submission Date: 05/17/2019
BLM Office: CARLSBAD
User: Stormi Davis
Title: Regulatory Analyst
Federal/Indian APD: FED
Is the first lease penetrated for production Federal or Indian? FED
Lease number: NMNM015321
Lease Acres: 838.8
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? NO
APD Operator: KAISER FRANCIS OIL COMPANY
Operator letter of designation:

Operator Info

Operator Organization Name: KAISER FRANCIS OIL COMPANY
Operator Address: 6733 S. Yale Ave.
Zip: 74121
Operator PO Box: PO Box 21468
Operator City: Tulsa
State: OK
Operator Phone: (918)491-0000
Operator Internet Address:

Section 2 - Well Information

Well in Master Development Plan? NO
Master Development Plan name:
Well in Master SUPO? NO
Master SUPO name:

Operator Name: KAISER FRANCIS OIL COMPANY

Well Name: RED HILLS FEDERAL **Well Number:** 502H

Well in Master Drilling Plan? NO **Master Drilling Plan name:**

Well Name: RED HILLS FEDERAL **Well Number:** 502H **Well API Number:**

Field/Pool or Exploratory? Field and Pool **Field Name:** WC-025 G-09 S253236A **Pool Name:** UPPER WOLFCAMP

Is the proposed well in an area containing other mineral resources? NATURAL GAS,OIL

Is the proposed well in a Helium production area? N **Use Existing Well Pad?** YES **New surface disturbance?** N

Type of Well Pad: MULTIPLE WELL **Multiple Well Pad Name:** RED HILLS **Number:** 2

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

Well Work Type: Drill

Well Type: CONVENTIONAL GAS WELL

Describe Well Type:

Well sub-Type: EXPLORATORY (WILDCAT)

Describe sub-type:

Distance to town: 25 Miles **Distance to nearest well:** 20 FT **Distance to lease line:** 276 FT

Reservoir well spacing assigned acres Measurement: 478.8 Acres

Well plat: Red_Hills_502H_C102_20190517102412.pdf

Red_Hills_502H_Pymt_20190517105330.pdf

Well work start Date: 07/01/2019 **Duration:** 30 DAYS

Section 3 - Well Location Table

Survey Type: RECTANGULAR

Describe Survey Type:

Datum: NAD83 **Vertical Datum:** NAVD88

Survey number: 6207A **Reference Datum:**

Wellbore	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	Will this well produce from this lease?
SHL Leg #1	2364	FSL	1795	FWL	25S	33E	31	Aliquot NESW	32.086292 7	-103.6141245	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 015321	3418	0	0	
KOP Leg #1	2600	FSL	1266	FWL	25S	33E	31	Aliquot NWSW	32.086942	-103.6158344	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 015321	-8531	11979	11949	

Operator Name: KAISER FRANCIS OIL COMPANY

Well Name: RED HILLS FEDERAL **Well Number:** 502H

Wellbore	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	Will this well produce from this lease?
PPP Leg #1-1	2500	FSL	1266	FWL	25S	33E	31	Aliquot NWSW	32.0866955	-103.6158393	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 015321	-8835	12300	12253	
EXIT Leg #1	330	FSL	1266	FWL	26S	33E	6	Lot 4	32.0662012	-103.6157575	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 015321	-9104	19849	12522	
BHL Leg #1	330	FSL	1266	FWL	26S	33E	6	Lot 4	32.0662012	-103.6157575	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 015321	-9104	19849	12522	

Drilling Plan

Section 1 - Geologic Formations

Formation ID	Formation Name	Elevation	True Vertical Depth	Measured Depth	Lithologies	Mineral Resources	Producing Formation
453832	—	3418	0	0		NONE	N
453833	RUSTLER	2558	860	860		NONE	N
453834	SALADO	2218	1200	1200		NONE	N
453835	TOP SALT	1418	2000	2000		NONE	N
453836	BASE OF SALT	-1032	4450	4450		NONE	N
453837	LAMAR	-1332	4750	4750		NATURAL GAS, OIL	N
453838	BELL CANYON	-1452	4870	4870		NATURAL GAS, OIL	N
453839	CHERRY CANYON	-2442	5860	5860		NATURAL GAS, OIL	N
453840	BRUSHY CANYON	-5182	8600	8600		NATURAL GAS, OIL	N
453831	BONE SPRING	-5382	8800	8800		NATURAL GAS, OIL	N
453848	AVALON SAND	-5592	9010	9010		NATURAL GAS, OIL	N

Operator Name: KAISER FRANCIS OIL COMPANY

Well Name: RED HILLS FEDERAL **Well Number:** 502H

Formation ID	Formation Name	Elevation	True Vertical Depth	Measured Depth	Lithologies	Mineral Resources	Producing Formation
453843	BONE SPRING 1ST	-6532	9950	9950		NATURAL GAS, OIL	N
454212	BONE SPRING 2ND	-7092	10510	10510		NATURAL GAS, OIL	N
454213	BONE SPRING LIME	-7532	10950	10950		NATURAL GAS, OIL	N
454214	BONE SPRING 3RD	-8267	11685	11685		NATURAL GAS, OIL	N
454215	WOLFCAMP	-8652	12070	12070		NATURAL GAS, OIL	Y

Section 2 - Blowout Prevention

Pressure Rating (PSI): 10M **Rating Depth:** 11000

Requesting Variance? YES

Variance request: Flex Hose Variance

Testing Procedure: BOP/BOPE will be tested by an independent service company to 250 psi low and 5000 psi high. The System may be upgraded to a higher pressure but still tested to the working pressure stated. If the system is upgraded all the components installed will be functional and tested. Pipe rams will be operationally checked each 24 hour period. The Annular shall be functionally operated at least weekly. Blind rams will be operationally checked on each trip out of the hole. These checks will be noted on the daily tour sheets.

Choke Diagram Attachment:

Red_Hills_502H_Choke_Manifold_10k_20191202105922.pdf

BOP Diagram Attachment:

Red_Hills__502H__BOP_10M_Annular_20190517104739.pdf

Cactus_Flex_Hose_16C_Certification_20191018070339.pdf

Operator Name: KAISER FRANCIS OIL COMPANY

Well Name: RED HILLS FEDERAL **Well Number:** 502H

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
1	SURFACE	14.75	10.75	NEW	API	N	0	932	0	932			932	J-55	40.5	ST&C	3.6	7.2	DRY	11.1	DRY
2	INTERMEDIATE	9.875	7.625	NEW	API	N	0	11872	0	11872			11872	HCP-110	29.7	LT&C	1.3	1.7	DRY	2.6	DRY
3	PRODUCTION	6.75	5.5	NEW	API	N	0	19849	0	12522			19849	P-110	20	OTHER - Eagle SF	1.4	1.6	DRY	2.7	DRY

Casing Attachments

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Red_Hills_502H_Casing_Specs_20190509140223.pdf

Operator Name: KAISER FRANCIS OIL COMPANY

Well Name: RED HILLS FEDERAL **Well Number:** 502H

Casing Attachments

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Red_Hills_502H_Casing_Specs_20190509140335.pdf

Casing ID: 3 **String Type:** PRODUCTION

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

5.5_x_20_P110_HP_USS_EAGLE_SFH_Performance_Sheet_20190509140511.pdf

Red_Hills_502H_Casing_Specs_20190509140512.pdf

Section 4 - Cement

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
SURFACE	Lead					1.34					
INTERMEDIATE	Lead					2.78					

Operator Name: KAISER FRANCIS OIL COMPANY

Well Name: RED HILLS FEDERAL **Well Number:** 502H

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
INTERMEDIATE	Tail										
PRODUCTION	Lead					1.93					

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:

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 mud materials to maintain mud properties and meet minimum lost circulation and weight increase requirements will be kept on location at all times

Describe the mud monitoring system utilized: PVT/Pason/Visual Monitoring

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
11872	12522	OIL-BASED MUD	10	12.5							
932	11872	OTHER : Diesel-Brine Emulsion	8.8	9.2							
0	932	OTHER : FRESH WATER	8.4	9							

Operator Name: KAISER FRANCIS OIL COMPANY

Well Name: RED HILLS FEDERAL **Well Number:** 502H

Section 6 - Test, Logging, Coring

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

TOC on production casing will determined by calculation.

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

DS,GR,MUDLOG

Coring operation description for the well:

None planned

Section 7 - Pressure

Anticipated Bottom Hole Pressure: 8139 **Anticipated Surface Pressure:** 5384.16

Anticipated Bottom Hole Temperature(F): 199

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:

Red_Hills_502H_H2S_Contingency_Plan_NM_Red_Hills_Pad_2_20190510101200.pdf

Section 8 - Other Information

Proposed horizontal/directional/multi-lateral plan submission:

Red_Hills_502H___Directional_Plan_20190510101241.pdf

Other proposed operations facets description:

Gas Capture Plan attached

Other proposed operations facets attachment:

Red_Hills_PAD_2_Gas_Capture_Plan_20190510101346.pdf

Other Variance attachment:

SUPO

KAISER-FRANCIS OIL COMPANY

Kaiser Francis

Red Hills 502H
Red Hills 502H
Red Hills 502H
Red Hills 502H

Plan: 190504 Red Hills 502H

Morcor Standard Plan

04 May, 2019

Morcor Engineering

Morcor Standard Plan

Company:	Kaiser Francis	**Local Co-ordinate Reference:**	Well Red Hills 502H
Project:	Red Hills 502H	**TVD Reference:**	WELL @ 3440.3usft (Original Well Elev)
Site:	Red Hills 502H	**MD Reference:**	WELL @ 3440.3usft (Original Well Elev)
Well:	Red Hills 502H	**North Reference:**	Grid
Wellbore:	Red Hills 502H	**Survey Calculation Method:**	Minimum Curvature
Design:	190504 Red Hills 502H	**Database:**	EDM 5000.1 Single User Db

Project Red Hills 502H

Map System:	US State Plane 1983	**System Datum:**	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site Red Hills 502H

Site Position:		**Northing:**	395,872.90 usft	**Latitude:**	32° 5' 10.654 N
From:	Lat/Long	**Easting:**	764,077.17 usft	**Longitude:**	103° 36' 50.848 W
Position Uncertainty:	1.0 usft	**Slot Radius:**	17-1/2 "	**Grid Convergence:**	0.38 °

Well Red Hills 502H

Well Position	**+N/-S**	0.0 usft	**Northing:**	395,872.90 usft	**Latitude:**	32° 5' 10.654 N
	+E/-W	0.0 usft	**Easting:**	764,077.17 usft	**Longitude:**	103° 36' 50.848 W
Position Uncertainty		0.0 usft	**Wellhead Elevation:**	usft	**Ground Level:**	3,418.3 usft

Wellbore Red Hills 502H

Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	IGRF2010	5/4/2019	6.62	59.85	47,742

Design 190504 Red Hills 502H

Audit Notes:

Version:	**Phase:**	PLAN	**Tie On Depth:**	0.0

Vertical Section:	**Depth From (TVD) (usft)**	**+N/-S (usft)**	**+E/-W (usft)**	**Direction (°)**
	0.0	0.0	0.0	183.57

Survey Tool Program **Date** 5/4/2019

From (usft)	**To (usft)**	**Survey (Wellbore)**	**Tool Name**	**Description**
0.0	19,849.0	190504 Red Hills 502H (Red Hills 502H)	MWD	MWD - Standard

Morcor Engineering

Morcor Standard Plan

Company:	Kaiser Francis	**Local Co-ordinate Reference:**	Well Red Hills 502H
Project:	Red Hills 502H	**TVD Reference:**	WELL @ 3440.3usft (Original Well Elev)
Site:	Red Hills 502H	**MD Reference:**	WELL @ 3440.3usft (Original Well Elev)
Well:	Red Hills 502H	**North Reference:**	Grid
Wellbore:	Red Hills 502H	**Survey Calculation Method:**	Minimum Curvature
Design:	190504 Red Hills 502H	**Database:**	EDM 5000.1 Single User Db

Planned Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	Easting (usft)	Northing (usft)	V. Sec (usft)	DLeg (°/100usft)
0.0	0.00	0.00	0.0	-3,440.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
50.0	0.00	0.00	50.0	-3,390.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
100.0	0.00	293.40	100.0	-3,340.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
120.0	0.00	293.40	120.0	-3,320.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
20" Conductor										
150.0	0.00	293.40	150.0	-3,290.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
200.0	0.00	293.40	200.0	-3,240.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
250.0	0.00	293.40	250.0	-3,190.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
300.0	0.00	293.40	300.0	-3,140.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
350.0	0.00	293.40	350.0	-3,090.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
400.0	0.00	293.40	400.0	-3,040.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
450.0	0.00	293.40	450.0	-2,990.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
500.0	0.00	293.40	500.0	-2,940.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
550.0	0.00	293.40	550.0	-2,890.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
600.0	0.00	293.40	600.0	-2,840.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
650.0	0.00	293.40	650.0	-2,790.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
700.0	0.00	293.40	700.0	-2,740.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
750.0	0.00	293.40	750.0	-2,690.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
800.0	0.00	293.40	800.0	-2,640.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
850.0	0.00	293.40	850.0	-2,590.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
882.0	0.00	293.40	882.0	-2,558.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
Rustler										
900.0	0.00	293.40	900.0	-2,540.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
932.0	0.00	293.40	932.0	-2,508.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
10 3/4" Surface Casing										
950.0	0.00	293.40	950.0	-2,490.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
1,000.0	0.00	293.40	1,000.0	-2,440.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
1,050.0	0.00	293.40	1,050.0	-2,390.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00

Morcor Engineering

Morcor Standard Plan

Company:	Kaiser Francis	**Local Co-ordinate Reference:**	Well Red Hills 502H
Project:	Red Hills 502H	**TVD Reference:**	WELL @ 3440.3usft (Original Well Elev)
Site:	Red Hills 502H	**MD Reference:**	WELL @ 3440.3usft (Original Well Elev)
Well:	Red Hills 502H	**North Reference:**	Grid
Wellbore:	Red Hills 502H	**Survey Calculation Method:**	Minimum Curvature
Design:	190504 Red Hills 502H	**Database:**	EDM 5000.1 Single User Db

Planned Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	Easting (usft)	Northing (usft)	V. Sec (usft)	DLeg (°/100usft)
1,100.0	0.00	293.40	1,100.0	-2,340.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
1,150.0	0.00	293.40	1,150.0	-2,290.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
1,200.0	0.00	293.40	1,200.0	-2,240.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
1,222.0	0.00	293.40	1,222.0	-2,218.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
Salado										
1,250.0	0.00	293.40	1,250.0	-2,190.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
1,300.0	0.00	293.40	1,300.0	-2,140.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
1,350.0	0.00	293.40	1,350.0	-2,090.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
1,400.0	0.00	293.40	1,400.0	-2,040.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
1,450.0	0.00	293.40	1,450.0	-1,990.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
1,500.0	0.00	293.40	1,500.0	-1,940.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
1,550.0	0.00	293.40	1,550.0	-1,890.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
1,600.0	0.00	293.40	1,600.0	-1,840.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
1,650.0	0.00	293.40	1,650.0	-1,790.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
1,700.0	0.00	293.40	1,700.0	-1,740.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
1,750.0	0.00	293.40	1,750.0	-1,690.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
1,800.0	0.00	293.40	1,800.0	-1,640.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
1,850.0	0.00	293.40	1,850.0	-1,590.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
1,900.0	0.00	293.40	1,900.0	-1,540.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
1,950.0	0.00	293.40	1,950.0	-1,490.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
2,000.0	0.00	293.40	2,000.0	-1,440.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
2,022.0	0.00	293.40	2,022.0	-1,418.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
Top of Salt										
2,050.0	0.00	293.40	2,050.0	-1,390.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
2,100.0	0.00	293.40	2,100.0	-1,340.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
2,150.0	0.00	293.40	2,150.0	-1,290.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
2,200.0	0.00	293.40	2,200.0	-1,240.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00

Company:	Kaiser Francis	**Local Co-ordinate Reference:**	Well Red Hills 502H
Project:	Red Hills 502H	**TVD Reference:**	WELL @ 3440.3usft (Original Well Elev)
Site:	Red Hills 502H	**MD Reference:**	WELL @ 3440.3usft (Original Well Elev)
Well:	Red Hills 502H	**North Reference:**	Grid
Wellbore:	Red Hills 502H	**Survey Calculation Method:**	Minimum Curvature
Design:	190504 Red Hills 502H	**Database:**	EDM 5000.1 Single User Db

Planned Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	Easting (usft)	Northing (usft)	V. Sec (usft)	DLeg (°/100usft)
2,250.0	0.00	293.40	2,250.0	-1,190.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
2,300.0	0.00	293.40	2,300.0	-1,140.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
2,350.0	0.00	293.40	2,350.0	-1,090.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
2,400.0	0.00	293.40	2,400.0	-1,040.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
2,450.0	0.00	293.40	2,450.0	-990.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
2,500.0	0.00	293.40	2,500.0	-940.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
2,550.0	0.00	293.40	2,550.0	-890.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
2,600.0	0.00	293.40	2,600.0	-840.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
2,650.0	0.00	293.40	2,650.0	-790.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
2,700.0	0.00	293.40	2,700.0	-740.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
2,750.0	0.00	293.40	2,750.0	-690.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
2,800.0	0.00	293.40	2,800.0	-640.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
2,850.0	0.00	293.40	2,850.0	-590.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
2,900.0	0.00	293.40	2,900.0	-540.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
2,950.0	0.00	293.40	2,950.0	-490.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
3,000.0	0.00	293.40	3,000.0	-440.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
3,050.0	0.00	293.40	3,050.0	-390.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
3,100.0	0.00	293.40	3,100.0	-340.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
3,150.0	0.00	293.40	3,150.0	-290.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
3,200.0	0.00	293.40	3,200.0	-240.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
3,250.0	0.00	293.40	3,250.0	-190.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
3,300.0	0.00	293.40	3,300.0	-140.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
3,350.0	0.00	293.40	3,350.0	-90.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
3,400.0	0.00	293.40	3,400.0	-40.3	0.0	0.0	764,077.17	395,872.90	0.00	0.00
3,450.0	0.00	293.40	3,450.0	9.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
3,500.0	0.00	293.40	3,500.0	59.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
3,550.0	0.00	293.40	3,550.0	109.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00

Morcor Engineering

Morcor Standard Plan

Company:	Kaiser Francis	**Local Co-ordinate Reference:**	Well Red Hills 502H
Project:	Red Hills 502H	**TVD Reference:**	WELL @ 3440.3usft (Original Well Elev)
Site:	Red Hills 502H	**MD Reference:**	WELL @ 3440.3usft (Original Well Elev)
Well:	Red Hills 502H	**North Reference:**	Grid
Wellbore:	Red Hills 502H	**Survey Calculation Method:**	Minimum Curvature
Design:	190504 Red Hills 502H	**Database:**	EDM 5000.1 Single User Db

Planned Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	Easting (usft)	Northing (usft)	V. Sec (usft)	DLeg (°/100usft)
3,600.0	0.00	293.40	3,600.0	159.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
3,650.0	0.00	293.40	3,650.0	209.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
3,700.0	0.00	293.40	3,700.0	259.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
3,750.0	0.00	293.40	3,750.0	309.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
3,800.0	0.00	293.40	3,800.0	359.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
3,850.0	0.00	293.40	3,850.0	409.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
3,900.0	0.00	293.40	3,900.0	459.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
3,950.0	0.00	293.40	3,950.0	509.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
4,000.0	0.00	293.40	4,000.0	559.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
4,050.0	0.00	293.40	4,050.0	609.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
4,100.0	0.00	293.40	4,100.0	659.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
4,150.0	0.00	293.40	4,150.0	709.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
4,200.0	0.00	293.40	4,200.0	759.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
4,250.0	0.00	293.40	4,250.0	809.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
4,300.0	0.00	293.40	4,300.0	859.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
4,350.0	0.00	293.40	4,350.0	909.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
4,400.0	0.00	293.40	4,400.0	959.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
4,450.0	0.00	293.40	4,450.0	1,009.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
4,472.0	0.00	293.40	4,472.0	1,031.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
Base of Salt										
4,500.0	0.00	293.40	4,500.0	1,059.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
4,550.0	0.00	293.40	4,550.0	1,109.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
4,600.0	0.00	293.40	4,600.0	1,159.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
4,650.0	0.00	293.40	4,650.0	1,209.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
4,700.0	0.00	293.40	4,700.0	1,259.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
4,750.0	0.00	293.40	4,750.0	1,309.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00

Company:	Kaiser Francis	**Local Co-ordinate Reference:**	Well Red Hills 502H
Project:	Red Hills 502H	**TVD Reference:**	WELL @ 3440.3usft (Original Well Elev)
Site:	Red Hills 502H	**MD Reference:**	WELL @ 3440.3usft (Original Well Elev)
Well:	Red Hills 502H	**North Reference:**	Grid
Wellbore:	Red Hills 502H	**Survey Calculation Method:**	Minimum Curvature
Design:	190504 Red Hills 502H	**Database:**	EDM 5000.1 Single User Db

Planned Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	Easting (usft)	Northing (usft)	V. Sec (usft)	DLeg (°/100usft)
4,772.0	0.00	293.40	4,772.0	1,331.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
Lamar										
4,800.0	0.00	293.40	4,800.0	1,359.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
4,850.0	0.00	293.40	4,850.0	1,409.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
4,892.0	0.00	293.40	4,892.0	1,451.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
Bell Canyon										
4,900.0	0.00	293.40	4,900.0	1,459.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
4,950.0	0.00	293.40	4,950.0	1,509.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
5,000.0	0.00	293.40	5,000.0	1,559.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
5,050.0	0.00	293.40	5,050.0	1,609.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
5,100.0	0.00	293.40	5,100.0	1,659.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
5,150.0	0.00	293.40	5,150.0	1,709.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
5,200.0	0.00	293.40	5,200.0	1,759.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
5,250.0	0.00	293.40	5,250.0	1,809.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
5,300.0	0.00	293.40	5,300.0	1,859.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
5,350.0	0.00	293.40	5,350.0	1,909.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
5,400.0	0.00	293.40	5,400.0	1,959.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
5,450.0	0.00	293.40	5,450.0	2,009.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
5,500.0	0.00	293.40	5,500.0	2,059.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
5,550.0	0.00	293.40	5,550.0	2,109.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
5,600.0	0.00	293.40	5,600.0	2,159.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
5,650.0	0.00	293.40	5,650.0	2,209.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
5,700.0	0.00	293.40	5,700.0	2,259.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
5,750.0	0.00	293.40	5,750.0	2,309.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
5,800.0	0.00	293.40	5,800.0	2,359.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
5,850.0	0.00	293.40	5,850.0	2,409.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00

Morcor Engineering

Morcor Standard Plan

Company:	Kaiser Francis	**Local Co-ordinate Reference:**	Well Red Hills 502H
Project:	Red Hills 502H	**TVD Reference:**	WELL @ 3440.3usft (Original Well Elev)
Site:	Red Hills 502H	**MD Reference:**	WELL @ 3440.3usft (Original Well Elev)
Well:	Red Hills 502H	**North Reference:**	Grid
Wellbore:	Red Hills 502H	**Survey Calculation Method:**	Minimum Curvature
Design:	190504 Red Hills 502H	**Database:**	EDM 5000.1 Single User Db

Planned Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	Easting (usft)	Northing (usft)	V. Sec (usft)	DLeg (°/100usft)
5,882.0	0.00	293.40	5,882.0	2,441.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
Cherry Canyon										
5,900.0	0.00	293.40	5,900.0	2,459.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
5,950.0	0.00	293.40	5,950.0	2,509.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
6,000.0	0.00	293.40	6,000.0	2,559.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
6,045.0	0.00	293.40	6,045.0	2,604.7	0.0	0.0	764,077.17	395,872.90	0.00	0.00
Start Build 3.00										
6,050.0	0.15	293.40	6,050.0	2,609.7	0.0	0.0	764,077.16	395,872.90	0.00	3.00
6,100.0	1.65	293.40	6,100.0	2,659.7	0.3	-0.7	764,076.44	395,873.21	-0.27	3.00
6,150.0	3.15	293.40	6,149.9	2,709.6	1.1	-2.6	764,074.52	395,874.04	-0.98	3.00
6,200.0	4.65	293.40	6,199.8	2,759.5	2.5	-5.8	764,071.40	395,875.39	-2.13	3.00
6,245.0	6.00	293.40	6,244.6	2,804.3	4.2	-9.6	764,067.56	395,877.05	-3.55	3.00
Start 5355.0 hold at 6245.0 MD										
6,250.0	6.00	293.40	6,249.6	2,809.3	4.4	-10.1	764,067.08	395,877.26	-3.73	0.00
6,300.0	6.00	293.40	6,299.3	2,859.0	6.4	-14.9	764,062.29	395,879.34	-5.50	0.00
6,350.0	6.00	293.40	6,349.1	2,908.8	8.5	-19.7	764,057.49	395,881.41	-7.27	0.00
6,400.0	6.00	293.40	6,398.8	2,958.5	10.6	-24.5	764,052.69	395,883.49	-9.04	0.00
6,450.0	6.00	293.40	6,448.5	3,008.2	12.7	-29.3	764,047.90	395,885.56	-10.82	0.00
6,500.0	6.00	293.40	6,498.2	3,057.9	14.7	-34.1	764,043.10	395,887.64	-12.59	0.00
6,550.0	6.00	293.40	6,548.0	3,107.7	16.8	-38.9	764,038.31	395,889.71	-14.36	0.00
6,600.0	6.00	293.40	6,597.7	3,157.4	18.9	-43.7	764,033.51	395,891.79	-16.13	0.00
6,650.0	6.00	293.40	6,647.4	3,207.1	21.0	-48.5	764,028.71	395,893.87	-17.91	0.00
6,700.0	6.00	293.40	6,697.1	3,256.8	23.0	-53.3	764,023.92	395,895.94	-19.68	0.00
6,750.0	6.00	293.40	6,746.9	3,306.6	25.1	-58.0	764,019.12	395,898.02	-21.45	0.00
6,800.0	6.00	293.40	6,796.6	3,356.3	27.2	-62.8	764,014.32	395,900.09	-23.23	0.00
6,850.0	6.00	293.40	6,846.3	3,406.0	29.3	-67.6	764,009.53	395,902.17	-25.00	0.00
6,900.0	6.00	293.40	6,896.0	3,455.7	31.3	-72.4	764,004.73	395,904.24	-26.77	0.00

Morcor Engineering

Morcor Standard Plan

Company:	Kaiser Francis	**Local Co-ordinate Reference:**	Well Red Hills 502H
Project:	Red Hills 502H	**TVD Reference:**	WELL @ 3440.3usft (Original Well Elev)
Site:	Red Hills 502H	**MD Reference:**	WELL @ 3440.3usft (Original Well Elev)
Well:	Red Hills 502H	**North Reference:**	Grid
Wellbore:	Red Hills 502H	**Survey Calculation Method:**	Minimum Curvature
Design:	190504 Red Hills 502H	**Database:**	EDM 5000.1 Single User Db

Planned Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	Easting (usft)	Northing (usft)	V. Sec (usft)	DLeg (°/100usft)
6,950.0	6.00	293.40	6,945.8	3,505.5	33.4	-77.2	763,999.93	395,906.32	-28.54	0.00
7,000.0	6.00	293.40	6,995.5	3,555.2	35.5	-82.0	763,995.14	395,908.40	-30.32	0.00
7,050.0	6.00	293.40	7,045.2	3,604.9	37.6	-86.8	763,990.34	395,910.47	-32.09	0.00
7,100.0	6.00	293.40	7,095.0	3,654.7	39.6	-91.6	763,985.54	395,912.55	-33.86	0.00
7,150.0	6.00	293.40	7,144.7	3,704.4	41.7	-96.4	763,980.75	395,914.62	-35.63	0.00
7,200.0	6.00	293.40	7,194.4	3,754.1	43.8	-101.2	763,975.95	395,916.70	-37.41	0.00
7,250.0	6.00	293.40	7,244.1	3,803.8	45.9	-106.0	763,971.15	395,918.77	-39.18	0.00
7,300.0	6.00	293.40	7,293.9	3,853.6	48.0	-110.8	763,966.36	395,920.85	-40.95	0.00
7,350.0	6.00	293.40	7,343.6	3,903.3	50.0	-115.6	763,961.56	395,922.92	-42.73	0.00
7,400.0	6.00	293.40	7,393.3	3,953.0	52.1	-120.4	763,956.76	395,925.00	-44.50	0.00
7,450.0	6.00	293.40	7,443.0	4,002.7	54.2	-125.2	763,951.97	395,927.08	-46.27	0.00
7,500.0	6.00	293.40	7,492.8	4,052.5	56.3	-130.0	763,947.17	395,929.15	-48.04	0.00
7,550.0	6.00	293.40	7,542.5	4,102.2	58.3	-134.8	763,942.37	395,931.23	-49.82	0.00
7,600.0	6.00	293.40	7,592.2	4,151.9	60.4	-139.6	763,937.58	395,933.30	-51.59	0.00
7,650.0	6.00	293.40	7,641.9	4,201.6	62.5	-144.4	763,932.78	395,935.38	-53.36	0.00
7,700.0	6.00	293.40	7,691.7	4,251.4	64.6	-149.2	763,927.98	395,937.45	-55.13	0.00
7,750.0	6.00	293.40	7,741.4	4,301.1	66.6	-154.0	763,923.19	395,939.53	-56.91	0.00
7,800.0	6.00	293.40	7,791.1	4,350.8	68.7	-158.8	763,918.39	395,941.61	-58.68	0.00
7,850.0	6.00	293.40	7,840.8	4,400.5	70.8	-163.6	763,913.59	395,943.68	-60.45	0.00
7,900.0	6.00	293.40	7,890.6	4,450.3	72.9	-168.4	763,908.80	395,945.76	-62.23	0.00
7,950.0	6.00	293.40	7,940.3	4,500.0	74.9	-173.2	763,904.00	395,947.83	-64.00	0.00
8,000.0	6.00	293.40	7,990.0	4,549.7	77.0	-178.0	763,899.20	395,949.91	-65.77	0.00
8,050.0	6.00	293.40	8,039.7	4,599.4	79.1	-182.8	763,894.41	395,951.98	-67.54	0.00
8,100.0	6.00	293.40	8,089.5	4,649.2	81.2	-187.6	763,889.61	395,954.06	-69.32	0.00
8,150.0	6.00	293.40	8,139.2	4,698.9	83.2	-192.4	763,884.81	395,956.14	-71.09	0.00
8,200.0	6.00	293.40	8,188.9	4,748.6	85.3	-197.1	763,880.02	395,958.21	-72.86	0.00
8,250.0	6.00	293.40	8,238.7	4,798.4	87.4	-201.9	763,875.22	395,960.29	-74.63	0.00

Morcor Engineering

Morcor Standard Plan

Company:	Kaiser Francis	**Local Co-ordinate Reference:**	Well Red Hills 502H
Project:	Red Hills 502H	**TVD Reference:**	WELL @ 3440.3usft (Original Well Elev)
Site:	Red Hills 502H	**MD Reference:**	WELL @ 3440.3usft (Original Well Elev)
Well:	Red Hills 502H	**North Reference:**	Grid
Wellbore:	Red Hills 502H	**Survey Calculation Method:**	Minimum Curvature
Design:	190504 Red Hills 502H	**Database:**	EDM 5000.1 Single User Db

Planned Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	Easting (usft)	Northing (usft)	V. Sec (usft)	DLeg (°/100usft)
8,300.0	6.00	293.40	8,288.4	4,848.1	89.5	-206.7	763,870.42	395,962.36	-76.41	0.00
8,350.0	6.00	293.40	8,338.1	4,897.8	91.5	-211.5	763,865.63	395,964.44	-78.18	0.00
8,400.0	6.00	293.40	8,387.8	4,947.5	93.6	-216.3	763,860.83	395,966.51	-79.95	0.00
8,450.0	6.00	293.40	8,437.6	4,997.3	95.7	-221.1	763,856.04	395,968.59	-81.73	0.00
8,500.0	6.00	293.40	8,487.3	5,047.0	97.8	-225.9	763,851.24	395,970.67	-83.50	0.00
8,550.0	6.00	293.40	8,537.0	5,096.7	99.8	-230.7	763,846.44	395,972.74	-85.27	0.00
8,600.0	6.00	293.40	8,586.7	5,146.4	101.9	-235.5	763,841.65	395,974.82	-87.04	0.00
8,635.5	6.00	293.40	8,622.0	5,181.7	103.4	-238.9	763,838.24	395,976.29	-88.30	0.00
Brushy Canyon										
8,650.0	6.00	293.40	8,636.5	5,196.2	104.0	-240.3	763,836.85	395,976.89	-88.82	0.00
8,700.0	6.00	293.40	8,686.2	5,245.9	106.1	-245.1	763,832.05	395,978.97	-90.59	0.00
8,750.0	6.00	293.40	8,735.9	5,295.6	108.1	-249.9	763,827.26	395,981.04	-92.36	0.00
8,800.0	6.00	293.40	8,785.6	5,345.3	110.2	-254.7	763,822.46	395,983.12	-94.13	0.00
8,836.6	6.00	293.40	8,822.0	5,381.7	111.7	-258.2	763,818.95	395,984.64	-95.43	0.00
Bone Spring										
8,850.0	6.00	293.40	8,835.4	5,395.1	112.3	-259.5	763,817.66	395,985.19	-95.91	0.00
8,900.0	6.00	293.40	8,885.1	5,444.8	114.4	-264.3	763,812.87	395,987.27	-97.68	0.00
8,950.0	6.00	293.40	8,934.8	5,494.5	116.4	-269.1	763,808.07	395,989.35	-99.45	0.00
9,000.0	6.00	293.40	8,984.5	5,544.2	118.5	-273.9	763,803.27	395,991.42	-101.22	0.00
9,047.7	6.00	293.40	9,032.0	5,591.7	120.5	-278.5	763,798.70	395,993.40	-102.92	0.00
Avalon										
9,050.0	6.00	293.40	9,034.3	5,594.0	120.6	-278.7	763,798.48	395,993.50	-103.00	0.00
9,100.0	6.00	293.40	9,084.0	5,643.7	122.7	-283.5	763,793.68	395,995.57	-104.77	0.00
9,150.0	6.00	293.40	9,133.7	5,693.4	124.8	-288.3	763,788.88	395,997.65	-106.54	0.00
9,200.0	6.00	293.40	9,183.4	5,743.1	126.8	-293.1	763,784.09	395,999.72	-108.32	0.00
9,250.0	6.00	293.40	9,233.2	5,792.9	128.9	-297.9	763,779.29	396,001.80	-110.09	0.00
9,300.0	6.00	293.40	9,282.9	5,842.6	131.0	-302.7	763,774.49	396,003.88	-111.86	0.00

Morcor Engineering

Morcor Standard Plan

Company:	Kaiser Francis	**Local Co-ordinate Reference:**	Well Red Hills 502H
Project:	Red Hills 502H	**TVD Reference:**	WELL @ 3440.3usft (Original Well Elev)
Site:	Red Hills 502H	**MD Reference:**	WELL @ 3440.3usft (Original Well Elev)
Well:	Red Hills 502H	**North Reference:**	Grid
Wellbore:	Red Hills 502H	**Survey Calculation Method:**	Minimum Curvature
Design:	190504 Red Hills 502H	**Database:**	EDM 5000.1 Single User Db

Planned Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	Easting (usft)	Northing (usft)	V. Sec (usft)	DLeg (°/100usft)
9,350.0	6.00	293.40	9,332.6	5,892.3	133.1	-307.5	763,769.70	396,005.95	-113.63	0.00
9,400.0	6.00	293.40	9,382.4	5,942.1	135.1	-312.3	763,764.90	396,008.03	-115.41	0.00
9,450.0	6.00	293.40	9,432.1	5,991.8	137.2	-317.1	763,760.10	396,010.10	-117.18	0.00
9,500.0	6.00	293.40	9,481.8	6,041.5	139.3	-321.9	763,755.31	396,012.18	-118.95	0.00
9,550.0	6.00	293.40	9,531.5	6,091.2	141.4	-326.7	763,750.51	396,014.25	-120.72	0.00
9,600.0	6.00	293.40	9,581.3	6,141.0	143.4	-331.5	763,745.71	396,016.33	-122.50	0.00
9,650.0	6.00	293.40	9,631.0	6,190.7	145.5	-336.2	763,740.92	396,018.41	-124.27	0.00
9,700.0	6.00	293.40	9,680.7	6,240.4	147.6	-341.0	763,736.12	396,020.48	-126.04	0.00
9,750.0	6.00	293.40	9,730.4	6,290.1	149.7	-345.8	763,731.32	396,022.56	-127.82	0.00
9,800.0	6.00	293.40	9,780.2	6,339.9	151.7	-350.6	763,726.53	396,024.63	-129.59	0.00
9,850.0	6.00	293.40	9,829.9	6,389.6	153.8	-355.4	763,721.73	396,026.71	-131.36	0.00
9,900.0	6.00	293.40	9,879.6	6,439.3	155.9	-360.2	763,716.93	396,028.78	-133.13	0.00
9,950.0	6.00	293.40	9,929.3	6,489.0	158.0	-365.0	763,712.14	396,030.86	-134.91	0.00
9,992.9	6.00	293.40	9,972.0	6,531.7	159.7	-369.1	763,708.02	396,032.64	-136.43	0.00
1st Bone Spring Sand										
10,000.0	6.00	293.40	9,979.1	6,538.8	160.0	-369.8	763,707.34	396,032.93	-136.68	0.00
10,050.0	6.00	293.40	10,028.8	6,588.5	162.1	-374.6	763,702.54	396,035.01	-138.45	0.00
10,100.0	6.00	293.40	10,078.5	6,638.2	164.2	-379.4	763,697.75	396,037.09	-140.22	0.00
10,150.0	6.00	293.40	10,128.2	6,687.9	166.3	-384.2	763,692.95	396,039.16	-142.00	0.00
10,200.0	6.00	293.40	10,178.0	6,737.7	168.3	-389.0	763,688.16	396,041.24	-143.77	0.00
10,250.0	6.00	293.40	10,227.7	6,787.4	170.4	-393.8	763,683.36	396,043.31	-145.54	0.00
10,300.0	6.00	293.40	10,277.4	6,837.1	172.5	-398.6	763,678.56	396,045.39	-147.32	0.00
10,350.0	6.00	293.40	10,327.1	6,886.8	174.6	-403.4	763,673.77	396,047.46	-149.09	0.00
10,400.0	6.00	293.40	10,376.9	6,936.6	176.6	-408.2	763,668.97	396,049.54	-150.86	0.00
10,450.0	6.00	293.40	10,426.6	6,986.3	178.7	-413.0	763,664.17	396,051.62	-152.63	0.00
10,500.0	6.00	293.40	10,476.3	7,036.0	180.8	-417.8	763,659.38	396,053.69	-154.41	0.00
10,550.0	6.00	293.40	10,526.1	7,085.8	182.9	-422.6	763,654.58	396,055.77	-156.18	0.00

Morcor Engineering

Morcor Standard Plan

Company:	Kaiser Francis	**Local Co-ordinate Reference:**	Well Red Hills 502H
Project:	Red Hills 502H	**TVD Reference:**	WELL @ 3440.3usft (Original Well Elev)
Site:	Red Hills 502H	**MD Reference:**	WELL @ 3440.3usft (Original Well Elev)
Well:	Red Hills 502H	**North Reference:**	Grid
Wellbore:	Red Hills 502H	**Survey Calculation Method:**	Minimum Curvature
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Planned Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	Easting (usft)	Northing (usft)	V. Sec (usft)	DLeg (°/100usft)
10,556.0	6.00	293.40	10,532.0	7,091.7	183.1	-423.2	763,654.01	396,056.02	-156.39	0.00
2nd Bone Spring Sand										
10,600.0	6.00	293.40	10,575.8	7,135.5	184.9	-427.4	763,649.78	396,057.84	-157.95	0.00
10,650.0	6.00	293.40	10,625.5	7,185.2	187.0	-432.2	763,644.99	396,059.92	-159.72	0.00
10,700.0	6.00	293.40	10,675.2	7,234.9	189.1	-437.0	763,640.19	396,061.99	-161.50	0.00
10,750.0	6.00	293.40	10,725.0	7,284.7	191.2	-441.8	763,635.39	396,064.07	-163.27	0.00
10,800.0	6.00	293.40	10,774.7	7,334.4	193.2	-446.6	763,630.60	396,066.15	-165.04	0.00
10,850.0	6.00	293.40	10,824.4	7,384.1	195.3	-451.4	763,625.80	396,068.22	-166.82	0.00
10,900.0	6.00	293.40	10,874.1	7,433.8	197.4	-456.2	763,621.00	396,070.30	-168.59	0.00
10,950.0	6.00	293.40	10,923.9	7,483.6	199.5	-461.0	763,616.21	396,072.37	-170.36	0.00
10,979.0	6.00	293.40	10,952.7	7,512.4	200.7	-463.7	763,613.42	396,073.58	-171.39	0.00
7 5/8" Intermediate Casing										
10,998.4	6.00	293.40	10,972.0	7,531.7	201.5	-465.6	763,611.56	396,074.38	-172.08	0.00
3rd Bone Spring Lime										
11,000.0	6.00	293.40	10,973.6	7,533.3	201.6	-465.8	763,611.41	396,074.45	-172.13	0.00
11,050.0	6.00	293.40	11,023.3	7,583.0	203.6	-470.6	763,606.61	396,076.52	-173.91	0.00
11,100.0	6.00	293.40	11,073.0	7,632.7	205.7	-475.3	763,601.82	396,078.60	-175.68	0.00
11,150.0	6.00	293.40	11,122.8	7,682.5	207.8	-480.1	763,597.02	396,080.68	-177.45	0.00
11,200.0	6.00	293.40	11,172.5	7,732.2	209.9	-484.9	763,592.22	396,082.75	-179.22	0.00
11,250.0	6.00	293.40	11,222.2	7,781.9	211.9	-489.7	763,587.43	396,084.83	-181.00	0.00
11,300.0	6.00	293.40	11,271.9	7,831.6	214.0	-494.5	763,582.63	396,086.90	-182.77	0.00
11,350.0	6.00	293.40	11,321.7	7,881.4	216.1	-499.3	763,577.83	396,088.98	-184.54	0.00
11,400.0	6.00	293.40	11,371.4	7,931.1	218.2	-504.1	763,573.04	396,091.05	-186.31	0.00
11,450.0	6.00	293.40	11,421.1	7,980.8	220.2	-508.9	763,568.24	396,093.13	-188.09	0.00
11,500.0	6.00	293.40	11,470.8	8,030.5	222.3	-513.7	763,563.44	396,095.20	-189.86	0.00
11,550.0	6.00	293.40	11,520.6	8,080.3	224.4	-518.5	763,558.65	396,097.28	-191.63	0.00

Morcor Engineering

Morcor Standard Plan

Company:	Kaiser Francis	**Local Co-ordinate Reference:**	Well Red Hills 502H
Project:	Red Hills 502H	**TVD Reference:**	WELL @ 3440.3usft (Original Well Elev)
Site:	Red Hills 502H	**MD Reference:**	WELL @ 3440.3usft (Original Well Elev)
Well:	Red Hills 502H	**North Reference:**	Grid
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Planned Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	Easting (usft)	Northing (usft)	V. Sec (usft)	DLeg (°/100usft)
11,600.0	6.00	293.40	11,570.3	8,130.0	226.5	-523.3	763,553.85	396,099.36	-193.41	0.00
Start Drop -3.00										
11,650.0	4.50	293.40	11,620.1	8,179.8	228.3	-527.5	763,549.65	396,101.17	-194.96	3.00
11,700.0	3.00	293.40	11,670.0	8,229.7	229.6	-530.5	763,546.65	396,102.47	-196.07	3.00
11,737.1	1.89	293.40	11,707.0	8,266.7	230.2	-532.0	763,545.20	396,103.10	-196.60	3.00
3rd Bone Spring Sand										
11,750.0	1.50	293.40	11,719.9	8,279.6	230.4	-532.3	763,544.85	396,103.25	-196.73	3.00
11,800.0	0.00	0.00	11,769.9	8,329.6	230.6	-532.9	763,544.25	396,103.51	-196.95	3.00
Start 179.0 hold at 11800.0 MD										
11,850.0	0.00	0.00	11,819.9	8,379.6	230.6	-532.9	763,544.25	396,103.51	-196.95	0.00
11,900.0	0.00	0.00	11,869.9	8,429.6	230.6	-532.9	763,544.25	396,103.51	-196.95	0.00
11,950.0	0.00	0.00	11,919.9	8,479.6	230.6	-532.9	763,544.25	396,103.51	-196.95	0.00
11,979.0	0.00	0.00	11,948.9	8,508.6	230.6	-532.9	763,544.25	396,103.51	-196.95	0.00
Start Build 10.00										
12,000.0	2.10	179.42	11,969.9	8,529.6	230.2	-532.9	763,544.25	396,103.13	-196.57	10.00
12,050.0	7.10	179.42	12,019.8	8,579.5	226.2	-532.9	763,544.29	396,099.12	-192.57	10.00
12,100.0	12.10	179.42	12,069.0	8,628.7	217.9	-532.8	763,544.38	396,090.78	-184.26	10.00
12,150.0	17.10	179.42	12,117.4	8,677.1	205.3	-532.7	763,544.51	396,078.19	-171.69	10.00
12,200.0	22.10	179.42	12,164.5	8,724.2	188.5	-532.5	763,544.68	396,061.42	-154.97	10.00
12,250.0	27.10	179.42	12,209.9	8,769.6	167.7	-532.3	763,544.89	396,040.62	-134.22	10.00
12,300.0	32.10	179.42	12,253.4	8,813.1	143.0	-532.0	763,545.14	396,015.93	-109.60	10.00
12,350.0	37.10	179.42	12,294.6	8,854.3	114.7	-531.7	763,545.42	395,987.55	-81.30	10.00
12,400.0	42.10	179.42	12,333.1	8,892.8	82.8	-531.4	763,545.75	395,955.70	-49.52	10.00
12,450.0	47.09	179.42	12,368.7	8,928.4	47.7	-531.1	763,546.10	395,920.61	-14.52	10.00
12,500.0	52.09	179.42	12,401.1	8,960.8	9.6	-530.7	763,546.49	395,882.55	23.44	10.00
12,550.0	57.09	179.42	12,430.0	8,989.7	-31.1	-530.3	763,546.90	395,841.81	64.08	10.00
12,600.0	62.09	179.42	12,455.3	9,015.0	-74.2	-529.8	763,547.33	395,798.70	107.07	10.00
12,650.0	67.09	179.42	12,476.8	9,036.5	-119.3	-529.4	763,547.79	395,753.55	152.10	10.00

Morcor Engineering

Morcor Standard Plan

Company:	Kaiser Francis	**Local Co-ordinate Reference:**	Well Red Hills 502H
Project:	Red Hills 502H	**TVD Reference:**	WELL @ 3440.3usft (Original Well Elev)
Site:	Red Hills 502H	**MD Reference:**	WELL @ 3440.3usft (Original Well Elev)
Well:	Red Hills 502H	**North Reference:**	Grid
Wellbore:	Red Hills 502H	**Survey Calculation Method:**	Minimum Curvature
Design:	190504 Red Hills 502H	**Database:**	EDM 5000.1 Single User Db

Planned Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	Easting (usft)	Northing (usft)	V. Sec (usft)	DLeg (°/100usft)
12,700.0	72.09	179.42	12,494.2	9,053.9	-166.2	-528.9	763,548.27	395,706.71	198.83	10.00
12,750.0	77.09	179.42	12,507.5	9,067.2	-214.4	-528.4	763,548.75	395,658.52	246.89	10.00
12,800.0	82.09	179.42	12,516.5	9,076.2	-263.5	-527.9	763,549.25	395,609.36	295.92	10.00
12,850.0	87.09	179.42	12,521.2	9,080.9	-313.3	-527.4	763,549.76	395,559.61	345.55	10.00
12,879.1	90.00	179.42	12,522.0	9,081.7	-342.4	-527.1	763,550.05	395,530.52	374.56	10.00
Start 6969.9 hold at 12879.1 MD										
12,900.0	90.00	179.42	12,522.0	9,081.7	-363.3	-526.9	763,550.26	395,509.62	395.41	0.00
12,950.0	90.00	179.42	12,522.0	9,081.7	-413.3	-526.4	763,550.77	395,459.62	445.28	0.00
13,000.0	90.00	179.42	12,522.0	9,081.7	-463.3	-525.9	763,551.27	395,409.63	495.14	0.00
13,050.0	90.00	179.42	12,522.0	9,081.7	-513.3	-525.4	763,551.78	395,359.63	545.01	0.00
13,100.0	90.00	179.42	12,522.0	9,081.7	-563.3	-524.9	763,552.29	395,309.63	594.88	0.00
13,150.0	90.00	179.42	12,522.0	9,081.7	-613.3	-524.4	763,552.79	395,259.63	644.75	0.00
13,200.0	90.00	179.42	12,522.0	9,081.7	-663.3	-523.9	763,553.30	395,209.64	694.62	0.00
13,250.0	90.00	179.42	12,522.0	9,081.7	-713.3	-523.4	763,553.80	395,159.64	744.49	0.00
13,300.0	90.00	179.42	12,522.0	9,081.7	-763.3	-522.9	763,554.31	395,109.64	794.36	0.00
13,350.0	90.00	179.42	12,522.0	9,081.7	-813.3	-522.3	763,554.82	395,059.64	844.23	0.00
13,400.0	90.00	179.42	12,522.0	9,081.7	-863.3	-521.8	763,555.32	395,009.65	894.09	0.00
13,450.0	90.00	179.42	12,522.0	9,081.7	-913.2	-521.3	763,555.83	394,959.65	943.96	0.00
13,500.0	90.00	179.42	12,522.0	9,081.7	-963.2	-520.8	763,556.33	394,909.65	993.83	0.00
13,550.0	90.00	179.42	12,522.0	9,081.7	-1,013.2	-520.3	763,556.84	394,859.65	1,043.70	0.00
13,600.0	90.00	179.42	12,522.0	9,081.7	-1,063.2	-519.8	763,557.35	394,809.66	1,093.57	0.00
13,650.0	90.00	179.42	12,522.0	9,081.7	-1,113.2	-519.3	763,557.85	394,759.66	1,143.44	0.00
13,700.0	90.00	179.42	12,522.0	9,081.7	-1,163.2	-518.8	763,558.36	394,709.66	1,193.31	0.00
13,750.0	90.00	179.42	12,522.0	9,081.7	-1,213.2	-518.3	763,558.87	394,659.66	1,243.18	0.00
13,800.0	90.00	179.42	12,522.0	9,081.7	-1,263.2	-517.8	763,559.37	394,609.67	1,293.04	0.00
13,850.0	90.00	179.42	12,522.0	9,081.7	-1,313.2	-517.3	763,559.88	394,559.67	1,342.91	0.00
13,900.0	90.00	179.42	12,522.0	9,081.7	-1,363.2	-516.8	763,560.38	394,509.67	1,392.78	0.00

Company:	Kaiser Francis	**Local Co-ordinate Reference:**	Well Red Hills 502H
Project:	Red Hills 502H	**TVD Reference:**	WELL @ 3440.3usft (Original Well Elev)
Site:	Red Hills 502H	**MD Reference:**	WELL @ 3440.3usft (Original Well Elev)
Well:	Red Hills 502H	**North Reference:**	Grid
Wellbore:	Red Hills 502H	**Survey Calculation Method:**	Minimum Curvature
Design:	190504 Red Hills 502H	**Database:**	EDM 5000.1 Single User Db

Planned Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	Easting (usft)	Northing (usft)	V. Sec (usft)	DLeg (°/100usft)
13,950.0	90.00	179.42	12,522.0	9,081.7	-1,413.2	-516.3	763,560.89	394,459.67	1,442.65	0.00
14,000.0	90.00	179.42	12,522.0	9,081.7	-1,463.2	-515.8	763,561.40	394,409.68	1,492.52	0.00
14,050.0	90.00	179.42	12,522.0	9,081.7	-1,513.2	-515.3	763,561.90	394,359.68	1,542.39	0.00
14,100.0	90.00	179.42	12,522.0	9,081.7	-1,563.2	-514.8	763,562.41	394,309.68	1,592.26	0.00
14,150.0	90.00	179.42	12,522.0	9,081.7	-1,613.2	-514.3	763,562.91	394,259.68	1,642.13	0.00
14,200.0	90.00	179.42	12,522.0	9,081.7	-1,663.2	-513.7	763,563.42	394,209.69	1,691.99	0.00
14,250.0	90.00	179.42	12,522.0	9,081.7	-1,713.2	-513.2	763,563.93	394,159.69	1,741.86	0.00
14,300.0	90.00	179.42	12,522.0	9,081.7	-1,763.2	-512.7	763,564.43	394,109.69	1,791.73	0.00
14,350.0	90.00	179.42	12,522.0	9,081.7	-1,813.2	-512.2	763,564.94	394,059.69	1,841.60	0.00
14,400.0	90.00	179.42	12,522.0	9,081.7	-1,863.2	-511.7	763,565.45	394,009.70	1,891.47	0.00
14,450.0	90.00	179.42	12,522.0	9,081.7	-1,913.2	-511.2	763,565.95	393,959.70	1,941.34	0.00
14,500.0	90.00	179.42	12,522.0	9,081.7	-1,963.2	-510.7	763,566.46	393,909.70	1,991.21	0.00
14,550.0	90.00	179.42	12,522.0	9,081.7	-2,013.2	-510.2	763,566.96	393,859.70	2,041.08	0.00
14,600.0	90.00	179.42	12,522.0	9,081.7	-2,063.2	-509.7	763,567.47	393,809.71	2,090.94	0.00
14,650.0	90.00	179.42	12,522.0	9,081.7	-2,113.2	-509.2	763,567.98	393,759.71	2,140.81	0.00
14,700.0	90.00	179.42	12,522.0	9,081.7	-2,163.2	-508.7	763,568.48	393,709.71	2,190.68	0.00
14,750.0	90.00	179.42	12,522.0	9,081.7	-2,213.2	-508.2	763,568.99	393,659.72	2,240.55	0.00
14,800.0	90.00	179.42	12,522.0	9,081.7	-2,263.2	-507.7	763,569.49	393,609.72	2,290.42	0.00
14,850.0	90.00	179.42	12,522.0	9,081.7	-2,313.2	-507.2	763,570.00	393,559.72	2,340.29	0.00
14,900.0	90.00	179.42	12,522.0	9,081.7	-2,363.2	-506.7	763,570.51	393,509.72	2,390.16	0.00
14,950.0	90.00	179.42	12,522.0	9,081.7	-2,413.2	-506.2	763,571.01	393,459.73	2,440.02	0.00
15,000.0	90.00	179.42	12,522.0	9,081.7	-2,463.2	-505.6	763,571.52	393,409.73	2,489.89	0.00
15,050.0	90.00	179.42	12,522.0	9,081.7	-2,513.2	-505.1	763,572.03	393,359.73	2,539.76	0.00
15,100.0	90.00	179.42	12,522.0	9,081.7	-2,563.2	-504.6	763,572.53	393,309.73	2,589.63	0.00
15,150.0	90.00	179.42	12,522.0	9,081.7	-2,613.2	-504.1	763,573.04	393,259.74	2,639.50	0.00
15,200.0	90.00	179.42	12,522.0	9,081.7	-2,663.2	-503.6	763,573.54	393,209.74	2,689.37	0.00
15,250.0	90.00	179.42	12,522.0	9,081.7	-2,713.2	-503.1	763,574.05	393,159.74	2,739.24	0.00

Company:	Kaiser Francis	**Local Co-ordinate Reference:**	Well Red Hills 502H
Project:	Red Hills 502H	**TVD Reference:**	WELL @ 3440.3usft (Original Well Elev)
Site:	Red Hills 502H	**MD Reference:**	WELL @ 3440.3usft (Original Well Elev)
Well:	Red Hills 502H	**North Reference:**	Grid
Wellbore:	Red Hills 502H	**Survey Calculation Method:**	Minimum Curvature
Design:	190504 Red Hills 502H	**Database:**	EDM 5000.1 Single User Db

Planned Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	Easting (usft)	Northing (usft)	V. Sec (usft)	DLeg (°/100usft)
15,300.0	90.00	179.42	12,522.0	9,081.7	-2,763.2	-502.6	763,574.56	393,109.74	2,789.11	0.00
15,350.0	90.00	179.42	12,522.0	9,081.7	-2,813.2	-502.1	763,575.06	393,059.75	2,838.97	0.00
15,400.0	90.00	179.42	12,522.0	9,081.7	-2,863.1	-501.6	763,575.57	393,009.75	2,888.84	0.00
15,450.0	90.00	179.42	12,522.0	9,081.7	-2,913.1	-501.1	763,576.07	392,959.75	2,938.71	0.00
15,500.0	90.00	179.42	12,522.0	9,081.7	-2,963.1	-500.6	763,576.58	392,909.75	2,988.58	0.00
15,550.0	90.00	179.42	12,522.0	9,081.7	-3,013.1	-500.1	763,577.09	392,859.76	3,038.45	0.00
15,600.0	90.00	179.42	12,522.0	9,081.7	-3,063.1	-499.6	763,577.59	392,809.76	3,088.32	0.00
15,650.0	90.00	179.42	12,522.0	9,081.7	-3,113.1	-499.1	763,578.10	392,759.76	3,138.19	0.00
15,700.0	90.00	179.42	12,522.0	9,081.7	-3,163.1	-498.6	763,578.60	392,709.76	3,188.06	0.00
15,750.0	90.00	179.42	12,522.0	9,081.7	-3,213.1	-498.1	763,579.11	392,659.77	3,237.92	0.00
15,800.0	90.00	179.42	12,522.0	9,081.7	-3,263.1	-497.5	763,579.62	392,609.77	3,287.79	0.00
15,850.0	90.00	179.42	12,522.0	9,081.7	-3,313.1	-497.0	763,580.12	392,559.77	3,337.66	0.00
15,900.0	90.00	179.42	12,522.0	9,081.7	-3,363.1	-496.5	763,580.63	392,509.77	3,387.53	0.00
15,950.0	90.00	179.42	12,522.0	9,081.7	-3,413.1	-496.0	763,581.14	392,459.78	3,437.40	0.00
16,000.0	90.00	179.42	12,522.0	9,081.7	-3,463.1	-495.5	763,581.64	392,409.78	3,487.27	0.00
16,050.0	90.00	179.42	12,522.0	9,081.7	-3,513.1	-495.0	763,582.15	392,359.78	3,537.14	0.00
16,100.0	90.00	179.42	12,522.0	9,081.7	-3,563.1	-494.5	763,582.65	392,309.78	3,587.01	0.00
16,150.0	90.00	179.42	12,522.0	9,081.7	-3,613.1	-494.0	763,583.16	392,259.79	3,636.87	0.00
16,200.0	90.00	179.42	12,522.0	9,081.7	-3,663.1	-493.5	763,583.67	392,209.79	3,686.74	0.00
16,250.0	90.00	179.42	12,522.0	9,081.7	-3,713.1	-493.0	763,584.17	392,159.79	3,736.61	0.00
16,300.0	90.00	179.42	12,522.0	9,081.7	-3,763.1	-492.5	763,584.68	392,109.79	3,786.48	0.00
16,350.0	90.00	179.42	12,522.0	9,081.7	-3,813.1	-492.0	763,585.18	392,059.80	3,836.35	0.00
16,400.0	90.00	179.42	12,522.0	9,081.7	-3,863.1	-491.5	763,585.69	392,009.80	3,886.22	0.00
16,450.0	90.00	179.42	12,522.0	9,081.7	-3,913.1	-491.0	763,586.20	391,959.80	3,936.09	0.00
16,500.0	90.00	179.42	12,522.0	9,081.7	-3,963.1	-490.5	763,586.70	391,909.80	3,985.95	0.00
16,550.0	90.00	179.42	12,522.0	9,081.7	-4,013.1	-490.0	763,587.21	391,859.81	4,035.82	0.00
16,600.0	90.00	179.42	12,522.0	9,081.7	-4,063.1	-489.5	763,587.72	391,809.81	4,085.69	0.00

Company:	Kaiser Francis	**Local Co-ordinate Reference:**	Well Red Hills 502H
Project:	Red Hills 502H	**TVD Reference:**	WELL @ 3440.3usft (Original Well Elev)
Site:	Red Hills 502H	**MD Reference:**	WELL @ 3440.3usft (Original Well Elev)
Well:	Red Hills 502H	**North Reference:**	Grid
Wellbore:	Red Hills 502H	**Survey Calculation Method:**	Minimum Curvature
Design:	190504 Red Hills 502H	**Database:**	EDM 5000.1 Single User Db

Planned Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	Easting (usft)	Northing (usft)	V. Sec (usft)	DLeg (°/100usft)
16,650.0	90.00	179.42	12,522.0	9,081.7	-4,113.1	-488.9	763,588.22	391,759.81	4,135.56	0.00
16,700.0	90.00	179.42	12,522.0	9,081.7	-4,163.1	-488.4	763,588.73	391,709.81	4,185.43	0.00
16,750.0	90.00	179.42	12,522.0	9,081.7	-4,213.1	-487.9	763,589.23	391,659.82	4,235.30	0.00
16,800.0	90.00	179.42	12,522.0	9,081.7	-4,263.1	-487.4	763,589.74	391,609.82	4,285.17	0.00
16,850.0	90.00	179.42	12,522.0	9,081.7	-4,313.1	-486.9	763,590.25	391,559.82	4,335.04	0.00
16,900.0	90.00	179.42	12,522.0	9,081.7	-4,363.1	-486.4	763,590.75	391,509.83	4,384.90	0.00
16,950.0	90.00	179.42	12,522.0	9,081.7	-4,413.1	-485.9	763,591.26	391,459.83	4,434.77	0.00
17,000.0	90.00	179.42	12,522.0	9,081.7	-4,463.1	-485.4	763,591.76	391,409.83	4,484.64	0.00
17,050.0	90.00	179.42	12,522.0	9,081.7	-4,513.1	-484.9	763,592.27	391,359.83	4,534.51	0.00
17,100.0	90.00	179.42	12,522.0	9,081.7	-4,563.1	-484.4	763,592.78	391,309.84	4,584.38	0.00
17,150.0	90.00	179.42	12,522.0	9,081.7	-4,613.1	-483.9	763,593.28	391,259.84	4,634.25	0.00
17,200.0	90.00	179.42	12,522.0	9,081.7	-4,663.1	-483.4	763,593.79	391,209.84	4,684.12	0.00
17,250.0	90.00	179.42	12,522.0	9,081.7	-4,713.1	-482.9	763,594.30	391,159.84	4,733.99	0.00
17,300.0	90.00	179.42	12,522.0	9,081.7	-4,763.1	-482.4	763,594.80	391,109.85	4,783.85	0.00
17,350.0	90.00	179.42	12,522.0	9,081.7	-4,813.0	-481.9	763,595.31	391,059.85	4,833.72	0.00
17,400.0	90.00	179.42	12,522.0	9,081.7	-4,863.0	-481.4	763,595.81	391,009.85	4,883.59	0.00
17,450.0	90.00	179.42	12,522.0	9,081.7	-4,913.0	-480.8	763,596.32	390,959.85	4,933.46	0.00
17,500.0	90.00	179.42	12,522.0	9,081.7	-4,963.0	-480.3	763,596.83	390,909.86	4,983.33	0.00
17,550.0	90.00	179.42	12,522.0	9,081.7	-5,013.0	-479.8	763,597.33	390,859.86	5,033.20	0.00
17,600.0	90.00	179.42	12,522.0	9,081.7	-5,063.0	-479.3	763,597.84	390,809.86	5,083.07	0.00
17,650.0	90.00	179.42	12,522.0	9,081.7	-5,113.0	-478.8	763,598.34	390,759.86	5,132.94	0.00
17,700.0	90.00	179.42	12,522.0	9,081.7	-5,163.0	-478.3	763,598.85	390,709.87	5,182.80	0.00
17,750.0	90.00	179.42	12,522.0	9,081.7	-5,213.0	-477.8	763,599.36	390,659.87	5,232.67	0.00
17,800.0	90.00	179.42	12,522.0	9,081.7	-5,263.0	-477.3	763,599.86	390,609.87	5,282.54	0.00
17,850.0	90.00	179.42	12,522.0	9,081.7	-5,313.0	-476.8	763,600.37	390,559.87	5,332.41	0.00
17,900.0	90.00	179.42	12,522.0	9,081.7	-5,363.0	-476.3	763,600.87	390,509.88	5,382.28	0.00
17,950.0	90.00	179.42	12,522.0	9,081.7	-5,413.0	-475.8	763,601.38	390,459.88	5,432.15	0.00

Company:	Kaiser Francis	**Local Co-ordinate Reference:**	Well Red Hills 502H
Project:	Red Hills 502H	**TVD Reference:**	WELL @ 3440.3usft (Original Well Elev)
Site:	Red Hills 502H	**MD Reference:**	WELL @ 3440.3usft (Original Well Elev)
Well:	Red Hills 502H	**North Reference:**	Grid
Wellbore:	Red Hills 502H	**Survey Calculation Method:**	Minimum Curvature
Design:	190504 Red Hills 502H	**Database:**	EDM 5000.1 Single User Db

Planned Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	Easting (usft)	Northing (usft)	V. Sec (usft)	DLeg (°/100usft)
18,000.0	90.00	179.42	12,522.0	9,081.7	-5,463.0	-475.3	763,601.89	390,409.88	5,482.02	0.00
18,050.0	90.00	179.42	12,522.0	9,081.7	-5,513.0	-474.8	763,602.39	390,359.88	5,531.89	0.00
18,100.0	90.00	179.42	12,522.0	9,081.7	-5,563.0	-474.3	763,602.90	390,309.89	5,581.75	0.00
18,150.0	90.00	179.42	12,522.0	9,081.7	-5,613.0	-473.8	763,603.41	390,259.89	5,631.62	0.00
18,200.0	90.00	179.42	12,522.0	9,081.7	-5,663.0	-473.3	763,603.91	390,209.89	5,681.49	0.00
18,250.0	90.00	179.42	12,522.0	9,081.7	-5,713.0	-472.7	763,604.42	390,159.89	5,731.36	0.00
18,300.0	90.00	179.42	12,522.0	9,081.7	-5,763.0	-472.2	763,604.92	390,109.90	5,781.23	0.00
18,350.0	90.00	179.42	12,522.0	9,081.7	-5,813.0	-471.7	763,605.43	390,059.90	5,831.10	0.00
18,400.0	90.00	179.42	12,522.0	9,081.7	-5,863.0	-471.2	763,605.94	390,009.90	5,880.97	0.00
18,450.0	90.00	179.42	12,522.0	9,081.7	-5,913.0	-470.7	763,606.44	389,959.90	5,930.83	0.00
18,500.0	90.00	179.42	12,522.0	9,081.7	-5,963.0	-470.2	763,606.95	389,909.91	5,980.70	0.00
18,550.0	90.00	179.42	12,522.0	9,081.7	-6,013.0	-469.7	763,607.45	389,859.91	6,030.57	0.00
18,600.0	90.00	179.42	12,522.0	9,081.7	-6,063.0	-469.2	763,607.96	389,809.91	6,080.44	0.00
18,650.0	90.00	179.42	12,522.0	9,081.7	-6,113.0	-468.7	763,608.47	389,759.91	6,130.31	0.00
18,700.0	90.00	179.42	12,522.0	9,081.7	-6,163.0	-468.2	763,608.97	389,709.92	6,180.18	0.00
18,750.0	90.00	179.42	12,522.0	9,081.7	-6,213.0	-467.7	763,609.48	389,659.92	6,230.05	0.00
18,800.0	90.00	179.42	12,522.0	9,081.7	-6,263.0	-467.2	763,609.99	389,609.92	6,279.92	0.00
18,850.0	90.00	179.42	12,522.0	9,081.7	-6,313.0	-466.7	763,610.49	389,559.93	6,329.78	0.00
18,900.0	90.00	179.42	12,522.0	9,081.7	-6,363.0	-466.2	763,611.00	389,509.93	6,379.65	0.00
18,950.0	90.00	179.42	12,522.0	9,081.7	-6,413.0	-465.7	763,611.50	389,459.93	6,429.52	0.00
19,000.0	90.00	179.42	12,522.0	9,081.7	-6,463.0	-465.2	763,612.01	389,409.93	6,479.39	0.00
19,050.0	90.00	179.42	12,522.0	9,081.7	-6,513.0	-464.6	763,612.52	389,359.94	6,529.26	0.00
19,100.0	90.00	179.42	12,522.0	9,081.7	-6,563.0	-464.1	763,613.02	389,309.94	6,579.13	0.00
19,150.0	90.00	179.42	12,522.0	9,081.7	-6,613.0	-463.6	763,613.53	389,259.94	6,629.00	0.00
19,200.0	90.00	179.42	12,522.0	9,081.7	-6,663.0	-463.1	763,614.03	389,209.94	6,678.87	0.00
19,250.0	90.00	179.42	12,522.0	9,081.7	-6,713.0	-462.6	763,614.54	389,159.95	6,728.73	0.00
19,300.0	90.00	179.42	12,522.0	9,081.7	-6,762.9	-462.1	763,615.05	389,109.95	6,778.60	0.00

Morcor Engineering

Morcor Standard Plan

Company:	Kaiser Francis	**Local Co-ordinate Reference:**	Well Red Hills 502H
Project:	Red Hills 502H	**TVD Reference:**	WELL @ 3440.3usft (Original Well Elev)
Site:	Red Hills 502H	**MD Reference:**	WELL @ 3440.3usft (Original Well Elev)
Well:	Red Hills 502H	**North Reference:**	Grid
Wellbore:	Red Hills 502H	**Survey Calculation Method:**	Minimum Curvature
Design:	190504 Red Hills 502H	**Database:**	EDM 5000.1 Single User Db

Planned Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	Easting (usft)	Northing (usft)	V. Sec (usft)	DLeg (°/100usft)
19,350.0	90.00	179.42	12,522.0	9,081.7	-6,812.9	-461.6	763,615.55	389,059.95	6,828.47	0.00
19,400.0	90.00	179.42	12,522.0	9,081.7	-6,862.9	-461.1	763,616.06	389,009.95	6,878.34	0.00
19,450.0	90.00	179.42	12,522.0	9,081.7	-6,912.9	-460.6	763,616.57	388,959.96	6,928.21	0.00
19,500.0	90.00	179.42	12,522.0	9,081.7	-6,962.9	-460.1	763,617.07	388,909.96	6,978.08	0.00
19,550.0	90.00	179.42	12,522.0	9,081.7	-7,012.9	-459.6	763,617.58	388,859.96	7,027.95	0.00
19,600.0	90.00	179.42	12,522.0	9,081.7	-7,062.9	-459.1	763,618.08	388,809.96	7,077.82	0.00
19,650.0	90.00	179.42	12,522.0	9,081.7	-7,112.9	-458.6	763,618.59	388,759.97	7,127.68	0.00
19,700.0	90.00	179.42	12,522.0	9,081.7	-7,162.9	-458.1	763,619.10	388,709.97	7,177.55	0.00
19,750.0	90.00	179.42	12,522.0	9,081.7	-7,212.9	-457.6	763,619.60	388,659.97	7,227.42	0.00
19,800.0	90.00	179.42	12,522.0	9,081.7	-7,262.9	-457.1	763,620.11	388,609.97	7,277.29	0.00
19,849.0	90.00	179.42	12,522.0	9,081.7	-7,311.9	-456.6	763,620.60	388,560.98	7,326.16	0.00

TD at 19849.0 - 5 1/2" Production Casing

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
120.0	120.0	20" Conductor	20	26
932.0	932.0	10 3/4" Surface Casing	10-3/4	12-1/4
10,979.0	10,952.7	7 5/8" Intermediate Casing	7-5/8	9-7/8
19,849.0	12,522.0	5 1/2" Production Casing	5-1/2	6-3/4

Morcor Engineering

Morcor Standard Plan

Company:	Kaiser Francis	**Local Co-ordinate Reference:**	Well Red Hills 502H
Project:	Red Hills 502H	**TVD Reference:**	WELL @ 3440.3usft (Original Well Elev)
Site:	Red Hills 502H	**MD Reference:**	WELL @ 3440.3usft (Original Well Elev)
Well:	Red Hills 502H	**North Reference:**	Grid
Wellbore:	Red Hills 502H	**Survey Calculation Method:**	Minimum Curvature
Design:	190504 Red Hills 502H	**Database:**	EDM 5000.1 Single User Db

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
4,892.0	4,892.0	Bell Canyon		0.00	
9,992.9	9,972.0	1st Bone Spring Sand		0.00	
9,047.7	9,032.0	Avalon		0.00	
4,772.0	4,772.0	Lamar		0.00	
8,836.6	8,822.0	Bone Spring		0.00	
882.0	882.0	Rustler		0.00	
4,472.0	4,472.0	Base of Salt		0.00	
10,998.4	10,972.0	3rd Bone Spring Lime		0.00	
5,882.0	5,882.0	Cherry Canyon		0.00	
8,635.5	8,622.0	Brushy Canyon		0.00	
11,737.1	11,707.0	3rd Bone Spring Sand		0.00	
2,022.0	2,022.0	Top of Salt		0.00	
10,556.0	10,532.0	2nd Bone Spring Sand		0.00	
1,222.0	1,222.0	Salado		0.00	

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
6,045.0	6,045.0	0.0	0.0	Start Build 3.00
6,245.0	6,244.6	4.2	-9.6	Start 5355.0 hold at 6245.0 MD
11,600.0	11,570.3	226.5	-523.3	Start Drop -3.00
11,800.0	11,769.9	230.6	-532.9	Start 179.0 hold at 11800.0 MD
11,979.0	11,948.9	230.6	-532.9	Start Build 10.00
12,879.1	12,522.0	-342.4	-527.1	Start 6969.9 hold at 12879.1 MD
19,849.0	12,522.0	-7,311.9	-456.6	TD at 19849.0

Checked By: _____ Approved By: _____ Date: _____