

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

**APPLICATION FOR PERMIT TO DRILL OR REENTER**

**OCD - HOBBS**  
**05/22/2020**  
**RECEIVED**

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

1a. Type of work: <input checked="" type="checkbox"/> DRILL <input type="checkbox"/> REENTER		5. Lease Serial No. NMNM122620
1b. Type of Well: <input checked="" type="checkbox"/> Oil Well <input type="checkbox"/> Gas Well <input type="checkbox"/> Other		6. If Indian, Allottee or Tribe Name
1c. Type of Completion: <input type="checkbox"/> Hydraulic Fracturing <input type="checkbox"/> Single Zone <input checked="" type="checkbox"/> Multiple Zone		7. If Unit or CA Agreement, Name and No.
2. Name of Operator KAISER FRANCIS OIL COMPANY [12361]		8. Lease Name and Well No. RED HILLS FEDERAL [5467] 506H
3a. Address 6733 S. Yale Ave., Tulsa, OK 74121	3b. Phone No. (include area code) (918) 491-0000	9. API Well No. 30-025-47189
4. Location of Well (Report location clearly and in accordance with any State requirements. *) At surface NENE / 300 FNL / 1035 FEL / LAT 32.093496 / LONG -103.606196 At proposed prod. zone SESE / 100 FSL / 850 FEL / LAT 32.065572 / LONG -103.605593		10. Field and Pool, or Exploratory [98158] BELL LAKE/BONE SPRING, SOUTH
11. Sec., T. R. M. or Blk. and Survey or Area SEC 31/T25S/R33E/NMP		12. County or Parish LEA
14. Distance in miles and direction from nearest town or post office* 25 miles		13. State NM
15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any) 300 feet	16. No of acres in lease 440.2	17. Spacing Unit dedicated to this well 640.0
18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. 20 feet	19. Proposed Depth 12500 feet / 23215 feet	20. BLM/BIA Bond No. in file FED: WYB000055
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 3400 feet	22. Approximate date work will start* 03/15/2020	23. Estimated duration 40 days
24. Attachments		

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

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

25. Signature (Electronic Submission)	Name (Printed/Typed) Melanie Wilson / Ph: (918) 491-0000	Date 01/09/2020
Title Regulatory Analyst		
Approved by (Signature) (Electronic Submission)	Name (Printed/Typed) Christopher Walls / Ph: (575) 234-2234	Date 05/19/2020
Title Petroleum Engineer	Office Carlsbad Field Office	

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 05/22/2020**

**APPROVED WITH CONDITIONS**  
**Approval Date: 05/19/2020**

*Kz*  
05/26/2020

SL

## Additional Operator Remarks

### Location of Well

0. SHL: NENE / 300 FNL / 1035 FEL / TWSP: 25S / RANGE: 33E / SECTION: 31 / LAT: 32.093496 / LONG: -103.606196 ( TVD: 0 feet, MD: 0 feet )

PPP: SESE / 1320 FSL / 850 FEL / TWSP: 25S / RANGE: 33E / SECTION: 31 / LAT: 32.083436 / LONG: -103.605597 ( TVD: 12500 feet, MD: 16716 feet )

PPP: NENE / 100 FNL / 850 FEL / TWSP: 25S / RANGE: 33E / SECTION: 31 / LAT: 32.094045 / LONG: -103.605599 ( TVD: 12500 feet, MD: 12856 feet )

PPP: NENE / 100 FNL / 850 FEL / TWSP: 25S / RANGE: 33E / SECTION: 31 / LAT: 32.094045 / LONG: -103.605599 ( TVD: 12500 feet, MD: 12856 feet )

BHL: SESE / 100 FSL / 850 FEL / TWSP: 26S / RANGE: 33E / SECTION: 6 / LAT: 32.065572 / LONG: -103.605593 ( TVD: 12500 feet, MD: 23215 feet )

### BLM Point of Contact

Name: Deborah Ham

Title: Legal Landlaw Examiner

Phone: (575) 234-5965

Email: dham@blm.gov

CONFIDENTIAL

**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.

CONFIDENTIAL

**PECOS DISTRICT  
SURFACE USE  
CONDITIONS OF APPROVAL**

OPERATOR'S NAME:	Kaiser Francis Oil Company
LEASE NO.:	NMNM122620
	NMNM015321
COUNTY:	Lea County

**Wells:**

**Red Hills Pad 5**

Red Hills 201H

Surface Hole Location: 300' FNL & 505' FWL, Section 31, T. 25 S., R. 33 E.

Bottom Hole Location: 100' FSL & 990' FWL, Section 6, T. 26 S, R 33 E.

Red Hills 701H

Surface Hole Location: 300' FNL & 475' FWL, Section 31, T. 25 S., R. 33 E.

Bottom Hole Location: 100' FSL & 400' FWL, Section 6, T. 26 S, R 33 E.

**Red Hills Pad 6**

Red Hills 203H

Surface Hole Location: 300' FNL & 1020' FWL, Section 31, T. 25 S., R. 33 E.

Bottom Hole Location: 100' FSL & 2240' FWL, Section 6, T. 26 S, R 33 E.

Red Hills 703H

Surface Hole Location: 300' FNL & 990' FWL, Section 31, T. 25 S., R. 33 E.

Bottom Hole Location: 100' FSL & 1700', Section 6, T. 26 S, R 33 E.

**Red Hills Pad 7**

Red Hills 605H

Surface Hole Location: 200' FNL & 2510' FEL, Section 31, T. 25 S., R. 33 E.

Bottom Hole Location: 100' FSL & 1320 FEL, Section 6, T. 26 S, R 33 E.

Red Hills 604H

Surface Hole Location: 200' FNL & 2490' FEL, Section 31, T. 25 S., R. 33 E.

Bottom Hole Location: 100' FSL & 2250' FEL, Section 6, T. 26 S, R 33 E.

Red Hills 405H

Surface Hole Location: 200' FNL & 2470' FEL, Section 31, T. 25 S., R. 33 E.

Bottom Hole Location: 100' FSL & 1320' FEL, Section 6, T. 26 S, R 33 E.

Red Hills 404H

Surface Hole Location: 200' FNL & 2450' FEL, Section 31, T. 25 S., R. 33 E.

Bottom Hole Location: 100' FSL & 2240' FEL, Section 6, T. 26 S, R 33 E.

Red Hills 004H

Surface Hole Location: 200' FNL & 2430' FEL, Section 31, T. 25 S., R. 33 E.

Bottom Hole Location: 100' FSL & 1790' FEL, Section 6, T. 26 S, R 33 E.

Red Hills 005H

Surface Hole Location: 200' FNL & 2410' FEL, Section 31, T. 25 S., R. 33 E.

Bottom Hole Location: 100' FSL & 2240' FEL, Section 6, T. 26 S, R 33 E.

Red Hills 205H

Surface Hole Location: 200' FNL & 2390' FEL, Section 31, T. 25 S., R. 33 E.

Bottom Hole Location: 200' FSL & 660' FEL, Section 6, T. 26 S, R 33 E.  
Red Hills 705H  
Surface Hole Location: 200' FNL & 2370' FEL, Section 31, T. 25 S., R. 33 E.  
Bottom Hole Location: 100' FSL & 2240' FEL, Section 6, T. 26 S, R 33 E.

**Red Hills Pad 8**

Red Hills 606H  
Surface Hole Location: 300' FNL & 995' FEL, Section 31, T. 25 S., R. 33 E.  
Bottom Hole Location: 100' FSL & 400' FEL, Section 6, T. 26 S, R 33 E.

Red Hills 406H  
Surface Hole Location: 300' FNL & 1015' FEL, Section 31, T. 25 S., R. 33 E.  
Bottom Hole Location: 100' FSL & 400' FEL, Section 6, T. 26 S, R 33 E.

Red Hills 506H  
Surface Hole Location: 300' FNL & 1035' FEL, Section 31, T. 25 S., R. 33 E.  
Bottom Hole Location: 100' FSL & 850' FEL, Section 6, T. 26 S, R 33 E.

Red Hills 106H  
Surface Hole Location: 300' FNL & 1055' FEL, Section 31, T. 25 S., R. 33 E.  
Bottom Hole Location: 100' FSL & 400' FEL, Section 6, T. 26 S, R 33 E.

Red Hills 006H  
Surface Hole Location: 300' FNL & 1075' FEL, Section 31, T. 25 S., R. 33 E.  
Bottom Hole Location: 100' FSL & 990' FEL, Section 6, T. 26 S, R 33 E.

Red Hills 206H  
Surface Hole Location: 300' FNL & 1095' FEL, Section 31, T. 25 S., R. 33 E.  
Bottom Hole Location: 100' FSL & 400' FEL, Section 6, T. 26 S, R 33 E.

Red Hills 706H  
Surface Hole Location: 300' FNL & 1115' FEL, Section 31, T. 25 S., R. 33 E.  
Bottom Hole Location: 100' FSL & 990' FEL, Section 6, T. 26 S, R 33 E.

## 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.

- General Provisions**
- Permit Expiration**
- Archaeology, Paleontology, and Historical Sites**
- Noxious Weeds**
- Special Requirements**
  - Watershed
  - Cave/Karst
  - Range
  - VRM IV
- Construction**
  - Notification
  - Topsoil
  - Closed Loop System
  - Federal Mineral Material Pits
  - Well Pads
  - Roads
- Road Section Diagram**
- Production (Post Drilling)**
  - Well Structures & Facilities
  - Pipelines
  - Electric Lines
- Interim Reclamation**
- Final Abandonment & Reclamation**

## **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 resource (historic or prehistoric site or object) discovered by the holder, or any person working on the holder's behalf, on public or Federal land shall be immediately reported to the Authorized Officer. The holder 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 will be made by the Authorized Officer to determine appropriate actions to prevent the loss of significant cultural or scientific values. The holder will be responsible for the cost of evaluation and any decision as to the proper mitigation measures will be made by the Authorized Officer after consulting with the holder.

OR

If the entire project is covered under the Permian Basin Programmatic Agreement (cultural resources only):

The proponent has contributed funds commensurate to the undertaking into an account for offsite mitigation. Participation in the PA serves as mitigation for the effects of this project on cultural resources. If any human skeletal remains, funerary objects, sacred objects, or objects of cultural patrimony are discovered at any time during construction, all construction activities shall halt and the BLM will be notified as soon as possible within 24 hours. Work shall not resume until a Notice to Proceed is issued by the BLM. See information below discussing NAGPRA.

If the proposed project is split between a Class III inventory and a Permian Basin Programmatic Agreement contribution, the portion of the project covered under Class III inventory should default to the first paragraph stipulations.

The holder is hereby obligated to comply with procedures established in the Native American Graves Protection and Repatriation Act (NAGPRA) to protect such cultural items as human remains, associated funerary objects, sacred objects, and objects of cultural patrimony discovered inadvertently during the course of project implementation. In the event that any of the cultural items listed above are discovered during the course of project work, the proponent shall immediately halt the disturbance and contact the BLM within 24 hours for instructions. The proponent or initiator of any project shall be held responsible for protecting, evaluating, reporting, excavating, treating, and disposing of these cultural items according to the procedures established by the BLM in consultation with Indian Tribes."

Any paleontological resource (historic or prehistoric site or object) discovered by the holder, or any person working on the holder's behalf, on public or Federal land shall be immediately reported to the Authorized Officer. The holder 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 will be made by the Authorized Officer to determine appropriate actions to prevent the loss of significant cultural or scientific values. The holder will be responsible for the cost of evaluation and any decision as to the proper mitigation measures will be made by the Authorized Officer after consulting with the holder.

#### **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.

#### **SPECIAL REQUIREMENT(S)**

##### **Watershed:**

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:**

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.

#### **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 valves, 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.

**Range:**

**Cattleguards**

Where a permanent cattlegaurd is approved, an appropriately sized cattleguard(s) sufficient to carry out the project shall be installed and maintained at fence crossing(s). Any existing cattleguard(s) on the access road 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 cattleguard(s) that are in place and are utilized during lease operations. A gate shall be constructed on one side of the cattleguard and fastened securely to H-braces.

**Fence Requirement**

Where entry granted across a fence line, the fence must be braced and tied off on both sides of the passageway prior to cutting and re-routing. The fence intercepting Red Hills Pad 7 will be re-routed around the western and southern edge and restored to the prior condition, or better, once work is completed. The operator shall notify the private surface landowner or the grazing allotment holder prior to crossing any fence(s).

**Livestock Watering Requirement**

Any damage to structures that provide water to livestock throughout the life of the well, caused by operations from the well site, must be immediately corrected by the operator. The operator must notify the BLM office (575-234-5972) and the private surface landowner or the grazing allotment holder if any damage occurs to structures that provide water to livestock.

**VRM IV:**

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

**V. 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**

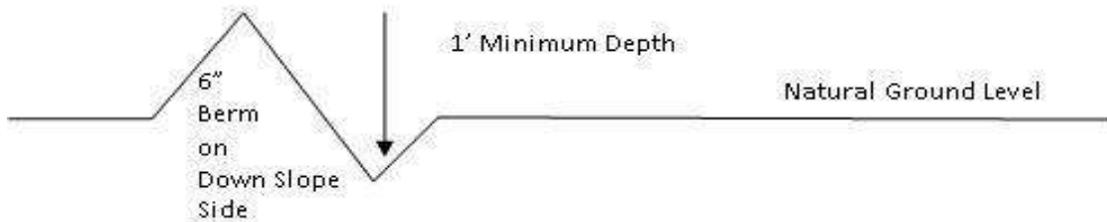
Vehicle turnouts shall be constructed on the road. Turnouts shall be intervisible with interval spacing distance less than 1000 feet. Turnouts shall conform to Figure 1; cross section and plans for typical road construction.

**Drainage**

Drainage control systems shall be constructed on the entire length of road (e.g. ditches, sidehill outloping 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:

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

#### **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

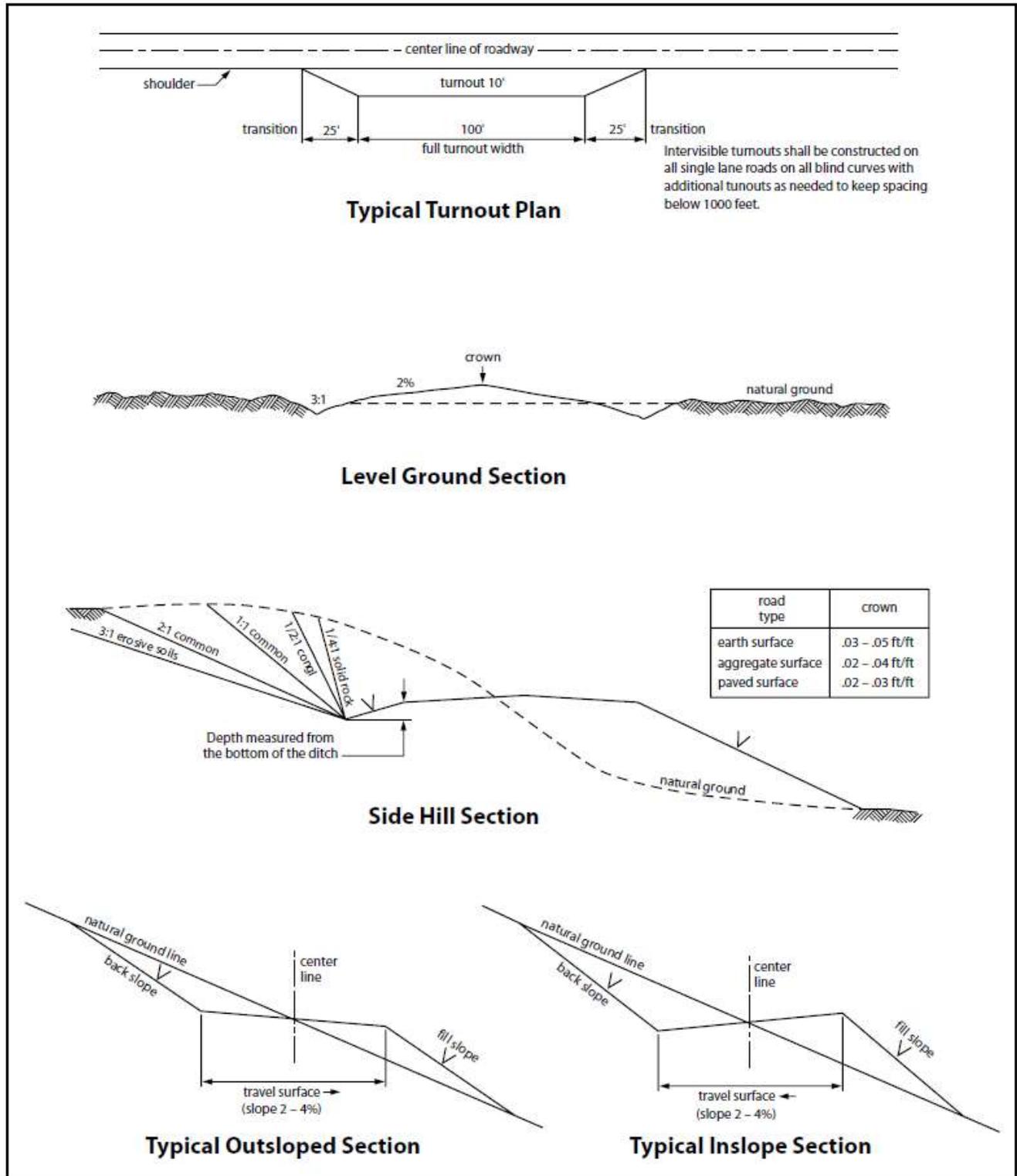


Figure 1. Cross-sections and plans for typical road sections representative of BLM resource or FS local and higher-class roads.

## VI. 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).

## **VII. 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).

## **VIII. 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).

Ground-level Abandoned Well Marker to avoid raptor perching: Upon the plugging and subsequent abandonment of the well, the well marker will be installed at ground level on a plate containing the pertinent information for the plugged well.

**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:

<u>Species</u>	<u>lb/acre</u>
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

## PECOS DISTRICT DRILLING CONDITIONS OF APPROVAL

<b>OPERATOR'S NAME:</b>	KAISER FRANCIS OIL COMPANY
<b>WELL NAME &amp; NO.:</b>	RED HILLS FEDERAL 506H
<b>SURFACE HOLE FOOTAGE:</b>	300'/N & 1035'/E
<b>BOTTOM HOLE FOOTAGE:</b>	100'/S & 850'/E
<b>LOCATION:</b>	Section 31, T.25 S., R.33 E., NMP
<b>COUNTY:</b>	Lea County, New Mexico

COA

H2S	<input type="radio"/> Yes	<input checked="" type="radio"/> No	
Potash	<input checked="" type="radio"/> None	<input type="radio"/> Secretary	<input type="radio"/> R-111-P
Cave/Karst Potential	<input checked="" type="radio"/> Low	<input type="radio"/> Medium	<input type="radio"/> High
Cave/Karst Potential	<input type="radio"/> Critical		
Variance	<input type="radio"/> None	<input checked="" type="radio"/> Flex Hose	<input type="radio"/> Other
Wellhead	<input type="radio"/> Conventional	<input checked="" type="radio"/> Multibowl	<input type="radio"/> Both
Other	<input type="checkbox"/> 4 String Area	<input type="checkbox"/> Capitan Reef	<input type="checkbox"/> WIPP
Other	<input type="checkbox"/> Fluid Filled	<input type="checkbox"/> Cement Squeeze	<input type="checkbox"/> Pilot Hole
Special Requirements	<input type="checkbox"/> Water Disposal	<input type="checkbox"/> COM	<input type="checkbox"/> Unit

### A. HYDROGEN SULFIDE

Hydrogen Sulfide (H2S) monitors shall be installed prior to drilling out the surface shoe. If H2S is detected in concentrations greater than 100 ppm, the Hydrogen Sulfide area shall meet Onshore Order 6 requirements, which includes equipment and personnel/public protection items. If Hydrogen Sulfide is encountered, provide measured values and formations to the BLM.

### B. CASING

#### Casing Design:

1. The **10-3/4** inch surface casing shall be set at approximately **950** feet (a minimum of 25 feet (Lea County) into the Rustler Anhydrite and above the salt) and cemented to the surface.
  - a. If cement does not circulate to the 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 six hours after pumping cement and ideally between 8-10 hours after completing the cement job.

- b. Wait on cement (WOC) time for a primary cement job will be a minimum of **8 hours** or 500 pounds compressive strength, whichever is greater. (This is to include the lead cement)
  - c. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compressive strength, whichever is greater.
  - d. If cement falls back, remedial cementing will be done prior to drilling out that string.
2. The minimum required fill of cement behind the **7-5/8** inch intermediate casing is:

**Option 1 (Single Stage):**

- Cement to surface. If cement does not circulate see B.1.a, c-d above. **Excess Cement Calculates to 24.11%, additional cement might be required. Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst or potash.**

3. The minimum required fill of cement behind the **5-1/2** inch production casing is:

**Option 1 (Single Stage):**

- Cement should tie-back at least **200 feet** into previous casing string. Operator shall provide method of verification.

**C. PRESSURE CONTROL**

1. Variance approved to use flex line from BOP to choke manifold. Manufacturer's specification to be readily available. No external damage to flex line. Flex line to be installed as straight as possible (no hard bends).'
2. Operator has proposed a multi-bowl wellhead assembly. This assembly will only be tested when installed on the surface casing. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **10,000 (10M) psi. Variance is approved to use a 5000 (5M) Annular which shall be tested to 5000 (5M) psi.**
  - 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 OOGO2.III.A.2.i must be followed.

### **GENERAL REQUIREMENTS**

The BLM is to be notified in advance for a representative to witness:

- a. Spudding well (minimum of 24 hours)
- b. Setting and/or Cementing of all casing strings (minimum of 4 hours)
- c. BOPE tests (minimum of 4 hours)

Eddy County  
Call the Carlsbad Field Office, 620 East Greene St., Carlsbad, NM 88220,  
(575) 361-2822

Lea County  
Call the Hobbs Field Station, 414 West Taylor, Hobbs NM 88240, (575)  
393-3612

1. 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
    - Notify the BLM when moving in and removing the Spudder Rig.
    - Notify the BLM when moving in the 2<sup>nd</sup> Rig. Rig to be moved in within 90 days of notification that Spudder Rig has left the location.
    - BOP/BOPE test to be conducted per Onshore Oil and Gas Order No. 2 as soon as 2nd Rig is rigged up on well.
2. 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.
3. 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 submitted to the BLM office as well as all other logs run on the borehole 30 days from completion. If available, a

digital copy of the logs is to be submitted in addition to the paper copies. 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 integrity 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 integrity 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 that portion of any 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. 5M or higher system requires an HCR valve, remote kill line and annular to match. The remote kill line is to be installed prior to testing the system and tested to stack pressure.
4. 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. Whenever any seal subject to test pressure is broken, all the tests in OOGO2.III.A.2.i must be followed.
  - e. 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.
5. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness the 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 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 not a cup or J-packer. The operator also has the option of utilizing an independent tester to test without a plug (i.e. against the casing) pursuant to Onshore Order 2 with the pressure not to exceed 70% of the burst rating for the casing. Any test against the casing must meet the WOC time for water basin (8 hours) or potash (24 hours) or 500 pounds compressive strength, whichever is greater, prior to initiating the test (see casing segment as lead cement may be critical item).
- 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 results of the test shall be reported to the appropriate BLM office.
- f. All tests are required to be recorded on a calibrated test chart. A copy of the BOP/BOPE test chart and a copy of independent service company test will be submitted to the appropriate BLM office.
- g. 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 if test is done with a test plug and 30 minutes without a test plug. This test shall be performed prior to the test at full stack pressure.
- h. BOP/BOPE must be tested by an independent service company 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

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

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.

Porto-johns and trash containers will be on-location during fracturing operations or any other crew-intensive operations.

**RI04292020**



APD ID: 10400053000

Submission Date: 01/09/2020

Highlighted data reflects the most recent changes

Operator Name: KAISER FRANCIS OIL COMPANY

Well Name: RED HILLS FEDERAL

Well Number: 506H

[Show Final Text](#)

Well Type: OIL WELL

Well Work Type: Drill

### Section 1 - General

APD ID: 10400053000

Tie to previous NOS? N

Submission Date: 01/09/2020

BLM Office: CARLSBAD

User: Melanie Wilson

Title: Regulatory Analyst

Federal/Indian APD: FED

Is the first lease penetrated for production Federal or Indian? FED

Lease number: NMNM122620

Lease Acres: 440.2

Surface access agreement in place?

Allotted?

Reservation:

Agreement in place? NO

Federal or Indian agreement:

Agreement number:

Agreement name:

Keep application confidential? Y

Permitting Agent? YES

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:

Well in Master Drilling Plan? NO

Master Drilling Plan name:

Well Name: RED HILLS FEDERAL

Well Number: 506H

Well API Number:

Field/Pool or Exploratory? Field and Pool

Field Name: BELL LAKE

Pool Name: BONE SPRING, SOUTH

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

**Operator Name:** KAISER FRANCIS OIL COMPANY

**Well Name:** RED HILLS FEDERAL

**Well Number:** 506H

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

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

**Type of Well Pad:** MULTIPLE WELL

**Multiple Well Pad Name:** RED HILLS **Number:** 8

**Well Class:** HORIZONTAL

**Number of Legs:** 1

**Well Work Type:** Drill

**Well Type:** OIL 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:** 300 FT

**Reservoir well spacing assigned acres Measurement:** 640 Acres

**Well plat:** Red\_Hills\_Fed\_506H\_C102\_20200109102545.pdf

RED\_HILLS\_\_PAYMENT\_CONF\_20200109102602.pdf

**Well work start Date:** 03/15/2020

**Duration:** 40 DAYS

### Section 3 - Well Location Table

**Survey Type:** RECTANGULAR

**Describe Survey Type:**

**Datum:** NAD83

**Vertical Datum:** NAVD88

**Survey number:** 6448C

**Reference Datum:** GROUND LEVEL

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	300	FNL	1035	FEL	25S	33E	31	Aliquot NENE	32.093496	-103.606196	LEA	NEW MEXI CO	NEW MEXI CO	F	NMNM 122620	3400	0	0	Y
KOP Leg #1	300	FNL	1035	FEL	25S	33E	31	Aliquot NENE	32.093496	-103.606196	LEA	NEW MEXI CO	NEW MEXI CO	F	NMNM 122620	-8485	11914	11885	Y

**Operator Name:** KAISER FRANCIS OIL COMPANY

**Well Name:** RED HILLS FEDERAL

**Well Number:** 506H

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	100	FNL	850	FEL	25S	33E	31	Aliquot NENE	32.094045	-103.605599	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 122620	-9100	12856	12500	Y
PPP Leg #1-2	100	FNL	850	FEL	25S	33E	31	Aliquot NENE	32.094045	-103.605599	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 122620	-9100	12856	12500	Y
PPP Leg #1-3	1320	FSL	850	FEL	25S	33E	31	Aliquot SESE	32.083436	-103.605597	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 015321	-9100	16716	12500	Y
EXIT Leg #1	100	FSL	850	FEL	26S	33E	6	Aliquot SESE	32.065572	-103.605593	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 015321	-9100	23215	12500	Y
BHL Leg #1	100	FSL	850	FEL	26S	33E	6	Aliquot SESE	32.065572	-103.605593	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 015321	-9100	23215	12500	Y

CONFIDENTIAL



**APD ID:** 10400053000

**Submission Date:** 01/09/2020

Highlighted data reflects the most recent changes

**Operator Name:** KAISER FRANCIS OIL COMPANY

**Well Name:** RED HILLS FEDERAL

**Well Number:** 506H

[Show Final Text](#)

**Well Type:** OIL WELL

**Well Work Type:** Drill

## Section 1 - Geologic Formations

Formation ID	Formation Name	Elevation	True Vertical Depth	Measured Depth	Lithologies	Mineral Resources	Producing Formation
628817	---	3400	0	0	OTHER : Surface	NONE	N
628818	RUSTLER	2540	860	860	SANDSTONE	NONE	N
628819	SALADO	2200	1200	1200	SALT	NONE	N
628820	TOP SALT	1400	2000	2000	SALT	NONE	N
628821	BASE OF SALT	-1050	4450	4450	SALT	NONE	N
628822	LAMAR	-1350	4750	4750	SANDSTONE	NATURAL GAS, OIL	N
628823	BELL CANYON	-1470	4870	4870	SANDSTONE	NATURAL GAS, OIL	N
628824	CHERRY CANYON	-2460	5860	5860	SANDSTONE	NATURAL GAS, OIL	N
628825	BRUSHY CANYON	-5200	8600	8600	SANDSTONE	NATURAL GAS, OIL	N
628835	BONE SPRING	-5400	8800	8800	SANDSTONE	NATURAL GAS, OIL	N
628834	AVALON SAND	-5610	9010	9010	SANDSTONE	NATURAL GAS, OIL	Y
630822	BONE SPRING 1ST	-6550	9950	9950	SANDSTONE	NATURAL GAS, OIL	N
628836	BONE SPRING 2ND	-7110	10510	10510	SANDSTONE	NATURAL GAS, OIL	N
630823	BONE SPRING LIME	-7550	10950	10950	LIMESTONE	NATURAL GAS, OIL	N
630824	WOLFCAMP	-8670	12070	12070	SANDSTONE	NATURAL GAS, OIL	Y

## Section 2 - Blowout Prevention

**Operator Name:** KAISER FRANCIS OIL COMPANY

**Well Name:** RED HILLS FEDERAL

**Well Number:** 506H

**Pressure Rating (PSI):** 5M

**Rating Depth:** 13000

**Equipment:** A 10M system will be installed according to Onshore Order #2 consisting of an Annular Preventer, BOP with two rams, a blind ram and safety valves and appropriate handles located on the rig floor. BOP will be equipped with 2 side outlets (choke side shall be a minimum 3 line, and kill side will be a minimum 2 line). Kill line will be installed with (2) valves and a check valve (2 min) of proper pressure rating for the system. Remote kill line (2 min) will be installed and ran to the outer edge of the substructure and be unobstructed. A manual and hydraulic valve (3 min) will be installed on the choke line, 3 chokes will be used with one being remotely controlled. Fill up line will be installed above the uppermost preventer. Pressure gauge of proper pressure rating will be installed on choke manifold. Upper and lower kelly cocks will be utilized with handles readily available in plain sight. A float sub will be available at all times. All connections subject to well pressure will be flanged, welded, or clamped.

**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 the high pressure indicated above per Onshore Order 2 requirements. 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\_Fed\_506H\_Choke\_Manifold\_20200109111556.pdf

**BOP Diagram Attachment:**

Well\_Control\_Plan\_20200102074248.pdf

Red\_Hills\_Fed\_506H\_Wellhead\_20200109111620.pdf

Red\_Hills\_Fed\_506H\_BOP\_20200109111622.pdf

Red\_Hills\_Fed\_506H\_Flex\_Hose\_20200109111623.pdf

Annular\_BOP\_Variance\_Request\_20200109111925.pdf

### Section 3 - Casing

Casing ID	String Type	Hole Size	Csg Size	Condition	Standard	Tapered String	Top Set MD	Bottom Set MD	Top Set TVD	Bottom Set TVD	Top Set MSL	Bottom Set MSL	Calculated casing length MD	Grade	Weight	Joint Type	Collapse SF	Burst SF	Joint SF Type	Joint SF	Body SF Type	Body SF
1	SURFACE	14.75	10.75	NEW	API	N	0	950	0	950	3400	2450	950	J-55	40.5	ST&C	3.6	7	DRY	10.9	DRY	16.3
2	INTERMEDIATE	9.875	7.625	NEW	API	N	0	11814	0	11786		-8386	11814	HCP-110	29.7	LT&C	1.3	1.7	DRY	2.6	DRY	2.7
3	PRODUCTION	6.75	5.5	NEW	API	N	0	23215	0	12500		-9100	23215	P-110	20	OTHER - Eagle SF	1.4	1.6	DRY	2.5	DRY	2.6

**Operator Name:** KAISER FRANCIS OIL COMPANY

**Well Name:** RED HILLS FEDERAL

**Well Number:** 506H

### Casing Attachments

---

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

**Inspection Document:**

**Spec Document:**

**Tapered String Spec:**

**Casing Design Assumptions and Worksheet(s):**

Red\_Hills\_Fed\_506H\_Casing\_Assumptions\_20200109112213.pdf

---

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

**Inspection Document:**

**Spec Document:**

**Tapered String Spec:**

**Casing Design Assumptions and Worksheet(s):**

Red\_Hills\_Fed\_506H\_Casing\_Assumptions\_20200109112111.pdf

---

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

**Inspection Document:**

**Spec Document:**

**Tapered String Spec:**

**Casing Design Assumptions and Worksheet(s):**

Red\_Hills\_Fed\_506H\_Prod\_Csg\_Specs\_20200109112324.pdf

---

**Operator Name:** KAISER FRANCIS OIL COMPANY

**Well Name:** RED HILLS FEDERAL

**Well Number:** 506H

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
SURFACE	Lead		0	950	570	1.33	14.8	761	50	Halcem	Bentonite

INTERMEDIATE	Lead		0	1181 4	915	2.77	12	2539	25	NeoCem	Extender
INTERMEDIATE	Tail		0	1181 4	522	1.22	15.6	637	25	Halcem	Accelerator
PRODUCTION	Lead		1000 0	2321 5	708	1.95	12.5	1381	25	EconoCem	Halad

### 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
950	1178 6	OTHER : Diesel- Brine Emulsion	8.8	9.2							
1178 6	1250 0	OTHER : Oil Based Mud	10	12.5							
0	950	OTHER : FRESH WATER	8.4	9							

**Operator Name:** KAISER FRANCIS OIL COMPANY

**Well Name:** RED HILLS FEDERAL

**Well Number:** 506H

## Section 6 - Test, Logging, Coring

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

Top of cement on production casing will be determined by calculation.

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

DIRECTIONAL SURVEY, GAMMA RAY LOG, MUD LOG/GEOLOGIC LITHOLOGY LOG,

**Coring operation description for the well:**

None planned

## Section 7 - Pressure

**Anticipated Bottom Hole Pressure:** 8125

**Anticipated Surface Pressure:** 5374

**Anticipated Bottom Hole Temperature(F):** 199

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

**Describe:**

**Contingency Plans geohazards description:**

**Contingency Plans geohazards attachment:**

**Hydrogen Sulfide drilling operations plan required?** YES

**Hydrogen sulfide drilling operations plan:**

Red\_Hills\_Federal\_H2S\_Plan\_20200107132250.pdf

## Section 8 - Other Information

**Proposed horizontal/directional/multi-lateral plan submission:**

Red\_Hills\_Fed\_506H\_Directional\_Plan\_20200109113042.pdf

**Other proposed operations facets description:**

Gas Capture Plan attached

**Other proposed operations facets attachment:**

Red\_Hills\_Pad\_8\_GCP\_20200109113054.pdf

**Other Variance attachment:**

Red\_Hills\_Fed\_506H\_Wellhead\_20200109113123.pdf

Annular\_BOP\_Variance\_Request\_20200109113123.pdf

Red\_Hills\_Fed\_506H\_Flex\_Hose\_20200109113124.pdf

Interval	Length	Casing Size	Weight (#/ft)	Grade	Thread	Condition	Hole Size	TVD (ft)
Conductor	120	20"				New		120
Surface	950	10-3/4"	40.5	J-55	STC	New	14.75	950
Intermediate	11814	7-5/8"	29.7	HCP-110	LTC	New	9.875	11786
Production	23215	5-1/2"	20	P110 HP	Eagle SF	New	6.75	12500

Mud Type	Mud Weight Hole Control	Depth	Viscosity	Fluid Loss
FW	8.4-9.0	910	32 - 34	NC
DBE	8.8-9.2	11700	34	NC
OBM	10.0-12	19661	48-52	<10

Anticipated Mud Weight (ppg)	Max Pore Pressure (psi)	Collapse (psi)	Burst (psi)	Body Tensile Strength	Joint Tensile Strength
9	445	1580	3130	629000	420000
9.2	5638	7150	9470	940000	922000
12	7800	11080	12640	641000	629000

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	7.0	16.3	10.9
1.3	1.7	2.7	2.6
1.4	1.6	2.6	2.5

CASING DETAILS

TVD	MD	Name
950.00	950.00	13 3/8"
11786.00	11814.95	7 5/8"



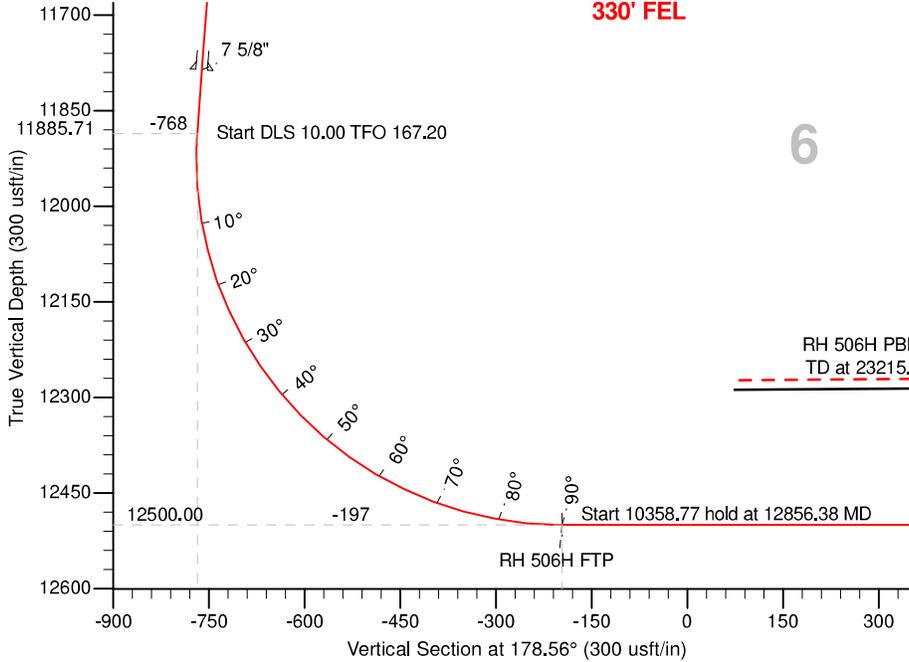
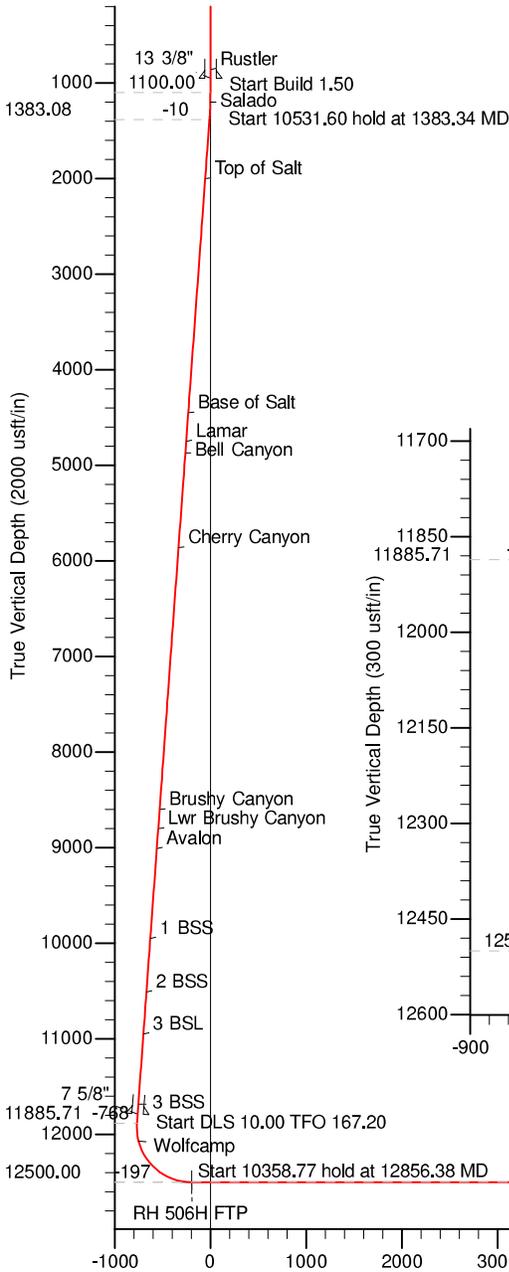
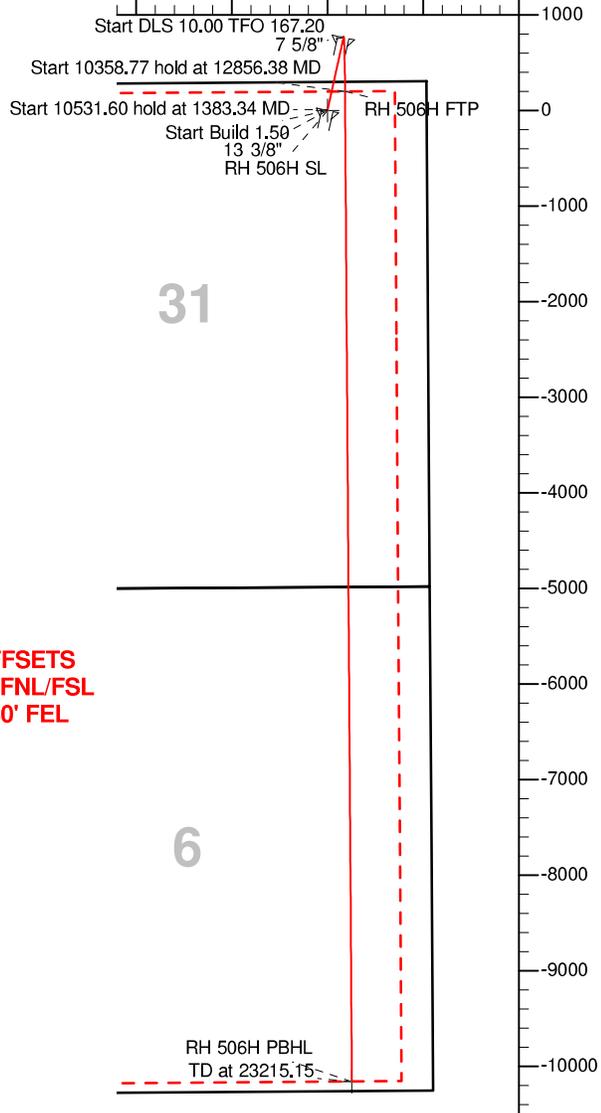
Azimuths to Grid North  
 True North: -0.39°  
 Magnetic North: 6.23°  
 Magnetic Field  
 Strength: 47470.4snT  
 Dip Angle: 59.79°  
 Date: 11/26/2020  
 Model: IGRF2020

US State Plane 1983  
 New Mexico Eastern Zone  
 32° 5' 36.586 N  
 103° 36' 22.307 W

FORMATION DETAILS

TVDP	MDP	Formation
860.00	860.00	Rustler
1200.00	1200.01	Salado
2000.00	2001.96	Top of Salt
4450.00	4458.72	Base of Salt
4750.00	4759.54	Lamar
4870.00	4879.87	Bell Canyon
5860.00	5872.60	Cherry Canyon
8600.00	8620.16	Brushy Canyon
8800.00	8820.71	Lwr Brushy Canyon
9010.00	9031.29	Avalon
9950.00	9973.88	1 BSS
10510.00	10535.43	2 BSS
10950.00	10976.64	3 BSL
11685.00	11713.67	3 BSS
12070.00	12100.81	Wolfcamp

West(-)/East(+) (2000 usft/in)  
 -2000 -1000 0 1000 2000



Vertical Section at 178.56° (2000 usft/in)

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
RH 506H SL	0.00	0.00	0.00	398509.82	766514.88	32° 5' 36.586 N	103° 36' 22.307 W
RH 506H FTP	12500.00	201.25	183.55	398711.06	766698.42	32° 5' 38.565 N	103° 36' 20.158 W
RH 506H PBHL	12500.00	-10157.27	255.37	388352.88	766770.24	32° 3' 56.061 N	103° 36' 20.135 W

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target	
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		S31-T25S-R33E SL
2	1100.00	0.00	0.00	1100.00	0.00	0.00	0.00	0.00	0.00		300'FNL 1035'FEL
3	1383.34	4.25	12.37	1383.08	10.26	2.25	1.50	12.37	-10.20		S31-T25S-R33E FTP
4	11914.93	4.25	12.37	11885.71	772.62	169.49	0.00	0.00	-768.12		100'FNL 850'FEL
5	12856.38	90.00	179.60	12500.00	201.25	183.55	10.00	167.20	-196.57	RH 506H FTP	S6-T26S-R33E PBHL
6	23215.15	90.00	179.60	12500.00	-10157.27	255.37	0.00	0.00	10160.48	RH 506H PBHL	100'FSL 850'FEL

# Titan Directional Drilling

## Survey Report

<b>Company:</b> Kaiser-Francis Oil Company	<b>Local Co-ordinate Reference:</b> Well Red Hills 506H - Slot E
<b>Project:</b> Permian NM E'83	<b>TVD Reference:</b> est.GL+KB @ 3426.00usft (planning)
<b>Site:</b> Red Hills Pad 8	<b>MD Reference:</b> est.GL+KB @ 3426.00usft (planning)
<b>Well:</b> Red Hills 506H	<b>North Reference:</b> Grid
<b>Wellbore:</b> #506H OH	<b>Survey Calculation Method:</b> Minimum Curvature
<b>Design:</b> Plan #1	<b>Database:</b> EDM 5k-14

<b>Project</b> Permian NM E'83		
<b>Map System:</b> US State Plane 1983	<b>System Datum:</b> Mean Sea Level	
<b>Geo Datum:</b> North American Datum 1983		
<b>Map Zone:</b> New Mexico Eastern Zone	Using geodetic scale factor	

<b>Site</b> Red Hills Pad 8, Centered on 706H			
<b>Site Position:</b>	<b>Northing:</b> 398,509.21 usft	<b>Latitude:</b> 32° 5' 36.585 N	
<b>From:</b> Map	<b>Easting:</b> 766,434.78 usft	<b>Longitude:</b> 103° 36' 23.238 W	
<b>Position Uncertainty:</b> 0.00 usft	<b>Slot Radius:</b> 13-3/16 "	<b>Grid Convergence:</b> 0.39 °	

<b>Well</b> Red Hills 506H - Slot E					
<b>Well Position</b>	<b>+N/-S</b> 0.00 usft	<b>Northing:</b> 398,509.82 usft	<b>Latitude:</b> 32° 5' 36.586 N		
	<b>+E/-W</b> 0.00 usft	<b>Easting:</b> 766,514.88 usft	<b>Longitude:</b> 103° 36' 22.307 W		
<b>Position Uncertainty</b>	0.00 usft	<b>Wellhead Elevation:</b> usft	<b>Ground Level:</b> 3,400.20 usft		

<b>Wellbore</b> #506H OH					
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2020	11/26/20	6.62	59.79	47,470.41756803

<b>Design</b> Plan #1					
<b>Audit Notes:</b>					
<b>Version:</b>	<b>Phase:</b> PROTOTYPE	<b>Tie On Depth:</b> 0.00			
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>	
	0.00	0.00	0.00	178.56	

<b>Planned Survey</b>										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
860.00	0.00	0.00	860.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Rustler</b>										
950.00	0.00	0.00	950.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>13 3/8"</b>										
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,200.00	1.50	12.37	1,199.99	1.28	0.28	-1.27	1.50	1.50	0.00	0.00
1,200.01	1.50	12.37	1,200.00	1.28	0.28	-1.27	0.00	0.00	0.00	0.00
<b>Salado</b>										
1,300.00	3.00	12.37	1,299.91	5.11	1.12	-5.08	1.50	1.50	0.00	0.00
1,383.34	4.25	12.37	1,383.08	10.26	2.25	-10.20	1.50	1.50	0.00	0.00
1,400.00	4.25	12.37	1,399.69	11.47	2.52	-11.40	0.00	0.00	0.00	0.00
1,500.00	4.25	12.37	1,499.42	18.70	4.10	-18.60	0.00	0.00	0.00	0.00
1,600.00	4.25	12.37	1,599.14	25.94	5.69	-25.79	0.00	0.00	0.00	0.00
1,700.00	4.25	12.37	1,698.87	33.18	7.28	-32.99	0.00	0.00	0.00	0.00
1,800.00	4.25	12.37	1,798.59	40.42	8.87	-40.19	0.00	0.00	0.00	0.00

# Titan Directional Drilling

## Survey Report

<b>Company:</b>	Kaiser-Francis Oil Company	<b>Local Co-ordinate Reference:</b>	Well Red Hills 506H - Slot E
<b>Project:</b>	Permian NM E'83	<b>TVD Reference:</b>	est.GL+KB @ 3426.00usft (planning)
<b>Site:</b>	Red Hills Pad 8	<b>MD Reference:</b>	est.GL+KB @ 3426.00usft (planning)
<b>Well:</b>	Red Hills 506H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	#506H OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Plan #1	<b>Database:</b>	EDM 5k-14

### Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
1,900.00	4.25	12.37	1,898.32	47.66	10.46	-47.38	0.00	0.00	0.00
2,000.00	4.25	12.37	1,998.04	54.90	12.04	-54.58	0.00	0.00	0.00
2,001.96	4.25	12.37	2,000.00	55.04	12.07	-54.72	0.00	0.00	0.00
<b>Top of Salt</b>									
2,100.00	4.25	12.37	2,097.77	62.14	13.63	-61.78	0.00	0.00	0.00
2,200.00	4.25	12.37	2,197.49	69.38	15.22	-68.97	0.00	0.00	0.00
2,300.00	4.25	12.37	2,297.22	76.62	16.81	-76.17	0.00	0.00	0.00
2,400.00	4.25	12.37	2,396.94	83.85	18.40	-83.37	0.00	0.00	0.00
2,500.00	4.25	12.37	2,496.67	91.09	19.98	-90.56	0.00	0.00	0.00
2,600.00	4.25	12.37	2,596.39	98.33	21.57	-97.76	0.00	0.00	0.00
2,700.00	4.25	12.37	2,696.12	105.57	23.16	-104.96	0.00	0.00	0.00
2,800.00	4.25	12.37	2,795.84	112.81	24.75	-112.15	0.00	0.00	0.00
2,900.00	4.25	12.37	2,895.57	120.05	26.34	-119.35	0.00	0.00	0.00
3,000.00	4.25	12.37	2,995.29	127.29	27.92	-126.54	0.00	0.00	0.00
3,100.00	4.25	12.37	3,095.02	134.53	29.51	-133.74	0.00	0.00	0.00
3,200.00	4.25	12.37	3,194.74	141.76	31.10	-140.94	0.00	0.00	0.00
3,300.00	4.25	12.37	3,294.47	149.00	32.69	-148.13	0.00	0.00	0.00
3,400.00	4.25	12.37	3,394.19	156.24	34.28	-155.33	0.00	0.00	0.00
3,500.00	4.25	12.37	3,493.92	163.48	35.86	-162.53	0.00	0.00	0.00
3,600.00	4.25	12.37	3,593.64	170.72	37.45	-169.72	0.00	0.00	0.00
3,700.00	4.25	12.37	3,693.37	177.96	39.04	-176.92	0.00	0.00	0.00
3,800.00	4.25	12.37	3,793.09	185.20	40.63	-184.12	0.00	0.00	0.00
3,900.00	4.25	12.37	3,892.82	192.44	42.22	-191.31	0.00	0.00	0.00
4,000.00	4.25	12.37	3,992.54	199.68	43.80	-198.51	0.00	0.00	0.00
4,100.00	4.25	12.37	4,092.27	206.91	45.39	-205.71	0.00	0.00	0.00
4,200.00	4.25	12.37	4,191.99	214.15	46.98	-212.90	0.00	0.00	0.00
4,300.00	4.25	12.37	4,291.72	221.39	48.57	-220.10	0.00	0.00	0.00
4,400.00	4.25	12.37	4,391.44	228.63	50.16	-227.30	0.00	0.00	0.00
4,458.72	4.25	12.37	4,450.00	232.88	51.09	-231.52	0.00	0.00	0.00
<b>Base of Salt</b>									
4,500.00	4.25	12.37	4,491.17	235.87	51.74	-234.49	0.00	0.00	0.00
4,600.00	4.25	12.37	4,590.89	243.11	53.33	-241.69	0.00	0.00	0.00
4,700.00	4.25	12.37	4,690.62	250.35	54.92	-248.89	0.00	0.00	0.00
4,759.54	4.25	12.37	4,750.00	254.66	55.87	-253.17	0.00	0.00	0.00
<b>Lamar</b>									
4,800.00	4.25	12.37	4,790.34	257.59	56.51	-256.08	0.00	0.00	0.00
4,879.87	4.25	12.37	4,870.00	263.37	57.78	-261.83	0.00	0.00	0.00
<b>Bell Canyon</b>									
4,900.00	4.25	12.37	4,890.07	264.82	58.10	-263.28	0.00	0.00	0.00
5,000.00	4.25	12.37	4,989.79	272.06	59.68	-270.48	0.00	0.00	0.00
5,100.00	4.25	12.37	5,089.52	279.30	61.27	-277.67	0.00	0.00	0.00
5,200.00	4.25	12.37	5,189.24	286.54	62.86	-284.87	0.00	0.00	0.00
5,300.00	4.25	12.37	5,288.97	293.78	64.45	-292.07	0.00	0.00	0.00
5,400.00	4.25	12.37	5,388.69	301.02	66.04	-299.26	0.00	0.00	0.00

# Titan Directional Drilling

## Survey Report

<b>Company:</b>	Kaiser-Francis Oil Company	<b>Local Co-ordinate Reference:</b>	Well Red Hills 506H - Slot E
<b>Project:</b>	Permian NM E'83	<b>TVD Reference:</b>	est.GL+KB @ 3426.00usft (planning)
<b>Site:</b>	Red Hills Pad 8	<b>MD Reference:</b>	est.GL+KB @ 3426.00usft (planning)
<b>Well:</b>	Red Hills 506H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	#506H OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Plan #1	<b>Database:</b>	EDM 5k-14

### Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,500.00	4.25	12.37	5,488.42	308.26	67.62	-306.46	0.00	0.00	0.00
5,600.00	4.25	12.37	5,588.15	315.50	69.21	-313.66	0.00	0.00	0.00
5,700.00	4.25	12.37	5,687.87	322.73	70.80	-320.85	0.00	0.00	0.00
5,800.00	4.25	12.37	5,787.60	329.97	72.39	-328.05	0.00	0.00	0.00
5,872.60	4.25	12.37	5,860.00	335.23	73.54	-333.28	0.00	0.00	0.00
<b>Cherry Canyon</b>									
5,900.00	4.25	12.37	5,887.32	337.21	73.98	-335.25	0.00	0.00	0.00
6,000.00	4.25	12.37	5,987.05	344.45	75.56	-342.44	0.00	0.00	0.00
6,100.00	4.25	12.37	6,086.77	351.69	77.15	-349.64	0.00	0.00	0.00
6,200.00	4.25	12.37	6,186.50	358.93	78.74	-356.84	0.00	0.00	0.00
6,300.00	4.25	12.37	6,286.22	366.17	80.33	-364.03	0.00	0.00	0.00
6,400.00	4.25	12.37	6,385.95	373.41	81.92	-371.23	0.00	0.00	0.00
6,500.00	4.25	12.37	6,485.67	380.65	83.50	-378.43	0.00	0.00	0.00
6,600.00	4.25	12.37	6,585.40	387.88	85.09	-385.62	0.00	0.00	0.00
6,700.00	4.25	12.37	6,685.12	395.12	86.68	-392.82	0.00	0.00	0.00
6,800.00	4.25	12.37	6,784.85	402.36	88.27	-400.02	0.00	0.00	0.00
6,900.00	4.25	12.37	6,884.57	409.60	89.86	-407.21	0.00	0.00	0.00
7,000.00	4.25	12.37	6,984.30	416.84	91.44	-414.41	0.00	0.00	0.00
7,100.00	4.25	12.37	7,084.02	424.08	93.03	-421.61	0.00	0.00	0.00
7,200.00	4.25	12.37	7,183.75	431.32	94.62	-428.80	0.00	0.00	0.00
7,300.00	4.25	12.37	7,283.47	438.56	96.21	-436.00	0.00	0.00	0.00
7,400.00	4.25	12.37	7,383.20	445.79	97.80	-443.20	0.00	0.00	0.00
7,500.00	4.25	12.37	7,482.92	453.03	99.38	-450.39	0.00	0.00	0.00
7,600.00	4.25	12.37	7,582.65	460.27	100.97	-457.59	0.00	0.00	0.00
7,700.00	4.25	12.37	7,682.37	467.51	102.56	-464.79	0.00	0.00	0.00
7,800.00	4.25	12.37	7,782.10	474.75	104.15	-471.98	0.00	0.00	0.00
7,900.00	4.25	12.37	7,881.82	481.99	105.74	-479.18	0.00	0.00	0.00
8,000.00	4.25	12.37	7,981.55	489.23	107.32	-486.38	0.00	0.00	0.00
8,100.00	4.25	12.37	8,081.27	496.47	108.91	-493.57	0.00	0.00	0.00
8,200.00	4.25	12.37	8,181.00	503.71	110.50	-500.77	0.00	0.00	0.00
8,300.00	4.25	12.37	8,280.72	510.94	112.09	-507.97	0.00	0.00	0.00
8,400.00	4.25	12.37	8,380.45	518.18	113.68	-515.16	0.00	0.00	0.00
8,500.00	4.25	12.37	8,480.17	525.42	115.26	-522.36	0.00	0.00	0.00
8,600.00	4.25	12.37	8,579.90	532.66	116.85	-529.56	0.00	0.00	0.00
8,620.16	4.25	12.37	8,600.00	534.12	117.17	-531.01	0.00	0.00	0.00
<b>Brushy Canyon</b>									
8,700.00	4.25	12.37	8,679.62	539.90	118.44	-536.75	0.00	0.00	0.00
8,800.00	4.25	12.37	8,779.35	547.14	120.03	-543.95	0.00	0.00	0.00
8,820.71	4.25	12.37	8,800.00	548.64	120.36	-545.44	0.00	0.00	0.00
<b>Lwr Brushy Canyon</b>									
8,900.00	4.25	12.37	8,879.07	554.38	121.62	-551.15	0.00	0.00	0.00
9,000.00	4.25	12.37	8,978.80	561.62	123.20	-558.34	0.00	0.00	0.00
9,031.29	4.25	12.37	9,010.00	563.88	123.70	-560.59	0.00	0.00	0.00
<b>Avalon</b>									

# Titan Directional Drilling

## Survey Report

<b>Company:</b>	Kaiser-Francis Oil Company	<b>Local Co-ordinate Reference:</b>	Well Red Hills 506H - Slot E
<b>Project:</b>	Permian NM E'83	<b>TVD Reference:</b>	est.GL+KB @ 3426.00usft (planning)
<b>Site:</b>	Red Hills Pad 8	<b>MD Reference:</b>	est.GL+KB @ 3426.00usft (planning)
<b>Well:</b>	Red Hills 506H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	#506H OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Plan #1	<b>Database:</b>	EDM 5k-14

### Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
9,100.00	4.25	12.37	9,078.52	568.85	124.79	-565.54	0.00	0.00	0.00
9,200.00	4.25	12.37	9,178.25	576.09	126.38	-572.73	0.00	0.00	0.00
9,300.00	4.25	12.37	9,277.97	583.33	127.97	-579.93	0.00	0.00	0.00
9,400.00	4.25	12.37	9,377.70	590.57	129.56	-587.13	0.00	0.00	0.00
9,500.00	4.25	12.37	9,477.42	597.81	131.14	-594.32	0.00	0.00	0.00
9,600.00	4.25	12.37	9,577.15	605.05	132.73	-601.52	0.00	0.00	0.00
9,700.00	4.25	12.37	9,676.87	612.29	134.32	-608.72	0.00	0.00	0.00
9,800.00	4.25	12.37	9,776.60	619.53	135.91	-615.91	0.00	0.00	0.00
9,900.00	4.25	12.37	9,876.32	626.76	137.50	-623.11	0.00	0.00	0.00
9,973.88	4.25	12.37	9,950.00	632.11	138.67	-628.43	0.00	0.00	0.00
<b>1 BSS</b>									
10,000.00	4.25	12.37	9,976.05	634.00	139.08	-630.31	0.00	0.00	0.00
10,100.00	4.25	12.37	10,075.77	641.24	140.67	-637.50	0.00	0.00	0.00
10,200.00	4.25	12.37	10,175.50	648.48	142.26	-644.70	0.00	0.00	0.00
10,300.00	4.25	12.37	10,275.22	655.72	143.85	-651.90	0.00	0.00	0.00
10,400.00	4.25	12.37	10,374.95	662.96	145.44	-659.09	0.00	0.00	0.00
10,500.00	4.25	12.37	10,474.67	670.20	147.02	-666.29	0.00	0.00	0.00
10,535.43	4.25	12.37	10,510.00	672.76	147.59	-668.84	0.00	0.00	0.00
<b>2 BSS</b>									
10,600.00	4.25	12.37	10,574.40	677.44	148.61	-673.49	0.00	0.00	0.00
10,700.00	4.25	12.37	10,674.12	684.68	150.20	-680.68	0.00	0.00	0.00
10,800.00	4.25	12.37	10,773.85	691.91	151.79	-687.88	0.00	0.00	0.00
10,900.00	4.25	12.37	10,873.57	699.15	153.38	-695.08	0.00	0.00	0.00
10,976.64	4.25	12.37	10,950.00	704.70	154.59	-700.59	0.00	0.00	0.00
<b>3 BSL</b>									
11,000.00	4.25	12.37	10,973.30	706.39	154.96	-702.27	0.00	0.00	0.00
11,100.00	4.25	12.37	11,073.02	713.63	156.55	-709.47	0.00	0.00	0.00
11,200.00	4.25	12.37	11,172.75	720.87	158.14	-716.67	0.00	0.00	0.00
11,300.00	4.25	12.37	11,272.47	728.11	159.73	-723.86	0.00	0.00	0.00
11,400.00	4.25	12.37	11,372.20	735.35	161.32	-731.06	0.00	0.00	0.00
11,500.00	4.25	12.37	11,471.92	742.59	162.90	-738.26	0.00	0.00	0.00
11,600.00	4.25	12.37	11,571.65	749.82	164.49	-745.45	0.00	0.00	0.00
11,700.00	4.25	12.37	11,671.37	757.06	166.08	-752.65	0.00	0.00	0.00
11,713.67	4.25	12.37	11,685.00	758.05	166.30	-753.63	0.00	0.00	0.00
<b>3 BSS</b>									
11,800.00	4.25	12.37	11,771.10	764.30	167.67	-759.85	0.00	0.00	0.00
11,814.95	4.25	12.37	11,786.00	765.38	167.91	-760.92	0.00	0.00	0.00
<b>7 5/8"</b>									
11,900.00	4.25	12.37	11,870.82	771.54	169.26	-767.04	0.00	0.00	0.00
11,914.93	4.25	12.37	11,885.71	772.62	169.49	-768.12	0.00	0.00	0.00
11,950.00	1.14	55.46	11,920.74	774.09	170.06	-769.57	10.00	-8.88	122.87
12,000.00	4.46	167.45	11,970.69	772.47	170.89	-767.93	10.00	6.65	223.98
12,050.00	9.41	173.91	12,020.31	766.50	171.75	-761.95	10.00	9.89	12.93
12,100.00	14.39	175.93	12,069.22	756.24	172.62	-751.66	10.00	9.97	4.04

# Titan Directional Drilling

## Survey Report

<b>Company:</b>	Kaiser-Francis Oil Company	<b>Local Co-ordinate Reference:</b>	Well Red Hills 506H - Slot E
<b>Project:</b>	Permian NM E'83	<b>TVD Reference:</b>	est.GL+KB @ 3426.00usft (planning)
<b>Site:</b>	Red Hills Pad 8	<b>MD Reference:</b>	est.GL+KB @ 3426.00usft (planning)
<b>Well:</b>	Red Hills 506H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	#506H OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Plan #1	<b>Database:</b>	EDM 5k-14

### Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
12,100.81	14.47	175.95	12,070.00	756.04	172.64	-751.46	10.00	9.98	2.64
<b>Wolfcamp</b>									
12,150.00	19.38	176.93	12,117.05	741.74	173.51	-737.15	10.00	9.98	1.98
12,200.00	24.38	177.53	12,163.43	723.14	174.40	-718.52	10.00	9.99	1.20
12,250.00	29.38	177.93	12,208.02	700.56	175.29	-695.93	10.00	9.99	0.81
12,300.00	34.37	178.23	12,250.46	674.18	176.17	-669.54	10.00	10.00	0.59
12,350.00	39.37	178.46	12,290.45	644.20	177.03	-639.55	10.00	10.00	0.46
12,400.00	44.37	178.64	12,327.67	610.85	177.88	-606.18	10.00	10.00	0.37
12,450.00	49.37	178.80	12,361.84	574.38	178.69	-569.71	10.00	10.00	0.31
12,500.00	54.37	178.93	12,392.71	535.07	179.47	-530.39	10.00	10.00	0.27
12,550.00	59.37	179.05	12,420.03	493.22	180.21	-488.53	10.00	10.00	0.23
12,600.00	64.37	179.15	12,443.60	449.15	180.90	-444.46	10.00	10.00	0.21
12,650.00	69.36	179.25	12,463.24	403.19	181.54	-398.50	10.00	10.00	0.19
12,700.00	74.36	179.34	12,478.79	355.69	182.13	-351.00	10.00	10.00	0.18
12,750.00	79.36	179.43	12,490.15	307.01	182.65	-302.33	10.00	10.00	0.17
12,800.00	84.36	179.51	12,497.23	257.54	183.11	-252.85	10.00	10.00	0.17
12,850.00	89.36	179.59	12,499.96	207.63	183.50	-202.95	10.00	10.00	0.16
12,856.38	90.00	179.60	12,500.00	201.25	183.55	-196.57	10.00	10.00	0.16
12,900.00	90.00	179.60	12,500.00	157.63	183.85	-152.96	0.00	0.00	0.00
13,000.00	90.00	179.60	12,500.00	57.63	184.54	-52.98	0.00	0.00	0.00
13,100.00	90.00	179.60	12,500.00	-42.37	185.24	47.01	0.00	0.00	0.00
13,200.00	90.00	179.60	12,500.00	-142.36	185.93	146.99	0.00	0.00	0.00
13,300.00	90.00	179.60	12,500.00	-242.36	186.62	246.97	0.00	0.00	0.00
13,400.00	90.00	179.60	12,500.00	-342.36	187.32	346.96	0.00	0.00	0.00
13,500.00	90.00	179.60	12,500.00	-442.36	188.01	446.94	0.00	0.00	0.00
13,600.00	90.00	179.60	12,500.00	-542.35	188.70	546.93	0.00	0.00	0.00
13,700.00	90.00	179.60	12,500.00	-642.35	189.40	646.91	0.00	0.00	0.00
13,800.00	90.00	179.60	12,500.00	-742.35	190.09	746.89	0.00	0.00	0.00
13,900.00	90.00	179.60	12,500.00	-842.35	190.78	846.88	0.00	0.00	0.00
14,000.00	90.00	179.60	12,500.00	-942.34	191.48	946.86	0.00	0.00	0.00
14,100.00	90.00	179.60	12,500.00	-1,042.34	192.17	1,046.84	0.00	0.00	0.00
14,200.00	90.00	179.60	12,500.00	-1,142.34	192.86	1,146.83	0.00	0.00	0.00
14,300.00	90.00	179.60	12,500.00	-1,242.34	193.56	1,246.81	0.00	0.00	0.00
14,400.00	90.00	179.60	12,500.00	-1,342.33	194.25	1,346.79	0.00	0.00	0.00
14,500.00	90.00	179.60	12,500.00	-1,442.33	194.94	1,446.78	0.00	0.00	0.00
14,600.00	90.00	179.60	12,500.00	-1,542.33	195.64	1,546.76	0.00	0.00	0.00
14,700.00	90.00	179.60	12,500.00	-1,642.33	196.33	1,646.74	0.00	0.00	0.00
14,800.00	90.00	179.60	12,500.00	-1,742.33	197.02	1,746.73	0.00	0.00	0.00
14,900.00	90.00	179.60	12,500.00	-1,842.32	197.72	1,846.71	0.00	0.00	0.00
15,000.00	90.00	179.60	12,500.00	-1,942.32	198.41	1,946.69	0.00	0.00	0.00
15,100.00	90.00	179.60	12,500.00	-2,042.32	199.10	2,046.68	0.00	0.00	0.00
15,200.00	90.00	179.60	12,500.00	-2,142.32	199.80	2,146.66	0.00	0.00	0.00
15,300.00	90.00	179.60	12,500.00	-2,242.31	200.49	2,246.64	0.00	0.00	0.00
15,400.00	90.00	179.60	12,500.00	-2,342.31	201.18	2,346.63	0.00	0.00	0.00

# Titan Directional Drilling

## Survey Report

<b>Company:</b>	Kaiser-Francis Oil Company	<b>Local Co-ordinate Reference:</b>	Well Red Hills 506H - Slot E
<b>Project:</b>	Permian NM E'83	<b>TVD Reference:</b>	est.GL+KB @ 3426.00usft (planning)
<b>Site:</b>	Red Hills Pad 8	<b>MD Reference:</b>	est.GL+KB @ 3426.00usft (planning)
<b>Well:</b>	Red Hills 506H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	#506H OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Plan #1	<b>Database:</b>	EDM 5k-14

### Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
15,500.00	90.00	179.60	12,500.00	-2,442.31	201.88	2,446.61	0.00	0.00	0.00
15,600.00	90.00	179.60	12,500.00	-2,542.31	202.57	2,546.59	0.00	0.00	0.00
15,700.00	90.00	179.60	12,500.00	-2,642.30	203.26	2,646.58	0.00	0.00	0.00
15,800.00	90.00	179.60	12,500.00	-2,742.30	203.96	2,746.56	0.00	0.00	0.00
15,900.00	90.00	179.60	12,500.00	-2,842.30	204.65	2,846.54	0.00	0.00	0.00
16,000.00	90.00	179.60	12,500.00	-2,942.30	205.34	2,946.53	0.00	0.00	0.00
16,100.00	90.00	179.60	12,500.00	-3,042.29	206.04	3,046.51	0.00	0.00	0.00
16,200.00	90.00	179.60	12,500.00	-3,142.29	206.73	3,146.49	0.00	0.00	0.00
16,300.00	90.00	179.60	12,500.00	-3,242.29	207.42	3,246.48	0.00	0.00	0.00
16,400.00	90.00	179.60	12,500.00	-3,342.29	208.12	3,346.46	0.00	0.00	0.00
16,500.00	90.00	179.60	12,500.00	-3,442.28	208.81	3,446.44	0.00	0.00	0.00
16,600.00	90.00	179.60	12,500.00	-3,542.28	209.50	3,546.43	0.00	0.00	0.00
16,700.00	90.00	179.60	12,500.00	-3,642.28	210.20	3,646.41	0.00	0.00	0.00
16,800.00	90.00	179.60	12,500.00	-3,742.28	210.89	3,746.40	0.00	0.00	0.00
16,900.00	90.00	179.60	12,500.00	-3,842.27	211.58	3,846.38	0.00	0.00	0.00
17,000.00	90.00	179.60	12,500.00	-3,942.27	212.28	3,946.36	0.00	0.00	0.00
17,100.00	90.00	179.60	12,500.00	-4,042.27	212.97	4,046.35	0.00	0.00	0.00
17,200.00	90.00	179.60	12,500.00	-4,142.27	213.66	4,146.33	0.00	0.00	0.00
17,300.00	90.00	179.60	12,500.00	-4,242.26	214.36	4,246.31	0.00	0.00	0.00
17,400.00	90.00	179.60	12,500.00	-4,342.26	215.05	4,346.30	0.00	0.00	0.00
17,500.00	90.00	179.60	12,500.00	-4,442.26	215.74	4,446.28	0.00	0.00	0.00
17,600.00	90.00	179.60	12,500.00	-4,542.26	216.44	4,546.26	0.00	0.00	0.00
17,700.00	90.00	179.60	12,500.00	-4,642.26	217.13	4,646.25	0.00	0.00	0.00
17,800.00	90.00	179.60	12,500.00	-4,742.25	217.82	4,746.23	0.00	0.00	0.00
17,900.00	90.00	179.60	12,500.00	-4,842.25	218.52	4,846.21	0.00	0.00	0.00
18,000.00	90.00	179.60	12,500.00	-4,942.25	219.21	4,946.20	0.00	0.00	0.00
18,100.00	90.00	179.60	12,500.00	-5,042.25	219.90	5,046.18	0.00	0.00	0.00
18,200.00	90.00	179.60	12,500.00	-5,142.24	220.60	5,146.16	0.00	0.00	0.00
18,300.00	90.00	179.60	12,500.00	-5,242.24	221.29	5,246.15	0.00	0.00	0.00
18,400.00	90.00	179.60	12,500.00	-5,342.24	221.98	5,346.13	0.00	0.00	0.00
18,500.00	90.00	179.60	12,500.00	-5,442.24	222.68	5,446.11	0.00	0.00	0.00
18,600.00	90.00	179.60	12,500.00	-5,542.23	223.37	5,546.10	0.00	0.00	0.00
18,700.00	90.00	179.60	12,500.00	-5,642.23	224.06	5,646.08	0.00	0.00	0.00
18,800.00	90.00	179.60	12,500.00	-5,742.23	224.76	5,746.06	0.00	0.00	0.00
18,900.00	90.00	179.60	12,500.00	-5,842.23	225.45	5,846.05	0.00	0.00	0.00
19,000.00	90.00	179.60	12,500.00	-5,942.22	226.14	5,946.03	0.00	0.00	0.00
19,100.00	90.00	179.60	12,500.00	-6,042.22	226.84	6,046.01	0.00	0.00	0.00
19,200.00	90.00	179.60	12,500.00	-6,142.22	227.53	6,146.00	0.00	0.00	0.00
19,300.00	90.00	179.60	12,500.00	-6,242.22	228.22	6,245.98	0.00	0.00	0.00
19,400.00	90.00	179.60	12,500.00	-6,342.21	228.92	6,345.96	0.00	0.00	0.00
19,500.00	90.00	179.60	12,500.00	-6,442.21	229.61	6,445.95	0.00	0.00	0.00
19,600.00	90.00	179.60	12,500.00	-6,542.21	230.30	6,545.93	0.00	0.00	0.00
19,700.00	90.00	179.60	12,500.00	-6,642.21	231.00	6,645.91	0.00	0.00	0.00

# Titan Directional Drilling

## Survey Report

<b>Company:</b>	Kaiser-Francis Oil Company	<b>Local Co-ordinate Reference:</b>	Well Red Hills 506H - Slot E
<b>Project:</b>	Permian NM E'83	<b>TVD Reference:</b>	est.GL+KB @ 3426.00usft (planning)
<b>Site:</b>	Red Hills Pad 8	<b>MD Reference:</b>	est.GL+KB @ 3426.00usft (planning)
<b>Well:</b>	Red Hills 506H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	#506H OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Plan #1	<b>Database:</b>	EDM 5k-14

### Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
19,800.00	90.00	179.60	12,500.00	-6,742.20	231.69	6,745.90	0.00	0.00	0.00
19,900.00	90.00	179.60	12,500.00	-6,842.20	232.38	6,845.88	0.00	0.00	0.00
20,000.00	90.00	179.60	12,500.00	-6,942.20	233.08	6,945.87	0.00	0.00	0.00
20,100.00	90.00	179.60	12,500.00	-7,042.20	233.77	7,045.85	0.00	0.00	0.00
20,200.00	90.00	179.60	12,500.00	-7,142.20	234.46	7,145.83	0.00	0.00	0.00
20,300.00	90.00	179.60	12,500.00	-7,242.19	235.16	7,245.82	0.00	0.00	0.00
20,400.00	90.00	179.60	12,500.00	-7,342.19	235.85	7,345.80	0.00	0.00	0.00
20,500.00	90.00	179.60	12,500.00	-7,442.19	236.54	7,445.78	0.00	0.00	0.00
20,600.00	90.00	179.60	12,500.00	-7,542.19	237.24	7,545.77	0.00	0.00	0.00
20,700.00	90.00	179.60	12,500.00	-7,642.18	237.93	7,645.75	0.00	0.00	0.00
20,800.00	90.00	179.60	12,500.00	-7,742.18	238.62	7,745.73	0.00	0.00	0.00
20,900.00	90.00	179.60	12,500.00	-7,842.18	239.32	7,845.72	0.00	0.00	0.00
21,000.00	90.00	179.60	12,500.00	-7,942.18	240.01	7,945.70	0.00	0.00	0.00
21,100.00	90.00	179.60	12,500.00	-8,042.17	240.70	8,045.68	0.00	0.00	0.00
21,200.00	90.00	179.60	12,500.00	-8,142.17	241.40	8,145.67	0.00	0.00	0.00
21,300.00	90.00	179.60	12,500.00	-8,242.17	242.09	8,245.65	0.00	0.00	0.00
21,400.00	90.00	179.60	12,500.00	-8,342.17	242.78	8,345.63	0.00	0.00	0.00
21,500.00	90.00	179.60	12,500.00	-8,442.16	243.48	8,445.62	0.00	0.00	0.00
21,600.00	90.00	179.60	12,500.00	-8,542.16	244.17	8,545.60	0.00	0.00	0.00
21,700.00	90.00	179.60	12,500.00	-8,642.16	244.86	8,645.58	0.00	0.00	0.00
21,800.00	90.00	179.60	12,500.00	-8,742.16	245.56	8,745.57	0.00	0.00	0.00
21,900.00	90.00	179.60	12,500.00	-8,842.15	246.25	8,845.55	0.00	0.00	0.00
22,000.00	90.00	179.60	12,500.00	-8,942.15	246.94	8,945.53	0.00	0.00	0.00
22,100.00	90.00	179.60	12,500.00	-9,042.15	247.64	9,045.52	0.00	0.00	0.00
22,200.00	90.00	179.60	12,500.00	-9,142.15	248.33	9,145.50	0.00	0.00	0.00
22,300.00	90.00	179.60	12,500.00	-9,242.14	249.02	9,245.48	0.00	0.00	0.00
22,400.00	90.00	179.60	12,500.00	-9,342.14	249.72	9,345.47	0.00	0.00	0.00
22,500.00	90.00	179.60	12,500.00	-9,442.14	250.41	9,445.45	0.00	0.00	0.00
22,600.00	90.00	179.60	12,500.00	-9,542.14	251.10	9,545.43	0.00	0.00	0.00
22,700.00	90.00	179.60	12,500.00	-9,642.14	251.80	9,645.42	0.00	0.00	0.00
22,800.00	90.00	179.60	12,500.00	-9,742.13	252.49	9,745.40	0.00	0.00	0.00
22,900.00	90.00	179.60	12,500.00	-9,842.13	253.18	9,845.38	0.00	0.00	0.00
23,000.00	90.00	179.60	12,500.00	-9,942.13	253.88	9,945.37	0.00	0.00	0.00
23,100.00	90.00	179.60	12,500.00	-10,042.13	254.57	10,045.35	0.00	0.00	0.00
23,200.00	90.00	179.60	12,500.00	-10,142.12	255.26	10,145.34	0.00	0.00	0.00
23,215.15	90.00	179.60	12,500.00	-10,157.27	255.37	10,160.48	0.00	0.00	0.00

# Titan Directional Drilling

## Survey Report

<b>Company:</b>	Kaiser-Francis Oil Company	<b>Local Co-ordinate Reference:</b>	Well Red Hills 506H - Slot E
<b>Project:</b>	Permian NM E'83	<b>TVD Reference:</b>	est.GL+KB @ 3426.00usft (planning)
<b>Site:</b>	Red Hills Pad 8	<b>MD Reference:</b>	est.GL+KB @ 3426.00usft (planning)
<b>Well:</b>	Red Hills 506H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	#506H OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Plan #1	<b>Database:</b>	EDM 5k-14

Casing Points					
	Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
	950.00	950.00	13 3/8"	13-3/8	17-1/2
	11,814.95	11,786.00	7 5/8"	7-5/8	9-7/8

Formations						
	Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
	860.00	860.00	Rustler			
	1,200.01	1,200.00	Salado			
	2,001.96	2,000.00	Top of Salt			
	4,458.72	4,450.00	Base of Salt			
	4,759.54	4,750.00	Lamar			
	4,879.87	4,870.00	Bell Canyon			
	5,872.60	5,860.00	Cherry Canyon			
	8,620.16	8,600.00	Brushy Canyon			
	8,820.71	8,800.00	Lwr Brushy Canyon			
	9,031.29	9,010.00	Avalon			
	9,973.88	9,950.00	1 BSS			
	10,535.43	10,510.00	2 BSS			
	10,976.64	10,950.00	3 BSL			
	11,713.67	11,685.00	3 BSS			
	12,100.81	12,070.00	Wolfcamp			