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DISTRICT II-ARTESIA O.C.D.

Carlsbad Field Office
OCD Artesia

Form 3160-3
(June 2015)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

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

5. Lease Serial No.
NMNM114354

6. If Indian, Allotee or Tribe Name

1a. Type of work: ☑ DRILL ☐ REENTER

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

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

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

8. Lease Name and Well No.
CRAZY HORSE 0304 FED COM
4H 322439

2. Name of Operator
CL&F RESOURCES LP 370951

9. API Well No.
30-015-45241

3a. Address
16945 Northchase Drive #500 Houston TX 77060

3b. Phone No. *(include area code)*
(281)873-3013 96088

10. Field and Pool, or Exploratory
~~PARKWAY~~ / BONE SPRING Galena Canyon

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*
At surface NWNE / 430 FNL / 2135 FEL / LAT 32.608469 / LONG -103.992511
At proposed prod. zone SENE / 1927 FNL / 330 FEL / LAT 32.604292 / LONG -103.95236

11. Sec., T. R. M. or Blk. and Survey or Area
SEC 5 / T20S / R30E / NMP

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

12. County or Parish

13. State

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any)	16. No of acres in lease	17. Spacing Unit dedicated to this well
430 feet	599.68	320
18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft.	**19. Proposed Depth**	**20. BLM/BIA Bond No. in file**
30 feet	8471 feet / 19296 feet	FED: NMB001314
21. Elevations (Show whether DF, KDB, RT, GL, etc.)	**22. Approximate date work will start***	**23. Estimated duration**
3248 feet	03/01/2018	90 days

24. Attachments

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

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

25. Signature	Name *(Printed/Typed)*	Date
(Electronic Submission)	Brian Wood / Ph: (505)466-8120	02/02/2018
Title: President		
Approved by *(Signature)*	Name *(Printed/Typed)*	Date
(Electronic Submission)	Cody Layton / Ph: (575)234-5959	08/23/2018
Title: Assistant Field Manager Lands & Minerals	Office: CARLSBAD	

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

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

APPROVED WITH CONDITIONS

(Continued on page 2)

*(Instructions on page 2)

Approval Date: 08/23/2018 RWP 9-14-18.

INSTRUCTIONS

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

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

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

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

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

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

ITEM 24: If the proposal will involve hydraulic fracturing operations, you must comply with 43 CFR 3162.3-3, including providing information about the protection of usable water. Operators should provide the best available information about all formations containing water and their depths. This information could include data and interpretation of resistivity logs run on nearby wells. Information may also be obtained from state or tribal regulatory agencies and from local BLM offices.

NOTICES

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

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

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

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Additional Operator Remarks

Location of Well

1. SHL: NWNE / 430 FNL / 2135 FEL / TWSP: 20S / RANGE: 30E / SECTION: 5 / LAT: 32.608469 / LONG: -103.992511 (TVD: 0 feet, MD: 0 feet)
   PPP: SENE / 1911 FNL / 1320 FEL / TWSP: 20S / RANGE: 30E / SECTION: 4 / LAT: 32.604318 / LONG: -103.972786 (TVD: 8400 feet, MD: 13019 feet)
   PPP: SWNW / 1911 FNL / 0 FWL / TWSP: 20S / RANGE: 30E / SECTION: 3 / LAT: 32.604315 / LONG: -103.968525 (TVD: 8415 feet, MD: 14337 feet)
   PPP: SENW / 1911 FNL / 1320 FWL / TWSP: 20S / RANGE: 30E / SECTION: 4 / LAT: 32.60434 / LONG: -103.98139 (TVD: 8370 feet, MD: 10357 feet)
   PPP: NWNE / 430 FNL / 2135 FEL / TWSP: 20S / RANGE: 30E / SECTION: 5 / LAT: 32.608469 / LONG: -103.992511 (TVD: 0 feet, MD: 0 feet)
   PPP: SWNW / 1695 FNL / 0 FWL / TWSP: 20S / RANGE: 30E / SECTION: 4 / LAT: 32.604932 / LONG: -103.985663 (TVD: 8320 feet, MD: 8982 feet)
   BHL: SENE / 1927 FNL / 330 FEL / TWSP: 20S / RANGE: 30E / SECTION: 3 / LAT: 32.604292 / LONG: -103.95236 (TVD: 8471 feet, MD: 19296 feet)

BLM Point of Contact

Name: Katrina Ponder
Title: Geologist
Phone: 5752345969
Email: kponder@blm.gov

Approval Date: 08/23/2018

Review and Appeal Rights

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

PECOS DISTRICT DRILLING
CONDITIONS OF APPROVAL

OPERATOR'S NAME:	**CL&F Operating LLC**
LEASE NO.:	**NMNM-114354**
WELL NAME & NO.:	**Crazy Horse 0304 Fed Com 4H**
SURFACE HOLE FOOTAGE:	**0430' FNL & 2135' FEL**
BOTTOM HOLE FOOTAGE	**1927' FNL & 0330' FEL Sec. 03, T. 20 S., R 30 E.**
LOCATION:	**Section 05, T. 20 S., R 30 E., NMPM**
COUNTY:	**County, New Mexico**

Communitization Agreement

- The operator will submit a Communitization Agreement to the Carlsbad Field Office, 620 E Greene St. Carlsbad, New Mexico 88220, at least 90 days before the anticipated date of first production from a well subject to a spacing order issued by the New Mexico Oil Conservation Division. The Communitization Agreement will include the signatures of all working interest owners in all Federal and Indian leases subject to the Communitization Agreement (i.e., operating rights owners and lessees of record), or certification that the operator has obtained the written signatures of all such owners and will make those signatures available to the BLM immediately upon request.
- If the operator does not comply with this condition of approval, the BLM may take enforcement actions that include, but are not limited to, those specified in 43 CFR 3163.1.
- In addition, the well sign shall include the surface and bottom hole lease numbers. When the Communitization Agreement number is known, it shall also be on the sign

A. DRILLING OPERATIONS 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

1. **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.**

2. Unless the production casing has been run and cemented or the well has been properly plugged, the drilling rig shall not be removed from over the hole without prior approval. **If the drilling rig is removed without approval – an Incident of Non-Compliance will be written and will be a "Major" violation.**

3. Floor controls are required for 3M or Greater systems. These controls will be on the rig floor, unobstructed, readily accessible to the driller and will be operational at all times during drilling and/or completion activities. Rig floor is defined as the area immediately around the rotary table; the area immediately above the substructure on which the draw works is located, this does not include the dog house or stairway area.

4. **The record of the drilling rate along with the GR/N well log run from TD to surface (horizontal well – vertical portion of hole) shall be 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.**

B. CASING

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.

Centralizers required on surface casing per Onshore Order 2.III.B.1.f.

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.

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.

No pea gravel permitted for remedial or fall back remedial without prior authorization from the BLM engineer.

R-111- P Potash
High Cave/Karst
Capitan Reef
Possibility of water flows in the Artesia Group and Salado.
Possibility of lost circulation in the Artesia Group, Rustler, Capitan Reef, and Delaware.

A MINIMUM OF TWO CASING STRINGS CEMENTED TO SURFACE IS REQUIRED IN HIGH CAVE/KARST AREAS. THE CEMENT MUST BE IN A SOLID SHEATH. THEREFORE, ONE INCH OPERATIONS ARE NOT SUFFICIENT TO PROTECT CAVE KARST RESOURCES. A CASING DESIGN THAT HAS A ONE INCH JOB PERFORMED DOES NOT COUNT AS A SOLID SHEATH.

1. The **20** inch surface casing shall be set at approximately **350** feet (a minimum of 25 feet into the Rustler Anhydrite and above the salt) and cemented to the surface. **If salt is encountered, set casing at least 25 feet above the salt.**

    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 is to include the lead cement slurry.**

    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 **13-3/8** inch intermediate casing is:

☐ Cement to surface. If cement does not circulate see B.1.a, c-d above. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to Potash.**

3. The minimum required fill of cement behind the **9-5/8** inch intermediate casing is:

DV tool shall be set a minimum of 50' below previous shoe and a minimum of 200' above current shoe. Operator shall submit sundry if DV tool depth cannot be set in this range. If an ECP is used, it is to be set a minimum of 50' below the shoe to provide cement across the shoe. If it cannot be set below the shoe, a CBL shall be run to verify cement coverage.

a. First stage to DV tool:___

☒ Cement to circulate. If cement does not circulate, contact the appropriate BLM office before proceeding with second stage cement job. Operator should have plans as to how they will achieve circulation on the next stage.

b. Second stage above DV tool:

☐ Cement to surface. If cement does not circulate, contact the appropriate BLM office. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to Potash and Capitan Reef.**

Formation below the 9-5/8" shoe to be tested according to Onshore Order 2.III.B.1.i. Test to be done as a mud equivalency test using the mud weight necessary for the pore pressure of the formation below the shoe and the mud weight for the bottom of the hole. Report results to BLM office.

Centralizers required on horizontal leg, must be type for horizontal service and a minimum of one every other joint.

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

☐ Cement to surface. If cement does not circulate, contact the appropriate BLM office. **Excess calculates to 11% - Additional cement may be required.**

5. 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.

6. Whenever a casing string is cemented in the R-111-P potash area, the NMOCD requirements shall be followed.

C. **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 53.

2. Variance approved to use flex line from BOP to choke manifold. 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.** If the BLM inspector questions the straightness of the hose, a BLM engineer will be contacted and will review in the field or via picture supplied by inspector to determine if changes are required (operator shall expect delays if this occurs).

3. **A variance is granted for the use of a diverter on the 20" surface casing.**

4. **In the case where the only BOP installed is an annular preventer, it shall be tested to a minimum of 2000 psi (which may require upgrading to 3M or 5M annular).**

5. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be psi.

6. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the **9-5/8** 2nd intermediate casing shoe shall be psi. **5M 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.**

7. **Operator has option to utilize a multi-bowl wellhead assembly. This assembly will only be tested when installed. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) shall be 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. **Operator shall perform the 2nd intermediate casing integrity test to 70% of the casing burst. This will test the multi-bowl seals.**
    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.**

8. The appropriate BLM office shall be notified a minimum of hours in advance for a representative to witness the tests.

    a. 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.

    b. The tests shall be done by an independent service company utilizing a test plug **not a cup or J-packer**.

    c. 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.

    d. The results of the test shall be reported to the appropriate BLM office.

    e. 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.**

    f. 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.

D. DRILL STEM TEST

If drill stem tests are performed, Onshore Order 2.III.D shall be followed.

E. 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.

JAM 082318

PECOS DISTRICT
SURFACE USE
CONDITIONS OF APPROVAL

OPERATOR'S NAME:	CL&F Resources LP
LEASE NO.:	NMNM114354
WELL NAME & NO.:	Crazy Horse 0304 Fed Com 4H
SURFACE HOLE FOOTAGE:	430'/N & 2135'/E
BOTTOM HOLE FOOTAGE	1927'/N & 330'/E
LOCATION:	Section 5, T.20 S., R.30 E., NMPM
COUNTY:	Eddy County, New Mexico

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

I. GENERAL PROVISIONS

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

II. PERMIT EXPIRATION

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

III. ARCHAEOLOGICAL, PALEONTOLOGY & HISTORICAL SITES

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

IV. NOXIOUS WEEDS

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

V. SPECIAL REQUIREMENT(S)

Cave/Karst Surface Mitigation

The following stipulations will be applied to minimize impacts during construction, drilling and production:

Construction:

In the advent that any underground voids are opened up during construction activities, construction activities will be halted and the BLM will be notified immediately.

No Blasting:

No blasting will be utilized for pad construction. The pad will be constructed and leveled by adding the necessary fill and caliche.

Pad Berming:

- 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. (Any 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.

Tank Battery Liners and Berms:

Tank battery locations and all facilities will be lined and bermed. A 20 mil permanent liner will be installed with 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.

Leak Detection System:

A method of detecting leaks is required. The method could incorporate gauges to measure loss, situating values and lines so they can be visually inspected, or installing

electronic sensors to alarm when a leak is present. Leak detection plan will be submitted to BLM for approval.

Automatic Shut-off Systems:

Automatic shut off, check values, or similar systems will be installed for pipelines and tanks to minimize the effects of catastrophic line failures used in production or drilling.

Cave/Karst Subsurface Mitigation

The following stipulations will be applied to protect cave/karst and ground water concerns:

Rotary Drilling with Fresh Water:

Fresh water will be used as a circulating medium in zones where caves or karst features are expected. SEE ALSO: Drilling COAs for this well.

Directional Drilling:

Kick off for directional drilling will occur at least 100 feet below the bottom of the cave occurrence zone. SEE ALSO: Drilling COAs for this well.

Lost Circulation:

ALL lost circulation zones from the surface to the base of the cave occurrence zone will be logged and reported in the drilling report.

Regardless of the type of drilling machinery used, if a void of four feet or more and circulation losses greater than 70 percent occur simultaneously while drilling in any cave-bearing zone, the BLM will be notified immediately by the operator. The BLM will assess the situation and work with the operator on corrective actions to resolve the problem.

Abandonment Cementing:

Upon well abandonment in 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.

Pressure Testing:

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

Hydrology:

The entire well pad will be bermed to prevent oil, salt, and other chemical contaminants from leaving the well pad. 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 berm shall be maintained through the life of the well and 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.

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.

A leak detection plan will be submitted to the BLM Carlsbad Field Office for approval prior to pipeline installation. The method could incorporate gauges to detect pressure drops, situating valves and lines so they can be visually inspected periodically or installing electronic sensors to alarm when a leak is present. The leak detection plan will incorporate an automatic shut off system that will be installed for proposed pipelines to minimize the effects of an undesirable event.

Rangeland Management Mitigation:
Structures that provide water to livestock, such as windmills, pipelines, drinking troughs, and earthen reservoirs, will be avoided by moving the proposed action.

Any damage to fences, cattle guards, and pipelines or structures that provide water to livestock during construction, throughout the life of the project, and caused by its operation, must be immediately corrected by CL&F. CL&F must notify the grazing allottee or the private surface landowner and the BLM-CFO (575-234-5972) if any damage occurs to pipelines or structures that provide water to livestock.

Potash Resource Mitigation:
Lessees must comply with the 2012 Secretarial Potash Order. The Order is designed to manage the efficient development of oil, gas, and potash resources. Section 6 of the Order provides general provisions which must be followed to minimize conflict between the industries and ensure the safety of operations.

To minimize impacts to potash resources, the proposed well is confined within the boundaries of the established Solution Shallow Drill Island (See Potash Memo and Map in attached file for Drill Island description).

VI. CONSTRUCTION

A. NOTIFICATION

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

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

B. TOPSOIL

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

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

C. CLOSED LOOP SYSTEM

Tanks are required for drilling operations: No Pits.

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

D. FEDERAL MINERAL MATERIALS PIT

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

E. WELL PAD SURFACING

Surfacing of the well pad is not required.

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

F. EXCLOSURE FENCING (CELLARS & PITS)

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

G. ON LEASE ACCESS ROADS

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

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

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

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

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

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

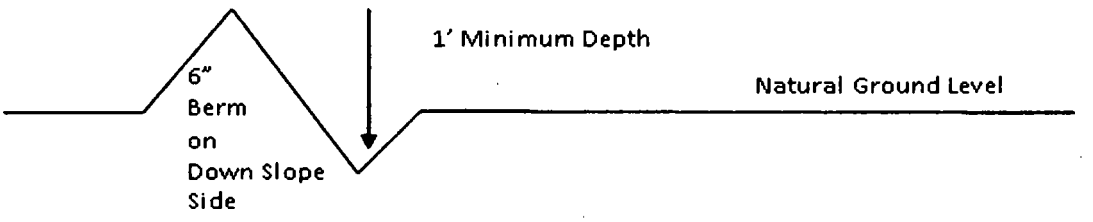
Turnouts
Vehicle turnouts shall be constructed on the road. Turnouts shall be intervisible with interval spacing distance less than 1000 feet. Turnouts shall conform to Figure 1; cross section and plans for typical road construction.

Drainage

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

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

Cross Section of a Typical Lead-off Ditch



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

Formula for Spacing Interval of Lead-off Ditches

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

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

Cattle guards

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

Fence Requirement

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

Public Access

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

Construction Steps

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

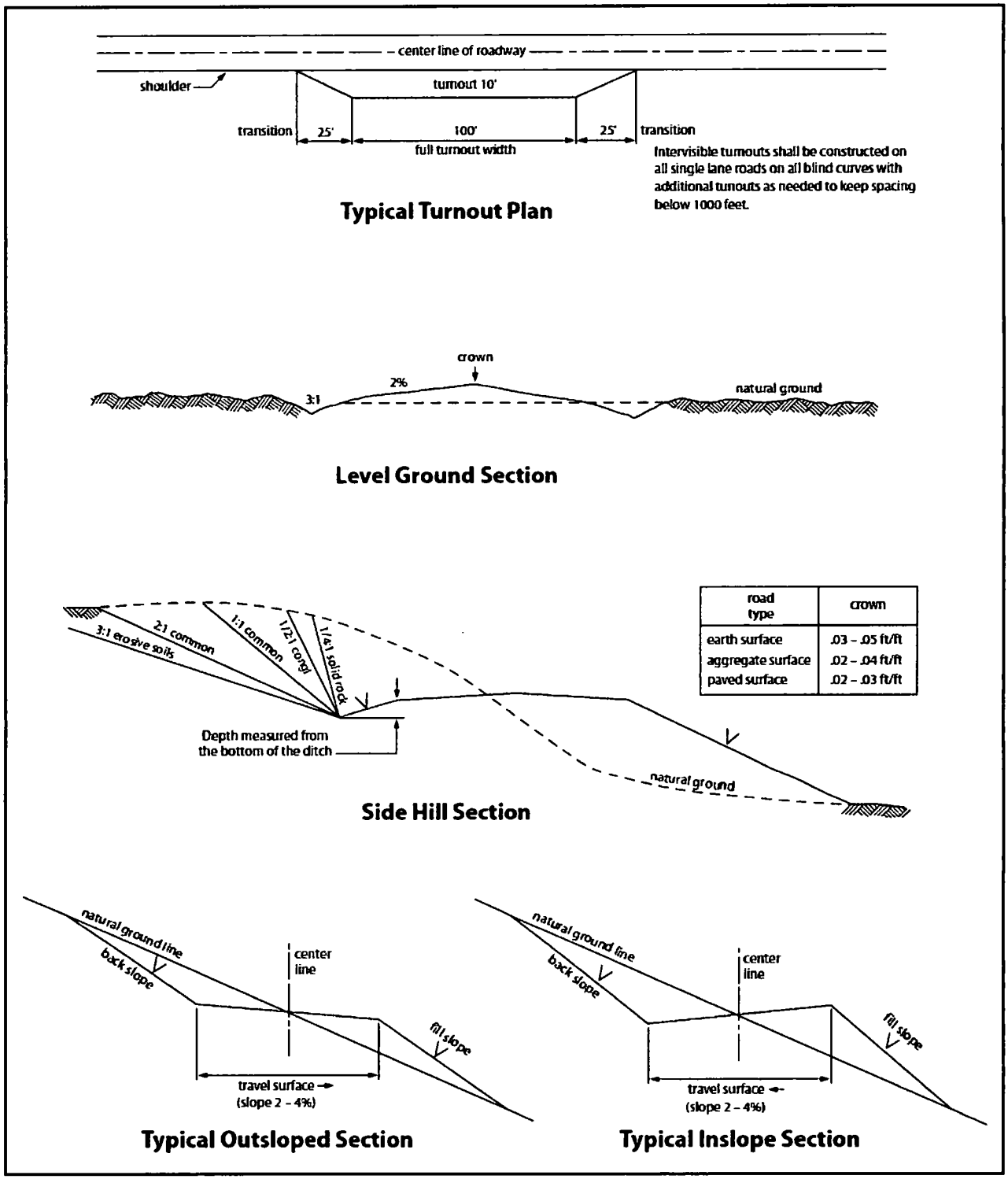


Figure 1. Cross-sections and plans for typical road sections representative of BLM resource or FS local and higher-class roads.

VII. PRODUCTION (POST DRILLING)

A. WELL STRUCTURES & FACILITIES

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

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

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

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

Containment Structures

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

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

VIII. INTERIM RECLAMATION

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

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

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

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

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

IX. FINAL ABANDONMENT & RECLAMATION

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

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

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

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

Seed Mixture 1 for Loamy Sites

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 shall 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 shall be either certified or registered seed. The seed container shall be tagged in accordance with State law(s) and available for inspection by the Authorized Officer.

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

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

Species	lb/acre
Plains lovegrass (Eragrostis intermedia)	0.5
Sand dropseed (Sporobolus cryptandrus)	1.0
Sideoats grama (Bouteloua curtipendula)	5.0
Plains bristlegrass (Setaria macrostachya)	2.0

*Pounds of pure live seed:

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

AFMSS

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

Operator Certification Data Report

08/24/2018

Operator Certification

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

NAME: Brian Wood **Signed on:** 02/02/2018

Title: President

Street Address: 37 Verano Loop

City: Santa Fe **State:** NM **Zip:** 87508

Phone: (505)466-8120

Email address: afmss@permitswest.com

Field Representative

Representative Name:

Street Address:

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

Phone:

Email address:

AFMSS

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

Application Data Report

08/24/2018

APD ID: 10400026854 **Submission Date:** 02/02/2018

Operator Name: CL&F RESOURCES LP

Well Name: CRAZY HORSE 0304 FED COM **Well Number:** 4H

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

Highlighted data reflects the most recent changes

Show Final Text

Section 1 - General

APD ID: 10400026854 **Tie to previous NOS?** **Submission Date:** 02/02/2018

BLM Office: CARLSBAD **User:** Brian Wood **Title:** President

Federal/Indian APD: FED **Is the first lease penetrated for production Federal or Indian?** FED

Lease number: NMNM114354 **Lease Acres:** 599.68

Surface access agreement in place? **Allotted?** **Reservation:**

Agreement in place? NO **Federal or Indian agreement:**

Agreement number:

Agreement name:

Keep application confidential? NO

Permitting Agent? YES **APD Operator:** CL&F RESOURCES LP

Operator letter of designation:

Operator Info

Operator Organization Name: CL&F RESOURCES LP

Operator Address: 16945 Northchase Drive #500

Zip: 77060

Operator PO Box:

Operator City: Houston **State:** TX

Operator Phone: (281)873-3013

Operator Internet Address:

Section 2 - Well Information

Well in Master Development Plan? NO **Mater Development Plan name:**

Well in Master SUPO? NO **Master SUPO name:**

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

Well Name: CRAZY HORSE 0304 FED COM **Well Number:** 4H **Well API Number:**

Field/Pool or Exploratory? Field and Pool **Field Name:** PARKWAY **Pool Name:** BONE SPRING

Is the proposed well in an area containing other mineral resources? POTASH

Operator Name: CL&F RESOURCES LP

Well Name: CRAZY HORSE 0304 FED COM **Well Number:** 4H

Describe other minerals:

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

Type of Well Pad: MULTIPLE WELL **Multiple Well Pad Name:** CRAZY HORSE **Number:** 3H

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

Well Work Type: Drill

Well Type: OIL WELL

Describe Well Type:

Well sub-Type: INFILL

Describe sub-type:

Distance to town: 19 Miles **Distance to nearest well:** 30 FT **Distance to lease line:** 430 FT

Reservoir well spacing assigned acres Measurement: 320 Acres

Well plat: CH_4H_Plat_20180403121111.pdf

Well work start Date: 03/01/2018 **Duration:** 90 DAYS

Section 3 - Well Location Table

Survey Type: RECTANGULAR

Describe Survey Type:

Datum: NAD83 **Vertical Datum:** NAVD88

Survey number: 7977

	NS-Foot	NS Indicator	EW-Foot	EW Indicator	Twsp	Range	Section	Aliquot/Lot/Tract	Latitude	Longitude	County	State	Meridian	Lease Type	Lease Number	Elevation	MD	TVD
SHL Leg #1	430	FNL	2135	FEL	20S	30E	5	Aliquot NWNE	32.608469	-103.992511	EDDY	NEW MEXICO	NEW MEXICO	F	NMNM 114354	3248	0	0
KOP Leg #1	430	FNL	2135	FEL	20S	30E	5	Aliquot NWNE	32.608469	-103.992511	EDDY	NEW MEXICO	NEW MEXICO	F	NMNM 114354	-5035	8900	8283
PPP Leg #1	1695	FNL	0	FWL	20S	30E	4	Aliquot SWNW	32.604932	-103.985663	EDDY	NEW MEXICO	NEW MEXICO	F	NMNM 0006775D	-5072	8982	8320

Operator Name: CL&F RESOURCES LP

Well Name: CRAZY HORSE 0304 FED COM **Well Number:** 4H

	NS-Foot	NS Indicator	EW-Foot	EW Indicator	Twsp	Range	Section	Aliquot/Lot/Tract	Latitude	Longitude	County	State	Meridian	Lease Type	Lease Number	Elevation	MD	TVD
PPP Leg #1	430	FNL	2135	FEL	20S	30E	5	Aliquot NWNE	32.608469	-103.992511	EDDY	NEW MEXICO	NEW MEXICO	F	NMNM 114354	3248	0	0
PPP Leg #1	1911	FNL	1320	FWL	20S	30E	4	Aliquot SENW	32.60434	-103.98139	EDDY	NEW MEXICO	NEW MEXICO	F	NMNM 0554233	-5122	10357	8370
PPP Leg #1	1911	FNL	0	FWL	20S	30E	3	Aliquot SWNW	32.604315	-103.968525	EDDY	NEW MEXICO	NEW MEXICO	F	NMNM 135240	-5167	14337	8415
PPP Leg #1	1911	FNL	1320	FEL	20S	30E	4	Aliquot SENE	32.604318	-103.972786	EDDY	NEW MEXICO	NEW MEXICO	F	NMNM 000677 5E	-5152	13019	8400
EXIT Leg #1	1927	FNL	330	FEL	20S	30E	3	Aliquot SENE	32.604292	-103.95236	EDDY	NEW MEXICO	NEW MEXICO	F	NMNM 135240	-5223	19296	8471
BHL Leg #1	1927	FNL	330	FEL	20S	30E	3	Aliquot SENE	32.604292	-103.95236	EDDY	NEW MEXICO	NEW MEXICO	F	NMNM 135240	-5223	19296	8471

CH_4H_Choke_20180202105808.pdf

BOP Diagram Attachment:

CH_4H_BOP_20180202105816.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	CONDUCTOR	36	OTHER	NEW	API	N	0	80	0	80	3248		80	OTHER	157.5	OTHER - Weld						
2	SURFACE	26	20.0	NEW	API	N	0	350	0	350	3248		350	J-55	94	OTHER - BTC	3.46	11.14	DRY	46.4	DRY	49
3	INTERMEDIATE	17.5	13.375	NEW	API	N	0	1680	0	1680	3248		1680	J-55	54.5	OTHER - BTC	1.29	2.75	DRY	9.9	DRY	9.3
4	INTERMEDIATE	12.25	9.625	NEW	API	N	0	3480	0	3480	3248		3480	J-55	40	LTC	1.6	1.93	DRY	3.73	DRY	4.52
5	INTERMEDIATE	12.25	9.625	NEW	API	N	0	3480	0	3480	3248		3480	J-55	54.5	LTC	1.6	1.93	DRY	3.73	DRY	4.52
6	PRODUCTION	8.75	5.5	NEW	API	N	0	19296	0	8471	3248		19296	P-110	20	OTHER - Atlas BK	3	1.2	DRY	2.2	DRY	2.1

Casing Attachments

Casing ID: 1 **String Type:** CONDUCTOR

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Operator Name: CL&F RESOURCES LP

Well Name: CRAZY HORSE 0304 FED COM **Well Number:** 4H

Casing Attachments

Casing ID: 2 **String Type:** SURFACE

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

CH_4H_Casing_Design_Assumptions_20180202110721.pdf

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

CH_4H_Casing_Design_Assumptions_20180202110746.pdf

Casing ID: 4 **String Type:** INTERMEDIATE

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

CH_4H_Casing_Design_Assumptions_20180202110824.pdf

Operator Name: CL&F RESOURCES LP

Well Name: CRAZY HORSE 0304 FED COM **Well Number:** 4H

Casing Attachments

Casing ID: 5 **String Type:** INTERMEDIATE

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

CH_4H_Casing_Design_Assumptions_20180202121103.pdf

Casing ID: 6 **String Type:** PRODUCTION

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

CH_4H_Casing_Design_Assumptions_20180202111408.pdf

Section 4 - Cement

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
CONDUCTOR	Lead		0	80	0	0	0	0		Redi Mix	None
SURFACE	Lead		0	321	800	1.34	14.8	1072	100	Class C	2% PF01 (CACl2)
INTERMEDIATE	Lead		0	1680	1200	1.75	13.5	2100	100	Class C	4% PF120 (Gel) & 1% PF01 (CACl2) & 3#

Operator Name: CL&F RESOURCES LP

Well Name: CRAZY HORSE 0304 FED COM **Well Number:** 4H

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
											PF42 (Koalseal) & 1/8# PF29 (Cellophane)
INTERMEDIATE	Tail		0	1680	200	1.33	14.8	266	100	Class C	1% PF01 (CACl2)
INTERMEDIATE	Lead		0	3480	350	2.05	12.6	717	50	Class C 35/65 Poz	5% PF44 (Salt) & 6% PF20 (Gel) & 3# PF42 (Kolseal) & .4# PF45 (Defoam) & 1/8# PF29 (Cellophane)
INTERMEDIATE	Tail		0	3480	200	1.32	14.8	264	50	Class C	.2% PF13 (Retarder)
INTERMEDIATE	Lead		0	3480	220	2.05	12.6	451	50	Class C 35/65 Poz	5% PF44 (Salt) & 6% PF20 (Gel) & 3# PF42 (Kolseal) & .4# PF45 (Defoam) & 1/8# PF29 (Cellophane)
INTERMEDIATE	Tail		0	3480	200	1.32	14.8	264	50	Class C	2% PF13 (Retarder)
PRODUCTION	Lead		0	19296	890	2.47	11.9	2198	25	Class H 50/50 Poz	5% PF44 (Salt) & 10% PF20 (Gel) & .2% PF153 (Anti-settle) & .4# PF45 (Defoam) & 3# PF42 (Koalseal) & 1/8# PF29 (Cellophane)
PRODUCTION	Tail		0	19296	2470	1.31	14.2	3236	25	Class H 50/50 Poz	5% PF44 (Salt) & 2% PF20 (Gel) & .3% FL & .1% PF813 (Retarder) & .2% PF65 (Dispersant) & .3% PF606 (Fluid Loss)

Operator Name: CL&F RESOURCES LP

Well Name: CRAZY HORSE 0304 FED COM **Well Number:** 4H

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 (e. g., cedar bark) and weight increase (e. g., barite, bentonite) requirements will be on site at all times.
Describe the mud monitoring system utilized: A Pason, or similar, system will be used to monitor fluid loss or gain.

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
3480	19296	OTHER : Cut brine	8.4	9.5							
0	321	OTHER : Fresh water	8.4	9							
321	1680	OTHER : Brine water	10	10.1							
1680	3480	OTHER : Fresh water	8.4	8.7							

Section 6 - Test, Logging, Coring

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

Mud logging program will be used from 3300' to TD. No open hole log is planned at this time. A gyro may be used from surface to first intermediate casing shoe if warranted. GR/MWD will be used from 80' to TD. Completion CBL may be run in vertical to free fall depth of curve 40+.
List of open and cased hole logs run in the well:

GR,MWD

Coring operation description for the well:

No core or drill stem test is planned.

Operator Name: CL&F RESOURCES LP

Well Name: CRAZY HORSE 0304 FED COM **Well Number:** 4H

Section 7 - Pressure

Anticipated Bottom Hole Pressure: 4216 **Anticipated Surface Pressure:** 2352.38

Anticipated Bottom Hole Temperature(F): 140

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

Describe:

Contingency Plans geoharzards description:

Contingency Plans geohazards attachment:

Hydrogen Sulfide drilling operations plan required? YES

Hydrogen sulfide drilling operations plan:

CH_4H_H2S_Plan_20180202124201.pdf

Section 8 - Other Information

Proposed horizontal/directional/multi-lateral plan submission:

CH_4H_Horizontal_Drill_Plan_20180202124240.pdf

Other proposed operations facets description:

Other proposed operations facets attachment:

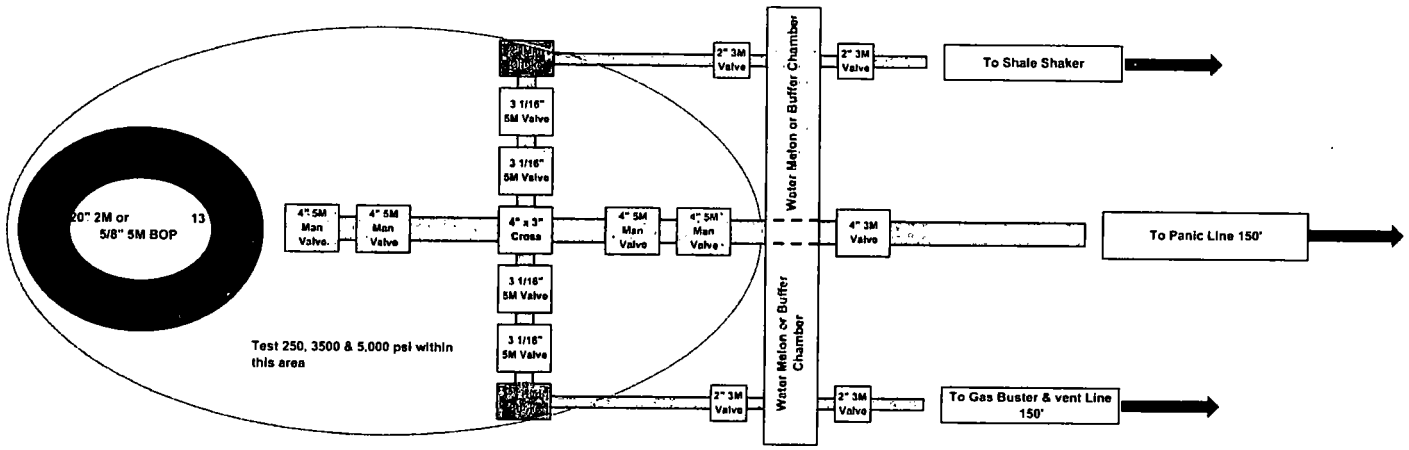
CH_4H_General_Drill_Plan_20180202124258.pdf

CH_4H_Speedhead_Specs_20180202124311.pdf

Other Variance attachment:

Choke Manifold

Minimum Configuration of Choke Side

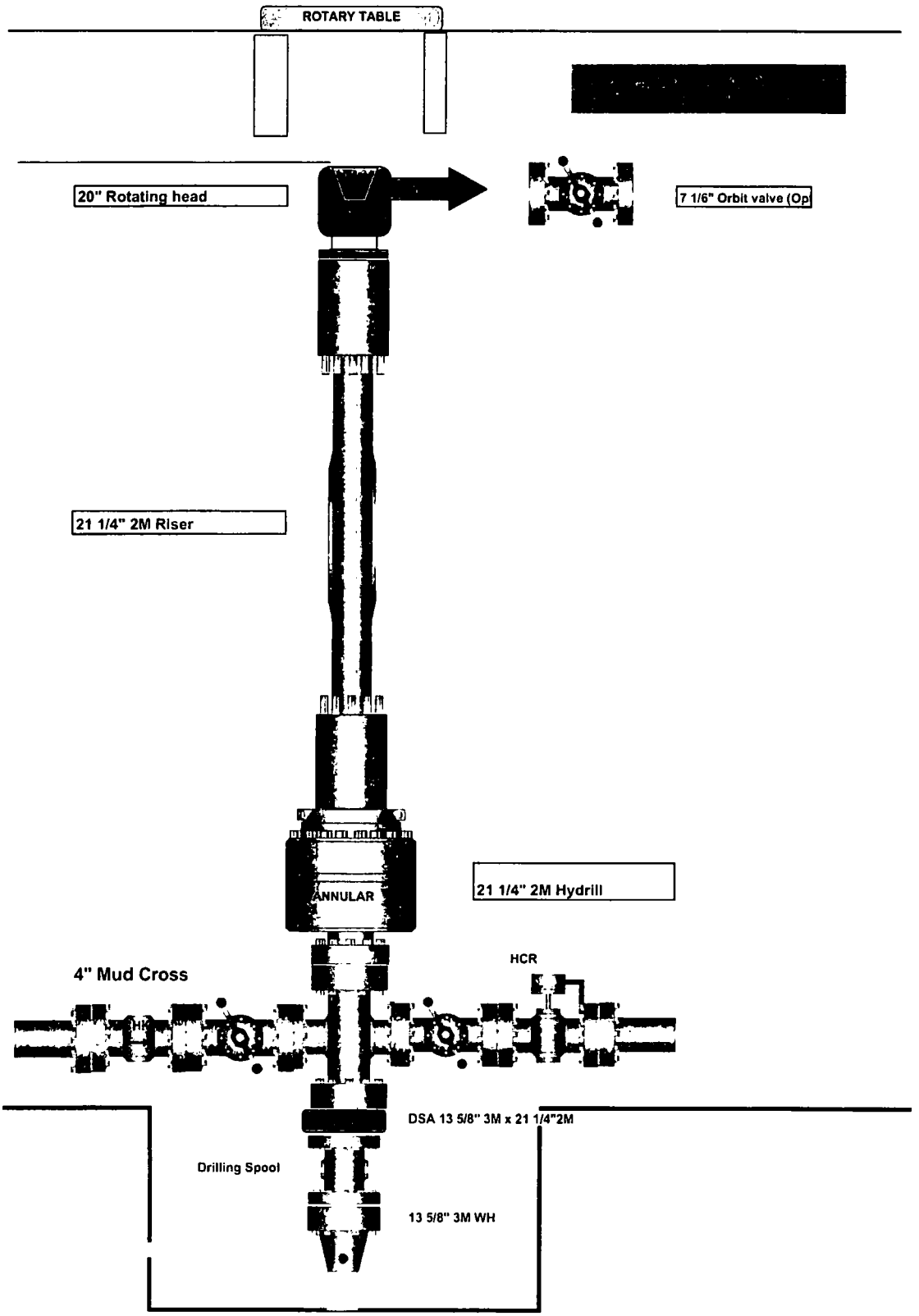


LOCATION: Approximately 15 miles NE of Carlsbad NM

COUNTY: Eddy STATE: New Mexico

RIG NAME & No. Any Rig

GL ELEVATION: 3218 KB 25'

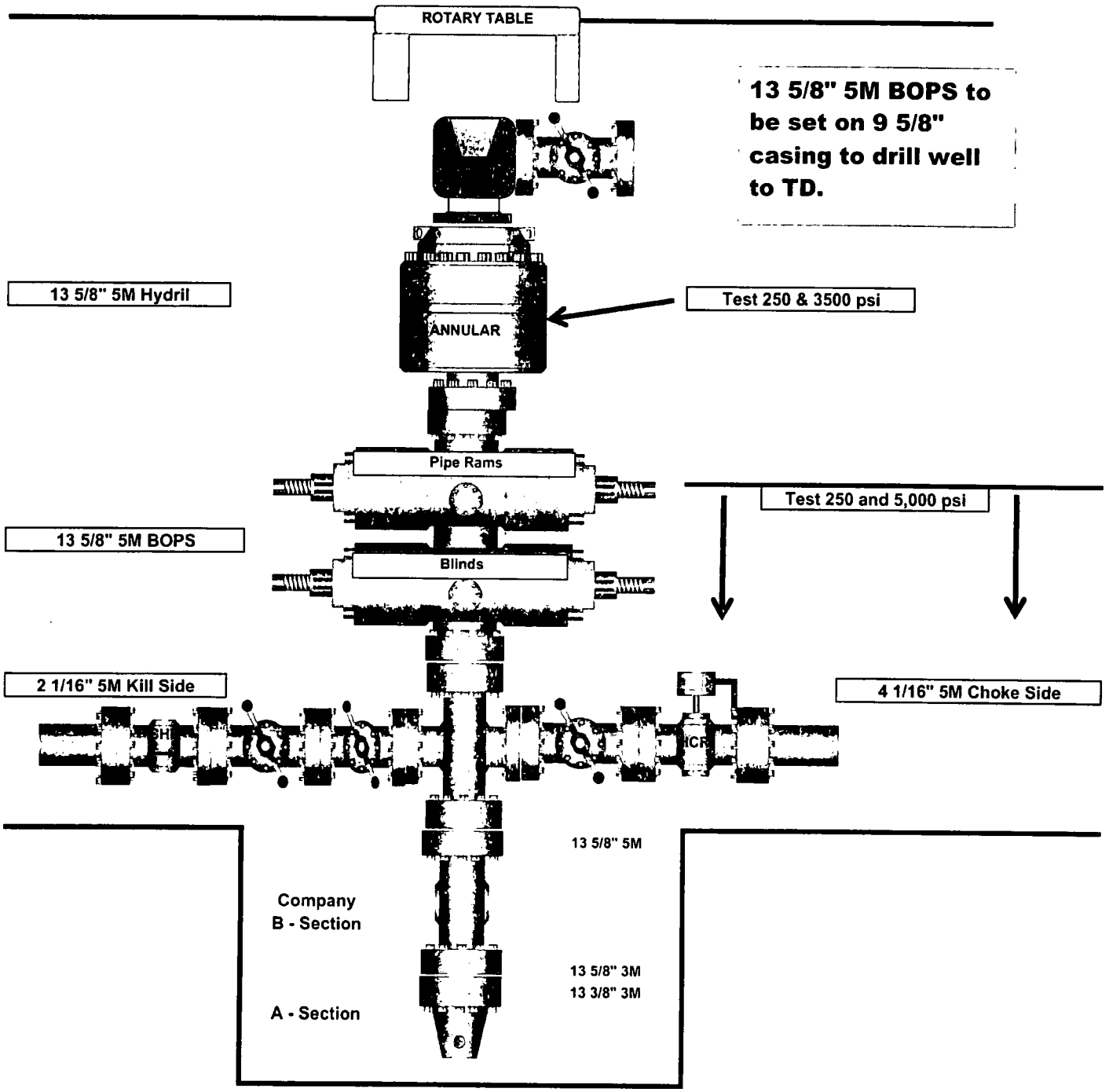


LOCATION: Approximately 15 miles NE of Carlsbad NM

COUNTY: Eddy STATE: New Mexico

RIG NAME & No. Any Rig

GL ELEVATION: 3218 KB 25'



Coflex Hose Certification

Continental CONTITECH

Fluid Technology

Quality Document

QUALITY CONTROL INSPECTION AND TEST CERTIFICATE				CERT. N°: 745	
PURCHASER: Phoenix Beattie Co.				P.O. N°: 032491	
CONTITECH ORDER N°: 412838		HOSE TYPE: 3" ID Choke and Kill Hose			
HOSE SERIAL N°: 52777		NOMINAL / ACTUAL LENGTH: 10,67 m			
W.P. 68,96 MPa 10000 psi		T.P. 103,4 MPa 15000 psi		Duration: 60 – min.	

Pressure test with water at ambient temperature

See attachment. (1 page)

↑ 10 mm = 10 Mn.

→ 10 mm = 25 MPa

COUPLINGS			
Type	Serial N°	Quality	Heat N°
3" coupling with 4 1/16" Flange end	917 913	AISI 4130	T7990A
		AISI 4130	26084

INFOCHIP INSTALLED

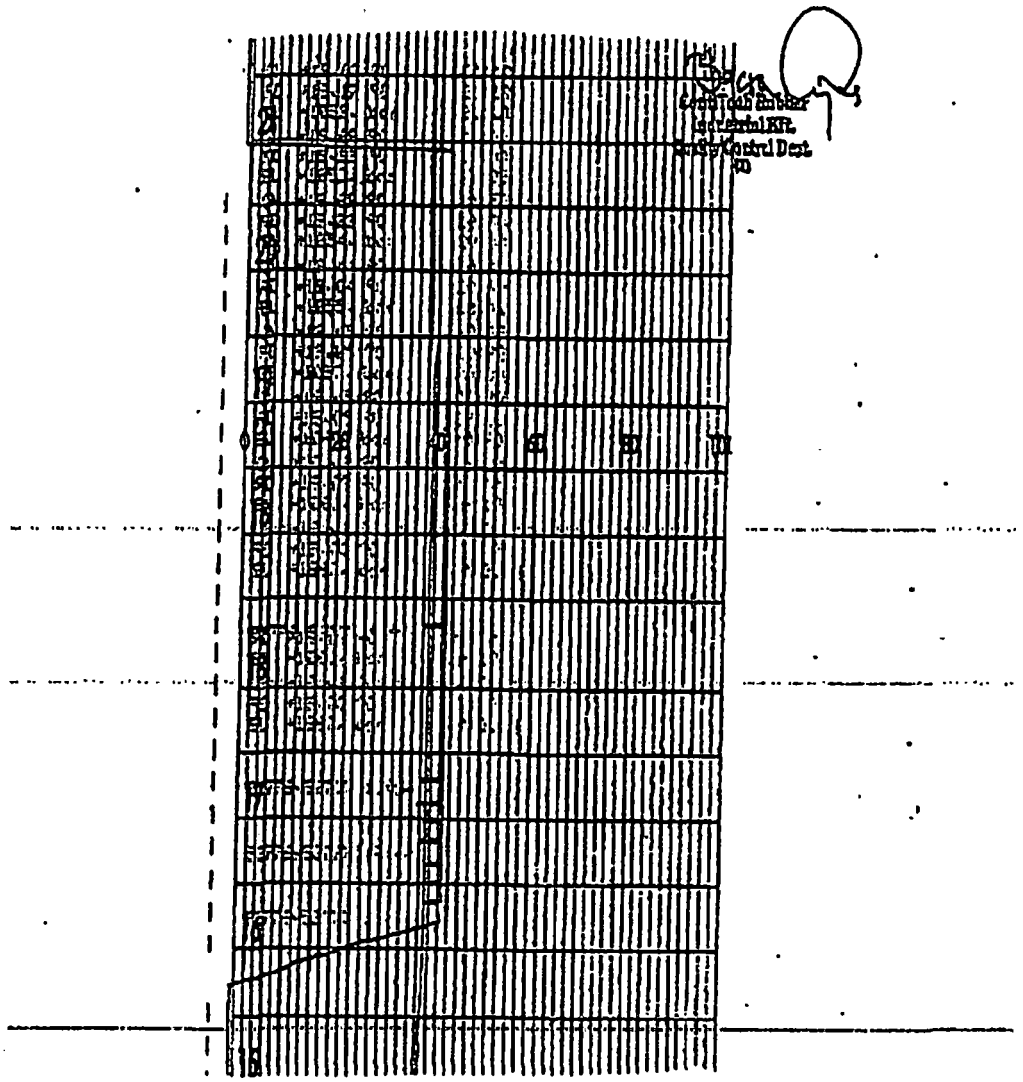
API Spec 16 C
Temperature rate: "B"

All metal parts are flawless

WE CERTIFY THAT THE ABOVE HOSE WAS BEEN MANUFACTURED IN ACCORDANCE WITH THE TERMS OF THE ORDER AND PRESSURE TESTED AS ABOVE WITH SATISFACTORY RESULT.

Date:	Inspector	Quality Control
04. April. 2008		Contitech Rubber Industrial Kft. Quality Control Dept.

Coflex Hose Certification



Coflex Hose Certification

Form No 100/12

PHOENIX Beattie

Phoenix Beattie Corp
[illegible]
Houston, TX 77041
Tel: (832) 327-4141
Fax: (832) 327-4149
E-mail: [illegible]
www.phoenixbeattie.com

Delivery Note

Customer Order Number	376-369-001	Delivery Note Number	003078	Page	1
Customer / Invoice Address HELMERICH & PAYNE INT'L DRILLING CO 1437 SOUTH BOULDER TULSA, OK 74119		Delivery / Address HELMERICH & PAYNE IDC ATTN: JOE STEPHENSON - RIG 370 13609 INDUSTRIAL ROAD HOUSTON, TX 77015			

Customer Acc No	Phoenix Beattie Contract Manager	Phoenix Beattie Reference	Date
H01	JJL	006330	05/23/2008

Item No	Beattie Part Number / Description	Qty Ordered	Qty Sent	Qty To Follow
1	HP10CK3A-35-4F1 3" 10K 16C C&K HOSE x 35ft OAL CW 4.1/16" API SPEC FLANGE E/ End 1: 4.1/16" 10Kpsi API Spec 6A Type 6BX Flange End 2: 4.1/16" 10Kpsi API Spec 6A Type 6BX Flange C/W BX155 Standard ring groove at each end Suitable for H2S Service Working pressure: 10,000psi Test pressure: 15,000psi Standard: API 16C full specification Armor Guarding: Included Fire Rating: Not Included Temperature rating: -20 Deg C to +100 Deg C	1	1	0
2	SECK3-HPF3 LIFTING & SAFETY EQUIPMENT TO SUIT HP10CK3-35-F1 2 x 160mm ID Safety Clamps 2 x 244mm ID Lifting Collars & element C's 2 x 7ft Stainless Steel wire rope 3/4" OD 4 x 7.7St Shackles	1	1	0
3	SC725-200S SAFETY CLAMP 200MM 7.2ST C/S GALVANISED	1	1	0

Casing Designs

Crazy Horse 03 - 04 Fed Com # 4H

Surface

Csg Size	Set Depth TVD	Set Depth MD	Grade	Weight	Conn	Collapse	Burst	Conn Yield	Body Yield	MD Air Weight	TVD Air Weight	Drlg Mud Weight	Mud Gradient	Cmt Weight	Cmt Gradient	Frac Gradient	Gas Gradient
20"	350	350	J55	94	BTC	520	2,110	1,402,000	1,480,000	32,900	32,900	9.00	0.47	14.80	0.77	0.70	0.11

SH Safety Factor Collapse	1.20	Mud	Collapse / TVD * MG	3.17	Actual Safety factor
	1.20	Cement	Collapse / TVD * CG - MG	4.93	
SH Safety Factor Burst	1.30	Mud	Burst / TVD * FG - GG	10.22	
SH Saftey Factor Conn	1.80	Top Joint	Conn Yd / MD * Wt	42.61	
SH Safety Factor Body	2.00	Top Joint	Body Yd / MD * Wt	44.98	

Per BLM	Burst	Collapse	Joint	
	1.000	1.125	1.600	(Dry)
			1.800	(Bouyed)

Int 1

Csg Size	Set Depth TVD	Set Depth MD	Grade	Weight	Conn	Collapse	Burst	Conn Yield	Body Yield	MD Air Weight	TVD Air Weight	Drlg Mud Weight	Mud Gradient	Cmt Weight	Cmt Gradient	Frac Gradient	Gas Gradient
13 3/8"	1680	1680	J55	54.5	BTC	1,130	2,730	909,000	853,000	91,560	91,560	10.00	0.52	14.20	0.74	0.70	0.11

SH Safety Factor Collapse	1.20	Mud	Collapse / TVD * MG	1.29	Actual Safety factor
	1.20	Cement	Collapse / TVD * CG - MG	3.08	
SH Safety Factor Burst	1.30	Mud	Burst / TVD * FG - GG	2.75	
SH Saftey Factor Conn	1.80	Top Joint	Conn Yd / MD * Wt	9.93	
SH Safety Factor Body	2.00	Top Joint	Body Yd / MD * Wt	9.32	

Per BLM	Burst	Collapse	Joint	
	1.000	1.125	1.600	(Dry)
			1.800	(Bouyed)

Int 2

Csg Size	Set Depth TVD	Set Depth MD	Grade	Weight	Conn	Collapse	Burst	Conn Yield	Body Yield	MD Air Weight	TVD Air Weight	Drlg Mud Weight	Mud Gradient	Cmt Weight	Cmt Gradient	Frac Gradient	Gas Gradient
9 5/8"	3480	3480	J55	40	LTC	2,570	3,950	520,000	630,000	139,200	139,200	9.00	0.47	13.70	0.71	0.70	0.11

SH Safety Factor Collapse	1.20	Mud	Collapse / TVD * MG	1.58	Actual Safety factor
	1.20	Cement	Collapse / TVD * CG - MG	3.02	
SH Safety Factor Burst	1.30	Mud	Burst / TVD * FG - GG	1.92	
SH Saftey Factor Conn	1.80	Top Joint	Conn Yd / MD * Wt	3.74	
SH Safety Factor Body	2.00	Top Joint	Body Yd / MD * Wt	4.53	

Per BLM	Burst	Collapse	Joint	
	1.000	1.125	1.600	(Dry)
			1.800	(Bouyed)

Production

Csg Size	Set Depth TVD	Set Depth MD	Grade	Weight	Conn	Collapse	Burst	Conn Yield	Body Yield	MD Air Weight	TVD Air Weight	Drlg Mud Weight	Mud Gradient	Cmt Weight	Cmt Gradient	Frac Gradient	Gas Gradient
5 1/2"	8594	19296	P110	20	Atlas BK	11,100	12,640	667,000	641,000	385,920	171,880	9.50	0.49	13.05	0.68	0.70	0.11

SH Safety Factor Collapse	1.20	Mud	Collapse / TVD * MG	2.61	Actual Safety Factors				
	1.20	Cement	Collapse / TVD * CG - MG	7.00					
SH Safety Factor Burst	1.30	Mud	Burst / TVD * FG - GG	2.49					
SH Saftey Factor Conn	1.80	Top Joint	Conn Yd / MD * Wt	1.73	Conn Yd @ CurveTVD	3.88	Actual Safety Factors		
SH Safety Factor Body	2.00	Top Joint	Body Yd / MD * Wt	1.66	Body Yd @ Curve TVD	3.73			

Per BLM	Burst	Collapse	Joint	
	1.000	1.125	1.600	(Dry)
			1.800	(Bouyed)

Minimum MU Torque	6,000	ftlbs
Maximum MU Torque	17,250	ftlbs
Optimum MU Torque	8,300	ftlbs
Max Operating Torque	19,550	ftlbs
Yield Torque	23,000	ftlbs

Casing Designs

Crazy Horse 03 - 04 Fed Com # 4H

Surface

Csg Size	Set Depth TVD	Set Depth MD	Grade	Weight	Conn	Collapse	Burst	Conn Yield	Body Yield	MD Air Weight	TVD Air Weight	Drlg Mud Weight	Mud Gradient	Cmt Weight	Cmt Gradient	Frac Gradient	Gas Gradient
20"	350	350	J55	94	BTC	520	2,110	1,402,000	1,480,000	32,900	32,900	9.00	0.47	14.80	0.77	0.70	0.11

SH Safety Factor Collapse	1.20	Mud	Collapse / TVD * MG	3.17	Actual Safety Factor
	1.20	Cement	Collapse / TVD * CG - MG	4.93	
SH Safety Factor Burst	1.30	Mud	Burst / TVD * FG - GG	10.22	
SH Saftey Factor Conn	1.80	Top Joint	Conn Yd / MD * Wt	42.61	
SH Safety Factor Body	2.00	Top Joint	Body Yd / MD * Wt	44.98	

Per BLM	Burst	Collapse	Joint	
	1.000	1.125	1.600	(Dry)
			1.800	(Bouyed)

Int 1

Csg Size	Set Depth TVD	Set Depth MD	Grade	Weight	Conn	Collapse	Burst	Conn Yield	Body Yield	MD Air Weight	TVD Air Weight	Drlg Mud Weight	Mud Gradient	Cmt Weight	Cmt Gradient	Frac Gradient	Gas Gradient
13 3/8"	1680	1680	J55	54.5	BTC	1,130	2,730	909,000	853,000	91,560	91,560	10.00	0.52	14.20	0.74	0.70	0.11

SH Safety Factor Collapse	1.20	Mud	Collapse / TVD * MG	1.29	Actual Safety Factor
	1.20	Cement	Collapse / TVD * CG - MG	3.08	
SH Safety Factor Burst	1.30	Mud	Burst / TVD * FG - GG	2.75	
SH Saftey Factor Conn	1.80	Top Joint	Conn Yd / MD * Wt	9.93	
SH Safety Factor Body	2.00	Top Joint	Body Yd / MD * Wt	9.32	

Per BLM	Burst	Collapse	Joint	
	1.000	1.125	1.600	(Dry)
			1.800	(Bouyed)

Int 2

Csg Size	Set Depth TVD	Set Depth MD	Grade	Weight	Conn	Collapse	Burst	Conn Yield	Body Yield	MD Air Weight	TVD Air Weight	Drlg Mud Weight	Mud Gradient	Cmt Weight	Cmt Gradient	Frac Gradient	Gas Gradient
9 5/8"	3480	3480	J55	40	LTC	2,570	3,950	520,000	630,000	139,200	139,200	9.00	0.47	13.70	0.71	0.70	0.11

SH Safety Factor Collapse	1.20	Mud	Collapse / TVD * MG	1.58	Actual Safety Factor
	1.20	Cement	Collapse / TVD * CG - MG	3.02	
SH Safety Factor Burst	1.30	Mud	Burst / TVD * FG - GG	1.92	
SH Saftey Factor Conn	1.80	Top Joint	Conn Yd / MD * Wt	3.74	
SH Safety Factor Body	2.00	Top Joint	Body Yd / MD * Wt	4.53	

Per BLM	Burst	Collapse	Joint	
	1.000	1.125	1.600	(Dry)
			1.800	(Bouyed)

Production

Csg Size	Set Depth TVD	Set Depth MD	Grade	Weight	Conn	Collapse	Burst	Conn Yield	Body Yield	MD Air Weight	TVD Air Weight	Drlg Mud Weight	Mud Gradient	Cmt Weight	Cmt Gradient	Frac Gradient	Gas Gradient
5 1/2"	8594	19296	P110	20	Atlas BK	11,100	12,640	667,000	641,000	385,920	171,880	9.50	0.49	13.05	0.68	0.70	0.11

SH Safety Factor Collapse	1.20	Mud	Collapse / TVD * MG	2.61	Actual Safety Factors
	1.20	Cement	Collapse / TVD * CG - MG	7.00	
SH Safety Factor Burst	1.30	Mud	Burst / TVD * FG - GG	2.49	
SH Saftey Factor Conn	1.80	Top Joint	Conn Yd / MD * Wt	1.73	
SH Safety Factor Body	2.00	Top Joint	Body Yd / MD * Wt	1.66	

Conn Yd @ CurveTVD	3.88	Actual Safety Factors	
Body Yd @ Curve TVD	3.73		

Per BLM	Burst	Collapse	Joint	
	1.000	1.125	1.600	(Dry)
			1.800	(Bouyed)

Minimum MU Torque	6,000	ftlbs
Maximum MU Torque	17,250	ftlbs
Optimum MU Torque	8,300	ftlbs
Max Operating Torque	19,550	ftlbs
Yield Torque	23,000	ftlbs

Casing Designs

Crazy Horse 03 - 04 Fed Com - # 4H

Surface

Csg Size	Set Depth TVD	Set Depth MD	Grade	Weight	Conn	Collapse	Burst	Conn Yield	Body Yield	MD Air Weight	TVD Air Weight	Drlg Mud Weight	Mud Gradient	Cmt Weight	Cmt Gradient	Frac Gradient	Gas Gradient
20"	350	350	J55	94	BTC	520	2,110	1,402,000	1,480,000	32,900	32,900	9.00	0.47	14.80	0.77	0.70	0.11

SH Safety Factor Collapse	1.20	Mud	Collapse / TVD * MG	3.17	Actual Safety factor
	1.20	Cement	Collapse / TVD * CG - MG	4.93	
SH Safety Factor Burst	1.30	Mud	Burst / TVD * FG - GG	10.22	
SH Saftey Factor Conn	1.80	Top Joint	Conn Yd / MD * Wt	42.61	
SH Safety Factor Body	2.00	Top Joint	Body Yd / MD * Wt	44.98	

	Burst	Collapse	Joint	
Per BLM	1.000	1.125	1.600	(Dry)
			1.800	(Bouyed)

Int 1

Csg Size	Set Depth TVD	Set Depth MD	Grade	Weight	Conn	Collapse	Burst	Conn Yield	Body Yield	MD Air Weight	TVD Air Weight	Drlg Mud Weight	Mud Gradient	Cmt Weight	Cmt Gradient	Frac Gradient	Gas Gradient
13 3/8"	1680	1680	J55	54.5	BTC	1,130	2,730	909,000	853,000	91,560	91,560	10.00	0.52	14.20	0.74	0.70	0.11

SH Safety Factor Collapse	1.20	Mud	Collapse / TVD * MG	1.29	Actual Safety factor
	1.20	Cement	Collapse / TVD * CG - MG	3.08	
SH Safety Factor Burst	1.30	Mud	Burst / TVD * FG - GG	2.75	
SH Saftey Factor Conn	1.80	Top Joint	Conn Yd / MD * Wt	9.93	
SH Safety Factor Body	2.00	Top Joint	Body Yd / MD * Wt	9.32	

	Burst	Collapse	Joint	
Per BLM	1.000	1.125	1.600	(Dry)
			1.800	(Bouyed)

Int 2

Csg Size	Set Depth TVD	Set Depth MD	Grade	Weight	Conn	Collapse	Burst	Conn Yield	Body Yield	MD Air Weight	TVD Air Weight	Drlg Mud Weight	Mud Gradient	Cmt Weight	Cmt Gradient	Frac Gradient	Gas Gradient
9 5/8"	3480	3480	J55	40	LTC	2,570	3,950	520,000	630,000	139,200	139,200	9.00	0.47	13.70	0.71	0.70	0.11

SH Safety Factor Collapse	1.20	Mud	Collapse / TVD * MG	1.58	Actual Safety factor
	1.20	Cement	Collapse / TVD * CG - MG	3.02	
SH Safety Factor Burst	1.30	Mud	Burst / TVD * FG - GG	1.92	
SH Saftey Factor Conn	1.80	Top Joint	Conn Yd / MD * Wt	3.74	
SH Safety Factor Body	2.00	Top Joint	Body Yd / MD * Wt	4.53	

	Burst	Collapse	Joint	
Per BLM	1.000	1.125	1.600	(Dry)
			1.800	(Bouyed)

Production

Csg Size	Set Depth TVD	Set Depth MD	Grade	Weight	Conn	Collapse	Burst	Conn Yield	Body Yield	MD Air Weight	TVD Air Weight	Drlg Mud Weight	Mud Gradient	Cmt Weight	Cmt Gradient	Frac Gradient	Gas Gradient
5 1/2"	8594	19296	P110	20	Atlas BK	11,100	12,640	667,000	641,000	385,920	171,880	9.50	0.49	13.05	0.68	0.70	0.11

SH Safety Factor Collapse	1.20	Mud	Collapse / TVD * MG	2.61	Actual Safety factors
	1.20	Cement	Collapse / TVD * CG - MG	7.00	
SH Safety Factor Burst	1.30	Mud	Burst / TVD * FG - GG	2.49	
SH Saftey Factor Conn	1.80	Top Joint	Conn Yd / MD * Wt	1.73	Conn Yd @ CurveTVD 3.88
SH Safety Factor Body	2.00	Top Joint	Body Yd / MD * Wt	1.66	Body Yd @ Curve TVD 3.73

Actual Safety Factors

	Burst	Collapse	Joint	
Per BLM	1.000	1.125	1.600	(Dry)
			1.800	(Bouyed)

Minimum MU Torque	6,000	ftlbs
Maximum MU Torque	17,250	ftlbs
Optimum MU Torque	8,300	ftlbs
Max Operating Torque	19,550	ftlbs
Yield Torque	23,000	ftlbs

Casing Designs

Crazy Horse 03 - 04 Fed Com # 4H

Surface

Csg Size	Set Depth TVD	Set Depth MD	Grade	Weight	Conn	Collapse	Burst	Conn Yield	Body Yield	MD Air Weight	TVD Air Weight	Drlg Mud Weight	Mud Gradient	Cmt Weight	Cmt Gradient	Frac Gradient	Gas Gradient
20"	350	350	J55	94	BTC	520	2,110	1,402,000	1,480,000	32,900	32,900	9.00	0.47	14.80	0.77	0.70	0.11

SH Safety Factor Collapse	1.20	Mud	Collapse / TVD * MG	3.17	Actual Safety factor
	1.20	Cement	Collapse / TVD * CG - MG	4.93	
SH Safety Factor Burst	1.30	Mud	Burst / TVD * FG - GG	10.22	
SH Saftey Factor Conn	1.80	Top Joint	Conn Yd / MD * Wt	42.61	
SH Safety Factor Body	2.00	Top Joint	Body Yd / MD * Wt	44.98	

Per BLM	Burst	Collapse	Joint	
	1.000	1.125	1.600	(Dry)
			1.800	(Bouyed)

Int 1

Csg Size	Set Depth TVD	Set Depth MD	Grade	Weight	Conn	Collapse	Burst	Conn Yield	Body Yield	MD Air Weight	TVD Air Weight	Drlg Mud Weight	Mud Gradient	Cmt Weight	Cmt Gradient	Frac Gradient	Gas Gradient
13 3/8"	1680	1680	J55	54.5	BTC	1,130	2,730	909,000	853,000	91,560	91,560	10.00	0.52	14.20	0.74	0.70	0.11

SH Safety Factor Collapse	1.20	Mud	Collapse / TVD * MG	1.29	Actual Safety factor
	1.20	Cement	Collapse / TVD * CG - MG	3.08	
SH Safety Factor Burst	1.30	Mud	Burst / TVD * FG - GG	2.75	
SH Saftey Factor Conn	1.80	Top Joint	Conn Yd / MD * Wt	9.93	
SH Safety Factor Body	2.00	Top Joint	Body Yd / MD * Wt	9.32	

Per BLM	Burst	Collapse	Joint	
	1.000	1.125	1.600	(Dry)
			1.800	(Bouyed)

Int 2

Csg Size	Set Depth TVD	Set Depth MD	Grade	Weight	Conn	Collapse	Burst	Conn Yield	Body Yield	MD Air Weight	TVD Air Weight	Drlg Mud Weight	Mud Gradient	Cmt Weight	Cmt Gradient	Frac Gradient	Gas Gradient
9 5/8"	3480	3480	J55	40	LTC	2,570	3,950	520,000	630,000	139,200	139,200	9.00	0.47	13.70	0.71	0.70	0.11

SH Safety Factor Collapse	1.20	Mud	Collapse / TVD * MG	1.56	Actual Safety factor
	1.20	Cement	Collapse / TVD * CG - MG	3.02	
SH Safety Factor Burst	1.30	Mud	Burst / TVD * FG - GG	1.92	
SH Saftey Factor Conn	1.80	Top Joint	Conn Yd / MD * Wt	3.74	
SH Safety Factor Body	2.00	Top Joint	Body Yd / MD * Wt	4.53	

Per BLM	Burst	Collapse	Joint	
	1.000	1.125	1.600	(Dry)
			1.800	(Bouyed)

Production

Csg Size	Set Depth TVD	Set Depth MD	Grade	Weight	Conn	Collapse	Burst	Conn Yield	Body Yield	MD Air Weight	TVD Air Weight	Drlg Mud Weight	Mud Gradient	Cmt Weight	Cmt Gradient	Frac Gradient	Gas Gradient
5 1/2"	8594	19296	P110	20	Atlas BK	11,100	12,640	667,000	641,000	385,920	171,880	9.50	0.49	13.05	0.68	0.70	0.11

SH Safety Factor Collapse	1.20	Mud	Collapse / TVD * MG	2.61	Actual Safety Factors
	1.20	Cement	Collapse / TVD * CG - MG	7.00	
SH Safety Factor Burst	1.30	Mud	Burst / TVD * FG - GG	2.49	
SH Saftey Factor Conn	1.80	Top Joint	Conn Yd / MD * Wt	1.73	
SH Safety Factor Body	2.00	Top Joint	Body Yd / MD * Wt	1.66	

Conn Yd @ CurveTVD	3.88	Actual Safety Factors	
Body Yd @ Curve TVD	3.73		

Per BLM	Burst	Collapse	Joint	
	1.000	1.125	1.600	(Dry)
			1.800	(Bouyed)

Minimum MU Torque	6,000	ftlbs
Maximum MU Torque	17,250	ftlbs
Optimum MU Torque	8,300	ftlbs
Max Operating Torque	19,550	ftlbs
Yield Torque	23,000	ftlbs

Casing Designs

Crazy Horse 03 - 04 Fed Com # 4H

Surface

Csg Size	Set Depth TVD	Set Depth MD	Grade	Weight	Conn	Collapse	Burst	Conn Yield	Body Yield	MD Air Weight	TVD Air Weight	Drlg Mud Weight	Mud Gradient	Cmt Weight	Cmt Gradient	Frac Gradient	Gas Gradient
20"	350	350	J55	94	BTC	520	2,110	1,402,000	1,480,000	32,900	32,900	9.00	0.47	14.80	0.77	0.70	0.11

					Actual Safety Factor
SH Safety Factor Collapse	1.20	Mud	Collapse / TVD * MG	3.17	
	1.20	Cement	Collapse / TVD * CG - MG	4.93	
SH Safety Factor Burst	1.30	Mud	Burst / TVD * FG - GG	10.22	
SH Saftey Factor Conn	1.80	Top Joint	Conn Yd / MD * Wt	42.61	
SH Safety Factor Body	2.00	Top Joint	Body Yd / MD * Wt	44.98	

Per BLM	Burst	Collapse	Joint	
	1.000	1.125	1.600	(Dry)
			1.800	(Bouyed)

Int 1

Csg Size	Set Depth TVD	Set Depth MD	Grade	Weight	Conn	Collapse	Burst	Conn Yield	Body Yield	MD Air Weight	TVD Air Weight	Drlg Mud Weight	Mud Gradient	Cmt Weight	Cmt Gradient	Frac Gradient	Gas Gradient
13 3/8"	1680	1680	J55	54.5	BTC	1,130	2,730	909,000	853,000	91,560	91,560	10.00	0.52	14.20	0.74	0.70	0.11

					Actual Safety Factor
SH Safety Factor Collapse	1.20	Mud	Collapse / TVD * MG	1.29	
	1.20	Cement	Collapse / TVD * CG - MG	3.08	
SH Safety Factor Burst	1.30	Mud	Burst / TVD * FG - GG	2.75	
SH Saftey Factor Conn	1.80	Top Joint	Conn Yd / MD * Wt	9.93	
SH Safety Factor Body	2.00	Top Joint	Body Yd / MD * Wt	9.32	

Per BLM	Burst	Collapse	Joint	
	1.000	1.125	1.600	(Dry)
			1.800	(Bouyed)

Int 2

Csg Size	Set Depth TVD	Set Depth MD	Grade	Weight	Conn	Collapse	Burst	Conn Yield	Body Yield	MD Air Weight	TVD Air Weight	Drlg Mud Weight	Mud Gradient	Cmt Weight	Cmt Gradient	Frac Gradient	Gas Gradient
9 5/8"	3480	3480	J55	40	LTC	2,570	3,950	520,000	630,000	139,200	139,200	9.00	0.47	13.70	0.71	0.70	0.11

					Actual Safety Factor
SH Safety Factor Collapse	1.20	Mud	Collapse / TVD * MG	1.58	
	1.20	Cement	Collapse / TVD * CG - MG	3.02	
SH Safety Factor Burst	1.30	Mud	Burst / TVD * FG - GG	1.92	
SH Saftey Factor Conn	1.80	Top Joint	Conn Yd / MD * Wt	3.74	
SH Safety Factor Body	2.00	Top Joint	Body Yd / MD * Wt	4.53	

Per BLM	Burst	Collapse	Joint	
	1.000	1.125	1.600	(Dry)
			1.800	(Bouyed)

Production

Csg Size	Set Depth TVD	Set Depth MD	Grade	Weight	Conn	Collapse	Burst	Conn Yield	Body Yield	MD Air Weight	TVD Air Weight	Drlg Mud Weight	Mud Gradient	Cmt Weight	Cmt Gradient	Frac Gradient	Gas Gradient
5 1/2"	8594	19296	P110	20	Atlas BK	11,100	12,640	667,000	641,000	385,920	171,880	9.50	0.49	13.05	0.68	0.70	0.11

					Actual Safety Factors
SH Safety Factor Collapse	1.20	Mud	Collapse / TVD * MG	2.61	
	1.20	Cement	Collapse / TVD * CG - MG	7.00	
SH Safety Factor Burst	1.30	Mud	Burst / TVD * FG - GG	2.49	
SH Saftey Factor Conn	1.80	Top Joint	Conn Yd / MD * Wt	1.73	
SH Safety Factor Body	2.00	Top Joint	Body Yd / MD * Wt	1.66	

Conn Yd @ CurveTVD	3.88	Actual Safety Factors
Body Yd @ Curve TVD	3.73	

Per BLM	Burst	Collapse	Joint	
	1.000	1.125	1.600	(Dry)
			1.800	(Bouyed)

Minimum MU Torque	6,000	ftlbs
Maximum MU Torque	17,250	ftlbs
Optimum MU Torque	8,300	ftlbs
Max Operating Torque	19,550	ftlbs
Yield Torque	23,000	ftlbs

AMERICAN SAFETY SERVICES INC

CL&F Operating LLC

Crazy Horse 03-04 Fed Com #4H

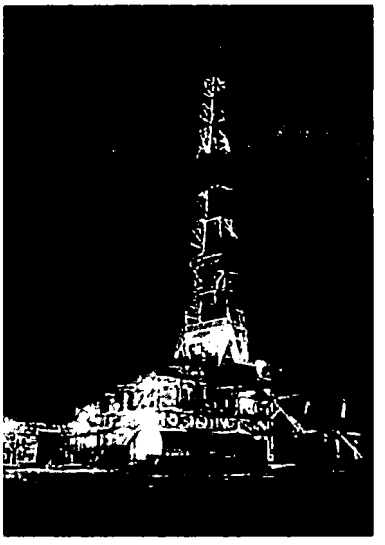
SURFACE LOCATION 430' FNL & 2135' FEL

SECTION 5 T20S R30E

EDDY COUNTY, NEW MEXICO

Latitude: N 32.608469 *Longitude:* W -103.992511

"CONTINGENCY PLAN"



422 West Main street suite 6

Artesia, New Mexico

(575)746/1096 (432)363/0198 fax

WELL CONTROL EMERGENCY RESPONSE PLAN

CL&F OPERATING LLC

CUSTOMER COPY

Permit Number:	**Date issue:**	**District**- NM
API #:	**Form W-1 Rec-**	**County**-EDDY
Type: New Drill	**ACRES-**	

Operator CL&F Operating LLC	

Lease Name: Crazy Horse 03-04 Fed Com **Well Number:** 4H

Location: **Total Depth:** TVD 8471' MDTD 19296'

Section: SECTION 5 T20S R30E **Abstract:**

Surface Location: 430' NORTH 2135' EAST **Dist to Nearest Lease Line** 430'

Dist to Nearest Well:

Directions: Approximately 15 miles NE of Carlsbad, NM.

THIS PERMIT IS GRANTED PURSUANT TO BUREAU OF LAND MANAGEMENT 43 CFR 3160 ONSHORE OIL AND GAS ORDER NO. 6 HYDROGEN SULFIDE OPERATIONS

Permit Plat:

CL&F Operating LLC

Crazy Horse 03-04 #4H

Location in Survey: 400' FNL & 2135' FEL in SECTION 5 T20S R30E

EDDY COUNTY, NEW MEXICO

This is a Hydrogen Sulfide field and shall be drilled in accordance with BLM ONSHORE ORDER NO. 6

Information in this section was provided to American Safety Services Inc. by Sierra-Hamilton.

CL&F OPERATING LLC Emergency Contact List

Division & Title	Name	Office	Residence	Cellular
Drilling Operations	Russ Ginanni	432.425.7450	432.218.6473	432.425.7450
Wellsite Supervisor	TBD			
Field Superintendent	TBD			
Engineer	TBD			
Drilling Manager	Mark Stover	281.873.9378		281.352.0391
Geologist	Mark Parrott	281.873.3033		713.560.7707
Land	Allison Gill	281.873.3013		337.302.7188
Public Safety	**Facility**	**Contact**	**Direct**	**Cellular**

EDDY COUNTY:				
Sheriff Department	Artesia, NM		575-746-9888	
Fire Department	Artesia, NM		575-746-2701	
Ambulance	Artesia, NM		911	
State Police	Artesia, NM		575-746-2703	
City Police	Artesia, NM		575-746-2703	
Sheriff Department	Carlsbad, NM		575-887-7551	
Fire Department	Carlsbad, NM		575-885-2111	
Ambulance	Carlsbad, NM		911	
State Police	Carlsbad, NM		575-885-3137	
City Police	Carlsbad, NM		575-885-2111	
Hospital	Carlsbad, NM		575-887-4121	
Flight for Life	CARLSBAD,NM		800.242.6199	
AEROCARE	ARTESIA, NM		800.800.0900	
Latitude	**N 32.608469**			
Longitude	**W -103.992511**			
Safety Contractor	**Name**	**Office**	**Residence**	**Cellular**
American Safety		575.746.1096		
Safety Supervisor NM	Tell Montoya	575.746.1096	575.749.0009	432.653.3866
Safety Manager NM	Andres Holguin	575.746.1096	575.202.2720	575.513.5033
Owner	Kevin Hokett	575.746.1096	432.363.3911	432.208.4372

DIRECTIONS: FROM CARLSBAD NM TAKE HWY 62/180 EAST FOR 16 MILES TO HWY 360 TURN NORTH FOR 8 MILES TO CR 235 (CURRY COMB RD.) TURN LEFT (WEST) FOR 1.5 MILES TO LEASE ROAD ON LEFT FOLLOW LEASE RD TO LOCATION.

TABLE OF CONTENTS

Additional H2s information is included at the end of the plan.....

Prepared by:

American Safety Services Inc

422 west main street suite 6

Artesia, New Mexico 88210

Executive Summary

This plan is intended to document **CL&F Operating LLC** procedures for dealing with well control emergency situations. American Safety Services Inc encourages taking all preventative measures required to reduce the probability of a well control incident from occurring. If it does occur, however, this pre-developed strategic action plan can be implemented quickly and decisively in response to the emergency. It is intended to supplement the **CL&F Operating LLC** Emergency Procedure and other similar plans.

This Well Control Emergency Response Plan (WCERP) was formulated during low-stress, non-emergency conditions. It is our experience that those response actions hastily grasped during the event suffer from the panic, confusion and indecisiveness of persons not normally involved with high-stress situations.

In any emergency response plan the health and safety of people is the prime concern. Generally, persons not familiar with highly specialized oil well firefighting, capping and dealing with the high pressures and flow rates associated with blow-outs should not attempt to handle one of these events. Guidelines for early response procedures are included to mitigate risks, losses and damages, however.

There are three incident levels for which an emergency well control response is required. These levels are based on the severity and potential impacts of the incident. They are simply labeled Level 1, Level 2 and Level 3, with Level 1 being the least serious and Level 3 the worst. Level 3 denotes a complete loss of well control with no opportunity for regaining it using equipment and procedures available on-site. These correspond roughly to the Emergency Categories listed in the General Emergency Procedure.

In dealing with a well control emergency response, each person has duties and responsibilities. All critical tasks must be delegated to one person with minimal overlap. Thus, each responsibility is handled effectively without undue duplication.

The on-site organization is supervised and controlled by the Team Leader for the rig involved in the blow-out. The overall situation is controlled by the Manager over the area in which the blowout occurs who will serve as the Incident Commander. For most operations this will be the Manager (Drilling Operations) or the Manager (Exploration). These are individuals with long experience who are familiar with

CL&F Operating LLC's drilling and workover operations, corporate internal structure, corporate culture, personnel, various support services, and the capabilities of all emergency response groups including American Safety Services Inc. Each commander is assisted by several deputies, each of whom deals with responsibilities in their areas of expertise. This provides the most efficient and effective method of dealing with the emergency, protecting human lives and health, mitigating damages, and protecting the environment.

Response Levels

This plan involves three types of incidents classified as Level 1, Level 2 and Level 3 depending on the seriousness of the incident. A **Level 1** incident involves an uncomplicated kick that requires only normal operating procedures by the

CL&F Operating LLC Rig Supervisor (Company Man) and the drilling crew with notification to the Team Leader (TL) having supervisory authority over that rig. A **Level 2** incident involves a complication of some type that requires extraordinary measures to be taken by the Company Man, drilling contractor personnel, the TL, Sr. Drilling Engineer and, in some instances, American Safety Services Inc to successfully deal with the situation. A **Level 3** incident involves the complete loss of well control. Response to this type incident requires declaration of a Major Incident, activation of the Well Control Organization within **CL&F Operating LLC** and all the personnel listed below to provide On-Scene Command at the site, Headquarters Control, Support Services and Operations Engineering Support.

Level 1 Well Control Incidents

Characteristics

Definition A Level 1 incident is defined as a well control problem that occurs during drilling or workover operations for which formal or informal standard operating procedures (SOPs) exist to control the event. There are no injuries or fires associated with this type incident and the situation can be brought under control using only the resources available on-site.

Action Requirement	These SOPs are executed by the rig crewmembers under the supervision of the toolpusher and **CL&F Operating LLC** Drilling Supervisor. The appropriate Team Leader is notified about the incident and the actions taken to control it. Support is rarely required from Drilling Services or from the well control services contractor unless the event escalates to a more serious level.

Examples

Drilling- related incidents	• An uncomplicated kick • Complete loss of circulation (e.g., >500 bph) with hydrocarbon zone open • Leak in casing with a permeable hydrocarbon zone open
Completion- or Workover- related incidents	• Unable to kill a well to start a workover • Tripping with high loss rate (e.g., >250 bph) • A kick taken after the well is killed • Hole in surface/intermediate/production casing due to corrosion or damage • Swabbing the well in during pipe tripping
Production-related incidents	• Pressure on production casing that cannot be bled down • Small leak on master valve, swab valve of wing valve on tree • Erosion and failure of the vent line to the pit, tank or test unit • Master valve frozen or stem broken with valve in closed position
Simultaneous operations incidents	• Moving in rig or workover unit with wellhead damage due to collision • Wellhead damage during heavy lift operations while installing BOPs, wireline lubricator, coiled tubing, etc. • Close approach/near miss drilling past existing well(s) from same drilling pad while drilling new well

Additional incidents

- Chemical stocks for mixing kill weight mud fall below pre-determined adequate levels
- Kick tolerance falls below pre-determined level (e.g., 2 ppg or 24 bbls)
- Casing wear exceeds acceptable amount
- Failure of critical equipment (e.g., main power system on rig)
- Severe lost circulation and continued mud losses to the loss zone
- Impending severe weather
- Flow after cementing intermediate casing, production casing, or production liner

Response Actions

Responsible party Rig Supervisor

Process overview The following table provides an overview of the actions required during a Level 1 well control incident:

Step	Action
1	• Evaluate the situation • Determine that the incident is Level 1
2	Notify all personnel on location
3	Immediately execute initial response action based on standard operating procedures
4	Notify Team Leader
5	Continue using standard operating procedures until situation is resolved

Level 2 Well Control Incident

Characteristics

Definition

A Level 2 emergency can be defined as an abnormal well control event involving some sort of complication in which:

- Well control has **not** been lost at the surface
- Resources beyond the normal capabilities of the rig crew or production operations staff may be required such as unfamiliar or complex well control procedures
- Outside well control consultation, materials, special equipment or personnel may be required

There are no injuries or fires associated with this incident level since control has not been lost. The situation is not sufficiently threatening to declare a Major Emergency or to activate an Incident Command System to deal with the situation.

Action Required

Trained drilling staff should be able to handle a Level 2 emergency in the normal course of drilling or working over a well by:

- Removing the complication, thereby reducing the incident severity to Level 1 status, then using SOPs to circulate out the kick and resolve the problem
- Prepare a specialized procedure to control the incident with the complication remaining throughout the procedure

It is important that action be taken quickly to resolve the situation. Level 2 incidents are more serious than Level 1 incidents and they can escalate quickly to a complete loss of well control (i.e., a Level 3 incident). Even if control is not lost at the surface, an underground blowout or other similar event can occur if measures are not taken quickly.

Examples

Drilling-related incidents

- Kick with no pipe in the hole
- Kick with the bit off the bottom
- Drill collars or other BHA components across the pipe rams, well shut in on the annular preventer
- Kick while fishing, pipe off bottom, fish in hole
- Kick with the bit off bottom, pipe stuck
- Kick with very high intensity or large volume taken (high shut-in pressure)

- Kick with simultaneous losses (above or below the bit)
- Kick with bit or drill string plugged
- Kick with critical equipment failure (e.g., pumps, electrical system, etc.)
- Kick with hole in drill string
- Kick without sufficient chemicals to weight up mud
- Kick with wireline in the hole
- Shallow gas kick with diversion
- Low volume flow after cementing surface casing

Level 1 incidents escalating to a Level 2 while circulating out a kick

- Exceeding maximum allowable surface pressure while circulating kick out of the open hole section (before kick reaches the casing shoe)
- Suspected underground cross-flow requiring further diagnosis
- Small leak in BOP or wellhead
- Leak in stab-in safety valve through ball seat and/or operating system seal
- Gas hydrate (ice) plug in circulation system
- Choke plugged or cut out
- Washout in drill string or in surface equipment
- Dropped drill string
- Sheared drillpipe
- Loss of BOP control function

Completion-or workover- related incidents

- Fishing operation performed under pressure
- Potential underground crossflow
- Leak in wireline BOP, lubricator and/or tree valves
- Fishing or milling operation performed under pressure with coiled tubing or snubbing unit where loss of well control is imminent

Production-related incidents

- Production casing leak with tubing leak
- Leak in master valve with failure of ESD valve control
- Leak in tubing with casing valve leak
- Tree component eroded to critical limit by sand
- Surface safety valves do not effectively shut-off flow

Simultaneous operations incidents

- Drilling into existing well casing from new well
- Casing leak develops during workover operations
- Damage to tree, wellhead or casing near surface due to heavy dropped object
- Motor vehicle collision resulting in severe damage to tree or wellhead
- Inability to access casing annulus due to inoperative (stuck) side outlet valve on wellhead

Response Actions

Responsible party Rig Supervisor

Process overview The following table provides an overview of the actions required during a Level 2 well control incident:

Step	Action
1	Evaluate the situation; determine that the situation constitutes a Level 2 Incident classification and advise the Team Leader
2	Down man rig; remove all non-essential personnel and equipment from the site
3	Execute initial response actions to protect personnel, the rig, the well and the reservoir
4	Develop a procedure to remove the complication and deal with the situation using SOPs
5	If complication cannot be removed, prepare a non-standard procedure to deal with the incident

6	Consult with the appropriate Team Leader, Drilling Engineer and well control specialists, if needed
7	Obtain approval for execution of either action plan from the Team Leader
8	Execute approved procedure to resolve situation (may require the participation of well control specialists to assist)
9	Review outcome of procedure with the Team Leader

Level 3 Well Control Incidents

Characteristics

Definition A Level 3 emergency denotes a **total loss of well control** with no opportunity to restore it using all the resources available on-site.

Action Required Level 3 Incidents require the declaration of a Major Emergency and the activation of a fully-functional Incident Command System to effectively deal with the situation.

Discussion

A Level 3 Incident is, quite simply, a blowout. These incidents are equivalent to Category 2 or Category 3 Emergencies, depending on the severity and circumstances involved in the blowout. The Well Control Organization must be activated upon determining that the well is out of control and measures must immediately be taken to protect people, the environment and material assets in that order.

These emergencies, although serious at the outset, have the potential to escalate further during control procedures. Such escalation may cause serious structural damage or total loss of the rig, BOP stack and wellhead due to explosion, fire, or cratering. Other nearby wells may also be damaged due to underground crossflow and erosion caused by the blow-out. This could result in multiple, simultaneous well control problems on several wells. Clearly, prompt decisive action is needed to avoid this situation.

The response to a Level 3 Incident can be divided into stages for clarity. Different activities, personnel, equipment and safety issues exist at each stage. These are discussed more fully below:

Phase 1: Initial response

Phase 1 is the initial reaction to the well control emergency. It commences at the outset of the Level 3 Incident when it is clear that control is lost and cannot be regained. Actions such as evacuation, exclusion zone establishment and site isolation occur during this stage. Preliminary work to provide water for fire fighting and setting on-scene command facilities at the site are included. It ends when well control intervention operations site begin including fire extinguishment operations.

Phase 2: Well control operations

Phase 2 is the on-site operations phase of the well control emergency. This phase begins when actual well control actions are initiated at the site using surface intervention techniques. It ends when the well has been brought under control by any means. This phase is concluded when the Incident Commander officially declares the emergency resolved, and well salvage and recovery operations begin.

Phase 3: Relief well planning and drilling

Phase 3 is the relief well planning and drilling phase of the well control emergency. It begins when the Incident Commander approves a relief well as part of the well control project. It ends when the blow-out well is intersected and killed by pumping through the relief well or when the well is brought under control using surface intervention techniques and the Incident Commander declares the emergency resolved. Note that Phase 2 and Phase 3 operations can occur simultaneously depending on the circumstances of the blowout event.

Phase 4: Well recovery operations	Phase 4 is the recovery phase of operations on the now dead blow-out well. This phase begins when the well or blow-out is brought under control. It ends when normal drilling, workover or production operations resume or when well is plugged and abandoned.
Phase 5: Post-incident evaluation	Phase 5 involves evaluation of the incident following resolution of the emergency situation. This phase begins at or near the conclusion of well recovery operations. It ends with the submission of the final incident report to **CL&F Operating LLC** management.

Examples

Drilling-related Incidents

- Underground flow with BOP stack closed and gas, oil or water broaches to the surface
- Uncontrolled flow to surface through drillpipe with no means of shutting off the flow
- Gas or oil comes to surface through the drillpipe x casing annulus and the BOP cannot control the flow
- Uncontrolled flow from BOP stack with drill string out of the hole and unable to close blind rams
- Drilling rig on fire due to blowout
- Surface failure of choke line, kill line or choke manifold and well cannot be shut-in

Workover-related Incidents

- Loss of BOP function
- Uncontrolled flow to surface through tubing with no means of shutting off flow
- Gas or oil comes to surface through casing x tubing annulus and stack does not shut off flow
- Uncontrolled flow from BOP stack with no tubing in the hole and unable to close blind rams
- Completion rig on fire due to blowout
- Failure of existing wellhead component with no way to stop the flow
- Collision, irreparable damage to wellhead and leak during rig move in or move out

Production-related Incidents

- Collision between vehicle and wellhead resulting in major leak
- Wellhead/tree on fire with no way to shut off flow
- Mechanical failure of master valve, wing valve or flowline with no means to stop the flow

Simultaneous operations Incidents

- Falling object from rig damages wellhead or flowline resulting in catastrophic leak
- Gas cloud from major leak prevents access to wellhead or tree to shut-in well

Response Actions

Responsible party Rig Supervisor

Process overview The following table provides an overview of the actions required by the Rig Supervisor or Sr. CL&F Operating LLC employee during a Level 3 well control incident:

Step	Action
1	Evaluate situation and determine that well control is lost with no means to restore control
2	Order all personnel at the site to a designated Safe Area
3	Account for all personnel on the site. If all personnel cannot be accounted for, organize a Search and Rescue Party and attempt to locate all personnel if it is safe for them to do so
4	Determine injuries, if any, and provide first aid. Assess the need for air ambulance evacuation of injured persons. Assign personnel to mark the landing site for helicopter in the Safe Area
5	Notify the Team Leader about the situation and request declaration of a Major Emergency
6	Establish Exclusion Zone around site and mark zone boundary using available supplies and materials
7	Post a watch to secure the rig and prevent unauthorized persons from entering the Exclusion Zone
8	Notify and evacuate nearby rigs, homes, businesses or other facilities if they are affected by the blow-out plume

9	Down man the rig and move non-essential personnel away from the area. **Note: Do not release the rig crew until they are interviewed regarding events leading up to the blowout incident.**
10	Request that the local Fire Station provide equipment and personnel to contain the fire and protect nearby assets with water spray, if it is safe to do so. **Note: Do not attempt to extinguish fire at rig; wait for well control specialists to enter the Exclusion Zone.**
11	Complete *Initial Status Report* and fax to American Safety Services Inc. 432-363-0198
12	Remain on the site and coordinate support services needed for initial well control efforts; await the arrival of the Team Leader (On-Scene Commander)
13	Contain pollution/oil spill, if possible and if safe to do so
14	Monitor well conditions, keep a log recording all observations and report any changes to Team Leader (if not yet on-site) by radio and to CWC via fax or phone
15	Brief American Safety Services Inc First Responder upon arrival at the site; assist First Responder in determining if boundaries of Exclusion Zone should be moved
16	Remain on-site to assist with well control operations

Duties and Responsibilities, Rig Supervisor

Reports to:	On-Scene Commander

Team Authority	Job Title
Team Member	Rig Supervisor (Company Man)

Pre-Spud

Responsibility
Daily duties on location include: • Conducts safety meetings • Designates two Safe Areas (Muster Areas) for emergencies • Maintains census of all personnel on site • Reviews his duties and the *Initial Response Checklist*
Maintains supply of *Communications Record* at the wellsite
Maintains a current copy of **CL&F Operating LLC** General Emergency Procedure at the site and in toolpusher's quarters
Provides training to rig personnel on required response steps in each type of incident including mustering at designated Safe Areas and evacuation, if required. Periodically runs Search and Rescue exercises to ensure team readiness.

Level 1

Well control incident

Responsibility
Determines that the incident is a Level 1 incident; responds quickly to the situation before it can escalate to a more serious level: • Obtains data necessary for response • Prepares a procedure for dealing with the incident • Follows standard operating procedures to deal with the situation • Notifies the Team Leader about the incident and steps taken to resolve it

Level 2

Well control incident

Responsibility
Determines that the situation is a Level 2 incident and defines the complication involved; responds to the situation to keep it from escalating to a more serious incident level: • Determines the best way to remove the complication, thus lowering the incident to Level 1

	• Contacts the Team Leader, Sr. Drilling Engineer and possibly American Safety Services Inc for consultation about the problem • Prepares a procedure to remove the complication, lower the severity level and deal with the incident using SOPs; alternatively, jointly prepares a procedure to deal with the situation without removing the complication • Reviews procedure with Team Leader and obtains approval to proceed • Advises Team Leader of the outcome

Level 3	**Responsibility**
Well control incident	Determines that the situation constitutes a complete loss of well control that cannot be regained using assets on-site

Level 3	**Responsibility**
Phase 1: Initial Response	Executes steps outlined in the *Initial Response Checklist* to deal quickly and decisively with the situation at the wellsite; maintains records of all contacts and communications using the *Communications Record,* if possible
	With the assistance of the Toolpusher: • Musters all personnel on the rig to one of the designated Safe Areas • Accounts for all personnel at each Safe Area by comparing personnel at the muster point to the current on-site personnel census • Determines the extent of any injuries, provides emergency first aid treatment and assesses the need for air evacuation of injured persons on an emergency basis • Locates a safe landing zone for emergency aircraft to evacuate injured personnel, if required, and marks it for med-evac helicopter • Notifies Team Leader about situation and recommends classification of event as Level 3 Incident; provides initial report on event and current activities • Notifies nearby rigs, facilities, residences, businesses and other persons that could be at risk from the blow-out • Once site is evacuated, establishes Exclusion Zone around the well/rig, marks with on-hand materials and posts a watch to keep everyone out of the Exclusion Zone **NOTE: Do not re-enter the Exclusion Zone for any reason until well control specialists arrive to assist.** • Meets with local security personnel and requests they secure and restrict access to the blow-out site • Requests assistance to evacuate nearby rigs, facilities, residences and businesses that may be affected by the blow-out

• If site evacuation is not required, contains the fire and protect assets by eliminating possible ignition sources and using a protective water spray by local fire department, if available **Note: Do not attempt to extinguish the fire.** • Completes *Initial Status Report* and faxes to: American Safety Services Inc - Fax 432-363-0198 • Contains pollution and/or spill, if possible without exposing personnel to danger or contamination • Monitors well conditions and maintains a log. Reports any significant changes in blow-out behavior to Team Leader • Briefs the American Safety Services Inc First Responder upon his arrival at the site • Relinquishes control of the wellsite to the On-Scene Commander (Team Leader) upon his arrival • Remains at the site and assists in well control efforts, as needed

Level 3	**Responsibility**
Phase 2: Well control	Assists with well control operations and support, as needed
	Prepares a detailed report of incidents immediately preceding the blow-out and provides to the On-Scene Incident Commander; reviews the report's content with the American Safety Services Inc Team Leader

Level 3	**Responsibility**
Phase 3 Relief well	Assists in well control planning, as needed, from his/her knowledge of the local area
	Visually surveys prospective relief well sites and roads for obstructions such as high lines, pipelines, unsatisfactory topography and other problems; provides details on each site to the Relief Well Design Team
	Provides information to the Rig Supervisor on the relief well rig and others supporting relief well drilling operations regarding local drilling conditions and any expected problems while drilling relief well and making intercept
	Assists On-Scene Commander to co-ordinate activities during relief well drilling

Level 3	**Responsibility**
Phase 4: Well recovery	Assists in planning well recovery work as directed by the On-Scene Commander
	Assists in developing recommendation to cease recovery operations, abandon blow-out well and substitute relief well after sidetracking

	Supervises well recovery work on the blow-out well if feasible, or abandonment if not

Level 3	Responsibility
Phase 5: Post-incident evaluation	Assists On-Scene Commander in preparing post-incident report and evaluation from field standpoint; includes his summary of events leading up to the incident and review of initial response efforts

Initial Risk Assessment

The Rig Supervisor will be the first to assess risks and determine the boundaries of the Exclusion Zone. The Exclusion Zone determines the minimum safe distance away from the blown-out well. It is based primarily on the concentration of combustible gas and/or toxic gas in the atmosphere. In general, the Exclusion Zone should be positioned according to the following:

Hazard	Maximum Limit
Combustible gas	10% of LEL*
Hydrogen Sulfide	10 ppm
Flammable liquid	10 bbls
Noise	85 dB

*Lower Explosive Limit

Other hazards such as proximity to vehicular traffic, sources of ignition, threats to production facilities and other risks must be evaluated and steps taken to ensure that the Exclusion Zone boundary is set far enough away from the blow-out site to reduce risks to all personnel to an acceptable level.

Once the Exclusion Zone Boundaries are set, no person should enter the area without special training, equipment and companion personnel. Often in such situations, persons not familiar with the potential of sudden catastrophic failures inside the Exclusion Zone venture too close to the blow-out in search of fellow workers, valuables left behind during the evacuation or curiosity. Sometimes, these mistaken few become victims if a failure, such as a spontaneous ignition of the plume, occurs while they are inside the Exclusion Zone.

Boundaries of the Exclusion Zone are not firm, and may need to be moved from time to time depending on several conditions such as:

- Flowrate from the well (increasing or decreasing)
- Zone of flow (increased H_2S concentration in the plume)
- Changes in atmospheric conditions (reduced air temperature, wind velocity, wind direction, atmospheric inversion, etc.)
- Hydrocarbon runoff with collection offsite
- Ignition of the plume
- Self-extinguishment of a fire
- Changes in boundary threshold limits

Risk management in the early stages of a blowout is accomplished primarily by prohibiting access to the site. Separation of potential victims from potential hazards is a very effective method of mitigating risks. In the case of Exclusion Zone boundary establishment, personnel are simply kept away from all hazards.

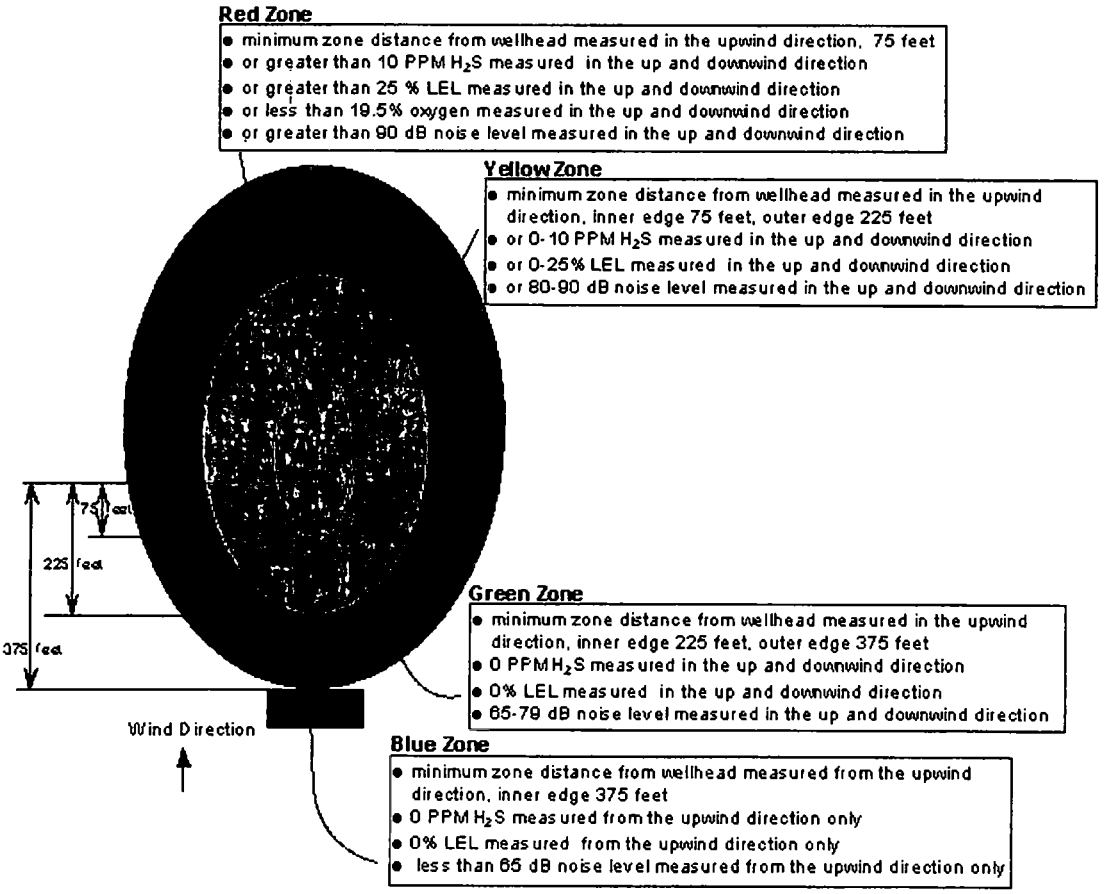
Situation Awareness

This is an area of human factors involving perceptions of people involved in high stress situations. Basically, it is the assessment of the person's concepts and thought processes when multiple data inputs are involved in an emergency. The best example of this area of study involves jet fighter pilots in combat situations.

In high stress situations the human mind can go into sensory overload easily. Alarms are sounding, warning lights are flashing, and there is normally panic, shouting, and rapid movements. All of these render many persons incapable of determining what information is valid and should be honored, and what inputs are redundant or meaningless and should be ignored.

Work zones have been established to control access to areas in which well control specialists and certain support personnel can function safely. Others that do not fully understand the risks involved are simply not allowed to enter these areas. This has been successful in limiting exposure and consequential injuries to those people with poorly developed situation awareness during well control operations.

Example of Work Zones



Appendix

Appendix A

Initial Response Checklist

Has pressure containment and flow control been completely lost and cannot	Yes ☐	No ☐

be regained?		

If "yes" this is a Level 3 Well Control Incident

Date:	Time:	Well Name & No.:
Drilling Contractor:		Rig Number:
CL&F Operating LLC DRL Supervisor:		**CL&F Operating LLC** Sr. Supervisor:

ACTIONS (Check off as performed)

☐	Evacuate all personnel to designated muster area
☐	Check names at muster area against Check-In Sheet; account for all personnel
☐	If all personnel are **not** at muster area, determine how many personnel are missing, where they were last seen and visually check the area, if possible, to see if they are safe
☐	Activate Search and Rescue Team to recover missing personnel, if required
☐	Provide emergency first aid for any injuries
☐	Determine if emergency medical services and ambulance transport are needed; locate landing site for med-evac helicopter and mark site
☐	Notify nearby rigs or production facilities about potential danger from blow-out
☐	Notify Team Leader about incident; recommend Major Emergency declaration
☐	Establish "Exclusion Zone" around location and mark with available supplies
☐	Secure the area and do not let unauthorized persons inside Exclusion Zone
☐	Contain pollution, if possible
☐	Remain on site pending arrival of Team Leader
☐	Monitor well conditions and report any changes to Team Leader
☐	Brief First Responder upon arrival at location
☐	Assist with well control operations, as needed
☐	

*Do not re-enter the Exclusion Zone unless absolutely necessary until qualified help arrives

**If well is on fire, do not attempt to put the fire out; if well is not on fire, try to keep it from catching on fire

Act quickly and decisively	Wait on instructions
Evacuate the rig or wellsite, if necessary	Hang around the rig
Wait in the Muster Area	Leave the well site
Answer questions asked by **CL&F Operating LLC** Team Leader and well control specialist truthfully	Talk to the press or the public without clearance; don't speculate about the cause of the incident; don't exaggerate
	Be a hero

Appendix B

Initial Status Report

Preliminary Information:

Operator: _____ Well Name & Number: _____

Rig: _____ Company Man: _____

Rig Phone: _____ Cell Phone: _____

Office Phone: _____ Office FAX: _____

Directions to site: _____

Blow-out Information:

Time of blow-out: _____ Well on fire? _____

Operation at time of blow-out: _____

Point of Escape: _____ Est. Flowrate: _____

Type of Fluid: _____ H_2S? Yes ☐ No ☐ CO_2? Yes ☐ No ☐

Height of plume before it ignites? _____ ft Total Height of flame: _____ ft

Mud Weight: _____ ppg MD: _____ ft TVD: _____ ft Last shoe test: _____ EMW @ _____ depth

Rig Condition: _____

BOP Condition: _____ Closing Unit OK? _____

Condition of drill string: _____ TIW valve installed? Yes ☐ No ☐

Response:

Personnel Evacuated? Yes ☐ No ☐ Number Missing: _____

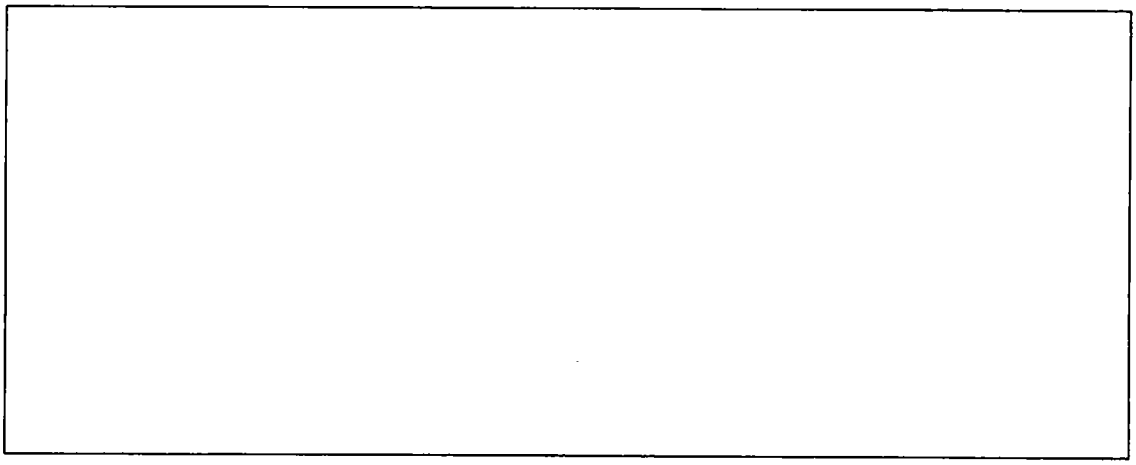
Exclusion Zone set up? Yes ☐ No ☐ Injuries? _____

Nearby rigs notified? Yes ☐ No ☐ Air Ambulance needed/called? Yes ☐ No ☐

Location Secured? Yes ☐ No ☐ Regulatory Agencies notified? Yes ☐ No ☐

Residents evacuated? Yes ☐ No ☐ Pollution contained? Yes ☐ No ☐

Drawing of Location:



Appendix C

Communications Record

Phone Transactions / Time Schedule / Contact Verification

Time	Description of Action	Contact

Hydrogen Sulfide (H2S) Properties and Effects

H2S is an **Extremely Toxic**, Flammable, Explosive and Corrosive Gas. It is heavier than air, paralyses you of smell. Causes breathing to stop and death will result.

At low concentration H2S has the odor of rotten eggs. The smell is very offensive. At slightly high concentration H2S will cause sense of smell to disappear and you are slowly poisoning yourself. At even slightly higher concentrations DEATH will result.

Properties of Hydrogen Sulfide (H2S)

Extremely deadly toxic gas

Colorless

Heavier than air

Burns with a blue flame

Produces Sulphur Dioxide (SO2) when burned (another toxic gas)

Highly corrosive

Irritant skin and eyes

Soluble in water and other liquids

Extremely flammable and explosive.

Hydrogen Sulfide (H2S) Toxicity Chart

Concentrations	**Effects**
Less than 1 PPM	Odor
1-PPM	May cause stress or health symptoms in sensitive people
10-PPM	Permissible Exposure Limit (PEL) Allowed 8 hours exposure without breathing apparatus.
15-PPM	Short Term Exposure Limit (STEL) 15-minute exposure 4 times a day allowed without breathing apparatus.
100-PPM	Immediately Dangerous to Life and Health (IDLH) No exposure allowed without breathing apparatus.
150 – 250 PPM	Loss of smell will result within a few minutes, burning of eyes, throat and coughing.
500-PPM	Destroys sense of reasoning and balance, ceases respiratory function within minutes and death will result.

200-PPM	Unconscious quickly, followed by loss of lung function, heart failure and death if not rescued and treated.
1000-PPM	Immediate loss of bodily functions including the lungs. Heart will arrest, DEATH within minutes if not rescued immediately and treated.

10,000 PPM is 1 %

Sulphur Dioxide (SO2) Toxicity Chart

Concentration	Effects
1-PPM	Odor
2-PPM	Permissible Exposure Limit (PEL) Safe for 8 hours without breathing apparatus
5-PPM	Short Term Exposure Limit (STEL) Safe for 15 Minutes – four time a day without breathing apparatus.
12-PPM	Burning of eyes, breathing irritation. Causes damage to the wall lining of the lungs.
100-PPM	Immediately Dangerous to Life and Health (IDLH) Causes serious decaying of skin tissue of respiratory system.
150-PPM	Extreme irritation, tolerated only for a few minutes.

500-PPM	Sense of suffocation with first breath requires medical aid.
1000-PPM	Death will result unless rescued and medical aid is provided.

SO2 is known to be a cancer-causing agent.

H2S Emergency Levels:

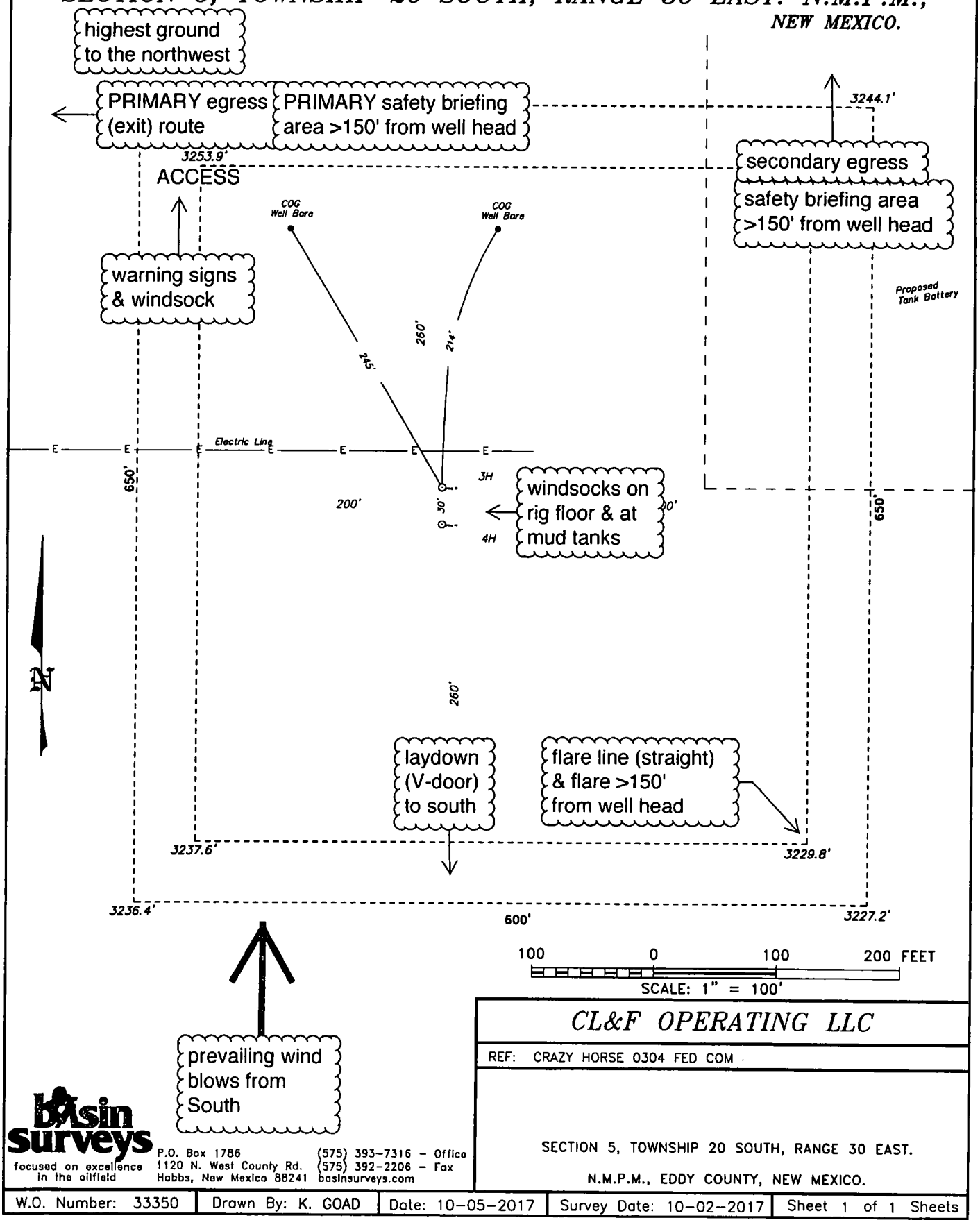
	Level I Low Impact Unconfirmed	Level II Significant Impact Potential	Level III Major Impact Hazard to People
Drilling	Problems During Drilling in a sour gas zone and the well has significant losses or gas-cut mud or kick	Equipment malfunction while circulating a kick or unable to maintain circulating volumes	Uncontrolled flow of sour gas (ignited or unignited) from the wellbore
Testing	Sour gas zone is open and an event occurs that has the potential to lead to a well control problem (leak at surface setup) Limited release.	An equipment malfunction restricts the ability to manage any level I emergency.	Uncontrollable flow of sour gas (ignited or unignited) from the wellbore.

Rig Crew Emergency Action

Position	**Report to**	**Duties**
Rig Manager	Drilling Supervisor	Activate the H2S Alarm. Supervise evacuation to Safe Briefing Area. Return to Drill Floor and Account for Essential personnel. Report to CO MAN for further Instructions.

Driller on Duty	Rig Manager	Prepare to Secure Well. Check Drill Crew personnel for H2S Safety Equipment Readiness. In Case of Emergency Remove Non- Essential Personnel from Rig Floor
Drill Crew	Driller	Check their H2S Breathing Equipment for Readiness and Follow Instruction of the Driller.
H2S Safety Supervisor	Report to Rig Floor	Ensure that all Personnel are Using Required Breathing Apparatus. Report to CO MAN Monitor all Operations and Monitor all Personnel Under Air.
Service Company Personnel Visitors	Safe Briefing Area	Report to Safe Area and Await Further Instructions.
All Non Essential Personnel	Safe Briefing Area	Await further Instructions

SECTION 5, TOWNSHIP 20 SOUTH, RANGE 30 EAST. N.M.P.M., NEW MEXICO.



CL&F OPERATING LLC

REF: CRAZY HORSE 0304 FED COM

SECTION 5, TOWNSHIP 20 SOUTH, RANGE 30 EAST.

N.M.P.M., EDDY COUNTY, NEW MEXICO.

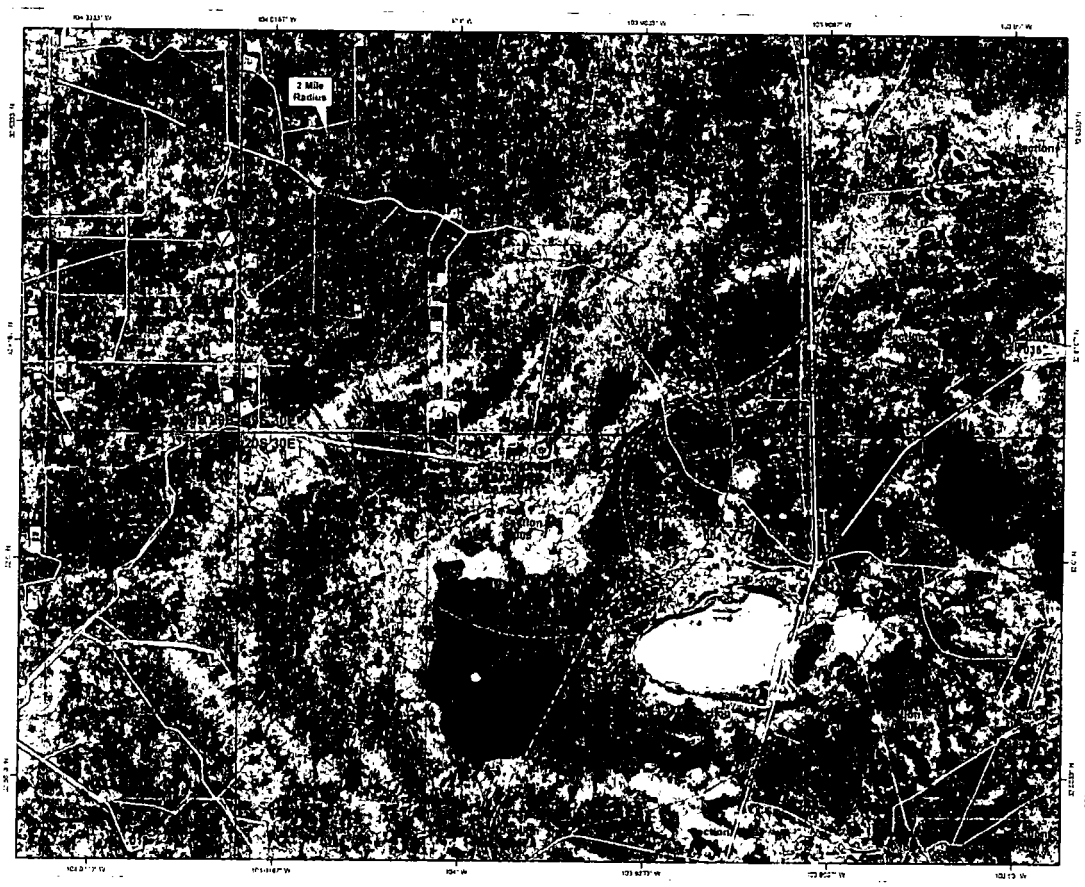
basin surveys
focused on excellence in the oilfield
P.O. Box 1786
1120 N. West County Rd.
Hobbs, New Mexico 88241
(575) 393-7316 - Office
(575) 392-2206 - Fax
basinsurveys.com

W.O. Number: 33350	Drawn By: K. GOAD	Date: 10-05-2017	Survey Date: 10-02-2017	Sheet 1 of 1 Sheets

CL & F Operating

Crazy Horse Fed Com #4H
H_2S Contingency Plan:
2 Mile Radius Map

Section 5, Township 20S, Range 30E
Eddy County, New Mexico



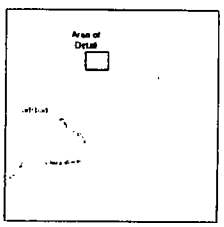
Surface Hole Location

1:27,000
0 0.25 0.5 1
Miles

N

NAD 1983 New Mexico State Plane East FIPS 3001 Feet

Prepared by Permits West, Inc., January 12, 2018 for CL & F Operating, LLC



CL&F Operating LLC
Project: Eddy County, NM (NAD 83)
Site: Sec 5, T20S, R30E
Well: Crazy Horse 4H
Wellbore: Wellbore #1
Plan: Plan #1 (Crazy Horse 4H/Wellbore #1)

WELL DETAILS: Crazy Horse 4H

Ground Elevation:: 3247.00
RKB Elevation: KB=25' @ 3272.00ft
Rig Name:

Northing	Easting	Latitude	Longitude
585260.0000	646285.0000	32.608469	-103.992511

INTEGRITY Directional Services

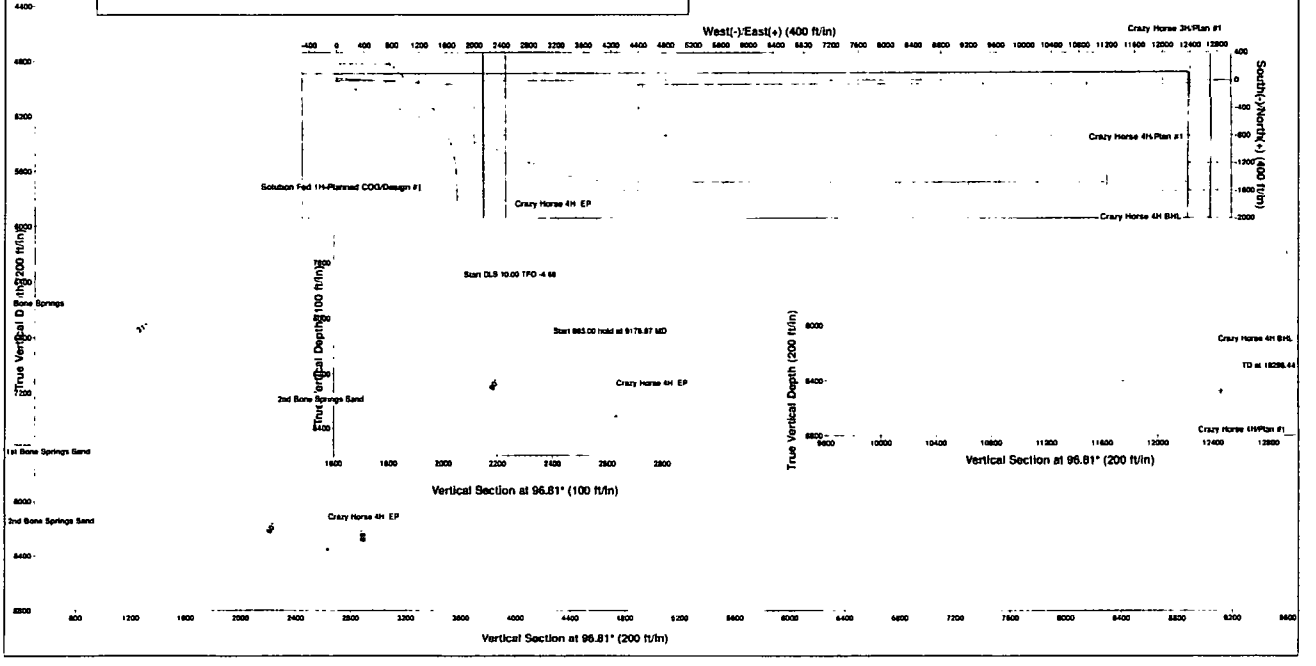
Planned Section Details

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	3580.00	0.00	0.00	3580.00	0.00	0.00	0.00	0.00	0.00
3	3980.00	8.00	113.97	3978.70	-11.33	25.48	2.00	113.97	26.64
4	4380.00	8.00	113.97	4374.81	-33.94	76.34	0.00	0.00	79.83
5	5536.04	31.12	113.98	5456.76	-190.18	427.58	2.00	0.02	447.13
6	8594.14	31.12	113.98	8074.73	-832.64	1871.68	0.00	0.00	1957.24
7	9176.97	89.32	110.00	8352.00	-1009.00	2322.70	10.00	-4.68	2426.00
8	10041.97	89.32	110.00	8362.27	-1304.83	3135.48	0.00	0.00	3268.13
9	11041.83	89.33	90.00	8374.18	-1477.57	4115.08	2.00	-90.10	4261.30
10	19296.44	89.33	90.00	8471.00	-1477.80	12369.12	0.00	0.00	12457.09

Azimuths to Grid North
True North: -0.18°
Magnetic North: 7.28°

Magnetic Field
Strength: 49243.0snT
Dip Angle: 60.47°
Date: 8/3/2017
Model: HDGM

PROJECT DETAILS: Eddy County, NM (NAD 83)
Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: New Mexico Eastern Zone
System Datum: Mean Sea Level
Local North: Grid



Integrity Directional Services, LLC

Survey Report

Company:	CL&F Operating LLC	**Local Co-ordinate Reference:**	Well Crazy Horse 4H
Project:	Eddy County, NM (NAD 83)	**TVD Reference:**	KB=25' @ 3272.00ft
Site:	Sec 5, T20S, R30E	**MD Reference:**	KB=25' @ 3272.00ft
Well:	Crazy Horse 4H	**North Reference:**	Grid
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Plan #1	**Database:**	EDM 5000.1 Multi User Db

Project	Eddy County, NM (NAD 83)		
Map System:	US State Plane 1983	**System Datum:**	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site	Sec 5, T20S, R30E				
Site Position:		**Northing:**	585,300.2000 usft	**Latitude:**	32.608579
From:	Map	**Easting:**	646,334.9000 usft	**Longitude:**	-103.992349
Position Uncertainty:	0.00 ft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	0.18 °

Well	Crazy Horse 4H					
Well Position	**+N/-S**	0.00 ft	**Northing:**	585,260.0000 usft	**Latitude:**	32.608469
	+E/-W	0.00 ft	**Easting:**	646,285.0000 usft	**Longitude:**	-103.992511
Position Uncertainty		0.00 ft	**Wellhead Elevation:**	0.00 ft	**Ground Level:**	3,247.00 ft

Wellbore	Wellbore #1			
Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	HDGM	8/3/2017	7.47	60.47	48,243

Design	Plan #1				
Audit Notes:					
Version:		**Phase:**	PLAN	**Tie On Depth:**	0.00
Vertical Section:	**Depth From (TVD) (ft)**	**+N/-S (ft)**	**+E/-W (ft)**	**Direction (°)**	
	0.00	0.00	0.00	96.81	

Survey Tool Program **Date** 10/11/2017

From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.00	19,296.44	Plan #1 (Wellbore #1)	MWD	MWD - Standard

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	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
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00

Integrity Directional Services, LLC

Survey Report

Company:	CL&F Operating LLC	**Local Co-ordinate Reference:**	Well Crazy Horse 4H
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Design:	Plan #1	**Database:**	EDM 5000.1 Multi User Db

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00
1,600.00	0.00	0.00	1,600.00	0.00	0.00	0.00	0.00	0.00	0.00
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.00	0.00	0.00
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00
1,900.00	0.00	0.00	1,900.00	0.00	0.00	0.00	0.00	0.00	0.00
2,000.00	0.00	0.00	2,000.00	0.00	0.00	0.00	0.00	0.00	0.00
2,100.00	0.00	0.00	2,100.00	0.00	0.00	0.00	0.00	0.00	0.00
2,200.00	0.00	0.00	2,200.00	0.00	0.00	0.00	0.00	0.00	0.00
2,300.00	0.00	0.00	2,300.00	0.00	0.00	0.00	0.00	0.00	0.00
2,400.00	0.00	0.00	2,400.00	0.00	0.00	0.00	0.00	0.00	0.00
2,500.00	0.00	0.00	2,500.00	0.00	0.00	0.00	0.00	0.00	0.00
2,600.00	0.00	0.00	2,600.00	0.00	0.00	0.00	0.00	0.00	0.00
2,700.00	0.00	0.00	2,700.00	0.00	0.00	0.00	0.00	0.00	0.00
2,800.00	0.00	0.00	2,800.00	0.00	0.00	0.00	0.00	0.00	0.00
2,900.00	0.00	0.00	2,900.00	0.00	0.00	0.00	0.00	0.00	0.00
3,000.00	0.00	0.00	3,000.00	0.00	0.00	0.00	0.00	0.00	0.00
3,100.00	0.00	0.00	3,100.00	0.00	0.00	0.00	0.00	0.00	0.00
3,200.00	0.00	0.00	3,200.00	0.00	0.00	0.00	0.00	0.00	0.00
3,300.00	0.00	0.00	3,300.00	0.00	0.00	0.00	0.00	0.00	0.00
3,400.00	0.00	0.00	3,400.00	0.00	0.00	0.00	0.00	0.00	0.00
3,500.00	0.00	0.00	3,500.00	0.00	0.00	0.00	0.00	0.00	0.00
3,580.00	0.00	0.00	3,580.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Build 2.00									
3,600.00	0.40	113.97	3,600.00	-0.03	0.06	0.07	2.00	2.00	0.00
3,700.00	2.40	113.97	3,699.96	-1.02	2.30	2.40	2.00	2.00	0.00
3,800.00	4.40	113.97	3,799.78	-3.43	7.72	8.07	2.00	2.00	0.00
3,900.00	6.40	113.97	3,899.34	-7.25	16.31	17.06	2.00	2.00	0.00
3,980.00	8.00	113.97	3,978.70	-11.33	25.48	26.64	2.00	2.00	0.00
Start 400.00 hold at 3980.00 MD									
4,000.00	8.00	113.97	3,998.51	-12.46	28.02	29.30	0.00	0.00	0.00
4,100.00	8.00	113.97	4,097.53	-18.11	40.74	42.60	0.00	0.00	0.00
4,200.00	8.00	113.97	4,196.56	-23.77	53.45	55.89	0.00	0.00	0.00
4,300.00	8.00	113.97	4,295.59	-29.42	66.17	69.19	0.00	0.00	0.00
4,380.00	8.00	113.97	4,374.81	-33.94	76.34	79.83	0.00	0.00	0.00
Start DLS 2.00 TFO 0.02									
4,400.00	8.40	113.97	4,394.60	-35.10	78.95	82.56	2.00	2.00	0.00
4,500.00	10.40	113.97	4,493.26	-41.74	93.87	98.16	2.00	2.00	0.00
4,600.00	12.40	113.98	4,591.28	-49.77	111.93	117.05	2.00	2.00	0.00
4,700.00	14.40	113.98	4,688.55	-59.19	133.11	139.19	2.00	2.00	0.00

Integrity Directional Services, LLC

Survey Report

Company:	CL&F Operating LLC	**Local Co-ordinate Reference:**	Well Crazy Horse 4H
Project:	Eddy County, NM (NAD 83)	**TVD Reference:**	KB=25' @ 3272.00ft
Site:	Sec 5, T20S, R30E	**MD Reference:**	KB=25' @ 3272.00ft
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Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Plan #1	**Database:**	EDM 5000.1 Multi User Db

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,800.00	16.40	113.98	4,784.96	-69.98	157.37	164.56	2.00	2.00	0.00
4,900.00	18.40	113.98	4,880.38	-82.13	184.69	193.13	2.00	2.00	0.00
5,000.00	20.40	113.98	4,974.69	-95.63	215.04	224.86	2.00	2.00	0.00
5,100.00	22.40	113.98	5,067.79	-110.46	248.37	259.72	2.00	2.00	0.00
5,200.00	24.40	113.98	5,159.56	-126.60	284.66	297.67	2.00	2.00	0.00
5,300.00	26.40	113.98	5,249.89	-144.03	323.85	338.65	2.00	2.00	0.00
5,400.00	28.40	113.98	5,338.67	-162.74	365.89	382.61	2.00	2.00	0.00
5,500.00	30.40	113.98	5,425.79	-182.69	410.74	429.51	2.00	2.00	0.00
5,536.04	31.12	113.98	5,456.76	-190.18	427.58	447.13	2.00	2.00	0.00
Start 3058.10 hold at 5536.04 MD									
5,600.00	31.12	113.98	5,511.51	-203.62	457.79	478.71	0.00	0.00	0.00
5,700.00	31.12	113.98	5,597.12	-224.63	505.01	528.09	0.00	0.00	0.00
5,800.00	31.12	113.98	5,682.73	-245.64	552.23	577.47	0.00	0.00	0.00
5,900.00	31.12	113.98	5,768.34	-266.64	599.45	626.85	0.00	0.00	0.00
6,000.00	31.12	113.98	5,853.94	-287.65	646.67	676.23	0.00	0.00	0.00
6,100.00	31.12	113.98	5,939.55	-308.66	693.90	725.61	0.00	0.00	0.00
6,200.00	31.12	113.98	6,025.16	-329.67	741.12	774.99	0.00	0.00	0.00
6,300.00	31.12	113.98	6,110.77	-350.68	788.34	824.38	0.00	0.00	0.00
6,400.00	31.12	113.98	6,196.38	-371.69	835.56	873.76	0.00	0.00	0.00
6,500.00	31.12	113.98	6,281.98	-392.69	882.79	923.14	0.00	0.00	0.00
6,600.00	31.12	113.98	6,367.59	-413.70	930.01	972.52	0.00	0.00	0.00
6,700.00	31.12	113.98	6,453.20	-434.71	977.23	1,021.90	0.00	0.00	0.00
6,800.00	31.12	113.98	6,538.81	-455.72	1,024.45	1,071.28	0.00	0.00	0.00
6,900.00	31.12	113.98	6,624.41	-476.73	1,071.67	1,120.66	0.00	0.00	0.00
7,000.00	31.12	113.98	6,710.02	-497.74	1,118.90	1,170.04	0.00	0.00	0.00
7,100.00	31.12	113.98	6,795.63	-518.74	1,166.12	1,219.42	0.00	0.00	0.00
7,200.00	31.12	113.98	6,881.24	-539.75	1,213.34	1,268.80	0.00	0.00	0.00
7,300.00	31.12	113.98	6,966.85	-560.76	1,260.56	1,318.19	0.00	0.00	0.00
7,400.00	31.12	113.98	7,052.45	-581.77	1,307.79	1,367.57	0.00	0.00	0.00
7,500.00	31.12	113.98	7,138.06	-602.78	1,355.01	1,416.95	0.00	0.00	0.00
7,600.00	31.12	113.98	7,223.67	-623.79	1,402.23	1,466.33	0.00	0.00	0.00
7,700.00	31.12	113.98	7,309.28	-644.79	1,449.45	1,515.71	0.00	0.00	0.00
7,800.00	31.12	113.98	7,394.89	-665.80	1,496.67	1,565.09	0.00	0.00	0.00
7,900.00	31.12	113.98	7,480.49	-686.81	1,543.90	1,614.47	0.00	0.00	0.00
8,000.00	31.12	113.98	7,566.10	-707.82	1,591.12	1,663.85	0.00	0.00	0.00
8,100.00	31.12	113.98	7,651.71	-728.83	1,638.34	1,713.23	0.00	0.00	0.00
8,200.00	31.12	113.98	7,737.32	-749.84	1,685.56	1,762.61	0.00	0.00	0.00
8,300.00	31.12	113.98	7,822.93	-770.84	1,732.78	1,811.99	0.00	0.00	0.00
8,400.00	31.12	113.98	7,908.53	-791.85	1,780.01	1,861.38	0.00	0.00	0.00
8,500.00	31.12	113.98	7,994.14	-812.86	1,827.23	1,910.76	0.00	0.00	0.00
8,594.14	31.12	113.98	8,074.73	-832.64	1,871.68	1,957.24	0.00	0.00	0.00
Start DLS 10.00 TFO -4.68									
8,600.00	31.70	113.89	8,079.73	-833.88	1,874.48	1,960.16	10.00	9.97	-1.55
8,700.00	41.68	112.69	8,159.82	-857.41	1,929.31	2,017.41	10.00	9.97	-1.20

Integrity Directional Services, LLC

Survey Report

Company:	CL&F Operating LLC	**Local Co-ordinate Reference:**	Well Crazy Horse 4H
Project:	Eddy County, NM (NAD 83)	**TVD Reference:**	KB=25' @ 3272.00ft
Site:	Sec 5, T20S, R30E	**MD Reference:**	KB=25' @ 3272.00ft
Well:	Crazy Horse 4H	**North Reference:**	Grid
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Plan #1	**Database:**	EDM 5000.1 Multi User Db

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
8,800.00	51.66	111.89	8,228.35	-884.92	1,996.55	2,087.43	10.00	9.98	-0.81
8,900.00	61.65	111.28	8,283.25	-915.58	2,074.14	2,168.12	10.00	9.99	-0.61
9,000.00	71.64	110.77	8,322.84	-948.47	2,159.73	2,257.00	10.00	9.99	-0.50
9,100.00	81.63	110.33	8,345.93	-982.57	2,250.72	2,351.39	10.00	9.99	-0.45
9,176.98	89.32	110.00	8,352.00	-1,009.00	2,322.70	2,426.00	10.00	9.99	-0.43
Start 865.00 hold at 9176.97 MD									
9,200.00	89.32	110.00	8,352.27	-1,016.87	2,344.33	2,448.41	0.00	0.00	0.00
9,300.00	89.32	110.00	8,353.46	-1,051.07	2,438.30	2,545.77	0.00	0.00	0.00
9,400.00	89.32	110.00	8,354.65	-1,085.27	2,532.26	2,643.13	0.00	0.00	0.00
9,484.06	89.32	110.00	8,355.64	-1,114.02	2,611.24	2,724.96	0.00	0.00	0.00
Crazy Horse 4H EP									
9,500.00	89.32	110.00	8,355.83	-1,119.47	2,626.22	2,740.48	0.00	0.00	0.00
9,600.00	89.32	110.00	8,357.02	-1,153.67	2,720.19	2,837.84	0.00	0.00	0.00
9,700.00	89.32	110.00	8,358.21	-1,187.87	2,814.15	2,935.19	0.00	0.00	0.00
9,800.00	89.32	110.00	8,359.39	-1,222.07	2,908.11	3,032.55	0.00	0.00	0.00
9,900.00	89.32	110.00	8,360.58	-1,256.27	3,002.07	3,129.91	0.00	0.00	0.00
10,000.00	89.32	110.00	8,361.77	-1,290.47	3,096.04	3,227.26	0.00	0.00	0.00
10,041.98	89.32	110.00	8,362.27	-1,304.83	3,135.48	3,268.13	0.00	0.00	0.00
Start DLS 2.00 TFO -90.10									
10,100.00	89.32	108.84	8,362.96	-1,324.12	3,190.20	3,324.75	2.00	0.00	-2.00
10,200.00	89.32	106.84	8,364.15	-1,354.75	3,285.38	3,422.89	2.00	0.00	-2.00
10,300.00	89.31	104.84	8,365.34	-1,382.04	3,381.57	3,521.64	2.00	0.00	-2.00
10,400.00	89.31	102.84	8,366.54	-1,405.96	3,478.65	3,620.88	2.00	0.00	-2.00
10,500.00	89.31	100.84	8,367.74	-1,426.47	3,576.51	3,720.48	2.00	0.00	-2.00
10,600.00	89.31	98.84	8,368.94	-1,443.55	3,675.03	3,820.33	2.00	0.00	-2.00
10,700.00	89.32	96.84	8,370.13	-1,457.19	3,774.08	3,920.30	2.00	0.00	-2.00
10,800.00	89.32	94.84	8,371.33	-1,467.36	3,873.55	4,020.28	2.00	0.00	-2.00
10,900.00	89.32	92.84	8,372.51	-1,474.06	3,973.32	4,120.13	2.00	0.00	-2.00
11,000.00	89.33	90.84	8,373.69	-1,477.26	4,073.25	4,219.74	2.00	0.00	-2.00
11,041.83	89.33	90.00	8,374.18	-1,477.57	4,115.08	4,261.30	2.00	0.00	-2.00
Start 8254.62 hold at 11041.83 MD									
11,100.00	89.33	90.00	8,374.87	-1,477.57	4,173.25	4,319.06	0.00	0.00	0.00
11,200.00	89.33	90.00	8,376.04	-1,477.57	4,273.24	4,418.35	0.00	0.00	0.00
11,300.00	89.33	90.00	8,377.21	-1,477.58	4,373.23	4,517.64	0.00	0.00	0.00
11,400.00	89.33	90.00	8,378.38	-1,477.58	4,473.22	4,616.92	0.00	0.00	0.00
11,500.00	89.33	90.00	8,379.56	-1,477.58	4,573.22	4,716.21	0.00	0.00	0.00
11,600.00	89.33	90.00	8,380.73	-1,477.59	4,673.21	4,815.50	0.00	0.00	0.00
11,700.00	89.33	90.00	8,381.90	-1,477.59	4,773.20	4,914.79	0.00	0.00	0.00
11,800.00	89.33	90.00	8,383.08	-1,477.59	4,873.20	5,014.07	0.00	0.00	0.00
11,900.00	89.33	90.00	8,384.25	-1,477.59	4,973.19	5,113.36	0.00	0.00	0.00
12,000.00	89.33	90.00	8,385.42	-1,477.60	5,073.18	5,212.65	0.00	0.00	0.00
12,100.00	89.33	90.00	8,386.59	-1,477.60	5,173.18	5,311.94	0.00	0.00	0.00
12,200.00	89.33	90.00	8,387.77	-1,477.60	5,273.17	5,411.22	0.00	0.00	0.00
12,300.00	89.33	90.00	8,388.94	-1,477.61	5,373.16	5,510.51	0.00	0.00	0.00

Integrity Directional Services, LLC

Survey Report

Company:	CL&F Operating LLC	**Local Co-ordinate Reference:**	Well Crazy Horse 4H
Project:	Eddy County, NM (NAD 83)	**TVD Reference:**	KB=25' @ 3272.00ft
Site:	Sec 5, T20S, R30E	**MD Reference:**	KB=25' @ 3272.00ft
Well:	Crazy Horse 4H	**North Reference:**	Grid
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Plan #1	**Database:**	EDM 5000.1 Multi User Db

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
12,400.00	89.33	90.00	8,390.11	-1,477.61	5,473.16	5,609.80	0.00	0.00	0.00
12,500.00	89.33	90.00	8,391.29	-1,477.61	5,573.15	5,709.08	0.00	0.00	0.00
12,600.00	89.33	90.00	8,392.46	-1,477.61	5,673.14	5,808.37	0.00	0.00	0.00
12,700.00	89.33	90.00	8,393.63	-1,477.62	5,773.14	5,907.66	0.00	0.00	0.00
12,800.00	89.33	90.00	8,394.80	-1,477.62	5,873.13	6,006.95	0.00	0.00	0.00
12,900.00	89.33	90.00	8,395.98	-1,477.62	5,973.12	6,106.23	0.00	0.00	0.00
13,000.00	89.33	90.00	8,397.15	-1,477.63	6,073.11	6,205.52	0.00	0.00	0.00
13,100.00	89.33	90.00	8,398.32	-1,477.63	6,173.11	6,304.81	0.00	0.00	0.00
13,200.00	89.33	90.00	8,399.50	-1,477.63	6,273.10	6,404.10	0.00	0.00	0.00
13,300.00	89.33	90.00	8,400.67	-1,477.63	6,373.09	6,503.38	0.00	0.00	0.00
13,400.00	89.33	90.00	8,401.84	-1,477.64	6,473.09	6,602.67	0.00	0.00	0.00
13,500.00	89.33	90.00	8,403.02	-1,477.64	6,573.08	6,701.96	0.00	0.00	0.00
13,600.00	89.33	90.00	8,404.19	-1,477.64	6,673.07	6,801.25	0.00	0.00	0.00
13,700.00	89.33	90.00	8,405.36	-1,477.65	6,773.07	6,900.53	0.00	0.00	0.00
13,800.00	89.33	90.00	8,406.53	-1,477.65	6,873.06	6,999.82	0.00	0.00	0.00
13,900.00	89.33	90.00	8,407.71	-1,477.65	6,973.05	7,099.11	0.00	0.00	0.00
14,000.00	89.33	90.00	8,408.88	-1,477.65	7,073.05	7,198.39	0.00	0.00	0.00
14,100.00	89.33	90.00	8,410.05	-1,477.66	7,173.04	7,297.68	0.00	0.00	0.00
14,200.00	89.33	90.00	8,411.23	-1,477.66	7,273.03	7,396.97	0.00	0.00	0.00
14,300.00	89.33	90.00	8,412.40	-1,477.66	7,373.03	7,496.26	0.00	0.00	0.00
14,400.00	89.33	90.00	8,413.57	-1,477.66	7,473.02	7,595.54	0.00	0.00	0.00
14,500.00	89.33	90.00	8,414.74	-1,477.67	7,573.01	7,694.83	0.00	0.00	0.00
14,600.00	89.33	90.00	8,415.92	-1,477.67	7,673.00	7,794.12	0.00	0.00	0.00
14,700.00	89.33	90.00	8,417.09	-1,477.67	7,773.00	7,893.41	0.00	0.00	0.00
14,800.00	89.33	90.00	8,418.26	-1,477.68	7,872.99	7,992.69	0.00	0.00	0.00
14,900.00	89.33	90.00	8,419.44	-1,477.68	7,972.98	8,091.98	0.00	0.00	0.00
15,000.00	89.33	90.00	8,420.61	-1,477.68	8,072.98	8,191.27	0.00	0.00	0.00
15,100.00	89.33	90.00	8,421.78	-1,477.68	8,172.97	8,290.56	0.00	0.00	0.00
15,200.00	89.33	90.00	8,422.95	-1,477.69	8,272.96	8,389.84	0.00	0.00	0.00
15,300.00	89.33	90.00	8,424.13	-1,477.69	8,372.96	8,489.13	0.00	0.00	0.00
15,400.00	89.33	90.00	8,425.30	-1,477.69	8,472.95	8,588.42	0.00	0.00	0.00
15,500.00	89.33	90.00	8,426.47	-1,477.70	8,572.94	8,687.70	0.00	0.00	0.00
15,600.00	89.33	90.00	8,427.65	-1,477.70	8,672.94	8,786.99	0.00	0.00	0.00
15,700.00	89.33	90.00	8,428.82	-1,477.70	8,772.93	8,886.28	0.00	0.00	0.00
15,800.00	89.33	90.00	8,429.99	-1,477.70	8,872.92	8,985.57	0.00	0.00	0.00
15,900.00	89.33	90.00	8,431.16	-1,477.71	8,972.92	9,084.85	0.00	0.00	0.00
16,000.00	89.33	90.00	8,432.34	-1,477.71	9,072.91	9,184.14	0.00	0.00	0.00
16,100.00	89.33	90.00	8,433.51	-1,477.71	9,172.90	9,283.43	0.00	0.00	0.00
16,200.00	89.33	90.00	8,434.68	-1,477.72	9,272.89	9,382.72	0.00	0.00	0.00
16,300.00	89.33	90.00	8,435.86	-1,477.72	9,372.89	9,482.00	0.00	0.00	0.00
16,400.00	89.33	90.00	8,437.03	-1,477.72	9,472.88	9,581.29	0.00	0.00	0.00
16,500.00	89.33	90.00	8,438.20	-1,477.72	9,572.87	9,680.58	0.00	0.00	0.00
16,600.00	89.33	90.00	8,439.37	-1,477.73	9,672.87	9,779.87	0.00	0.00	0.00

Integrity Directional Services, LLC

Survey Report

Company:	CL&F Operating LLC	**Local Co-ordinate Reference:**	Well Crazy Horse 4H
Project:	Eddy County, NM (NAD 83)	**TVD Reference:**	KB=25' @ 3272.00ft
Site:	Sec 5, T20S, R30E	**MD Reference:**	KB=25' @ 3272.00ft
Well:	Crazy Horse 4H	**North Reference:**	Grid
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Plan #1	**Database:**	EDM 5000.1 Multi User Db

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
16,700.00	89.33	90.00	8,440.55	-1,477.73	9,772.86	9,879.15	0.00	0.00	0.00
16,800.00	89.33	90.00	8,441.72	-1,477.73	9,872.85	9,978.44	0.00	0.00	0.00
16,900.00	89.33	90.00	8,442.89	-1,477.74	9,972.85	10,077.73	0.00	0.00	0.00
17,000.00	89.33	90.00	8,444.07	-1,477.74	10,072.84	10,177.02	0.00	0.00	0.00
17,100.00	89.33	90.00	8,445.24	-1,477.74	10,172.83	10,276.30	0.00	0.00	0.00
17,200.00	89.33	90.00	8,446.41	-1,477.74	10,272.83	10,375.59	0.00	0.00	0.00
17,300.00	89.33	90.00	8,447.58	-1,477.75	10,372.82	10,474.88	0.00	0.00	0.00
17,400.00	89.33	90.00	8,448.76	-1,477.75	10,472.81	10,574.16	0.00	0.00	0.00
17,500.00	89.33	90.00	8,449.93	-1,477.75	10,572.81	10,673.45	0.00	0.00	0.00
17,600.00	89.33	90.00	8,451.10	-1,477.76	10,672.80	10,772.74	0.00	0.00	0.00
17,700.00	89.33	90.00	8,452.28	-1,477.76	10,772.79	10,872.03	0.00	0.00	0.00
17,800.00	89.33	90.00	8,453.45	-1,477.76	10,872.78	10,971.31	0.00	0.00	0.00
17,900.00	89.33	90.00	8,454.62	-1,477.76	10,972.78	11,070.60	0.00	0.00	0.00
18,000.00	89.33	90.00	8,455.79	-1,477.77	11,072.77	11,169.89	0.00	0.00	0.00
18,100.00	89.33	90.00	8,456.97	-1,477.77	11,172.76	11,269.18	0.00	0.00	0.00
18,200.00	89.33	90.00	8,458.14	-1,477.77	11,272.76	11,368.46	0.00	0.00	0.00
18,300.00	89.33	90.00	8,459.31	-1,477.77	11,372.75	11,467.75	0.00	0.00	0.00
18,400.00	89.33	90.00	8,460.49	-1,477.78	11,472.74	11,567.04	0.00	0.00	0.00
18,500.00	89.33	90.00	8,461.66	-1,477.78	11,572.74	11,666.33	0.00	0.00	0.00
18,600.00	89.33	90.00	8,462.83	-1,477.78	11,672.73	11,765.61	0.00	0.00	0.00
18,700.00	89.33	90.00	8,464.00	-1,477.79	11,772.72	11,864.90	0.00	0.00	0.00
18,800.00	89.33	90.00	8,465.18	-1,477.79	11,872.72	11,964.19	0.00	0.00	0.00
18,900.00	89.33	90.00	8,466.35	-1,477.79	11,972.71	12,063.47	0.00	0.00	0.00
19,000.00	89.33	90.00	8,467.52	-1,477.79	12,072.70	12,162.76	0.00	0.00	0.00
19,100.00	89.33	90.00	8,468.70	-1,477.80	12,172.70	12,262.05	0.00	0.00	0.00
19,200.00	89.33	90.00	8,469.87	-1,477.80	12,272.69	12,361.34	0.00	0.00	0.00
19,296.44	89.33	90.00	8,471.00	-1,477.80	12,369.13	12,457.09	0.00	0.00	0.00

TD at 19296.44 - Crazy Horse 4H BHL

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Crazy Horse 4H EP - plan misses target center by 404.90ft at 9484.06ft MD (8355.64 TVD, -1114.02 N, 2611.24 E) - Point	0.00	0.00	8,352.00	-1,494.50	2,472.81	583,765.5000	648,757.8000	32.604339	-103.984497
Crazy Horse 4H BHL - plan hits target center - Point	0.00	0.00	8,471.00	-1,477.80	12,369.13	583,782.2000	658,654.1000	32.604292	-103.952360

Integrity Directional Services, LLC

Survey Report

Company:	CL&F Operating LLC	**Local Co-ordinate Reference:**	Well Crazy Horse 4H
Project:	Eddy County, NM (NAD 83)	**TVD Reference:**	KB=25' @ 3272.00ft
Site:	Sec 5, T20S, R30E	**MD Reference:**	KB=25' @ 3272.00ft
Well:	Crazy Horse 4H	**North Reference:**	Grid
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Plan #1	**Database:**	EDM 5000.1 Multi User Db

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,869.00	1,869.00	Yates	Empty	0.00	
2,168.00	2,168.00	Seven Rivers	Empty	0.00	
3,652.01	3,652.00	Delaware Sand	Empty		
6,688.09	6,443.00	Bone Springs	Empty		
8,090.99	7,644.00	1st Bone Springs Sand	Empty		
10,856.78	8,372.00	2nd Bone Springs Sand	Empty		

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	Local Coordinates +E/-W (ft)	Comment
3580	3580	0	0	Start Build 2.00
3980	3979	-11	25	Start 400.00 hold at 3980.00 MD
4380	4375	-34	76	Start DLS 2.00 TFO 0.02
5536	5457	-190	428	Start 3058.10 hold at 5536.04 MD
8594	8075	-833	1872	Start DLS 10.00 TFO -4.68
9177	8352	-1009	2323	Start 865.00 hold at 9176.97 MD
10,042	8362	-1305	3135	Start DLS 2.00 TFO -90.10
11,042	8374	-1478	4115	Start 8254.62 hold at 11041.83 MD
19,296	8471	-1478	12,369	TD at 19296.44

Checked By: _____ Approved By: _____ Date: _____

CL&F Operating LLC

Eddy County, NM (NAD 83)
Sec 5, T20S, R30E
Crazy Horse 4H

Wellbore #1
Plan #1

Anticollision Report

11 October, 2017

INTEGRITY
Directional Services

Integrity Directional Services, LLC

Anticollision Report

Company:	CL&F Operating LLC	**Local Co-ordinate Reference:**	Well Crazy Horse 4H
Project:	Eddy County, NM (NAD 83)	**TVD Reference:**	KB=25' @ 3272.00ft
Reference Site:	Sec 5, T20S, R30E	**MD Reference:**	KB=25' @ 3272.00ft
Site Error:	0.00 ft	**North Reference:**	Grid
Reference Well:	Crazy Horse 4H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	EDM 5000.1 Multi User Db
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Reference	Plan #1		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	MD + Stations Interval 100.00ft	**Error Model:**	ISCWSA
Depth Range:	Unlimited	**Scan Method:**	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 10,000.00 ft	**Error Surface:**	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma	**Casing Method:**	Not applied

Survey Tool Program **Date** 10/11/2017

From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.00	19,296.44	Plan #1 (Wellbore #1)	MWD	MWD - Standard

Summary

Site Name Offset Well - Wellbore - Design	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
Sec 5, T20S, R30E						
Crazy Horse 3H - Wellbore #1 - Plan #1	3,580.00	3,580.00	30.10	14.29	1.904	CC
Crazy Horse 3H - Wellbore #1 - Plan #1	3,600.00	3,600.01	30.12	14.23	1.895	ES, SF
Solution Fed 1H-Planned COG - Wellbore #1 - Design #1	3,100.00	3,095.00	243.86	230.21	17.865	CC
Solution Fed 1H-Planned COG - Wellbore #1 - Design #1	3,200.00	3,193.70	244.09	230.00	17.330	ES
Solution Fed 1H-Planned COG - Wellbore #1 - Design #1	8,800.00	9,748.49	363.03	294.04	5.263	SF

Offset Design Sec 5, T20S, R30E - Crazy Horse 3H - Wellbore #1 - Plan #1

Offset Site Error: 0.00 ft

Survey Program: 0-MWD

Offset Well Error: 0.00 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.00	0.00	0.00	0.00	0.00	0.00	0.00	30.10	0.00	30.10				
100.00	100.00	100.00	100.00	0.08	0.08	0.00	30.10	0.00	30.10	29.93	0.17	178.556	
200.00	200.00	200.00	200.00	0.31	0.31	0.00	30.10	0.00	30.10	29.48	0.62	48.697	
300.00	300.00	300.00	300.00	0.53	0.53	0.00	30.10	0.00	30.10	29.03	1.07	28.193	
400.00	400.00	400.00	400.00	0.76	0.76	0.00	30.10	0.00	30.10	28.58	1.52	19.840	
500.00	500.00	500.00	500.00	0.98	0.98	0.00	30.10	0.00	30.10	28.13	1.97	15.305	
600.00	600.00	600.00	600.00	1.21	1.21	0.00	30.10	0.00	30.10	27.68	2.42	12.457	
700.00	700.00	700.00	700.00	1.43	1.43	0.00	30.10	0.00	30.10	27.23	2.87	10.503	
800.00	800.00	800.00	800.00	1.66	1.66	0.00	30.10	0.00	30.10	26.78	3.32	9.079	
900.00	900.00	900.00	900.00	1.88	1.88	0.00	30.10	0.00	30.10	26.34	3.76	7.995	
1,000.00	1,000.00	1,000.00	1,000.00	2.11	2.11	0.00	30.10	0.00	30.10	25.89	4.21	7.142	
1,100.00	1,100.00	1,100.00	1,100.00	2.33	2.33	0.00	30.10	0.00	30.10	25.44	4.66	6.454	
1,200.00	1,200.00	1,200.00	1,200.00	2.56	2.56	0.00	30.10	0.00	30.10	24.99	5.11	5.886	
1,300.00	1,300.00	1,300.00	1,300.00	2.78	2.78	0.00	30.10	0.00	30.10	24.54	5.56	5.411	
1,400.00	1,400.00	1,400.00	1,400.00	3.01	3.01	0.00	30.10	0.00	30.10	24.09	6.01	5.006	
1,500.00	1,500.00	1,500.00	1,500.00	3.23	3.23	0.00	30.10	0.00	30.10	23.64	6.46	4.658	
1,600.00	1,600.00	1,600.00	1,600.00	3.46	3.46	0.00	30.10	0.00	30.10	23.19	6.91	4.355	
1,700.00	1,700.00	1,700.00	1,700.00	3.68	3.68	0.00	30.10	0.00	30.10	22.74	7.36	4.089	
1,800.00	1,800.00	1,800.00	1,800.00	3.91	3.91	0.00	30.10	0.00	30.10	22.29	7.81	3.854	
1,900.00	1,900.00	1,900.00	1,900.00	4.13	4.13	0.00	30.10	0.00	30.10	21.84	8.26	3.644	
2,000.00	2,000.00	2,000.00	2,000.00	4.35	4.35	0.00	30.10	0.00	30.10	21.39	8.71	3.456	
2,100.00	2,100.00	2,100.00	2,100.00	4.58	4.58	0.00	30.10	0.00	30.10	20.94	9.16	3.286	

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

Integrity Directional Services, LLC

Anticollision Report

Company:	CL&F Operating LLC	**Local Co-ordinate Reference:**	Well Crazy Horse 4H
Project:	Eddy County, NM (NAD 83)	**TVD Reference:**	KB=25' @ 3272.00ft
Reference Site:	Sec 5, T20S, R30E	**MD Reference:**	KB=25' @ 3272.00ft
Site Error:	0.00 ft	**North Reference:**	Grid
Reference Well:	Crazy Horse 4H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	EDM 5000.1 Multi User Db
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design Sec 5, T20S, R30E - Crazy Horse 3H - Wellbore #1 - Plan #1 — **Offset Site Error:** 0.00 ft

Survey Program: 0-MWD — **Offset Well Error:** 0.00 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
2,200.00	2,200.00	2,200.00	2,200.00	4.80	4.80	0.00	30.10	0.00	30.10	20.49	9.61	3.133	
2,300.00	2,300.00	2,300.00	2,300.00	5.03	5.03	0.00	30.10	0.00	30.10	20.04	10.06	2.993	
2,400.00	2,400.00	2,400.00	2,400.00	5.25	5.25	0.00	30.10	0.00	30.10	19.59	10.51	2.865	
2,500.00	2,500.00	2,500.00	2,500.00	5.48	5.48	0.00	30.10	0.00	30.10	19.14	10.96	2.747	
2,600.00	2,600.00	2,600.00	2,600.00	5.70	5.70	0.00	30.10	0.00	30.10	18.69	11.41	2.639	
2,700.00	2,700.00	2,700.00	2,700.00	5.93	5.93	0.00	30.10	0.00	30.10	18.24	11.86	2.539	
2,800.00	2,800.00	2,800.00	2,800.00	6.15	6.15	0.00	30.10	0.00	30.10	17.79	12.31	2.446	
2,900.00	2,900.00	2,900.00	2,900.00	6.38	6.38	0.00	30.10	0.00	30.10	17.34	12.76	2.360	
3,000.00	3,000.00	3,000.00	3,000.00	6.60	6.60	0.00	30.10	0.00	30.10	16.90	13.21	2.279	
3,100.00	3,100.00	3,100.00	3,100.00	6.83	6.83	0.00	30.10	0.00	30.10	16.45	13.65	2.204	
3,200.00	3,200.00	3,200.00	3,200.00	7.05	7.05	0.00	30.10	0.00	30.10	16.00	14.10	2.134	
3,300.00	3,300.00	3,300.00	3,300.00	7.28	7.28	0.00	30.10	0.00	30.10	15.55	14.55	2.068	
3,400.00	3,400.00	3,400.00	3,400.00	7.50	7.50	0.00	30.10	0.00	30.10	15.10	15.00	2.006	
3,500.00	3,500.00	3,500.00	3,500.00	7.73	7.73	0.00	30.10	0.00	30.10	14.65	15.45	1.948	
3,580.00	3,580.00	3,580.00	3,580.00	7.91	7.91	0.00	30.10	0.00	30.10	14.29	15.81	1.904	CC
3,600.00	3,600.00	3,600.01	3,600.01	7.95	7.95	-113.96	30.10	0.07	30.12	14.23	15.89	1.895	ES, SF
3,700.00	3,699.96	3,700.06	3,700.03	8.13	8.14	-113.56	29.96	2.51	30.98	14.71	16.27	1.904	
3,800.00	3,799.78	3,800.09	3,799.87	8.32	8.34	-112.67	29.63	8.44	33.06	16.40	16.66	1.985	
3,900.00	3,899.34	3,900.06	3,899.39	8.52	8.55	-111.47	29.10	17.83	36.38	19.33	17.05	2.133	
3,980.00	3,978.70	3,979.98	3,978.69	8.68	8.72	-110.40	28.53	27.83	39.93	22.55	17.38	2.297	
4,000.00	3,998.51	3,999.96	3,998.47	8.72	8.76	-110.15	28.38	30.61	40.92	23.45	17.47	2.343	
4,100.00	4,097.53	4,099.83	4,097.37	8.94	8.99	-109.08	27.60	44.49	45.86	27.96	17.90	2.562	
4,200.00	4,196.56	4,199.71	4,196.27	9.16	9.22	-108.21	26.82	58.36	50.82	32.47	18.35	2.769	
4,300.00	4,295.59	4,299.58	4,295.17	9.39	9.45	-107.50	26.04	72.24	55.79	36.97	18.82	2.964	
4,380.00	4,374.81	4,379.48	4,374.30	9.58	9.65	-107.02	25.41	83.35	59.77	40.57	19.20	3.113	
4,400.00	4,394.60	4,399.43	4,394.04	9.62	9.70	-106.89	25.25	86.18	60.79	41.49	19.29	3.151	
4,500.00	4,493.26	4,499.08	4,492.35	9.87	9.95	-106.22	24.36	102.41	66.65	46.86	19.79	3.368	
4,600.00	4,591.28	4,598.61	4,589.92	10.15	10.23	-105.55	23.31	122.01	73.78	53.45	20.33	3.629	
4,700.00	4,688.55	4,698.00	4,686.61	10.45	10.53	-104.89	22.10	144.95	82.17	61.25	20.92	3.928	
4,800.00	4,784.96	4,797.21	4,782.28	10.78	10.87	-104.27	20.74	171.18	91.80	70.23	21.57	4.256	
4,900.00	4,880.38	4,896.25	4,876.81	11.15	11.24	-103.68	19.22	200.65	102.66	80.37	22.30	4.604	
5,000.00	4,974.69	4,995.07	4,970.07	11.57	11.66	-103.14	17.56	233.29	114.74	91.63	23.11	4.965	
5,100.00	5,067.79	5,093.68	5,061.95	12.05	12.12	-102.64	15.75	269.04	128.02	104.00	24.02	5.330	
5,200.00	5,159.56	5,192.04	5,152.31	12.58	12.64	-102.17	13.80	307.83	142.48	117.44	25.04	5.690	
5,300.00	5,249.89	5,290.16	5,241.07	13.17	13.22	-101.73	11.71	349.58	158.10	131.91	26.19	6.037	
5,400.00	5,338.67	5,388.30	5,328.48	13.84	13.87	-101.39	9.48	394.15	174.82	147.38	27.46	6.367	
5,500.00	5,425.79	5,486.71	5,415.84	14.59	14.56	-101.88	7.23	439.41	192.33	163.50	28.83	6.671	
5,536.04	5,456.76	5,522.12	5,447.27	14.87	14.81	-102.26	6.42	455.70	198.83	169.48	29.34	6.776	
5,600.00	5,511.51	5,584.92	5,503.01	15.40	15.27	-103.19	4.98	484.59	210.48	180.21	30.28	6.952	
5,700.00	5,597.12	5,683.11	5,590.17	16.26	16.01	-104.46	2.72	529.75	228.80	197.02	31.78	7.199	
5,800.00	5,682.73	5,781.30	5,677.33	17.14	16.78	-105.54	0.47	574.91	247.21	213.88	33.33	7.417	
5,900.00	5,768.34	5,879.50	5,764.49	18.05	17.56	-106.48	-1.78	620.08	265.70	230.77	34.92	7.608	
6,000.00	5,853.94	5,977.69	5,851.65	18.98	18.36	-107.29	-4.03	665.24	284.24	247.69	36.55	7.777	
6,100.00	5,939.55	6,075.88	5,938.81	19.93	19.18	-108.00	-6.28	710.40	302.83	264.63	38.20	7.927	
6,200.00	6,025.16	6,174.07	6,025.97	20.90	20.00	-108.62	-8.53	755.57	321.46	281.58	39.88	8.061	
6,300.00	6,110.77	6,272.26	6,113.13	21.88	20.84	-109.18	-10.78	800.73	340.13	298.55	41.58	8.180	
6,400.00	6,196.38	6,370.45	6,200.29	22.88	21.69	-109.69	-13.03	845.89	358.82	315.52	43.30	8.286	
6,500.00	6,281.98	6,468.64	6,287.44	23.88	22.55	-110.14	-15.28	891.06	377.54	332.50	45.04	8.382	
6,600.00	6,367.59	6,566.83	6,374.60	24.90	23.42	-110.55	-17.53	936.22	396.28	349.48	46.80	8.468	
6,700.00	6,453.20	6,665.03	6,461.76	25.92	24.29	-110.92	-19.78	981.38	415.04	366.47	48.57	8.546	
6,800.00	6,538.81	6,763.22	6,548.92	26.95	25.17	-111.26	-22.04	1,026.55	433.81	383.46	50.35	8.617	
6,900.00	6,624.41	6,861.41	6,636.08	27.99	26.06	-111.57	-24.29	1,071.71	452.59	400.45	52.14	8.681	

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

Integrity Directional Services, LLC

Anticollision Report

Company:	CL&F Operating LLC	**Local Co-ordinate Reference:**	Well Crazy Horse 4H
Project:	Eddy County, NM (NAD 83)	**TVD Reference:**	KB=25' @ 3272.00ft
Reference Site:	Sec 5, T20S, R30E	**MD Reference:**	KB=25' @ 3272.00ft
Site Error:	0.00 ft	**North Reference:**	Grid
Reference Well:	Crazy Horse 4H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	EDM 5000.1 Multi User Db
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design Sec 5, T20S, R30E - Crazy Horse 3H - Wellbore #1 - Plan #1 — **Offset Site Error:** 0.00 ft

Survey Program: 0-MWD — **Offset Well Error:** 0.00 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
7,000.00	6,710.02	6,959.60	6,723.24	29.03	26.95	-111.86	-26.54	1,116.87	471.39	417.45	53.94	8.740	
7,100.00	6,795.63	7,057.79	6,810.40	30.08	27.84	-112.12	-28.79	1,162.03	490.20	434.45	55.75	8.793	
7,200.00	6,881.24	7,155.98	6,897.56	31.13	28.74	-112.37	-31.04	1,207.20	509.01	451.45	57.56	8.843	
7,300.00	6,966.85	7,254.17	6,984.72	32.19	29.84	-112.60	-33.29	1,252.36	527.84	468.45	59.39	8.888	
7,400.00	7,052.45	7,352.38	7,071.88	33.25	30.55	-112.81	-35.54	1,297.52	546.67	485.45	61.22	8.930	
7,500.00	7,138.06	7,450.58	7,159.04	34.32	31.46	-113.01	-37.79	1,342.69	565.51	502.45	63.05	8.969	
7,600.00	7,223.67	7,548.75	7,246.20	35.39	32.37	-113.19	-40.04	1,387.85	584.35	519.46	64.90	9.004	
7,700.00	7,309.28	7,646.94	7,333.36	36.46	33.29	-113.37	-42.29	1,433.01	603.21	536.46	66.74	9.038	
7,800.00	7,394.89	7,745.13	7,420.51	37.53	34.21	-113.53	-44.54	1,478.18	622.06	553.47	68.59	9.069	
7,900.00	7,480.49	7,843.32	7,507.67	38.61	35.13	-113.68	-46.80	1,523.34	640.92	570.47	70.45	9.098	
8,000.00	7,566.10	7,941.51	7,594.83	39.69	36.05	-113.83	-49.05	1,568.50	659.79	587.48	72.31	9.124	
8,100.00	7,651.71	8,039.70	7,681.99	40.77	36.97	-113.97	-51.30	1,613.67	678.66	604.48	74.17	9.150	
8,200.00	7,737.32	8,137.89	7,769.15	41.85	37.90	-114.10	-53.55	1,658.83	697.53	621.49	76.04	9.173	
8,300.00	7,822.93	8,238.09	7,856.31	42.93	38.83	-114.22	-55.80	1,703.99	716.40	638.49	77.91	9.196	
8,400.00	7,908.53	8,334.28	7,943.47	44.02	39.75	-114.33	-58.05	1,749.16	735.28	655.50	79.78	9.216	
8,500.00	7,994.14	8,432.47	8,030.63	45.11	40.69	-114.44	-60.30	1,794.32	754.16	672.51	81.65	9.236	
8,594.14	8,074.73	8,530.09	8,113.74	46.13	41.76	-114.02	-62.43	1,845.27	771.65	687.86	83.78	9.210	
8,600.00	8,079.73	8,538.11	8,118.57	46.20	41.84	-113.78	-62.55	1,848.86	772.72	688.78	83.94	9.206	
8,650.00	8,121.08	8,587.00	8,157.82	46.80	42.53	-111.72	-63.54	1,881.22	782.84	697.25	85.39	9.165	
8,700.00	8,159.82	8,637.00	8,193.43	47.48	43.30	-109.68	-64.43	1,916.28	793.79	706.76	87.03	9.121	
8,750.00	8,195.67	8,686.14	8,225.33	48.26	44.13	-107.63	-65.21	1,953.63	806.08	717.25	88.84	9.074	
8,800.00	8,228.35	8,734.46	8,253.46	49.11	45.01	-105.55	-65.89	1,992.90	819.42	728.62	90.80	9.024	
8,850.00	8,257.62	8,782.03	8,277.83	50.03	45.94	-103.46	-66.47	2,033.73	833.69	740.79	92.90	8.974	
8,900.00	8,283.25	8,828.91	8,298.45	51.03	46.92	-101.35	-66.94	2,075.82	848.79	753.68	95.11	8.925	
8,950.00	8,305.05	8,875.19	8,315.37	52.08	47.92	-99.23	-67.31	2,118.87	864.57	767.18	97.39	8.877	
9,000.00	8,322.84	8,920.94	8,328.62	53.18	48.94	-97.12	-67.58	2,162.65	880.91	781.19	99.72	8.833	
9,050.00	8,336.51	8,966.25	8,338.27	54.33	49.99	-95.03	-67.75	2,206.91	897.69	795.61	102.08	8.794	
9,100.00	8,345.93	9,011.23	8,344.37	55.49	51.04	-92.98	-67.82	2,251.46	914.75	810.33	104.41	8.761	
9,150.00	8,351.05	9,055.95	8,346.94	56.68	52.09	-90.97	-67.81	2,296.09	931.96	825.24	106.72	8.733	
9,176.98	8,352.00	9,081.06	8,347.25	57.32	52.69	-89.94	-67.77	2,321.21	941.25	833.29	107.96	8.719	
9,200.00	8,352.27	9,102.69	8,347.51	57.87	53.20	-89.94	-67.73	2,342.83	949.16	840.17	108.98	8.709	
9,300.00	8,353.46	9,196.60	8,348.61	60.26	55.45	-89.95	-67.57	2,436.73	983.51	870.03	113.48	8.667	
9,400.00	8,354.65	9,290.51	8,349.72	62.69	57.73	-89.95	-67.42	2,530.64	1,017.87	899.84	118.03	8.624	
9,500.00	8,355.83	9,384.43	8,350.83	65.14	60.03	-89.96	-67.27	2,624.55	1,052.22	929.59	122.63	8.580	
9,600.00	8,357.02	9,478.34	8,351.94	67.61	62.36	-89.96	-67.11	2,718.46	1,086.58	959.30	127.27	8.537	
9,700.00	8,358.21	9,572.25	8,353.05	70.10	64.70	-89.97	-66.96	2,812.38	1,120.93	988.97	131.96	8.495	
9,800.00	8,359.39	9,666.17	8,354.16	72.60	67.06	-89.97	-66.80	2,906.27	1,155.28	1,018.61	136.67	8.453	
9,900.00	8,360.58	9,760.08	8,355.27	75.13	69.44	-89.98	-66.65	3,000.18	1,189.64	1,048.22	141.42	8.412	
10,000.00	8,361.77	9,854.00	8,356.38	77.67	71.84	-89.98	-66.49	3,094.08	1,223.99	1,077.80	146.20	8.372	
10,041.98	8,362.27	9,893.42	8,356.84	78.73	72.85	-89.98	-66.43	3,133.50	1,238.41	1,090.21	148.21	8.356	
10,100.00	8,362.96	9,948.11	8,357.49	80.22	74.25	-89.97	-66.34	3,188.19	1,257.79	1,106.45	151.34	8.311	
10,200.00	8,364.15	10,043.24	8,358.61	82.78	76.70	-89.95	-66.18	3,283.32	1,288.58	1,131.89	156.70	8.223	
10,300.00	8,365.34	10,139.40	8,359.75	85.35	79.19	-89.93	-66.02	3,379.47	1,316.03	1,154.05	161.98	8.125	
10,400.00	8,366.54	10,236.45	8,360.89	87.93	81.71	-89.91	-65.86	3,476.51	1,340.11	1,172.92	167.18	8.016	
10,500.00	8,367.74	10,334.29	8,362.05	90.51	84.26	-89.89	-65.70	3,574.34	1,360.78	1,188.51	172.28	7.899	
10,600.00	8,368.94	10,432.78	8,363.21	93.08	86.84	-89.87	-65.54	3,672.83	1,378.03	1,200.78	177.25	7.775	
10,700.00	8,370.13	10,531.82	8,364.38	95.65	89.44	-89.84	-65.38	3,771.86	1,391.83	1,209.75	182.08	7.644	
10,800.00	8,371.33	10,631.28	8,365.56	98.20	92.06	-89.82	-65.21	3,871.31	1,402.17	1,215.42	186.74	7.509	
10,900.00	8,372.51	10,731.04	8,366.73	100.74	94.70	-89.80	-65.05	3,971.06	1,409.02	1,217.80	191.23	7.368	
11,000.00	8,373.69	10,830.98	8,367.91	103.25	97.34	-89.78	-64.88	4,071.00	1,412.39	1,216.88	195.51	7.224	
11,041.83	8,374.18	10,872.80	8,368.41	104.30	98.45	-89.77	-64.81	4,112.82	1,412.77	1,215.53	197.24	7.163	
11,100.00	8,374.87	10,930.97	8,369.09	105.75	100.00	-89.77	-64.72	4,170.99	1,412.67	1,212.54	200.32	7.053	

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

Integrity Directional Services, LLC

Anticollision Report

Company:	CL&F Operating LLC	**Local Co-ordinate Reference:**	Well Crazy Horse 4H
Project:	Eddy County, NM (NAD 83)	**TVD Reference:**	KB=25' @ 3272.00ft
Reference Site:	Sec 5, T20S, R30E	**MD Reference:**	KB=25' @ 3272.00ft
Site Error:	0.00 ft	**North Reference:**	Grid
Reference Well:	Crazy Horse 4H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	EDM 5000.1 Multi User Db
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design Sec 5, T20S, R30E - Crazy Horse 3H - Wellbore #1 - Plan #1 — **Offset Site Error:** 0.00 ft

Survey Program: 0-MWD — **Offset Well Error:** 0.00 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
11,200.00	8,376.04	11,030.97	8,370.28	108.27	102.68	-89.77	-64.55	4,270.98	1,413.04	1,207.41	205.63	6.872	
11,300.00	8,377.21	11,130.97	8,371.46	110.79	105.32	-89.77	-64.39	4,370.97	1,413.20	1,202.26	210.95	6.699	
11,400.00	8,378.38	11,230.97	8,372.64	113.33	107.99	-89.77	-64.22	4,470.96	1,413.37	1,197.10	216.28	6.535	
11,500.00	8,379.56	11,330.97	8,373.82	115.87	110.66	-89.77	-64.06	4,570.96	1,413.54	1,191.93	221.61	6.378	
11,600.00	8,380.73	11,430.97	8,375.00	118.42	113.34	-89.77	-63.89	4,670.95	1,413.71	1,186.75	226.96	6.229	
11,700.00	8,381.90	11,530.97	8,376.18	120.99	116.02	-89.77	-63.73	4,770.94	1,413.87	1,181.56	232.31	6.088	
11,800.00	8,383.08	11,630.97	8,377.36	123.56	118.70	-89.77	-63.56	4,870.94	1,414.04	1,176.37	237.67	5.950	
11,900.00	8,384.25	11,730.97	8,378.54	126.14	121.39	-89.77	-63.40	4,970.93	1,414.21	1,171.17	243.04	5.819	
12,000.00	8,385.42	11,830.97	8,379.72	128.73	124.08	-89.77	-63.24	5,070.92	1,414.38	1,165.96	248.41	5.694	
12,100.00	8,386.59	11,930.97	8,380.90	131.32	126.78	-89.77	-63.07	5,170.91	1,414.54	1,160.75	253.79	5.574	
12,200.00	8,387.77	12,030.97	8,382.08	133.92	129.47	-89.77	-62.91	5,270.91	1,414.71	1,155.53	259.18	5.458	
12,300.00	8,388.94	12,130.97	8,383.26	136.53	132.17	-89.77	-62.74	5,370.90	1,414.88	1,150.31	264.57	5.348	
12,400.00	8,390.11	12,230.97	8,384.45	139.14	134.87	-89.77	-62.58	5,470.89	1,415.05	1,145.08	269.97	5.242	
12,500.00	8,391.29	12,330.97	8,385.63	141.76	137.58	-89.77	-62.41	5,570.88	1,415.21	1,139.84	275.37	5.139	
12,600.00	8,392.46	12,430.97	8,386.81	144.38	140.28	-89.77	-62.25	5,670.88	1,415.38	1,134.61	280.78	5.041	
12,700.00	8,393.63	12,530.97	8,387.99	147.01	142.99	-89.77	-62.08	5,770.87	1,415.55	1,129.36	286.19	4.946	
12,800.00	8,394.80	12,630.97	8,389.17	149.64	145.70	-89.77	-61.92	5,870.86	1,415.72	1,124.12	291.60	4.855	
12,900.00	8,395.98	12,730.97	8,390.35	152.28	148.41	-89.77	-61.75	5,970.86	1,415.88	1,118.87	297.02	4.767	
13,000.00	8,397.15	12,830.97	8,391.53	154.92	151.13	-89.77	-61.59	6,070.85	1,416.05	1,113.61	302.44	4.682	
13,100.00	8,398.32	12,930.97	8,392.71	157.57	153.84	-89.77	-61.42	6,170.84	1,416.22	1,108.35	307.86	4.600	
13,200.00	8,399.50	13,030.97	8,393.89	160.22	156.56	-89.77	-61.26	6,270.83	1,416.39	1,103.09	313.29	4.521	
13,300.00	8,400.67	13,130.97	8,395.07	162.87	159.27	-89.77	-61.09	6,370.83	1,416.55	1,097.83	318.72	4.444	
13,400.00	8,401.84	13,230.97	8,396.25	165.53	161.99	-89.78	-60.93	6,470.82	1,416.72	1,092.56	324.16	4.370	
13,500.00	8,403.02	13,330.97	8,397.43	168.19	164.71	-89.78	-60.76	6,570.81	1,416.89	1,087.30	329.59	4.299	
13,600.00	8,404.19	13,430.97	8,398.61	170.85	167.43	-89.78	-60.60	6,670.80	1,417.06	1,082.02	335.03	4.230	
13,700.00	8,405.36	13,530.97	8,399.80	173.52	170.16	-89.78	-60.44	6,770.80	1,417.22	1,076.75	340.47	4.163	
13,800.00	8,406.53	13,630.97	8,400.98	176.19	172.88	-89.78	-60.27	6,870.79	1,417.39	1,071.47	345.92	4.097	
13,900.00	8,407.71	13,730.97	8,402.16	178.86	175.61	-89.78	-60.11	6,970.78	1,417.56	1,066.19	351.36	4.034	
14,000.00	8,408.88	13,830.97	8,403.34	181.54	178.33	-89.78	-59.94	7,070.78	1,417.73	1,060.91	356.81	3.973	
14,100.00	8,410.05	13,930.97	8,404.52	184.21	181.06	-89.78	-59.78	7,170.77	1,417.89	1,055.63	362.26	3.914	
14,200.00	8,411.23	14,030.97	8,405.70	186.89	183.79	-89.78	-59.61	7,270.76	1,418.06	1,050.35	367.71	3.856	
14,300.00	8,412.40	14,130.97	8,406.88	189.57	186.52	-89.78	-59.45	7,370.75	1,418.23	1,045.06	373.17	3.800	
14,400.00	8,413.57	14,230.97	8,408.06	192.26	189.25	-89.78	-59.28	7,470.75	1,418.40	1,039.77	378.63	3.746	
14,500.00	8,414.74	14,330.97	8,409.24	194.94	191.98	-89.78	-59.12	7,570.74	1,418.56	1,034.48	384.08	3.693	
14,600.00	8,415.92	14,430.97	8,410.42	197.63	194.71	-89.78	-58.95	7,670.73	1,418.73	1,029.19	389.54	3.642	
14,700.00	8,417.09	14,530.97	8,411.60	200.32	197.44	-89.78	-58.79	7,770.73	1,418.90	1,023.89	395.00	3.592	
14,800.00	8,418.26	14,630.97	8,412.78	203.01	200.17	-89.78	-58.62	7,870.72	1,419.07	1,018.60	400.47	3.544	
14,900.00	8,419.44	14,730.97	8,413.97	205.71	202.91	-89.78	-58.46	7,970.71	1,419.23	1,013.30	405.93	3.498	
15,000.00	8,420.61	14,830.97	8,415.15	208.40	205.64	-89.78	-58.29	8,070.70	1,419.40	1,008.00	411.40	3.450	
15,100.00	8,421.78	14,930.97	8,416.33	211.10	208.37	-89.78	-58.13	8,170.70	1,419.57	1,002.70	416.86	3.405	
15,200.00	8,422.95	15,030.97	8,417.51	213.80	211.11	-89.78	-57.96	8,270.69	1,419.74	997.40	422.33	3.362	
15,300.00	8,424.13	15,130.97	8,418.69	216.50	213.85	-89.78	-57.80	8,370.68	1,419.90	992.10	427.80	3.319	
15,400.00	8,425.30	15,230.97	8,419.87	219.20	216.58	-89.78	-57.64	8,470.67	1,420.07	986.80	433.27	3.278	
15,500.00	8,426.47	15,330.97	8,421.05	221.90	219.32	-89.78	-57.47	8,570.67	1,420.24	981.49	438.74	3.237	
15,600.00	8,427.65	15,430.97	8,422.23	224.61	222.06	-89.78	-57.31	8,670.66	1,420.41	976.19	444.22	3.198	
15,700.00	8,428.82	15,530.97	8,423.41	227.31	224.79	-89.78	-57.14	8,770.65	1,420.57	970.88	449.69	3.159	
15,800.00	8,429.99	15,630.97	8,424.59	230.02	227.53	-89.78	-56.98	8,870.65	1,420.74	965.58	455.16	3.121	
15,900.00	8,431.16	15,730.97	8,425.77	232.73	230.27	-89.78	-56.81	8,970.64	1,420.91	960.27	460.64	3.085	
16,000.00	8,432.34	15,830.97	8,426.95	235.44	233.01	-89.78	-56.65	9,070.63	1,421.08	954.96	466.12	3.049	
16,100.00	8,433.51	15,930.97	8,428.13	238.15	235.75	-89.78	-56.48	9,170.62	1,421.24	949.65	471.59	3.014	
16,200.00	8,434.68	16,030.97	8,429.32	240.86	238.49	-89.78	-56.32	9,270.62	1,421.41	944.34	477.07	2.979	
16,300.00	8,435.86	16,130.97	8,430.50	243.57	241.23	-89.79	-56.15	9,370.61	1,421.58	939.02	482.55	2.946	

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

Integrity Directional Services, LLC

Anticollision Report

Company:	CL&F Operating LLC	**Local Co-ordinate Reference:**	Well Crazy Horse 4H
Project:	Eddy County, NM (NAD 83)	**TVD Reference:**	KB=25' @ 3272.00ft
Reference Site:	Sec 5, T20S, R30E	**MD Reference:**	KB=25' @ 3272.00ft
Site Error:	0.00 ft	**North Reference:**	Grid
Reference Well:	Crazy Horse 4H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	EDM 5000.1 Multi User Db
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design Sec 5, T20S, R30E - Crazy Horse 3H - Wellbore #1 - Plan #1

Offset Site Error: 0.00 ft

Survey Program: 0-MWD

Offset Well Error: 0.00 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
16,400.00	8,437.03	16,230.97	8,431.68	246.29	243.97	-89.79	-55.99	9,470.60	1,421.75	933.71	488.03	2.913	
16,500.00	8,438.20	16,330.97	8,432.86	249.00	246.71	-89.79	-55.82	9,570.59	1,421.91	928.40	493.51	2.881	
16,600.00	8,439.37	16,430.97	8,434.04	251.72	249.46	-89.79	-55.66	9,670.59	1,422.08	923.08	499.00	2.850	
16,700.00	8,440.55	16,530.97	8,435.22	254.43	252.20	-89.79	-55.49	9,770.58	1,422.25	917.77	504.48	2.819	
16,800.00	8,441.72	16,630.97	8,436.40	257.15	254.94	-89.79	-55.33	9,870.57	1,422.42	912.45	509.96	2.789	
16,900.00	8,442.89	16,730.97	8,437.58	259.87	257.68	-89.79	-55.16	9,970.57	1,422.58	907.14	515.45	2.760	
17,000.00	8,444.07	16,830.97	8,438.76	262.59	260.43	-89.79	-55.00	10,070.56	1,422.75	901.82	520.93	2.731	
17,100.00	8,445.24	16,930.97	8,439.94	265.31	263.17	-89.79	-54.83	10,170.55	1,422.92	896.50	526.42	2.703	
17,200.00	8,446.41	17,030.97	8,441.12	268.03	265.91	-89.79	-54.67	10,270.54	1,423.09	891.18	531.90	2.675	
17,300.00	8,447.58	17,130.97	8,442.30	270.75	268.66	-89.79	-54.51	10,370.54	1,423.25	885.86	537.39	2.648	
17,400.00	8,448.76	17,230.97	8,443.49	273.47	271.40	-89.79	-54.34	10,470.53	1,423.42	880.54	542.88	2.622	
17,500.00	8,449.93	17,330.97	8,444.67	276.20	274.15	-89.79	-54.18	10,570.52	1,423.59	875.22	548.37	2.596	
17,600.00	8,451.10	17,430.97	8,445.85	278.92	276.89	-89.79	-54.01	10,670.52	1,423.76	869.90	553.85	2.571	
17,700.00	8,452.28	17,530.97	8,447.03	281.64	279.64	-89.79	-53.85	10,770.51	1,423.92	864.58	559.34	2.546	
17,800.00	8,453.45	17,630.97	8,448.21	284.37	282.38	-89.79	-53.68	10,870.50	1,424.09	859.26	564.83	2.521	
17,900.00	8,454.62	17,730.97	8,449.39	287.09	285.13	-89.79	-53.52	10,970.49	1,424.26	853.94	570.32	2.497	
18,000.00	8,455.79	17,830.97	8,450.57	289.82	287.87	-89.79	-53.35	11,070.49	1,424.43	848.61	575.81	2.474	
18,100.00	8,456.97	17,930.96	8,451.75	292.55	290.62	-89.79	-53.19	11,170.48	1,424.59	843.29	581.30	2.451	
18,200.00	8,458.14	18,030.96	8,452.93	295.28	293.37	-89.79	-53.02	11,270.47	1,424.76	837.96	586.80	2.428	
18,300.00	8,459.31	18,130.96	8,454.11	298.00	296.11	-89.79	-52.86	11,370.46	1,424.93	832.64	592.29	2.406	
18,400.00	8,460.49	18,230.96	8,455.29	300.73	298.86	-89.79	-52.69	11,470.46	1,425.10	827.31	597.78	2.384	
18,500.00	8,461.66	18,330.96	8,456.47	303.46	301.61	-89.79	-52.53	11,570.45	1,425.26	821.99	603.27	2.363	
18,600.00	8,462.83	18,430.96	8,457.66	306.19	304.35	-89.79	-52.36	11,670.44	1,425.43	816.66	608.77	2.342	
18,700.00	8,464.00	18,530.96	8,458.84	308.92	307.10	-89.79	-52.20	11,770.44	1,425.60	811.34	614.26	2.321	
18,800.00	8,465.18	18,630.96	8,460.02	311.65	309.85	-89.79	-52.03	11,870.43	1,425.77	806.01	619.75	2.301	
18,900.00	8,466.35	18,730.96	8,461.20	314.38	312.60	-89.79	-51.87	11,970.42	1,425.93	800.68	625.25	2.281	
19,000.00	8,467.52	18,830.96	8,462.38	317.12	315.34	-89.79	-51.71	12,070.41	1,426.10	795.36	630.74	2.261	
19,100.00	8,468.70	18,930.96	8,463.56	319.85	318.09	-89.79	-51.54	12,170.41	1,426.27	790.03	636.24	2.242	
19,200.00	8,469.87	19,030.96	8,464.74	322.58	320.84	-89.80	-51.38	12,270.40	1,426.44	784.70	641.74	2.223	
19,296.44	8,471.00	19,127.41	8,465.88	325.22	323.49	-89.80	-51.22	12,366.84	1,426.60	779.56	647.04	2.205	

Integrity Directional Services, LLC

Anticollision Report

Company:	CL&F Operating LLC	**Local Co-ordinate Reference:**	Well Crazy Horse 4H
Project:	Eddy County, NM (NAD 83)	**TVD Reference:**	KB=25' @ 3272.00ft
Reference Site:	Sec 5, T20S, R30E	**MD Reference:**	KB=25' @ 3272.00ft
Site Error:	0.00 ft	**North Reference:**	Grid
Reference Well:	Crazy Horse 4H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	EDM 5000.1 Multi User Db
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design Sec 5, T20S, R30E - Solution Fed 1H-Planned COG - Wellbore #1 - Design #1 — Offset Site Error: 0.00 ft

Survey Program: 0-MWD — Offset Well Error: 0.00 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.00	0.00	0.00	0.00	0.00	0.00	10.35	239.89	43.83	243.91				
100.00	100.00	95.00	95.00	0.08	0.09	10.35	239.89	43.83	243.86	243.69	0.17	1,428.051	
200.00	200.00	195.00	195.00	0.31	0.30	10.35	239.89	43.83	243.86	243.25	0.61	397.422	
300.00	300.00	295.00	295.00	0.53	0.53	10.35	239.89	43.83	243.86	242.80	1.06	229.379	
400.00	400.00	395.00	395.00	0.76	0.75	10.35	239.89	43.83	243.86	242.35	1.51	161.213	
500.00	500.00	495.00	495.00	0.98	0.98	10.35	239.89	43.83	243.86	241.90	1.96	124.280	
600.00	600.00	595.00	595.00	1.21	1.20	10.35	239.89	43.83	243.86	241.45	2.41	101.115	
700.00	700.00	695.00	695.00	1.43	1.43	10.35	239.89	43.83	243.86	241.00	2.86	85.229	
800.00	800.00	795.00	795.00	1.66	1.65	10.35	239.89	43.83	243.86	240.55	3.31	73.657	
900.00	900.00	895.00	895.00	1.88	1.88	10.35	239.89	43.83	243.86	240.10	3.76	64.851	
1,000.00	1,000.00	995.00	995.00	2.11	2.10	10.35	239.89	43.83	243.86	239.65	4.21	57.926	
1,100.00	1,100.00	1,095.00	1,095.00	2.33	2.33	10.35	239.89	43.83	243.86	239.20	4.66	52.338	
1,200.00	1,200.00	1,195.00	1,195.00	2.56	2.55	10.35	239.89	43.83	243.86	238.75	5.11	47.733	
1,300.00	1,300.00	1,295.00	1,295.00	2.78	2.78	10.35	239.89	43.83	243.86	238.30	5.56	43.872	
1,400.00	1,400.00	1,395.00	1,395.00	3.01	3.00	10.35	239.89	43.83	243.86	237.85	6.01	40.590	
1,500.00	1,500.00	1,495.00	1,495.00	3.23	3.23	10.35	239.89	43.83	243.86	237.41	6.46	37.764	
1,600.00	1,600.00	1,595.00	1,595.00	3.46	3.45	10.35	239.89	43.83	243.86	236.96	6.91	35.306	
1,700.00	1,700.00	1,695.00	1,695.00	3.68	3.68	10.35	239.89	43.83	243.86	236.51	7.36	33.149	
1,800.00	1,800.00	1,795.00	1,795.00	3.91	3.90	10.35	239.89	43.83	243.86	236.06	7.81	31.240	
1,900.00	1,900.00	1,895.00	1,895.00	4.13	4.13	10.35	239.89	43.83	243.86	235.61	8.26	29.539	
2,000.00	2,000.00	1,995.00	1,995.00	4.35	4.35	10.35	239.89	43.83	243.86	235.16	8.71	28.013	
2,100.00	2,100.00	2,095.00	2,095.00	4.58	4.58	10.35	239.89	43.83	243.86	234.71	9.15	26.638	
2,200.00	2,200.00	2,195.00	2,195.00	4.80	4.80	10.35	239.89	43.83	243.86	234.26	9.60	25.391	
2,300.00	2,300.00	2,295.00	2,295.00	5.03	5.02	10.35	239.89	43.83	243.86	233.81	10.05	24.256	
2,400.00	2,400.00	2,395.00	2,395.00	5.25	5.25	10.35	239.89	43.83	243.86	233.36	10.50	23.218	
2,500.00	2,500.00	2,495.00	2,495.00	5.48	5.47	10.35	239.89	43.83	243.86	232.91	10.95	22.265	
2,600.00	2,600.00	2,595.00	2,595.00	5.70	5.70	10.35	239.89	43.83	243.86	232.46	11.40	21.387	
2,700.00	2,700.00	2,695.00	2,695.00	5.93	5.92	10.35	239.89	43.83	243.86	232.01	11.85	20.576	
2,800.00	2,800.00	2,795.00	2,795.00	6.15	6.15	10.35	239.89	43.83	243.86	231.56	12.30	19.824	
2,900.00	2,900.00	2,895.00	2,895.00	6.38	6.37	10.35	239.89	43.83	243.86	231.11	12.75	19.125	
3,000.00	3,000.00	2,995.00	2,995.00	6.60	6.60	10.35	239.89	43.83	243.86	230.66	13.20	18.474	
3,100.00	3,100.00	3,095.00	3,095.00	6.83	6.82	10.35	239.89	43.83	243.86	230.21	13.65	17.865 CC	
3,200.00	3,200.00	3,193.70	3,193.69	7.05	7.03	10.63	239.89	45.04	244.09	230.00	14.08	17.330 ES	
3,300.00	3,300.00	3,291.97	3,291.85	7.28	7.23	11.68	239.89	49.58	244.98	230.48	14.50	16.890	
3,400.00	3,400.00	3,389.82	3,389.38	7.50	7.43	13.47	239.89	57.45	246.74	231.81	14.92	16.532	
3,500.00	3,500.00	3,487.02	3,485.94	7.73	7.64	15.95	239.89	68.55	249.66	234.31	15.35	16.269	
3,580.00	3,580.00	3,564.17	3,562.27	7.91	7.81	18.38	239.89	79.69	253.10	237.42	15.68	16.140	
3,600.00	3,600.00	3,583.36	3,581.22	7.95	7.86	-94.92	239.89	82.78	254.15	238.35	15.80	16.087	
3,700.00	3,699.98	3,681.41	3,677.79	8.13	8.09	-91.80	239.89	99.68	260.42	244.21	16.21	16.062	
3,800.00	3,799.78	3,780.65	3,775.53	8.32	8.34	-89.48	239.89	116.92	267.40	250.75	16.64	16.066	
3,900.00	3,899.34	3,880.18	3,873.55	8.52	8.60	-87.99	239.89	134.20	274.61	257.52	17.09	16.070	
3,980.00	3,978.70	3,959.93	3,952.09	8.68	8.81	-87.37	239.89	148.05	280.36	262.90	17.46	16.061	
4,000.00	3,998.51	3,979.88	3,971.73	8.72	8.87	-87.30	239.89	151.51	281.79	264.24	17.55	16.056	
4,100.00	4,097.53	4,079.61	4,069.95	8.94	9.15	-86.97	239.89	168.83	288.94	270.91	18.03	16.026	
4,200.00	4,196.56	4,179.34	4,168.16	9.16	9.43	-86.65	239.89	186.15	296.09	277.57	18.52	15.985	
4,300.00	4,295.59	4,279.07	4,266.38	9.39	9.73	-86.35	239.89	203.47	303.26	284.23	19.03	15.936	
4,380.00	4,374.81	4,358.86	4,344.95	9.58	9.97	-86.12	239.89	217.32	308.99	289.55	19.44	15.892	
4,400.00	4,394.60	4,378.80	4,364.59	9.62	10.03	-86.05	239.89	220.79	310.42	290.88	19.55	15.881	
4,500.00	4,493.26	4,478.55	4,462.82	9.87	10.33	-86.08	239.89	238.11	317.43	297.35	20.09	15.802	
4,600.00	4,591.28	4,578.22	4,560.98	10.15	10.64	-86.72	239.89	255.41	324.24	303.57	20.66	15.693	
4,700.00	4,688.55	4,677.69	4,658.94	10.45	10.96	-87.93	239.89	272.69	330.96	309.69	21.27	15.557	
4,800.00	4,784.96	4,778.84	4,756.59	10.78	11.28	-89.67	239.89	289.90	337.83	315.90	21.93	15.405	

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

Integrity Directional Services, LLC

Anticollision Report

Company:	CL&F Operating LLC	**Local Co-ordinate Reference:**	Well Crazy Horse 4H
Project:	Eddy County, NM (NAD 83)	**TVD Reference:**	KB=25' @ 3272.00ft
Reference Site:	Sec 5, T20S, R30E	**MD Reference:**	KB=25' @ 3272.00ft
Site Error:	0.00 ft	**North Reference:**	Grid
Reference Well:	Crazy Horse 4H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	EDM 5000.1 Multi User Db
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design Sec 5, T20S, R30E - Solution Fed 1H-Planned COG - Wellbore #1 - Design #1 — **Offset Site Error:** 0.00 ft

Survey Program: 0-MWD — **Offset Well Error:** 0.00 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
4,900.00	4,880.38	4,875.56	4,853.80	11.15	11.60	-91.88	239.89	307.05	345.16	322.53	22.63	15.251	
5,000.00	4,974.69	4,973.71	4,950.46	11.57	11.92	-94.52	239.89	324.09	353.32	329.94	23.38	15.114	
5,100.00	5,067.79	5,071.19	5,046.46	12.05	12.25	-97.51	239.89	341.02	362.76	338.60	24.16	15.014	
5,200.00	5,159.56	5,167.86	5,141.67	12.58	12.57	-100.79	239.89	357.80	373.94	348.97	24.97	14.974	
5,300.00	5,249.89	5,263.62	5,235.97	13.17	12.90	-104.26	239.89	374.43	387.34	361.55	25.80	15.014	
5,400.00	5,338.67	5,358.35	5,329.26	13.84	13.22	-107.86	239.89	390.88	403.43	376.81	26.62	15.155	
5,500.00	5,425.79	5,451.94	5,421.42	14.59	13.55	-111.48	239.89	407.13	422.60	395.17	27.42	15.411	
5,538.04	5,456.76	5,485.36	5,454.34	14.87	13.66	-112.77	239.89	412.94	430.33	402.63	27.70	15.533	
5,600.00	5,511.51	5,544.53	5,512.61	15.40	13.87	-115.25	239.89	423.21	444.90	416.69	28.21	15.770	
5,700.00	5,597.12	5,637.03	5,603.71	16.26	14.19	-118.85	239.89	439.28	469.29	440.31	28.98	16.194	
5,800.00	5,682.73	5,729.54	5,694.81	17.14	14.51	-122.10	239.89	455.34	495.39	465.68	29.72	16.670	
5,900.00	5,768.34	5,822.05	5,785.91	18.05	14.84	-125.04	239.89	471.40	522.96	492.52	30.43	17.184	
6,000.00	5,853.94	5,914.56	5,877.02	18.98	15.17	-127.71	239.89	487.47	551.76	520.63	31.13	17.725	
6,100.00	5,939.55	6,007.06	5,968.12	19.93	15.50	-130.12	239.89	503.53	581.61	549.80	31.81	18.284	
6,200.00	6,025.16	6,099.57	6,059.22	20.90	15.83	-132.31	239.89	519.59	612.37	579.89	32.48	18.855	
6,300.00	6,110.77	6,192.08	6,150.32	21.88	16.16	-134.29	239.89	535.65	643.90	610.76	33.14	19.431	
6,400.00	6,196.38	6,284.59	6,241.42	22.88	16.49	-136.10	239.89	551.72	676.09	642.30	33.79	20.008	
6,500.00	6,281.98	6,377.09	6,332.53	23.88	16.83	-137.74	239.89	567.79	708.85	674.41	34.44	20.582	
6,600.00	6,367.59	6,469.60	6,423.63	24.90	17.16	-139.25	239.89	583.85	742.12	707.03	35.09	21.151	
6,700.00	6,453.20	6,562.11	6,514.73	25.92	17.50	-140.63	239.89	599.91	775.81	740.08	35.73	21.713	
6,800.00	6,538.81	6,654.62	6,605.83	26.95	17.84	-141.90	239.89	615.98	809.88	773.51	36.37	22.265	
6,900.00	6,624.41	6,747.12	6,696.93	27.99	18.17	-143.07	239.89	632.04	844.29	807.27	37.02	22.808	
7,000.00	6,710.02	6,839.63	6,788.04	29.03	18.51	-144.15	239.89	648.10	878.99	841.33	37.66	23.339	
7,100.00	6,795.63	6,932.14	6,879.14	30.08	18.85	-145.15	239.89	664.17	913.96	875.65	38.31	23.859	
7,200.00	6,881.24	7,024.64	6,970.24	31.13	19.19	-146.07	239.89	680.23	949.15	910.20	38.95	24.366	
7,300.00	6,966.85	7,117.15	7,061.34	32.19	19.53	-146.94	239.89	696.30	984.55	944.95	39.60	24.861	
7,400.00	7,052.45	7,209.66	7,152.44	33.25	19.88	-147.74	239.89	712.36	1,020.14	979.89	40.25	25.344	
7,500.00	7,138.06	7,302.17	7,243.55	34.32	20.22	-148.49	239.89	728.42	1,055.89	1,014.99	40.90	25.814	
7,600.00	7,223.67	7,378.73	7,319.08	35.39	20.47	-149.11	239.89	740.91	1,092.41	1,050.89	41.52	26.313	
7,700.00	7,309.28	9,340.52	8,372.25	36.46	38.88	-171.95	-599.51	1,524.70	1,071.57	1,033.47	38.10	28.122	
7,800.00	7,394.89	9,383.02	8,372.41	37.53	39.57	-174.57	-637.12	1,544.50	984.10	945.65	38.46	25.591	
7,900.00	7,480.49	9,424.06	8,372.57	38.61	40.22	-177.53	-673.84	1,562.81	897.36	858.22	39.14	22.925	
8,000.00	7,566.10	9,463.67	8,372.72	39.69	40.85	179.16	-709.66	1,579.74	811.70	771.39	40.30	20.140	
8,100.00	7,651.71	9,501.91	8,372.86	40.77	41.45	175.49	-744.55	1,595.36	727.59	685.53	42.06	17.299	
8,200.00	7,737.32	9,538.80	8,373.00	41.85	42.02	171.48	-778.51	1,609.78	645.79	601.24	44.54	14.498	
8,300.00	7,822.93	9,574.39	8,373.14	42.93	42.57	167.15	-811.53	1,623.06	567.41	519.64	47.77	11.877	
8,400.00	7,908.53	9,608.74	8,373.27	44.02	43.09	162.57	-843.62	1,635.30	494.24	442.52	51.72	9.556	
8,500.00	7,994.14	9,641.87	8,373.39	45.11	43.59	157.79	-874.79	1,646.55	429.10	372.84	56.27	7.626	
8,594.14	8,074.73	9,672.00	8,373.51	46.13	44.04	153.18	-903.29	1,656.31	379.02	318.10	60.92	6.222	
8,600.00	8,079.73	9,673.85	8,373.51	46.20	44.07	153.08	-905.05	1,656.89	376.40	315.35	61.05	6.165	
8,650.00	8,121.08	9,690.59	8,373.58	46.80	44.32	151.82	-920.95	1,662.11	358.84	296.48	62.38	5.753	
8,700.00	8,159.82	9,708.78	8,373.65	47.48	44.59	149.87	-938.29	1,667.61	350.59	286.51	64.08	5.471	
8,717.14	8,172.45	9,715.31	8,373.67	47.75	44.68	149.05	-944.52	1,669.55	350.01	285.24	64.78	5.403	
8,750.00	8,195.67	9,728.17	8,373.72	48.26	44.86	147.27	-956.82	1,673.30	352.11	285.86	66.26	5.314	
8,800.00	8,228.35	9,748.49	8,373.80	49.11	45.16	144.00	-975.31	1,679.06	363.03	294.04	68.98	5.263 SF	
8,850.00	8,257.62	9,769.49	8,373.88	50.03	45.46	140.03	-996.51	1,684.79	382.25	309.92	72.34	5.284	
8,900.00	8,283.25	9,790.92	8,373.96	51.03	45.77	135.31	-1,017.20	1,690.41	408.33	331.98	76.36	5.348	
8,950.00	8,305.05	9,812.55	8,374.04	52.08	46.08	129.81	-1,038.13	1,695.85	439.76	358.78	80.98	5.431	
9,000.00	8,322.84	9,834.16	8,374.12	53.18	46.37	123.50	-1,059.10	1,701.04	475.19	389.17	86.02	5.524	
9,050.00	8,336.51	9,855.54	8,374.20	54.33	46.67	116.42	-1,079.91	1,705.95	513.52	422.37	91.15	5.634	
9,100.00	8,345.93	9,876.51	8,374.28	55.49	46.96	108.68	-1,100.38	1,710.54	553.89	457.99	95.89	5.776	
9,150.00	8,351.05	9,900.00	8,374.36	56.68	47.29	100.38	-1,123.38	1,715.40	595.63	495.85	99.78	5.969	

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

Integrity Directional Services, LLC

Anticollision Report

Company:	CL&F Operating LLC	**Local Co-ordinate Reference:**	Well Crazy Horse 4H
Project:	Eddy County, NM (NAD 83)	**TVD Reference:**	KB=25' @ 3272.00ft
Reference Site:	Sec 5, T20S, R30E	**MD Reference:**	KB=25' @ 3272.00ft
Site Error:	0.00 ft	**North Reference:**	Grid
Reference Well:	Crazy Horse 4H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	EDM 5000.1 Multi User Db
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design Sec 5, T20S, R30E - Solution Fed 1H-Planned COG - Wellbore #1 - Design #1

Offset Site Error: 0.00 ft

Survey Program: 0-MWD

Offset Well Error: 0.00 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
9,176.98	8,352.00	9,900.00	8,374.36	57.32	47.29	96.10	-1,123.36	1,715.40	818.57	517.41	101.16	6.115	
9,200.00	8,352.27	9,918.63	8,374.43	57.87	47.51	95.83	-1,139.68	1,718.68	838.17	536.28	101.89	6.264	
9,300.00	8,353.46	9,954.10	8,374.57	60.26	48.01	95.30	-1,176.50	1,725.54	724.18	619.52	104.66	6.919	
9,400.00	8,354.65	10,000.00	8,374.73	62.69	48.63	94.76	-1,221.79	1,732.96	811.27	703.73	107.53	7.544	
9,500.00	8,355.83	10,022.09	8,374.82	65.14	48.90	94.54	-1,243.65	1,736.14	899.03	788.88	110.17	8.161	
9,600.00	8,357.02	10,052.99	8,374.93	67.61	49.30	94.25	-1,274.29	1,740.16	987.68	874.79	112.90	8.749	
9,700.00	8,358.21	10,100.00	8,375.10	70.10	49.90	93.88	-1,321.01	1,745.33	1,077.30	961.53	115.77	9.305	
9,800.00	8,359.39	10,100.00	8,375.10	72.60	49.90	93.88	-1,321.01	1,745.33	1,167.16	1,048.89	118.28	9.868	
9,900.00	8,360.58	10,135.20	8,375.23	75.13	50.33	93.64	-1,356.07	1,748.45	1,257.74	1,136.69	121.05	10.390	
10,000.00	8,361.77	10,159.55	8,375.31	77.67	50.62	93.49	-1,380.36	1,750.23	1,348.93	1,225.18	123.75	10.900	
10,041.98	8,362.27	10,169.37	8,375.35	78.73	50.74	93.43	-1,390.16	1,750.86	1,387.36	1,262.47	124.89	11.108	
10,100.00	8,362.96	10,200.00	8,375.46	80.22	51.12	93.43	-1,420.74	1,752.50	1,441.04	1,314.95	126.09	11.428	
10,200.00	8,364.15	10,200.00	8,375.46	82.78	51.12	93.79	-1,420.74	1,752.50	1,534.38	1,406.69	127.69	12.016	
10,300.00	8,365.34	10,200.00	8,375.46	85.35	51.12	94.26	-1,420.74	1,752.50	1,629.60	1,500.45	129.15	12.618	
10,400.00	8,366.54	10,233.52	8,375.58	87.93	51.50	94.53	-1,454.23	1,753.73	1,725.65	1,595.03	130.63	13.211	
10,500.00	8,367.74	10,245.41	8,375.62	90.51	51.64	95.13	-1,466.13	1,754.03	1,822.96	1,691.15	131.81	13.830	
10,600.00	8,368.94	10,255.00	8,375.65	93.08	51.75	96.00	-1,475.71	1,754.22	1,921.12	1,788.35	132.77	14.470	
10,700.00	8,370.13	10,262.44	8,375.68	95.65	51.84	97.37	-1,483.15	1,754.33	2,019.95	1,886.54	133.41	15.141	
10,800.00	8,371.33	10,286.01	8,375.76	98.20	52.12	99.00	-1,506.72	1,754.48	2,119.46	1,985.69	133.77	15.844	
10,900.00	8,372.51	10,286.01	8,375.76	100.74	52.12	103.60	-1,506.72	1,754.48	2,219.09	2,086.62	132.47	16.752	
11,000.00	8,373.69	10,286.01	8,375.76	103.25	52.12	118.45	-1,506.72	1,754.48	2,318.97	2,197.49	121.47	19.090	
11,041.83	8,374.18	10,286.01	8,375.76	104.30	52.12	139.55	-1,506.72	1,754.48	2,360.78	2,266.77	94.01	25.112	
11,100.00	8,374.87	10,286.01	8,375.76	105.75	52.12	139.55	-1,506.72	1,754.48	2,418.95	2,323.89	95.06	25.448	
11,200.00	8,376.04	10,286.01	8,375.76	108.27	52.12	139.55	-1,506.72	1,754.48	2,518.93	2,422.07	96.85	26.007	
11,300.00	8,377.21	10,286.01	8,375.76	110.79	52.12	139.55	-1,506.72	1,754.48	2,618.91	2,520.26	98.66	26.545	
11,400.00	8,378.38	10,286.01	8,375.76	113.33	52.12	139.55	-1,506.72	1,754.48	2,718.90	2,618.43	100.47	27.063	
11,500.00	8,379.56	10,286.01	8,375.76	115.87	52.12	139.55	-1,506.72	1,754.48	2,818.89	2,716.61	102.28	27.562	
11,600.00	8,380.73	10,286.01	8,375.76	118.42	52.12	139.55	-1,506.72	1,754.48	2,918.87	2,814.78	104.09	28.042	
11,700.00	8,381.90	10,286.01	8,375.76	120.99	52.12	139.55	-1,506.72	1,754.48	3,018.86	2,912.95	105.91	28.505	
11,800.00	8,383.08	10,286.01	8,375.76	123.56	52.12	139.55	-1,506.72	1,754.48	3,118.85	3,011.12	107.73	28.952	
11,900.00	8,384.25	10,286.01	8,375.76	126.14	52.12	139.55	-1,506.72	1,754.48	3,218.84	3,109.29	109.55	29.383	
12,000.00	8,385.42	10,286.01	8,375.76	128.73	52.12	139.55	-1,506.72	1,754.48	3,318.83	3,207.48	111.37	29.799	
12,100.00	8,386.59	10,286.01	8,375.76	131.32	52.12	139.55	-1,506.72	1,754.48	3,418.82	3,305.62	113.20	30.201	
12,200.00	8,387.77	10,286.01	8,375.76	133.92	52.12	139.55	-1,506.72	1,754.48	3,518.81	3,403.78	115.03	30.590	
12,300.00	8,388.94	10,286.01	8,375.76	136.53	52.12	139.55	-1,506.72	1,754.48	3,618.81	3,501.94	116.86	30.967	
12,400.00	8,390.11	10,286.01	8,375.76	139.14	52.12	139.55	-1,506.72	1,754.48	3,718.80	3,600.10	118.69	31.331	
12,500.00	8,391.29	10,286.01	8,375.76	141.76	52.12	139.55	-1,506.72	1,754.48	3,818.79	3,698.26	120.53	31.683	
12,600.00	8,392.46	10,286.01	8,375.76	144.38	52.12	139.55	-1,506.72	1,754.48	3,918.78	3,796.42	122.37	32.025	
12,700.00	8,393.63	10,286.01	8,375.76	147.01	52.12	139.55	-1,506.72	1,754.48	4,018.78	3,894.57	124.20	32.356	
12,800.00	8,394.80	10,286.01	8,375.76	149.64	52.12	139.55	-1,506.72	1,754.48	4,118.77	3,992.73	126.04	32.677	
12,900.00	8,395.98	10,286.01	8,375.76	152.28	52.12	139.55	-1,506.72	1,754.48	4,218.77	4,090.88	127.89	32.989	
13,000.00	8,397.15	10,286.01	8,375.76	154.92	52.12	139.55	-1,506.72	1,754.48	4,318.76	4,189.03	129.73	33.291	
13,100.00	8,398.32	10,286.01	8,375.76	157.57	52.12	139.55	-1,506.72	1,754.48	4,418.76	4,287.18	131.57	33.584	
13,200.00	8,399.50	10,286.01	8,375.76	160.22	52.12	139.55	-1,506.72	1,754.48	4,518.75	4,385.33	133.42	33.869	
13,300.00	8,400.67	10,286.01	8,375.76	162.87	52.12	139.55	-1,506.72	1,754.48	4,618.75	4,483.48	135.26	34.146	
13,400.00	8,401.84	10,286.01	8,375.76	165.53	52.12	139.55	-1,506.72	1,754.48	4,718.74	4,581.63	137.11	34.416	
13,500.00	8,403.02	10,286.01	8,375.76	168.19	52.12	139.55	-1,506.72	1,754.48	4,818.74	4,679.78	138.96	34.679	
13,600.00	8,404.19	10,286.01	8,375.76	170.85	52.12	139.55	-1,506.72	1,754.48	4,918.73	4,777.92	140.81	34.932	
13,700.00	8,405.36	10,286.01	8,375.76	173.52	52.12	139.55	-1,506.72	1,754.48	5,018.73	4,876.07	142.66	35.180	
13,800.00	8,406.53	10,286.01	8,375.76	176.19	52.12	139.55	-1,506.72	1,754.48	5,118.72	4,974.22	144.51	35.422	
13,900.00	8,407.71	10,286.01	8,375.76	178.86	52.12	139.55	-1,506.72	1,754.48	5,218.72	5,072.36	146.36	35.657	
14,000.00	8,408.88	10,286.01	8,375.76	181.54	52.12	139.55	-1,506.72	1,754.48	5,318.72	5,170.50	148.21	35.886	

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

Integrity Directional Services, LLC

Anticollision Report

Company:	CL&F Operating LLC	**Local Co-ordinate Reference:**	Well Crazy Horse 4H
Project:	Eddy County, NM (NAD 83)	**TVD Reference:**	KB=25' @ 3272.00ft
Reference Site:	Sec 5, T20S, R30E	**MD Reference:**	KB=25' @ 3272.00ft
Site Error:	0.00 ft	**North Reference:**	Grid
Reference Well:	Crazy Horse 4H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	EDM 5000.1 Multi User Db
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design Sec 5, T20S, R30E - Solution Fed 1H-Planned COG - Wellbore #1 - Design #1

Survey Program: 0-MWD

Offset Site Error: 0.00 ft

Offset Well Error: 0.00 ft

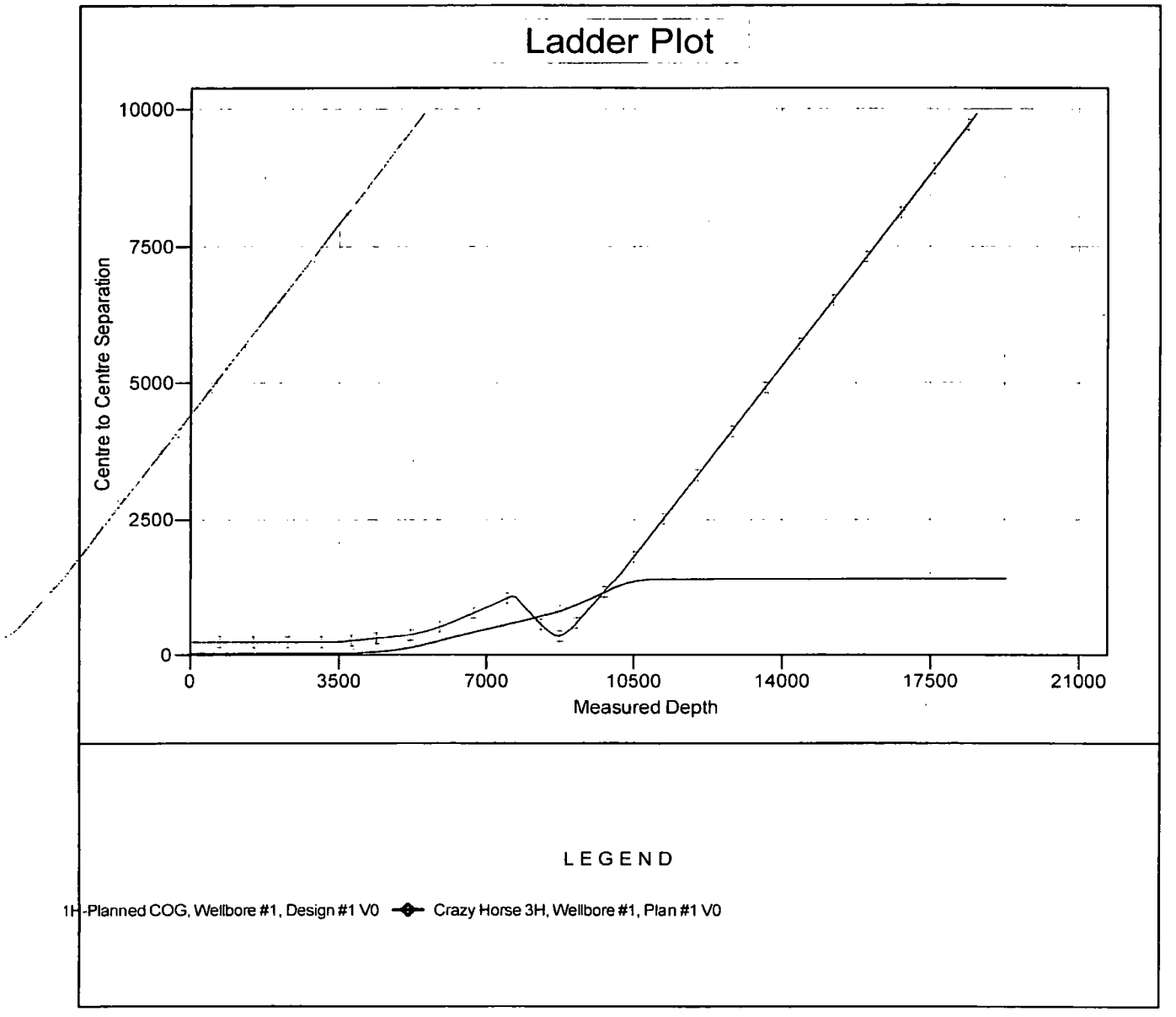
Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
14,100.00	8,410.05	10,286.01	8,375.76	184.21	52.12	139.55	-1,506.72	1,754.48	5,418.71	5,268.65	150.07	36.109	
14,200.00	8,411.23	10,286.01	8,375.76	186.89	52.12	139.55	-1,506.72	1,754.48	5,518.71	5,366.79	151.92	36.326	
14,300.00	8,412.40	10,286.01	8,375.76	189.57	52.12	139.55	-1,506.72	1,754.48	5,618.71	5,464.93	153.78	36.538	
14,400.00	8,413.57	10,286.01	8,375.76	192.26	52.12	139.55	-1,506.72	1,754.48	5,718.70	5,563.07	155.63	36.745	
14,500.00	8,414.74	10,286.01	8,375.76	194.94	52.12	139.55	-1,506.72	1,754.48	5,818.70	5,661.21	157.49	36.947	
14,600.00	8,415.92	10,286.01	8,375.76	197.63	52.12	139.55	-1,506.72	1,754.48	5,918.70	5,759.35	159.34	37.144	
14,700.00	8,417.09	10,286.01	8,375.76	200.32	52.12	139.55	-1,506.72	1,754.48	6,018.69	5,857.49	161.20	37.337	
14,800.00	8,418.26	10,286.01	8,375.76	203.01	52.12	139.55	-1,506.72	1,754.48	6,118.69	5,955.63	163.06	37.524	
14,900.00	8,419.44	10,286.01	8,375.76	205.71	52.12	139.55	-1,506.72	1,754.48	6,218.69	6,053.77	164.92	37.708	
15,000.00	8,420.61	10,286.01	8,375.76	208.40	52.12	139.55	-1,506.72	1,754.48	6,318.69	6,151.91	166.78	37.887	
15,100.00	8,421.78	10,286.01	8,375.76	211.10	52.12	139.55	-1,506.72	1,754.48	6,418.68	6,250.05	168.64	38.062	
15,200.00	8,422.95	10,286.01	8,375.76	213.80	52.12	139.55	-1,506.72	1,754.48	6,518.68	6,348.19	170.50	38.234	
15,300.00	8,424.13	10,286.01	8,375.76	216.50	52.12	139.55	-1,506.72	1,754.48	6,618.68	6,446.32	172.36	38.401	
15,400.00	8,425.30	10,286.01	8,375.76	219.20	52.12	139.55	-1,506.72	1,754.48	6,718.68	6,544.46	174.22	38.565	
15,500.00	8,426.47	10,286.01	8,375.76	221.90	52.12	139.55	-1,506.72	1,754.48	6,818.67	6,642.60	176.08	38.725	
15,600.00	8,427.65	10,286.01	8,375.76	224.61	52.12	139.55	-1,506.72	1,754.48	6,918.67	6,740.73	177.94	38.882	
15,700.00	8,428.82	10,286.01	8,375.76	227.31	52.12	139.55	-1,506.72	1,754.48	7,018.67	6,838.87	179.80	39.035	
15,800.00	8,429.99	10,286.01	8,375.76	230.02	52.12	139.55	-1,506.72	1,754.48	7,118.67	6,937.00	181.66	39.186	
15,900.00	8,431.16	10,286.01	8,375.76	232.73	52.12	139.55	-1,506.72	1,754.48	7,218.67	7,035.14	183.53	39.333	
16,000.00	8,432.34	10,286.01	8,375.76	235.44	52.12	139.55	-1,506.72	1,754.48	7,318.66	7,133.27	185.39	39.477	
16,100.00	8,433.51	10,286.01	8,375.76	238.15	52.12	139.55	-1,506.72	1,754.48	7,418.66	7,231.41	187.25	39.618	
16,200.00	8,434.68	10,286.01	8,375.76	240.86	52.12	139.55	-1,506.72	1,754.48	7,518.66	7,329.54	189.12	39.756	
16,300.00	8,435.86	10,286.01	8,375.76	243.57	52.12	139.55	-1,506.72	1,754.48	7,618.66	7,427.68	190.98	39.892	
16,400.00	8,437.03	10,286.01	8,375.76	246.29	52.12	139.55	-1,506.72	1,754.48	7,718.66	7,525.81	192.85	40.025	
16,500.00	8,438.20	10,286.01	8,375.76	249.00	52.12	139.55	-1,506.72	1,754.48	7,818.66	7,623.94	194.71	40.155	
16,600.00	8,439.37	10,286.01	8,375.76	251.72	52.12	139.55	-1,506.72	1,754.48	7,918.65	7,722.08	196.58	40.283	
16,700.00	8,440.55	10,286.01	8,375.76	254.43	52.12	139.55	-1,506.72	1,754.48	8,018.65	7,820.21	198.44	40.408	
16,800.00	8,441.72	10,286.01	8,375.76	257.15	52.12	139.55	-1,506.72	1,754.48	8,118.65	7,918.34	200.31	40.531	
16,900.00	8,442.89	10,286.01	8,375.76	259.87	52.12	139.55	-1,506.72	1,754.48	8,218.65	8,016.48	202.17	40.651	
17,000.00	8,444.07	10,286.01	8,375.76	262.59	52.12	139.55	-1,506.72	1,754.48	8,318.65	8,114.61	204.04	40.770	
17,100.00	8,445.24	10,286.01	8,375.76	265.31	52.12	139.55	-1,506.72	1,754.48	8,418.65	8,212.74	205.91	40.886	
17,200.00	8,446.41	10,286.01	8,375.76	268.03	52.12	139.55	-1,506.72	1,754.48	8,518.65	8,310.87	207.77	41.000	
17,300.00	8,447.58	10,286.01	8,375.76	270.75	52.12	139.55	-1,506.72	1,754.48	8,618.64	8,409.00	209.64	41.112	
17,400.00	8,448.76	10,286.01	8,375.76	273.47	52.12	139.55	-1,506.72	1,754.48	8,718.64	8,507.14	211.51	41.222	
17,500.00	8,449.93	10,286.01	8,375.76	276.20	52.12	139.55	-1,506.72	1,754.48	8,818.64	8,605.27	213.37	41.329	
17,600.00	8,451.10	10,286.01	8,375.76	278.92	52.12	139.55	-1,506.72	1,754.48	8,918.64	8,703.40	215.24	41.435	
17,700.00	8,452.28	10,286.01	8,375.76	281.64	52.12	139.55	-1,506.72	1,754.48	9,018.64	8,801.53	217.11	41.540	
17,800.00	8,453.45	10,286.01	8,375.76	284.37	52.12	139.55	-1,506.72	1,754.48	9,118.64	8,899.66	218.98	41.642	
17,900.00	8,454.62	10,286.01	8,375.76	287.09	52.12	139.55	-1,506.72	1,754.48	9,218.64	8,997.79	220.85	41.742	
18,000.00	8,455.79	10,286.01	8,375.76	289.82	52.12	139.55	-1,506.72	1,754.48	9,318.63	9,095.92	222.71	41.841	
18,100.00	8,456.97	10,286.01	8,375.76	292.55	52.12	139.55	-1,506.72	1,754.48	9,418.63	9,194.05	224.58	41.938	
18,200.00	8,458.14	10,286.01	8,375.76	295.28	52.12	139.55	-1,506.72	1,754.48	9,518.63	9,292.18	226.45	42.034	
18,300.00	8,459.31	10,286.01	8,375.76	298.00	52.12	139.55	-1,506.72	1,754.48	9,618.63	9,390.31	228.32	42.128	
18,400.00	8,460.49	10,286.01	8,375.76	300.73	52.12	139.55	-1,506.72	1,754.48	9,718.63	9,488.44	230.19	42.220	
18,500.00	8,461.66	10,286.01	8,375.76	303.46	52.12	139.55	-1,506.72	1,754.48	9,818.63	9,586.57	232.06	42.311	
18,600.00	8,462.83	10,286.01	8,375.76	306.19	52.12	139.55	-1,506.72	1,754.48	9,918.63	9,684.70	233.93	42.400	

Integrity Directional Services, LLC

Anticollision Report

Company:	CL&F Operating LLC	**Local Co-ordinate Reference:**	Well Crazy Horse 4H
Project:	Eddy County, NM (NAD 83)	**TVD Reference:**	KB=25' @ 3272.00ft
Reference Site:	Sec 5, T20S, R30E	**MD Reference:**	KB=25' @ 3272.00ft
Site Error:	0.00 ft	**North Reference:**	Grid
Reference Well:	Crazy Horse 4H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	EDM 5000.1 Multi User Db
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Reference Depths are relative to KB=25' @ 3272.00ft	Coordinates are relative to: Crazy Horse 4H
Offset Depths are relative to Offset Datum	Coordinate System is US State Plane 1983, New Mexico Eastern Zone
Central Meridian is -104.333334	Grid Convergence at Surface is: 0.18°



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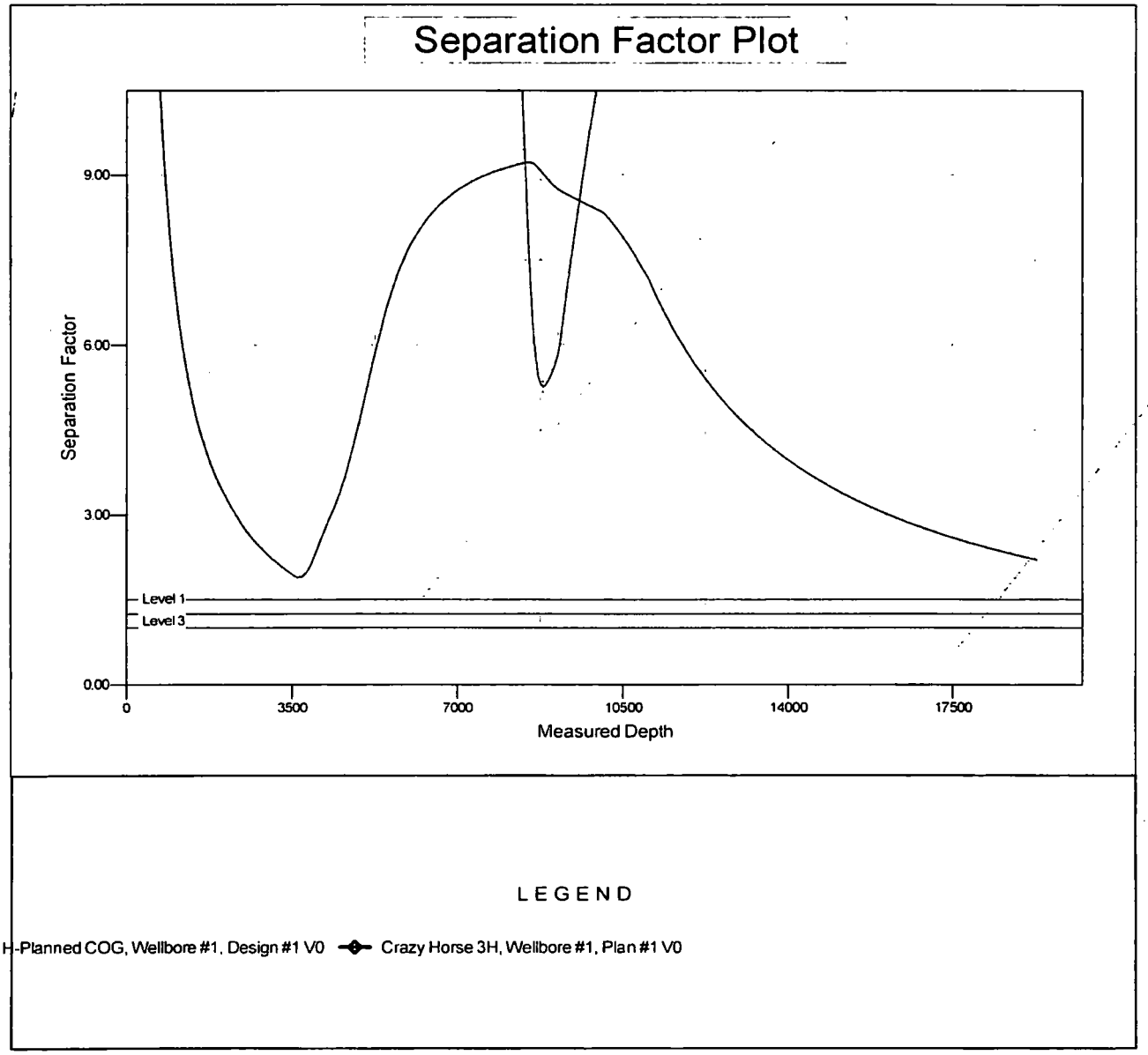


CL & F Operating LLC
Crazy Horse 0304 Fed Com 4H
SHL 430' FNL & 2135' FEL Sec. 5
BHL 1927' FNL & 330' FEL Sec. 3
T. 20 S., R. 30 E., Eddy County, NM

Drilling Program

1. ESTIMATED TOPS

Formation Name	TVD	MD	Bearing
Quaternary caliche	000'	000'	water
Rustler anhydrite	200'	200'	N/A
Top salt	460'	460'	N/A
Tansill sandstone	1560'	1560'	N/A
Yates sandstone	1777'	1777'	N/A
Seven Rivers gypsum	2076'	2076'	N/A
Capitan Reef limestone	2169'	2169'	water
Delaware sandstone	3532'	3532'	hydrocarbons
Bone Spring carbonate	6270'	6488'	hydrocarbons
1st Bone Spring sandstone	7487'	7901'	hydrocarbons
(KOP	8080'	8600'	hydrocarbons)
2nd Bone Spring sandstone (& goal)	8350'	9176'	hydrocarbons
TD	8471'	19296'	hydrocarbons

2. NOTABLE ZONES

Second Bone Spring sand is the goal. Closest water well (CP 00644 POD2) is 5389' southeast. Water bearing strata were found from 68' to 285' in the 285' deep well.

3. PRESSURE CONTROL

A 10,000' 2,000 psi and 5,000 psi BOPE system will be used below surface casing to TD. See attached BOP, choke manifold, co-flex hose, and speed head diagrams.

CL & F Operating LLC
Crazy Horse 0304 Fed Com 4H
SHL 430' FNL & 2135' FEL Sec. 5
BHL 1927' FNL & 330' FEL Sec. 3
T. 20 S., R. 30 E., Eddy County, NM

A Variance is requested from the BLM for the use of a diverter on the 26" section.
A Variance is requested from the BLM for the use of a 20" 3M Annular on the 17 1/2" and 12 1/4" sections.

BOP Installed on this size hole	Section Depth	MW Anticipated	Size	Min Required WP	Device Closure Type (not sequence)	Application	Tested To
26"	321'	9	None	None	Annular		100% Diverter Assy - No Test Used
					Ram		
					Ram		
					Double Pipe & Blind		
					Other - Diverter	X	
17.5"	1680'	10	20"	2M	Annular	X	50% of 2000 psi component WP
					Ram		
					Ram		
					Double Pipe & Blind		
					Other		
12.25"	3480'	8.4	20"	2M	Annular	X	50% of 2000 psi component WP
					Ram		
					Ram		
					Double Pipe & Blind		
					Other		
8.75" x 8.5"	8471' TVD 19,296' MD	9.5	13.625"	5M	Annular	X	70% of WP
					Ram		100% of 5000 psi component WP
					Ram		
					Double Pipe & Blind	X	
					Other		

Independent service company will test BOP / BOPE to 250 psi low and the high pressure as listed above.
System may be upgraded to a higher pressure, but still tested at % listed for component WP as listed above.
If the system is upgraded, all the components for that section will be functional and tested.
Pipe rams will be functionally checked each 24-hour period. Blind rams will be operationally checked on each TOH.
These checks will be noted on the IADC records onsite.
Other BOPE accessories will include a kelly cock, floor safety valve, inside BOP, choke manifold, and lines.

See attached BOPE schematics.
Formation integrity test will be performed per Onshore Order # 2. On exploratory wells, or on that portion of any well approved for a 5M BOPE sytem or greater, a pressure integrity test of each casing shoe shall be performed. All will be tested in accordance with Onshore oil and Gas Order # 2 III.1.i.
A Variance is requested from BLM for the use of a flexible choke line from the BOP to the choke manifold. See attached specifications and hydrostatic test chart.
A Multibowl wellhead (may) be used. The BOP will be tested per Onshore order # 2 after installation on the 1st Intermediate casing (13 3/8" @ 1815') which will cover testing requirements for a maximum of 30 days. If any seal subject to test pressure is broken, the system must be tested. *Should a conventional wellhead be used, testing provisions will apply to each section as components are set.*

4. CASING & CEMENT

All casing will be API and new. See attached casing assumption worksheet.

Hole Size	Interval	Casing Size	Weight (lbs)	Grade	Joint	MW	SF Collapse	SF Burst	SF Joint Tension	SF Body Tension
36"	0' - 80'	30" cond.	157.5	H40	Weld	FW	NA	NA	NA	NA
26"	0' - 350' TVD	20" surface	94	J55	BTC	9.00	3.46	11.14	46.40	49.00
17.5"	0' - 1680' TVD	13.375" inter. 1	54.5	J55	BTC	10.00	1.29	2.75	9.90	9.30
12.25"	0' - 3480' TVD	9.625" inter. 2	40	J55	LTC	8.40	1.6	1.93	3.73	4.52
8.75" x 8.5"	0' - 8471' TVD 0' - 19296' MD	5.5" product.	20	P110	Atlas BK	9.50	3.00	1.20	2.20	2.10
				BLM Minimum Safety Factor				1.125	1.000	1.6 Dry 1.8 Wet
All casing strings will be tested in accordance with Onshore Oil & Gas Order # 2 III.B.1.h										
Sierra Hamilton standards used for all SF calculations. Collapse 1.3, Burst 1.2, Tension Jt 1.8, Tension Body 2.0										
Assumed .70 FG and 100% evacuation of Gas @ .11 GR										

CL & F Operating LLC
Crazy Horse 0304 Fed Com 4H
SHL 430' FNL & 2135' FEL Sec. 5
BHL 1927' FNL & 330' FEL Sec. 3
T. 20 S., R. 30 E., Eddy County, NM

Special Conditions

Is casing new? If used, attach certification as required in Onshore Order # 1.	Y
Does Casing meet API specifications? If no, attach casing specification sheet.	Y
Is premium or uncommon casing planned? If yes attach casing specification sheet.	N
Does the above casing design meet or exceed BLM's minimum standards? If not, provide justification (loading assumptions, casing design criteria).	Y
Will intermediate pipe be kept at least 1/3 fluid filled to avoid approaching the collapse pressure rating of the casing?	Y
Is the well located within the Capitan Reef?	Y
If yes, does production casing cement tie back a minimum of 50' above the Reef?	Y
Is well within the designated 4 string boundary?	Y
Is the well located in SOPA but not R-111-P?	N
If yes, are the first 2 strings cemented to surface and 3rd string cement tied back 500' into previous casing?	
Is the well located in R-111-P and SOPA?	Y
If yes, are the first three strings cemented to surface?	Y
Is 2nd string set 100' to 600' below base of salt?	Y
Is well located in high Cave / Karst?	Y
If yes, are there two strings cemented to surface?	Y
(For 2 string wells) If yes, is there a contingency casing if lost circulation occurs?	
Is the well located in critical Cave / Karst?	N
If yes, are there three strings cemented to surface?	

TOC for all casing will be surface.

Casing	Depth	Lead Tail	Sacks	Density ppg	Yield	Volume cu ft	H2O gal/sack	Excess OH	500# Comp Strength (hours)	Blend
30" conduct.	80'		A/R					A/R		Redi Mix
20" surface	321'	Lead	800	14.8	1.34	1072	6.3	100%	7.01	Class C & 2% PF01 (CACl2)
		Tail	None					100%		

13.375" inter. 1	1680'	Lead	1200	13.5	1.75	2100	8.9	100%	7.47	Class C & 4% PF120 (Gel) & 1% PF01 (CACl2) & 3# PF42 (Koalseal) & 1/8# PF29 (Cellophane)
		Tail	200	14.8	1.33	266	6.3	100%	4.01	Class C & 1% PF01 (CACl2)
9.625" inter. 2	3480'	Lead Stg 1	350	12.6	2.05	717	15.36	50%	11.3	Class C 35/65 Poz & 5% PF44 (Salt) & 6% PF20 (Gel) & 3# PF42 (Kolseal) & .4# PF45 (Defoam) & 1/8# PF29 (Cellophane)
		Tail Stg 1	200	14.8	1.32	264	6.3	50%	5.45	Class C & .2% PF13 (Retarder)
		Lead Stg 2	220	12.6	2.05	451	15.36	50%	16.5	Class C 35/65 Poz & 5% PF44 (Salt) & 6% PF20 (Gel) & 3# PF42 (Kolseal) & .4# PF45 (Defoam) & 1/8# PF29 (Cellophane)
		Tail Stg 2	200	14.8	1.32	264	6.3	50%	5.9	Class C & .2% PF13 (Retarder)

5.5" product.	19296'	Lead	890	11.9	2.47	2198	13.84	25%	62.79	Class H 50/50 Poz & 5% PF44 (Salt) & 10% PF20 (Gel) & .2% PF153 (Anti-settle) & .4# PF45 (Defoam) & 3# PF42 (Koalseal) & 1/8# PF29 (Cellophane)
		Tail	2470	14.2	1.31	3236	5.96	25%	23.45	Class H 50/50 Poz & 5% PF44 (Salt) & 2% PF20 (Gel) & .3% FL & .1% PF813 (Retarder) & .2% PF65 (Dispersant) & .3% PF606 (Fluid Loss)
DV Tool depth(s) will be adjusted based on hole conditions. ECP usage will be determined as per hole conditions at the time.										
Cement volumes will be adjusted per fluid caliper or other device if ran, percentage excess may increase.										
DV tool (if required) will be positioned 50 - 100' below 13.375" casing. Expect set depth 1730 - 1780'										
Lab reports with the 500 psi compressive strength times for all slurries will be onsite.										

Bow spring centralizers will be run on every second joint of the surface casing. Bow spring centralizers will be run on every third joint of the intermediate casing strings. Bow spring centralizers will be run on every fourth joint of the vertical portion of the production casing. Positive centralizers will be run on every second joint of the curve and horizontal portions of the production casing.

5. MUD PROGRAM

Sufficient mud materials to maintain mud properties and meet minimum lost circulation (e. g., cedar bark) and weight increase (e. g., barite, bentonite)

requirements will be on site at all times. A Pason, or similar, system will be used to monitor fluid loss or gain. A closed loop system will be used.

Type	Interval (MD)	lb/gal	Viscosity	Fluid Loss
fresh water	0' - 321'	8.4 - 9.0	29 - 40	NC
brine water	321' - 1680'	10.0 - 10.1	29 - 32	NC
fresh water	1680' - 3480'	8.4 - 8.7	28 - 32	NC
cut brine	3480' - 19296'	8.4 - 9.5	29 - 36	NC

6. CORES, TESTS, & LOGS

No core or drill stem test is planned. Mud logging program will be used from ≈3300' to TD. No open hole log is planned at this time. A gyro may be used from surface to first intermediate casing shoe if warranted. GR/MWD will be used from 80' to TD. Completion CBL may be run in vertical to free fall depth of curve 40°±.

7. DOWN HOLE CONDITIONS

Maximum expected bottom hole pressure is ≈4216 psi. Expected bottom hole temperature is ≈140° F. Water flows, lost circulation, and abnormally high pressures are possible from the Sevens Rivers to TD.

H2S is potentially present from the Seven Rivers to TD. H2S monitors will be installed before drilling out of the surface casing. If H2S is detected in concentrations >100 ppm, then CL & F will comply with Onshore Order 6. If H2S is encountered, then CL & F will provide measured values and formations to BLM.

8. OTHER INFORMATION

Anticipated spud date is upon approval. It is expected it will take ≈3 months to drill and complete the well.

Wellhead Conventional

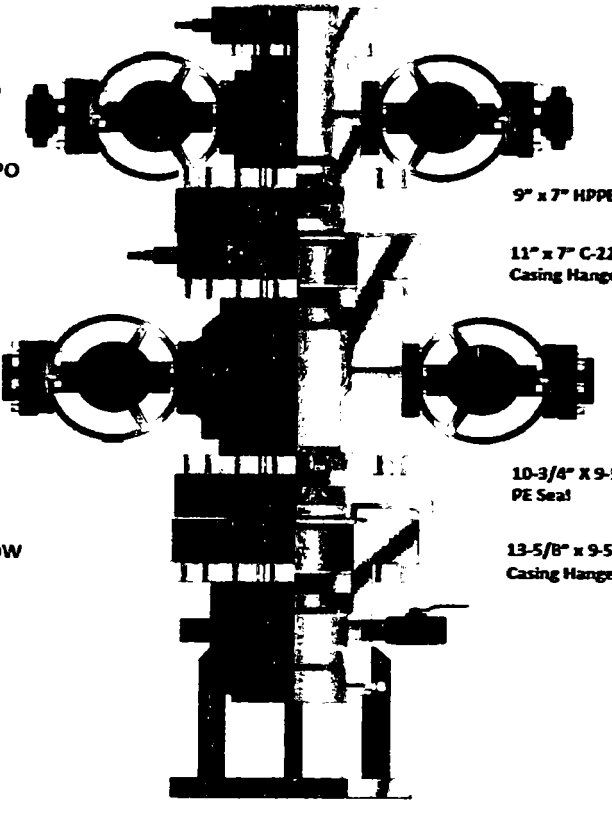
CLIFF

Crazy Horse 1H, 2H, 3H, 4H
Conventional Wellhead
13-3/8" X 9-5/8" X 7"
Quote# WH170816-01D

Tubing Head
11"-5M x 7"-10M w/SSO
(2) 1-13/16"-10M HWO
Gate Valve
(2) 1-13/16"-10M x 2" LPO

Casing Spool
13-3/8"-3M x 11"-5M
BP, w/2 2-1/16"-5M SSO

Casing Head
13-5/8"-3M x 13-3/8" SOW
2-2" LPO, w/Baseplate



9" x 7" HPPE Seal

11" x 7" C-22
Casing Hanger

10-3/4" X 9-5/8"
PE Seal

13-5/8" x 9-5/8" C-22
Casing Hanger

SY NERGY
WELLHEAD & FRAC

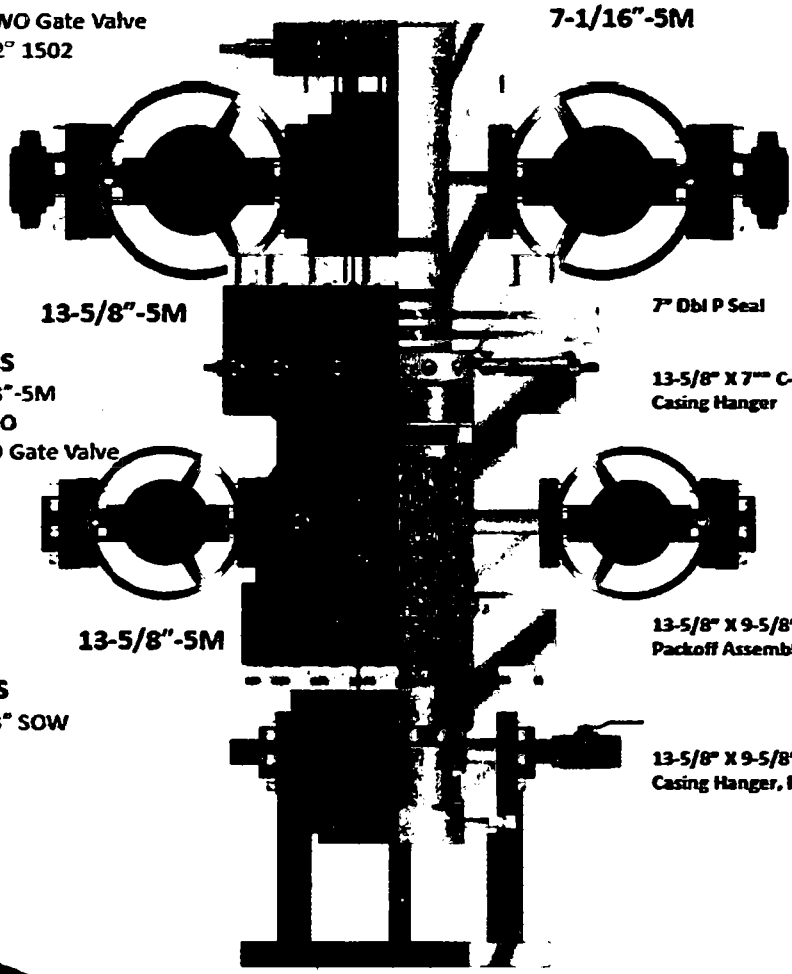
email: sales@syenergypg.com

Wellhead Multibowl

CLIFF

Crazy Horse 1H, 2H, 3H, 4H
Multi-Bowl System
13-3/8" X 9-5/8" X 7"
Quote# MB170821-01D

Tubing Head
11"-5M x 7"-10M w/SSO
(2) 1-13/16"-10M HWO Gate Valve
(2) 1-13/16"-10M x 2" 1502



Casing Spool- MBS
13-5/8"-5M X 13-5/8"-5M
w/(2) 2-1/16"-5M SSO
(2) 2-1/16"-5M HWO Gate Valve

Casing Head- MBS
13-5/8"-5M X 13-3/8" SOW

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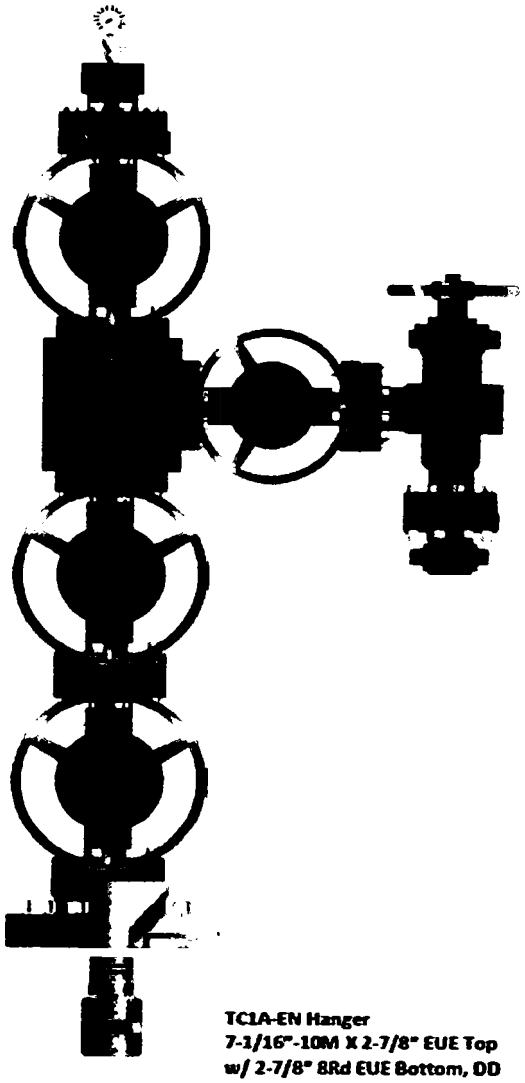
WELLHEAD & FRAC

email. sales@syenergypg.com

Production Tree

CLIFF

Crazy Horse 1H, 2H, 3H, 4H
Production Tree
2-9/16"-5M
Quote# WH170816-01D



Upper Tree Assembly 2-9/16" (FE)
A5P-EN 7-1/16"-10M X 2-9/16"-5M, DD
TC1A-EN HGR 7-1/16"-10M X 2-7/8"
8Rd EUE Top, w/ 2-7/8" 8Rd EUE Btm, DD
Gate Valve, 2-9/16"-5M, DD Run
Tee, 2-9/16"-5M x 2-1/16"-5M, DD
Gate Valve, 2-1/16"-5M, DD Wing
Adjustable Choke 2-1/16-5M FE X FE, DD,
WEECO 2-1/16"-5M x 2" 1502, DD

TC1A-EN Hanger
7-1/16"-10M X 2-7/8" EUE Top
w/ 2-7/8" 8Rd EUE Bottom, DD

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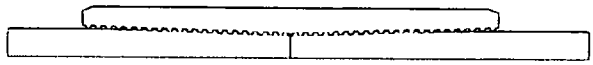
5.5 20# P110 BK Connection Data

PRECISION CONNECTIONS, LLC



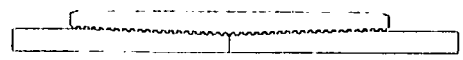
Precision Connections BK-HT
5.5 in. 20 lb/ft P-110 with 6.3 in. Coupling OD

Pipe Body		
Nominal OD	5.500	inches
Nominal Weight	20.00	lb/ft
Wall Thickness	0.361	inches
Plain End Weight	19.81	lb/ft
Drift	4.653	inches
Nominal ID	4.778	inches
Grade	P-110	
Min Yield	110,000	lbf/in²
Min Tensile	125,000	lbf/in²
Critical Section Area	5.828	in²
Pipe Body Yield Strength	641	kips
Min Internal Yield Pressure	12,640	psi
Collapse Pressure	11,100	psi

Connection		
Coupling OD	6.300	inches
Coupling Length	8.250	inches
Make Up Loss	4.125	inches
Critical Section Area	8.456	in²
Internal Pressure Rating	100%	
External Pressure Rating	100%	
Tension Efficiency	100%	
Connection Strength	641	kips
Compression Efficiency	100%	
Uniaxial Bend Rating	80.0	° / 100 ft
Min Make Up Torque	8,300	ft-lbs
Yield Torque	32,000	ft-lbs

v1.1 10/10/2016

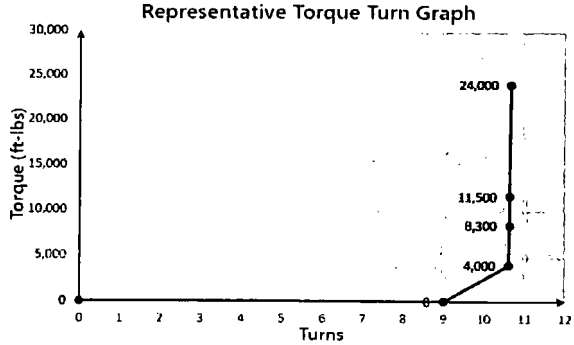
PRECISION CONNECTIONS, LLC



Torque Data Sheet - Precision Connections BK-HT
5.5 in. 20 lb/ft P-110 with 6.3 in. Coupling OD

Min Make Up Torque	8,300	ft-lbs	Max Operating Torque	27,200	ft-lbs
Max Make Up Torque	24,000	ft-lbs	Yield Torque	32,000	ft-lbs
Optimum Torque	11,500	ft-lbs			

Representative Torque Turn Graph

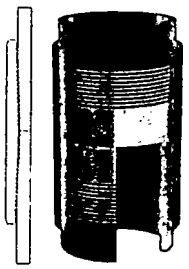


v1.1 10/10/2016

Precision Connections BK

Semi Premium Connection

Designed Primarily for High Torque Frac Strings



- **Better Buttress Sealing** Modified buttress thread for tighter thread sealing and pin nose seal stabilization.

- **API Thread Tolerance – Verified** fit of several major insert manufacturers.

- **BK Thread Tolerance – Minimizes** thread gap for better thread sealing. *Uses a Custom Premium Insert.*

Advanced Relief Groove ensures more threads are engaged for maximum sealing. The thicker midpoint cross sectional area provides additional coupling strength.

BK Relief Groove

Dark areas indicate unengaged thread regions

First Generation Relief Groove

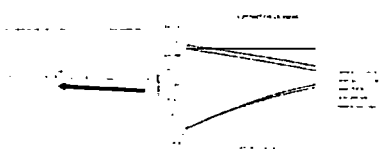
- **Strength Pin Nose to Pin Nose contact for high torque resistance,** higher pressure ratings, higher bending loads and higher structural compressive loading . Smooth Premium Bore with no I-Area to get hung up on.

BK

Buttress

Pressure

High RPM Fatigue Resistance from Low Stress Runout Threads The BK uses the field proven buttress thread with low stress runout threads to extend the time it can be rotated through a dogleg at high RPM.



APD ID: 10400026854 **Submission Date:** 02/02/2018

Operator Name: CL&F RESOURCES LP

Well Name: CRAZY HORSE 0304 FED COM **Well Number:** 4H

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

[redacted]

Show Final Text

Section 1 - Existing Roads

Will existing roads be used? YES

Existing Road Map:

CH_4H_Road_Map_20180202124351.pdf

Existing Road Purpose: ACCESS **Row(s) Exist?** NO

ROW ID(s)

ID:

Do the existing roads need to be improved? NO

Existing Road Improvement Description:

Existing Road Improvement Attachment:

Section 2 - New or Reconstructed Access Roads

Will new roads be needed? YES

New Road Map:

CH_4H_New_Road_Map_20180202124414.pdf

New road type: RESOURCE

Length: 113 Feet **Width (ft.):** 30

Max slope (%): 0 **Max grade (%):** 1

Army Corp of Engineers (ACOE) permit required? NO

ACOE Permit Number(s):

New road travel width: 14

New road access erosion control: Crowned and ditched

New road access plan or profile prepared? NO

New road access plan attachment:

Access road engineering design? NO

Access road engineering design attachment:

Access surfacing type: OTHER

Access topsoil source: ONSITE

Access surfacing type description: Caliche

Access onsite topsoil source depth: 6

Offsite topsoil source description:

Onsite topsoil removal process: Grader

Access other construction information:

Access miscellaneous information:

Number of access turnouts: **Access turnout map:**

Drainage Control

New road drainage crossing: OTHER

Drainage Control comments: Crowned and ditched

Road Drainage Control Structures (DCS) description: None

Road Drainage Control Structures (DCS) attachment:

Access Additional Attachments

Additional Attachment(s):

Section 3 - Location of Existing Wells

Existing Wells Map? YES

Attach Well map:

CH_4H_Well_Map_20180202124437.pdf

Existing Wells description:

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

Submit or defer a Proposed Production Facilities plan? SUBMIT

Production Facilities description: A 400' x 400' tank battery will be built on the northeast side of the pad. Southeast corner of the battery will be rounded off to avoid a fence. Gas pipeline and power line plans have not been finalized.
Production Facilities map:

CH_4H_Production_Facilities_20180202124516.pdf

Section 5 - Location and Types of Water Supply

Water Source Table

Operator Name: CL&F RESOURCES LP

Well Name: CRAZY HORSE 0304 FED COM **Well Number:** 4H

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

Water source type: GW WELL

Describe type:

Source longitude:

Source latitude:

Source datum:

Water source permit type: WATER WELL

Source land ownership: PRIVATE

Water source transport method: TRUCKING

Source transportation land ownership: PRIVATE

Water source volume (barrels): 25000

Source volume (acre-feet): 3.2223275

Source volume (gal): 1050000

Water source and transportation map:

CH_4H_Water_Source_Map_20180202124611.pdf

Water source comments:

New water well? NO

New Water Well Info

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

Well target aquifer:

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

Aquifer comments:

Aquifer documentation:

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

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

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

Drilling method: **Drill material:**

Grout material: **Grout depth:**

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

Well Production type: **Completion Method:**

Water well additional information:

State appropriation permit:

Additional information attachment:

Operator Name: CL&F RESOURCES LP

Well Name: CRAZY HORSE 0304 FED COM **Well Number:** 4H

Section 6 - Construction Materials

Construction Materials description: COG and NM One Call (811) will be notified before construction starts. COG has 1 approved well on the north side of the pad and a second well staked. An un-energized overhead power line will be moved to the west side of the pad and reserved for future use. Top 6" of soil and brush will be stockpiled west of the pad. Pipe racks will be to the south. A closed loop drilling system will be used. Caliche will be hauled from existing Constructors, Inc. pit on private land in NWNE 34-21s-27e. Tank battery will be built overlapping the northeast side of the well pad. Top 6" of soil and brush will be stockpiled east of the battery and west of the fence. North edge of battery is the border with State land. There will be no construction on State land.

Construction Materials source location attachment:

CH_4H_Construction_Methods_20180202124738.pdf

Section 7 - Methods for Handling Waste

Waste type: DRILLING

Waste content description: Cuttings, mud, salts, and other chemicals

Amount of waste: 2000 barrels

Waste disposal frequency : Daily

Safe containment description: Steel tanks

Safe containmant attachment:

Waste disposal type: BURIAL ONSITE **Disposal location ownership:** PRIVATE

Disposal type description:

Disposal location description: R360's state approved (NM1-6-0) disposal site at Halfway, NM

Reserve Pit

Reserve Pit being used? NO

Temporary disposal of produced water into reserve pit?

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

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

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

Reserve pit liner

Reserve pit liner specifications and installation description

Cuttings Area

Cuttings Area being used? NO

Are you storing cuttings on location? YES

Description of cuttings location Steel tanks on pad

Operator Name: CL&F RESOURCES LP

Well Name: CRAZY HORSE 0304 FED COM **Well Number:** 4H

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

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

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

WCuttings area liner

Cuttings area liner specifications and installation description

Section 8 - Ancillary Facilities

Are you requesting any Ancillary Facilities?: NO

Ancillary Facilities attachment:

Comments:

Section 9 - Well Site Layout

Well Site Layout Diagram:

CH_4H_Well_Site_Layout_20180202125035.pdf

Comments:

Section 10 - Plans for Surface Reclamation

Type of disturbance: New Surface Disturbance **Multiple Well Pad Name:** CRAZY HORSE

Multiple Well Pad Number: 3H

Recontouring attachment:

CH_4H_Recontour_Plat_20180202125049.pdf

CH_4H_Interim_Reclamation_Diagram_20180202125056.pdf

Drainage/Erosion control construction: Crowned and ditched

Drainage/Erosion control reclamation: Harrowed on the contour

Well pad proposed disturbance (acres): 5.7

Well pad interim reclamation (acres): 0.57

Well pad long term disturbance (acres): 5.13

Road proposed disturbance (acres): 0.08

Road interim reclamation (acres): 0

Road long term disturbance (acres): 0.08

Powerline proposed disturbance (acres): 0

Powerline interim reclamation (acres): 0

Powerline long term disturbance (acres): 0

Pipeline proposed disturbance (acres): 0

Pipeline interim reclamation (acres): 0

Pipeline long term disturbance (acres): 0

Other proposed disturbance (acres): 3.67

Other interim reclamation (acres): 0

Other long term disturbance (acres): 3.67

Total interim reclamation: 0.57

Operator Name: CL&F RESOURCES LP

Well Name: CRAZY HORSE 0304 FED COM **Well Number:** 4H

Total proposed disturbance: 9.45 **Total long term disturbance:** 8.88

Disturbance Comments: There will be a 75' x 250' overlap between pad & battery = 0.43 acre therefore making the true short-term disturbance acres 9.45 acres. The equation above does not allow for this calculation.
Reconstruction method: Interim reclamation will shrink the well pad 9% by removing caliche and reclaiming the south 50', leaving 5.74 acres for 2 CL & F wells and 2 COG wells, truck turn arounds for two CL & F and COG. Disturbed areas will be contoured to match pre-construction grades. Soil and brush will be evenly spread over disturbed areas. Disturbed areas will be seeded in accordance with BLM requirements.
Topsoil redistribution: Enough stockpiled topsoil will be retained to cover the remainder of the pad and battery when the wells are plugged. Once the last well is plugged, then the remainder of the pad, battery, and new road will be similarly reclaimed. Noxious weeds will be controlled.
Soil treatment: None

Existing Vegetation at the well pad:

Existing Vegetation at the well pad attachment:

Existing Vegetation Community at the road:

Existing Vegetation Community at the road attachment:

Existing Vegetation Community at the pipeline:

Existing Vegetation Community at the pipeline attachment:

Existing Vegetation Community at other disturbances:

Existing Vegetation Community at other disturbances attachment:

Non native seed used? NO

Non native seed description:

Seedling transplant description:

Will seedlings be transplanted for this project? NO

Seedling transplant description attachment:

Will seed be harvested for use in site reclamation? NO

Seed harvest description:

Seed harvest description attachment:

Seed Management

Seed Table

Operator Name: CL&F RESOURCES LP

Well Name: CRAZY HORSE 0304 FED COM **Well Number:** 4H

Seed type:

Seed source:

Seed name:

Source name:

Source address:

Source phone:

Seed cultivar:

Seed use location:

PLS pounds per acre:

Proposed seeding season:

Seed Summary	
Seed Type	**Pounds/Acre**

Total pounds/Acre:

Seed reclamation attachment:

Operator Contact/Responsible Official Contact Info

First Name:

Last Name:

Phone:

Email:

Seedbed prep:

Seed BMP:

Seed method:

Existing invasive species? NO

Existing invasive species treatment description:

Existing invasive species treatment attachment:

Weed treatment plan description: To BLM standards

Weed treatment plan attachment:

Monitoring plan description: To BLM standards

Monitoring plan attachment:

Success standards: To BLM satisfaction

Pit closure description: None

Pit closure attachment:

Section 11 - Surface Ownership

Disturbance type: NEW ACCESS ROAD

Describe:

Surface Owner: BUREAU OF LAND MANAGEMENT

Other surface owner description:

BIA Local Office:

BOR Local Office:

COE Local Office:

DOD Local Office:

NPS Local Office:

State Local Office:

Military Local Office:

USFWS Local Office:

Other Local Office:

USFS Region:

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

Disturbance type: WELL PAD

Describe:

Surface Owner: BUREAU OF LAND MANAGEMENT

Other surface owner description:

BIA Local Office:

BOR Local Office:

COE Local Office:

DOD Local Office:

NPS Local Office:

State Local Office:

Military Local Office:

USFWS Local Office:

Other Local Office:

USFS Region:

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

Disturbance type: EXISTING ACCESS ROAD

Describe:

Surface Owner: BUREAU OF LAND MANAGEMENT

Other surface owner description:

BIA Local Office:

BOR Local Office:

COE Local Office:

DOD Local Office:

NPS Local Office:

State Local Office:

Military Local Office:

USFWS Local Office:

Other Local Office:

USFS Region:

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

Section 12 - Other Information

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

ROW Type(s):

ROW Applications

SUPO Additional Information:

Use a previously conducted onsite? YES

Previous Onsite information: On-site inspection was held with Jim Rutley, Bobby Ballard, Jim Goodbar, Chelsie Dugan, and June Hernandez (all BLM) on September 26, 2017.

Other SUPO Attachment

CH_4H_General_SUPO_20180202125703.pdf

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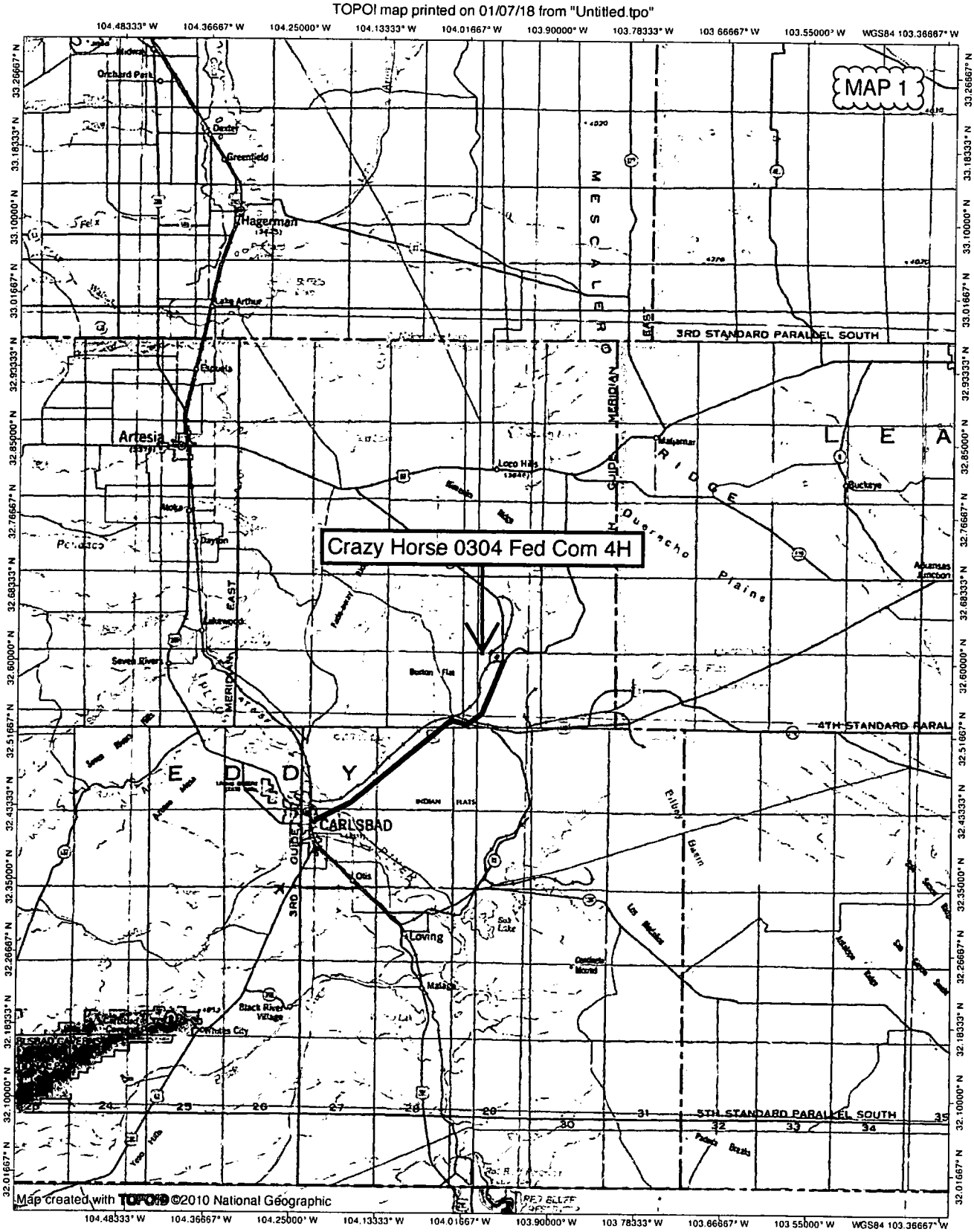
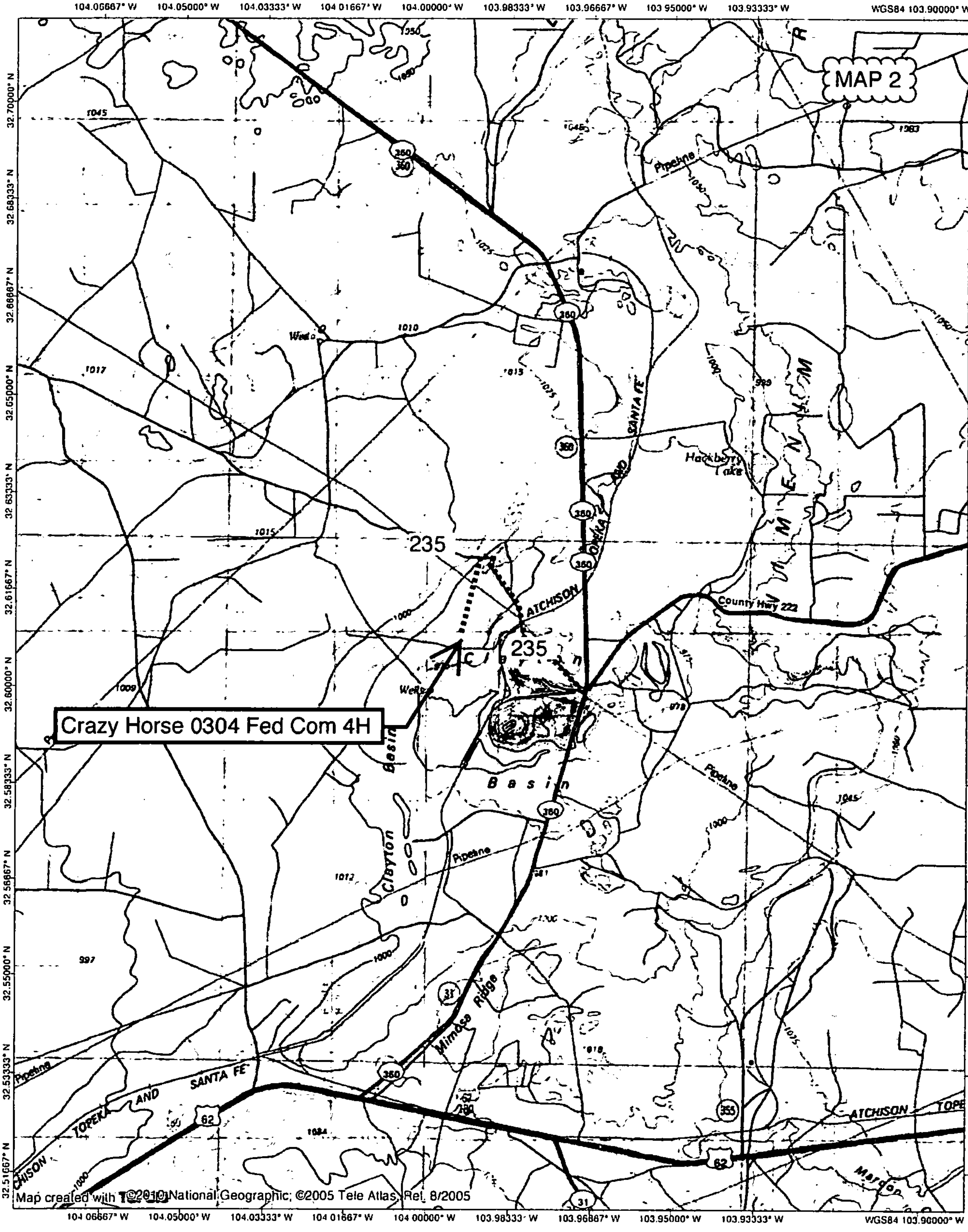


NATIONAL GEOGRAPHIC

0 5 10 15 20 miles
0 5 10 15 20 25 30 km

TN ↑ MN
7°
01/07/18

TOPO! map printed on 01/07/18 from "Untitled.tpo"



NATIONAL GEOGRAPHIC

0.0 0.5 1.0 1.5 2.0 2.5 3.0 miles

0 1 2 3 4 5 km

TN MN 7°

01/07/18

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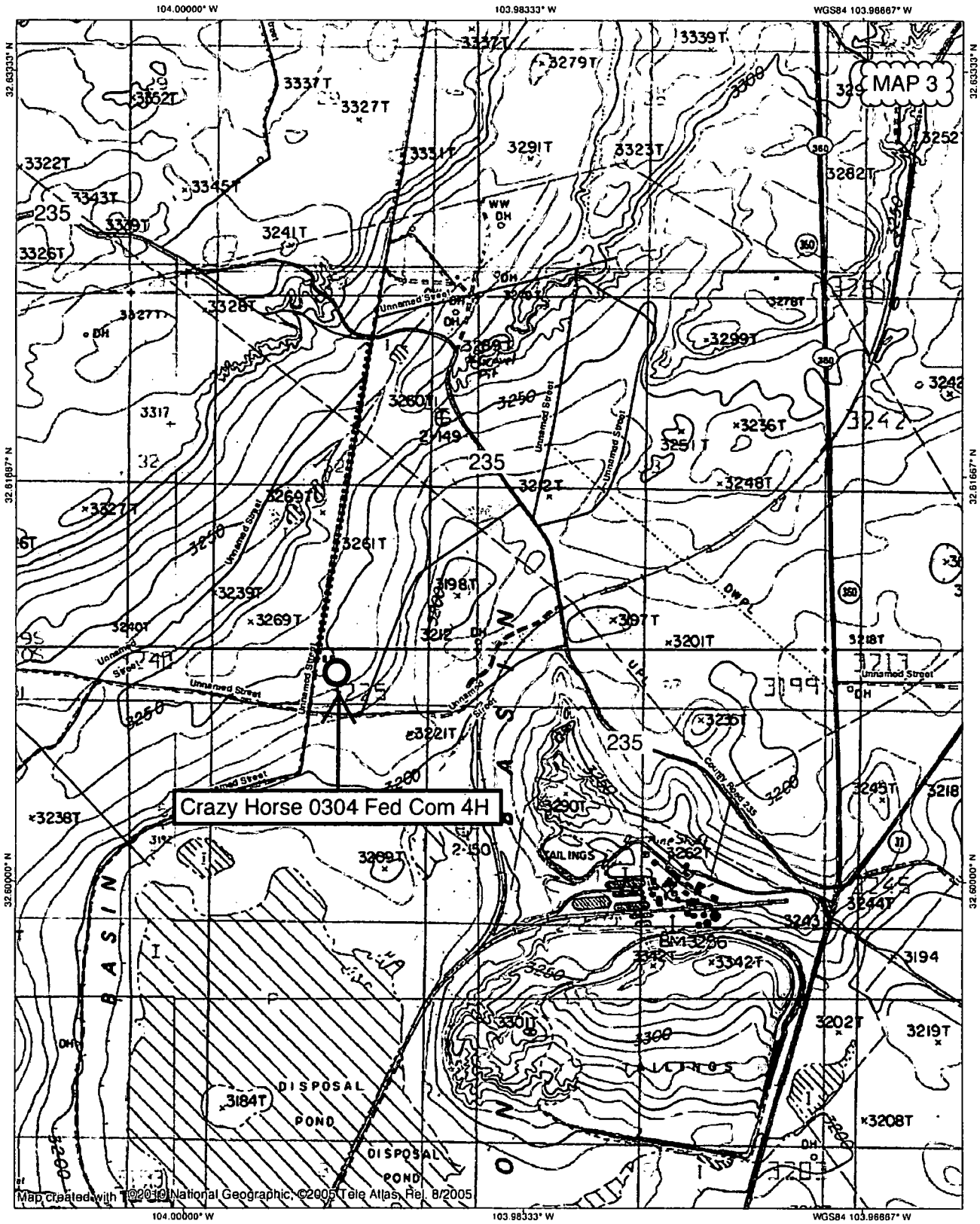


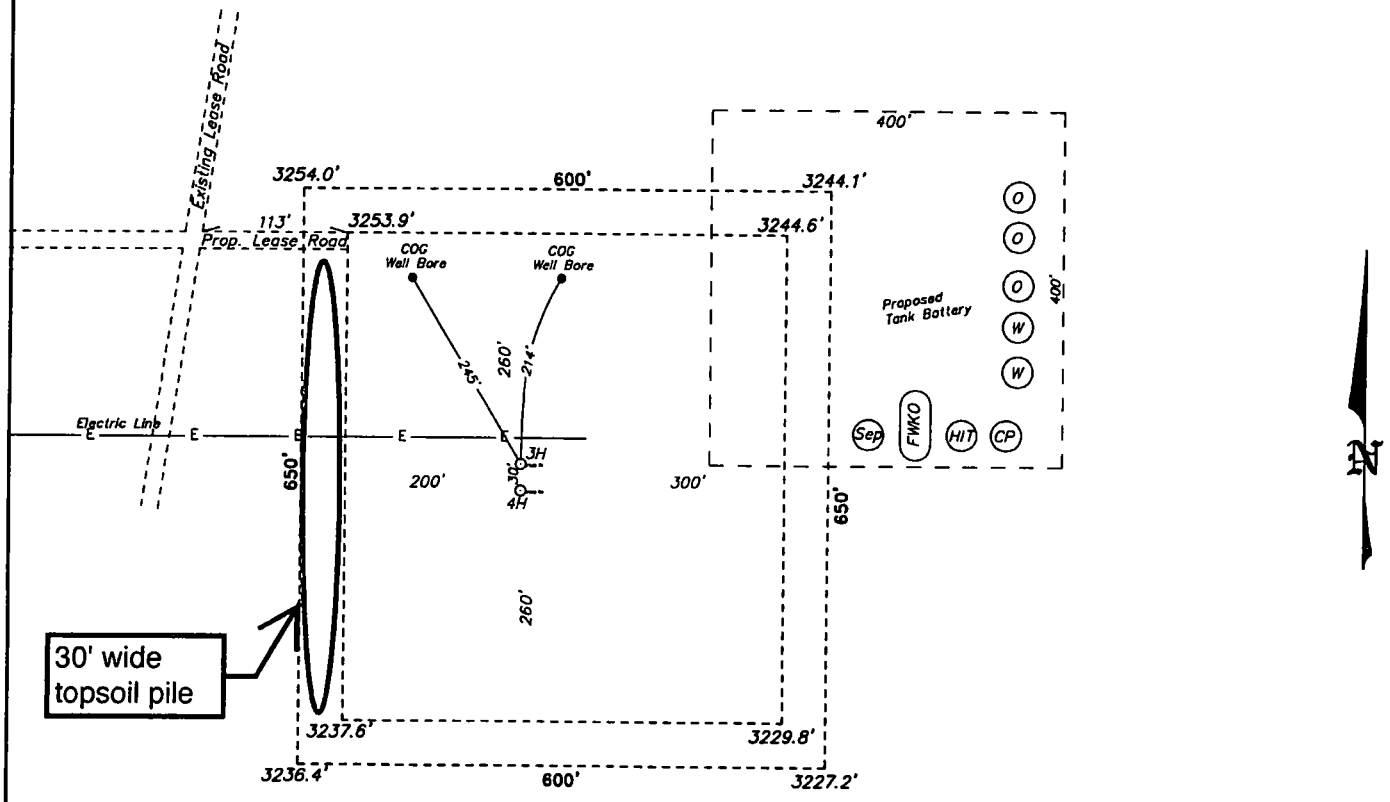
NATIONAL GEOGRAPHIC

0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 miles
0.0 0.5 1.0 km

TN MN
7°
01/07/18

SECTION 5, TOWNSHIP 20 SOUTH, RANGE 30 EAST. N.M.P.M.,
EDDY COUNTY, NEW MEXICO.

MAP 4



CL&F OPERATING LLC
CRAZY HORSE 0304 FED COM #3H
ELEV. - 3248'

Lat - N 32.608552°
Long - W 103.992511°
NMSPCE- N 585290.1
E 646285.0
(NAD-83)

CARLSBAD, NM IS ±25 MILES TO THE SOUTHWEST OF LOCATION.

200 0 200 400 FEET

SCALE: 1" = 200'

CL&F OPERATING LLC

CRAZY HORSE 0304 FED COM

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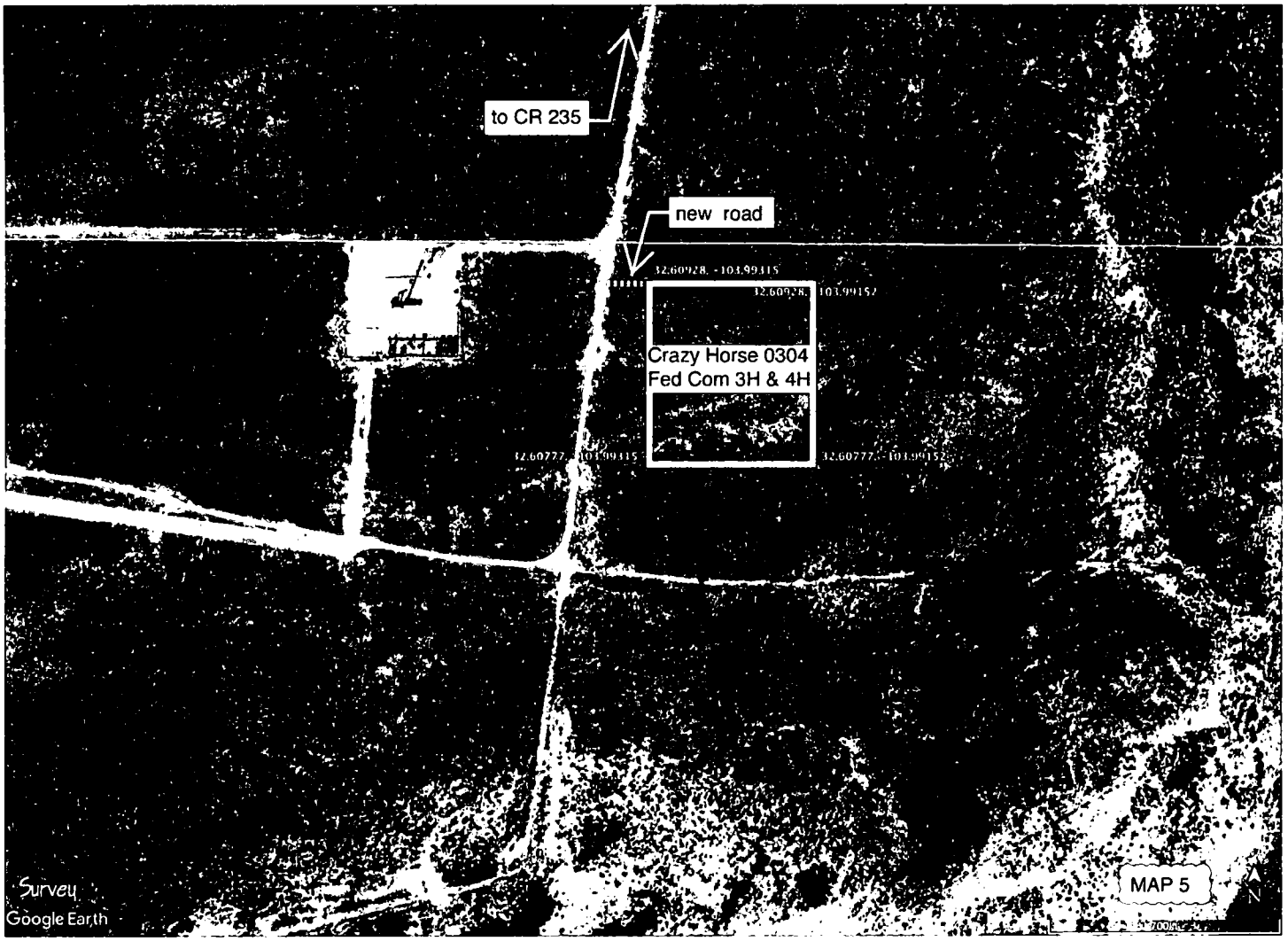
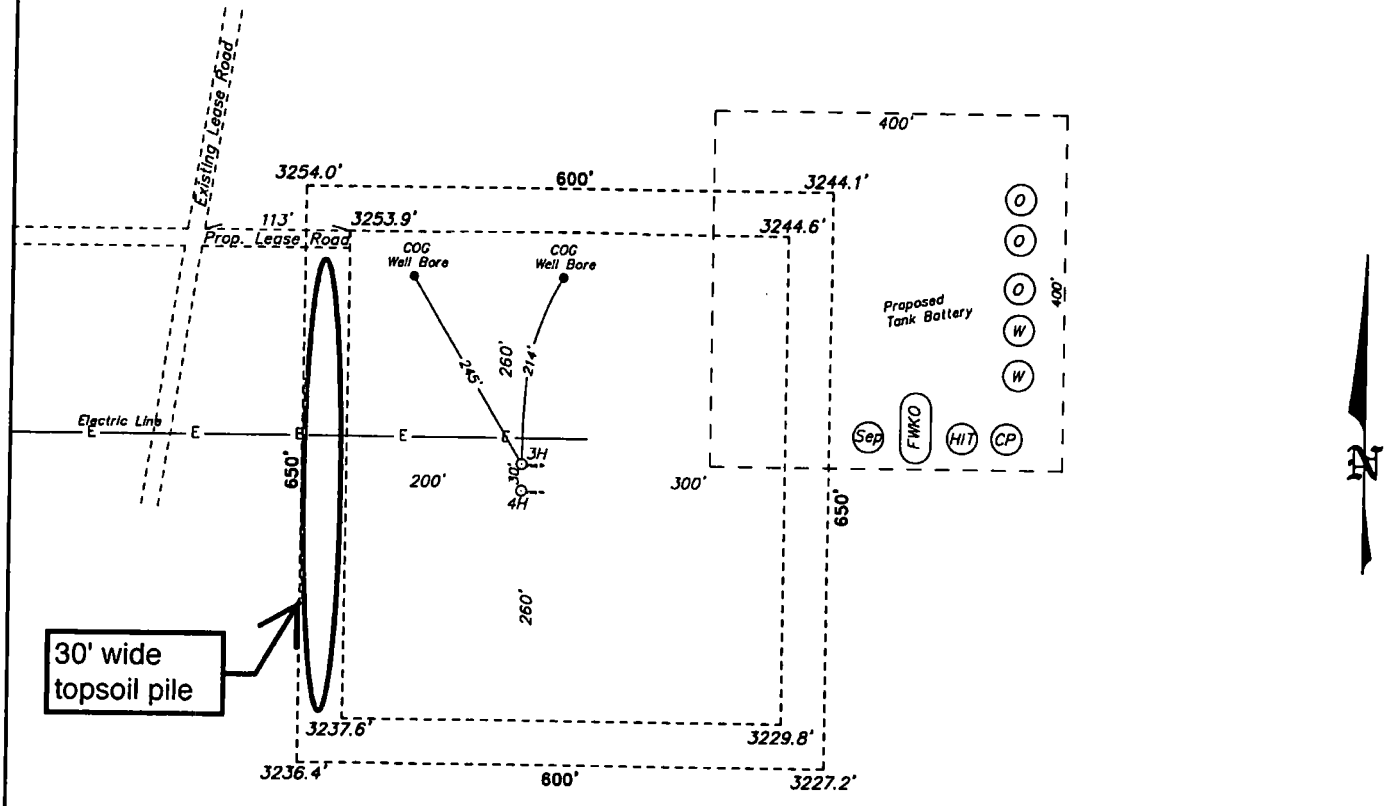

to CR 235
new road
32.60928, -104.99415
32.60928, -104.99152
Crazy Horse 0304
Fed Com 3H & 4H
32.60777, -104.99415
32.60777, -104.99152
Survey
Google Earth
MAP 5
N

SECTION 5, TOWNSHIP 20 SOUTH, RANGE 30 EAST. N.M.P.M.,
EDDY COUNTY, NEW MEXICO.

MAP 4



CL&F OPERATING LLC
CRAZY HORSE 0304 FED COM #3H
ELEV. - 3248'

Lat - N 32.608552°
Long - W 103.992511°
NMSPCE- N 585290.1
E 646285.0
(NAD-83)

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200 0 200 400 FEET

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CL&F OPERATING LLC

CRAZY HORSE 0304 FED COM

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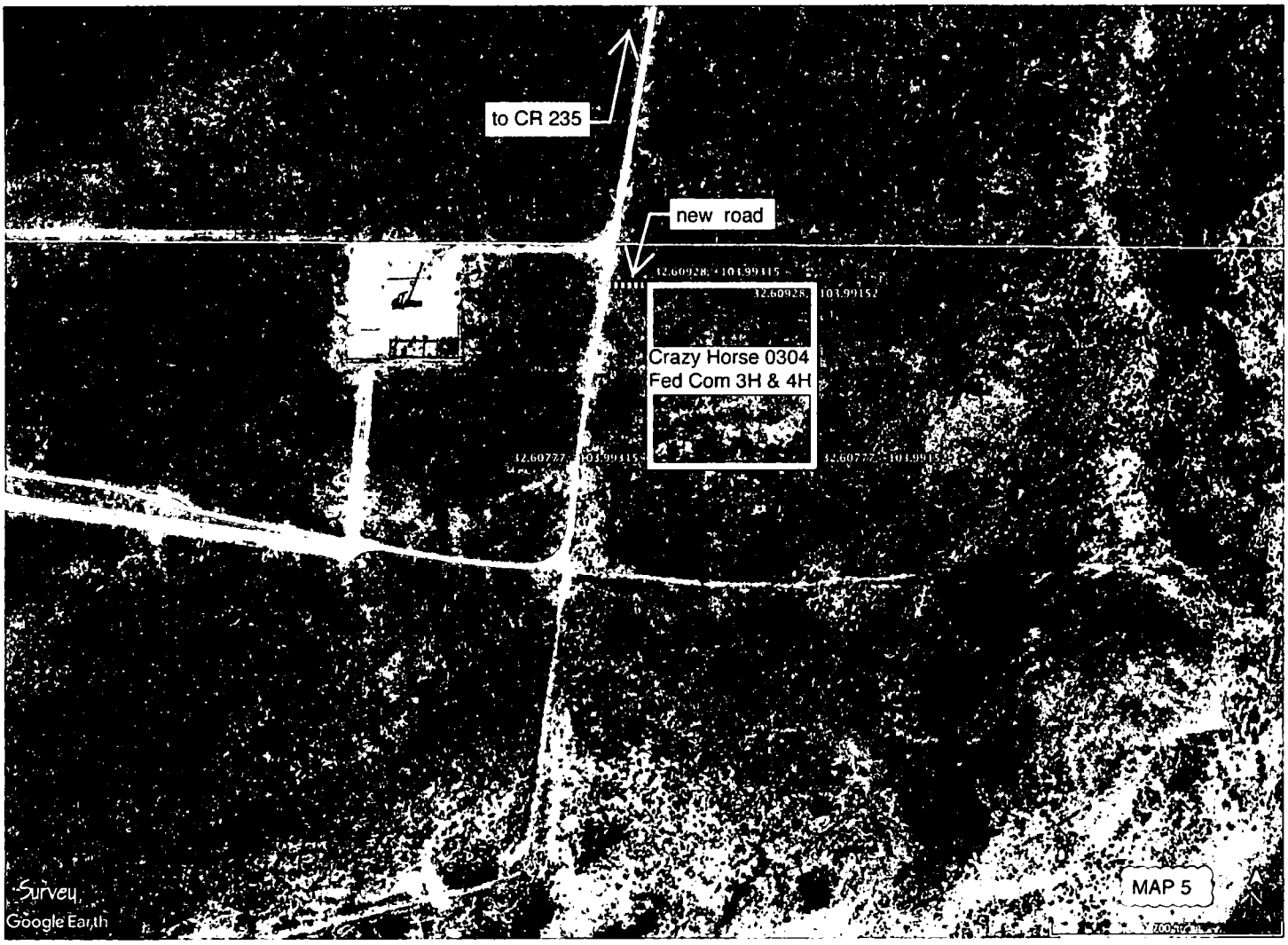
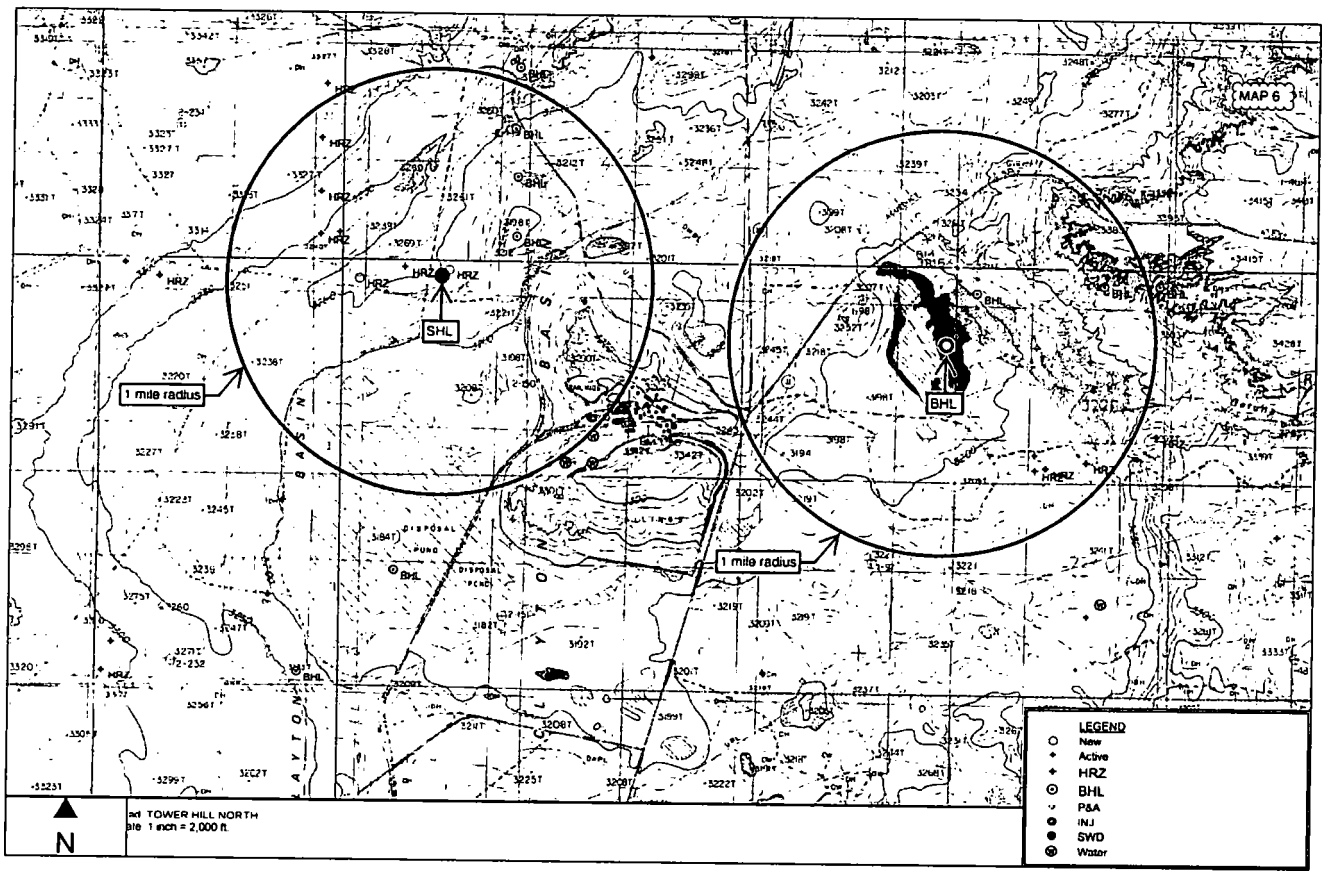
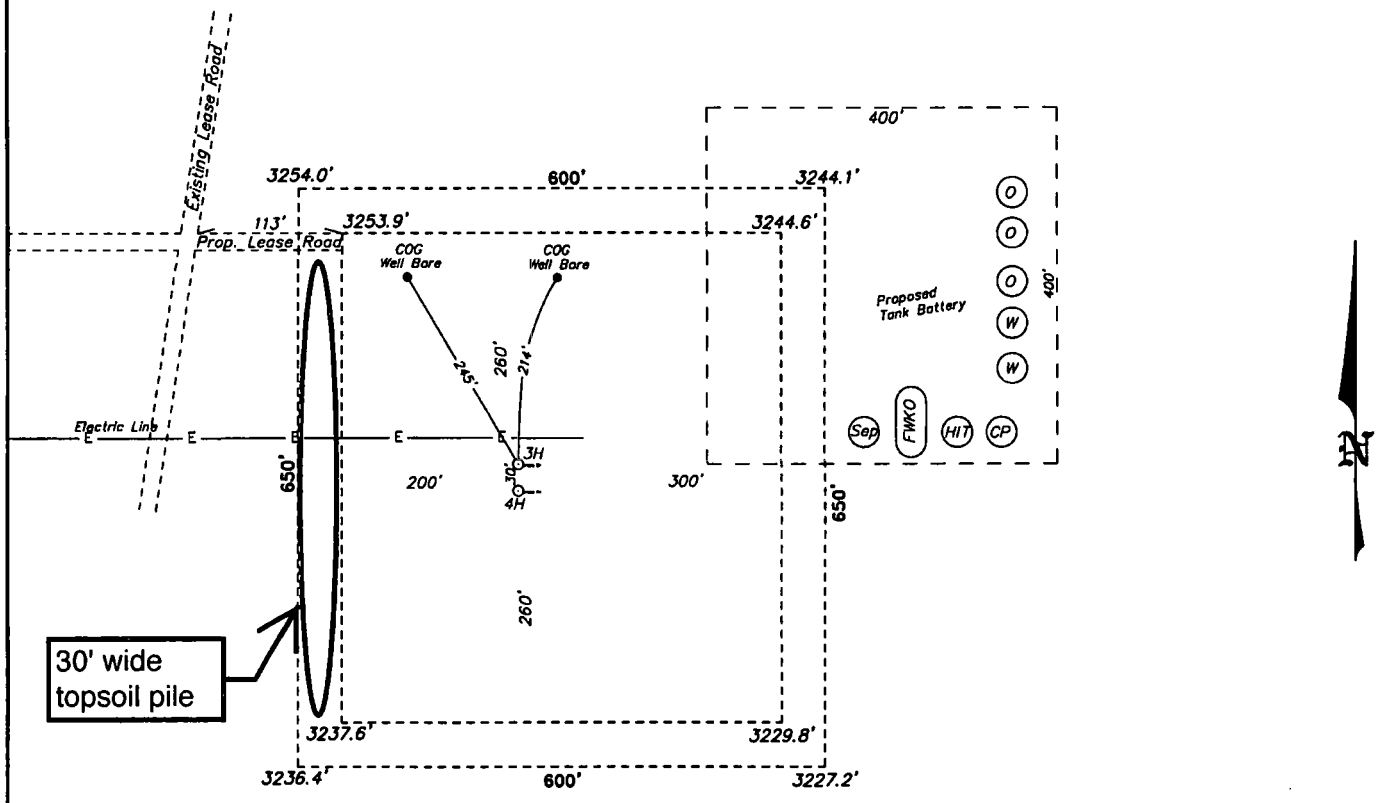

to CR 235
new road
12.60928, -103.99115
12.60928, -103.99152
Crazy Horse 0304
Fed Com 3H & 4H
12.60777, -103.99115
12.60777, -103.99152
Survey
Google Earth
MAP 5


MAP 6
SHL
BHL
1 mile radius
1 mile radius
LEGEND
New
Active
HRZ
BHL
P&A
INJ
SWD
Water
N
TOWER HILL NORTH
1 inch = 2,000 ft.

SECTION 5, TOWNSHIP 20 SOUTH, RANGE 30 EAST. N.M.P.M.,

EDDY COUNTY, NEW MEXICO.

MAP 7



CL&F OPERATING LLC
CRAZY HORSE 0304 FED COM #3H
ELEV. - 3248'

Lat - N 32.608552°
Long - W 103.992511°
NMSPCE- N 585290.1
E 646285.0
(NAD-83)

CARLSBAD, NM IS ±25 MILES TO THE SOUTHWEST OF LOCATION.

200 0 200 400 FEET

SCALE: 1" = 200'

CL&F OPERATING LLC

CRAZY HORSE 0304 FED COM

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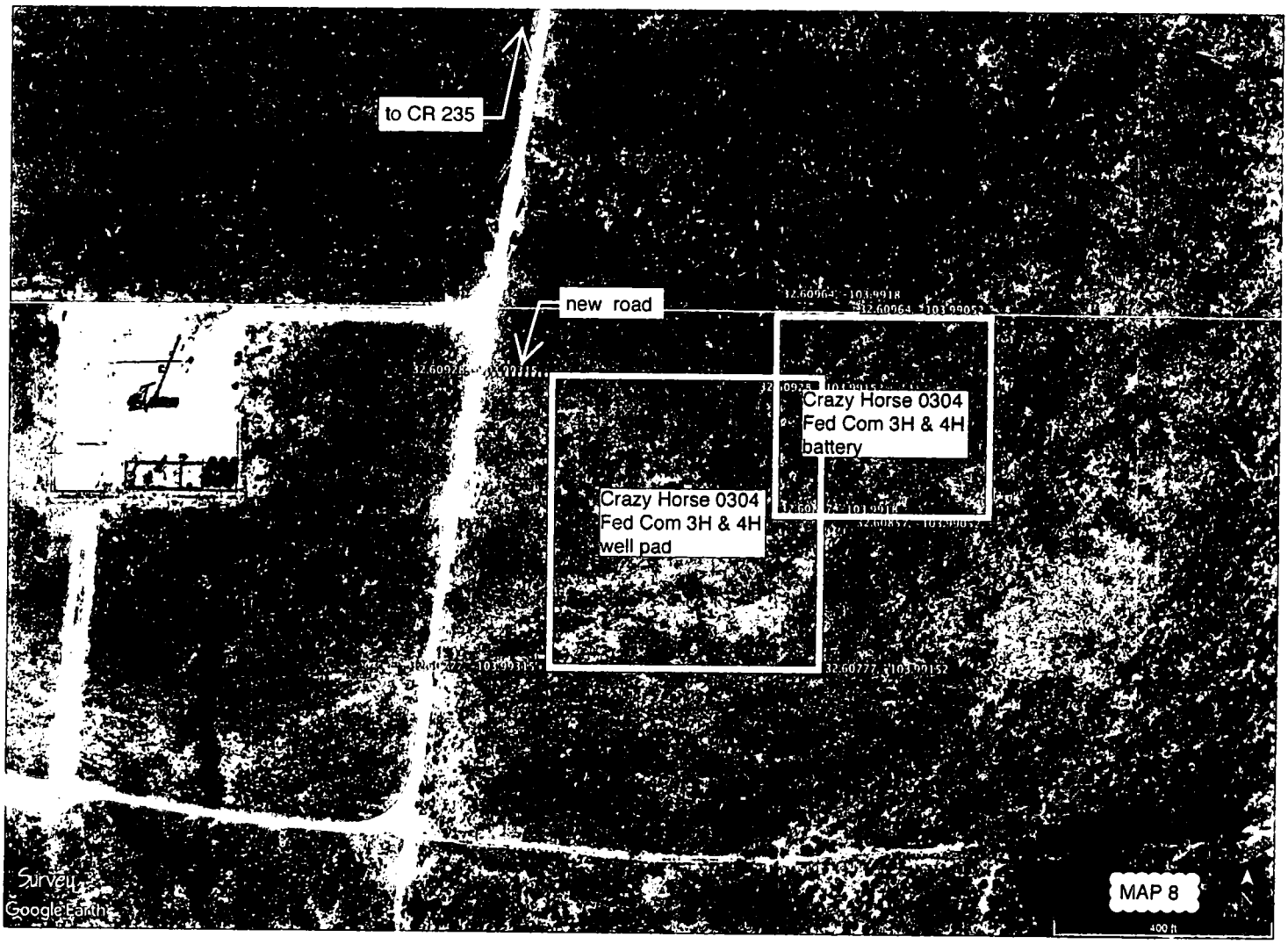
to CR 235
new road
Crazy Horse 0304
Fed Com 3H & 4H
battery
Crazy Horse 0304
Fed Com 3H & 4H
well pad
Survey
Google Earth
MAP 8
400 ft

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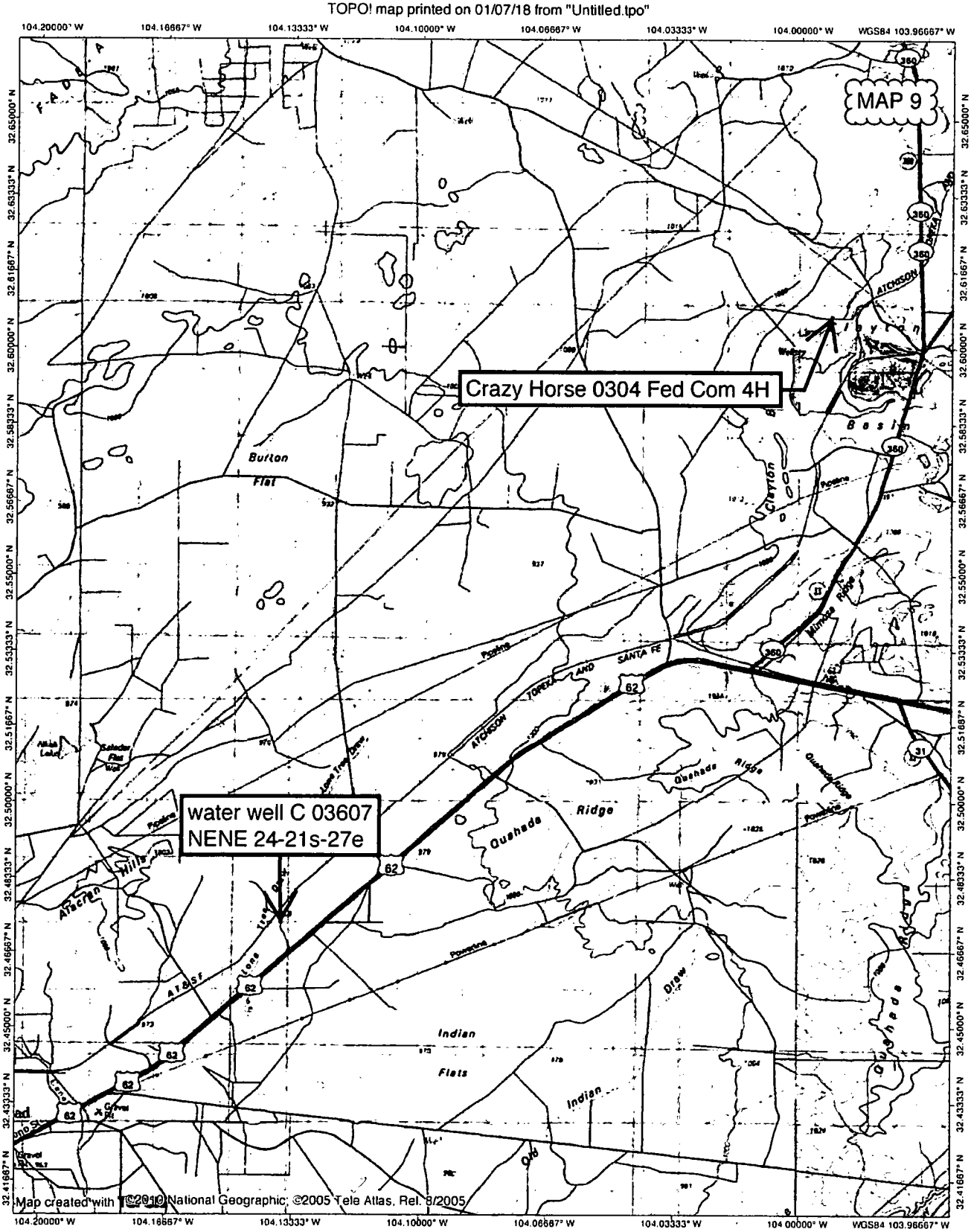


NATIONAL GEOGRAPHIC

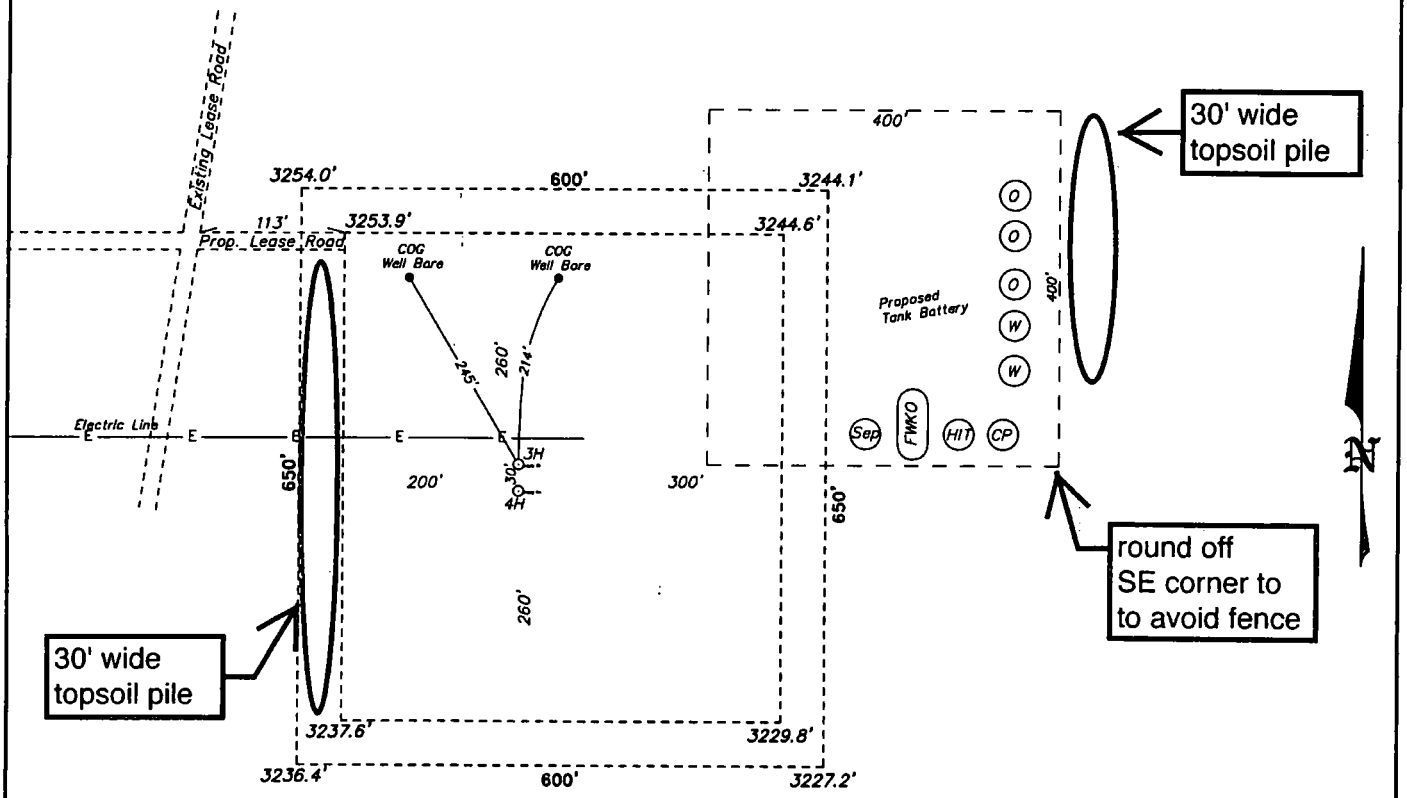
0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 miles
0 1 2 3 4 5 6 km

TN ↑ MN
7°
01/07/18

SECTION 5, TOWNSHIP 20 SOUTH, RANGE 30 EAST. N.M.P.M.,

EDDY COUNTY, NEW MEXICO.

MAP 10



CL&F OPERATING LLC
CRAZY HORSE 0304 FED COM #3H
ELEV. - 3248'

Lat - N 32.608552°
Long - W 103.992511°
NMSPCE- N 585290.1
E 646285.0
(NAD-83)

CARLSBAD, NM IS ±25 MILES TO THE SOUTHWEST OF LOCATION.

200 0 200 400 FEET

SCALE: 1" = 200'

CL&F OPERATING LLC

CRAZY HORSE 0304 FED COM

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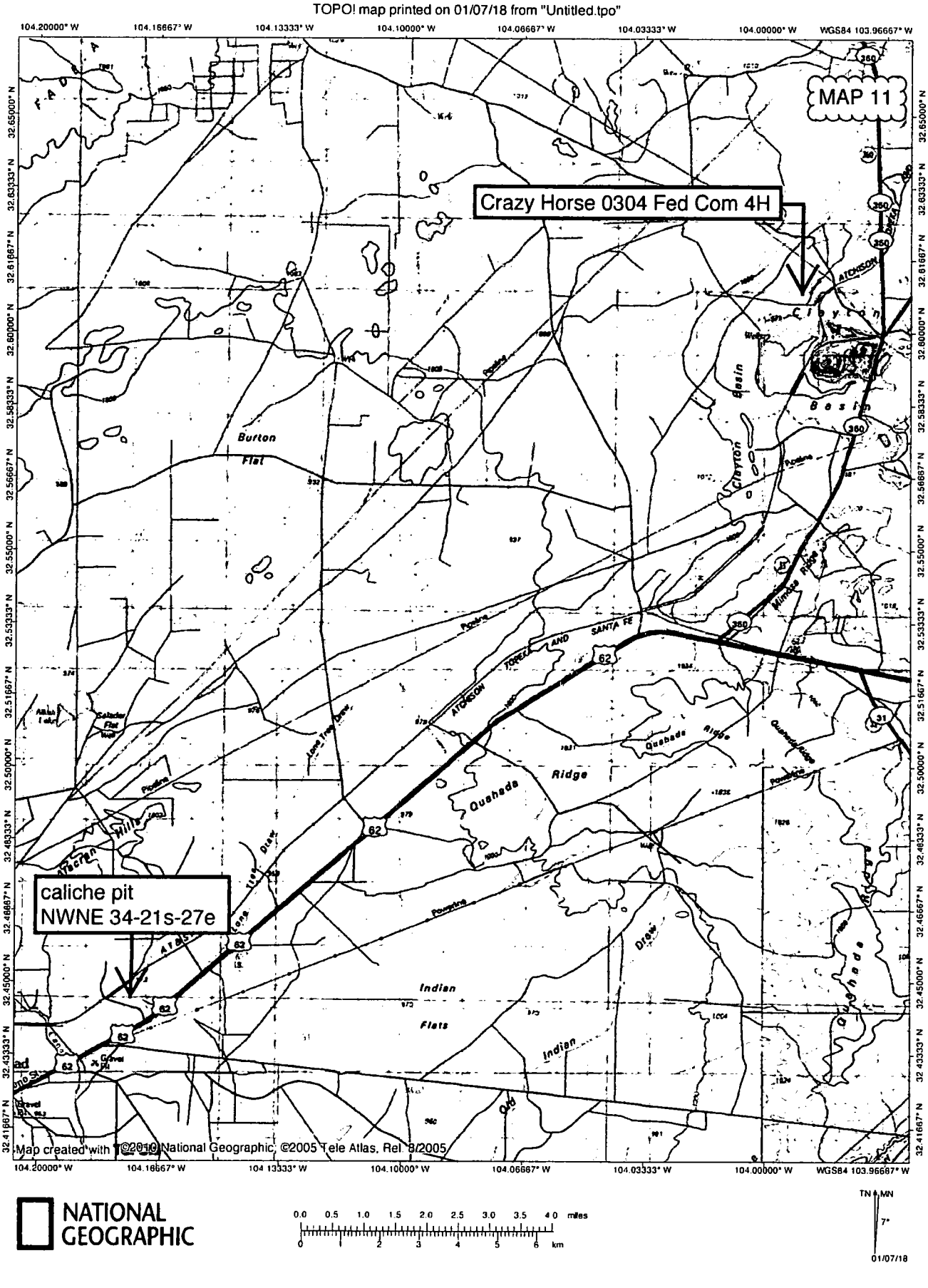
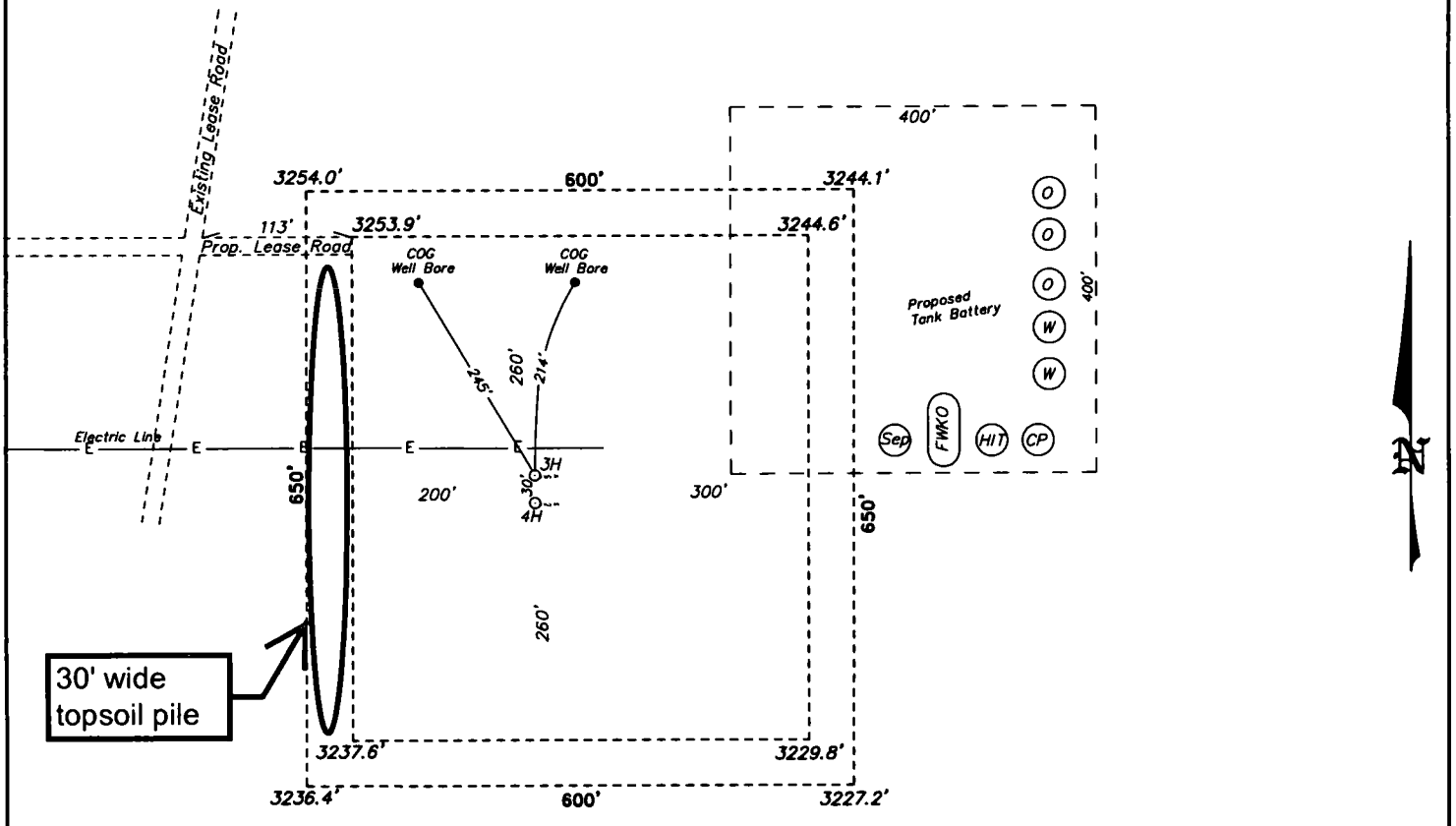

TOPO! map printed on 01/07/18 from "Untitled.tpo"
MAP 11
Crazy Horse 0304 Fed Com 4H
caliche pit
NWNE 34-21s-27e
Map created with TOPO! ©2010 National Geographic, ©2005 Tele Atlas, Rel. 8/2005
NATIONAL GEOGRAPHIC
01/07/18

SECTION 5, TOWNSHIP 20 SOUTH, RANGE 30 EAST. N.M.P.M.,

EDDY COUNTY, NEW MEXICO.

MAP 7



CL&F OPERATING LLC
CRAZY HORSE 0304 FED COM #3H
ELEV. - 3248'

Lat - N 32.608552°
Long - W 103.992511°
NMSPCE- N 585290.1
E 646285.0
(NAD-83)

CARLSBAD, NM IS ±25 MILES TO THE SOUTHWEST OF LOCATION.

200 0 200 400 FEET

SCALE: 1" = 200'

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CRAZY HORSE 0304 FED COM

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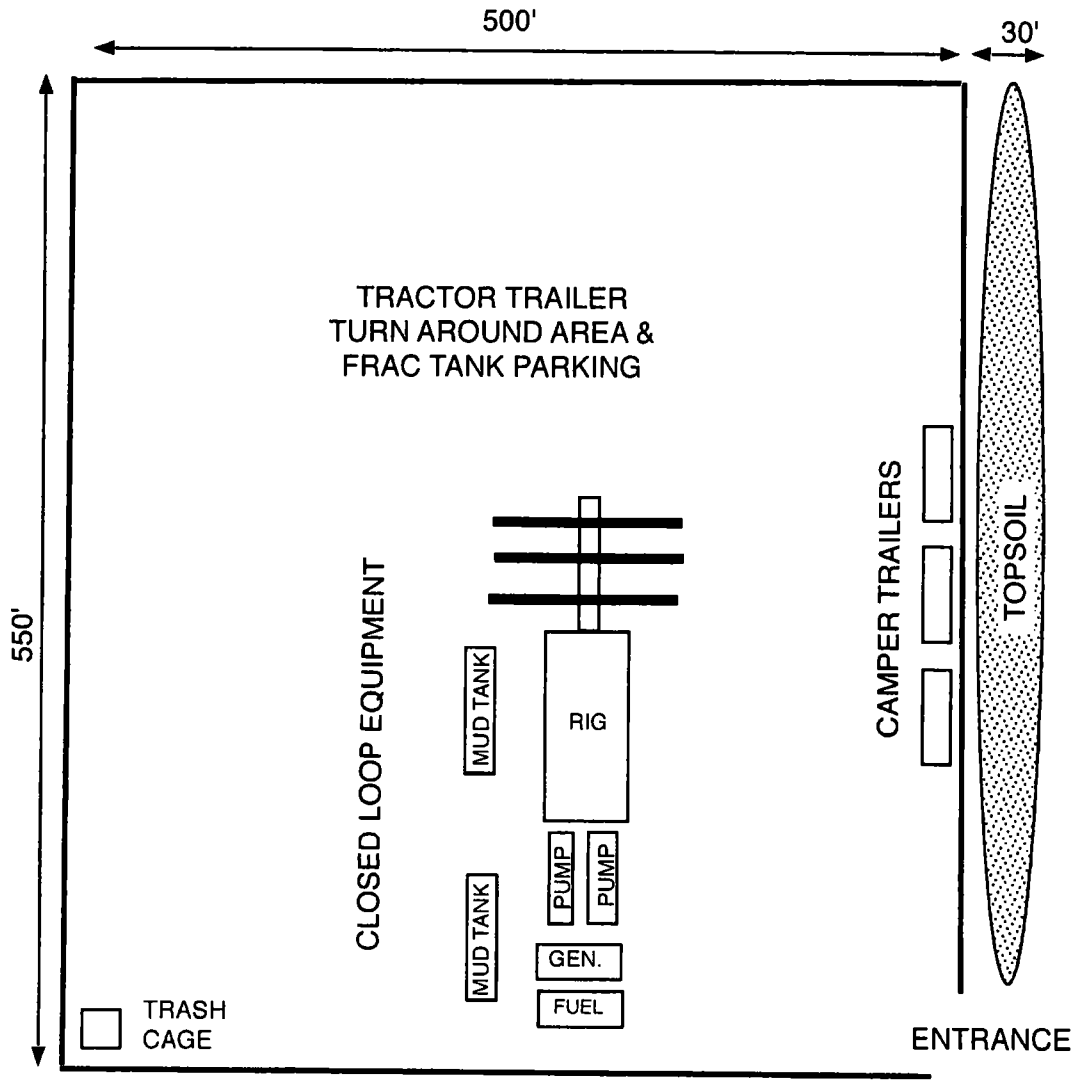
W.O. Number: 33350	Drawn By: K. GOAD	Date: 10-05-2017	Survey Date: 10-02-2017	Sheet 1 of 1 Sheets

Crazy Horse 0304 Fed Com 4H
rig diagram

1" = 100'

NORTH

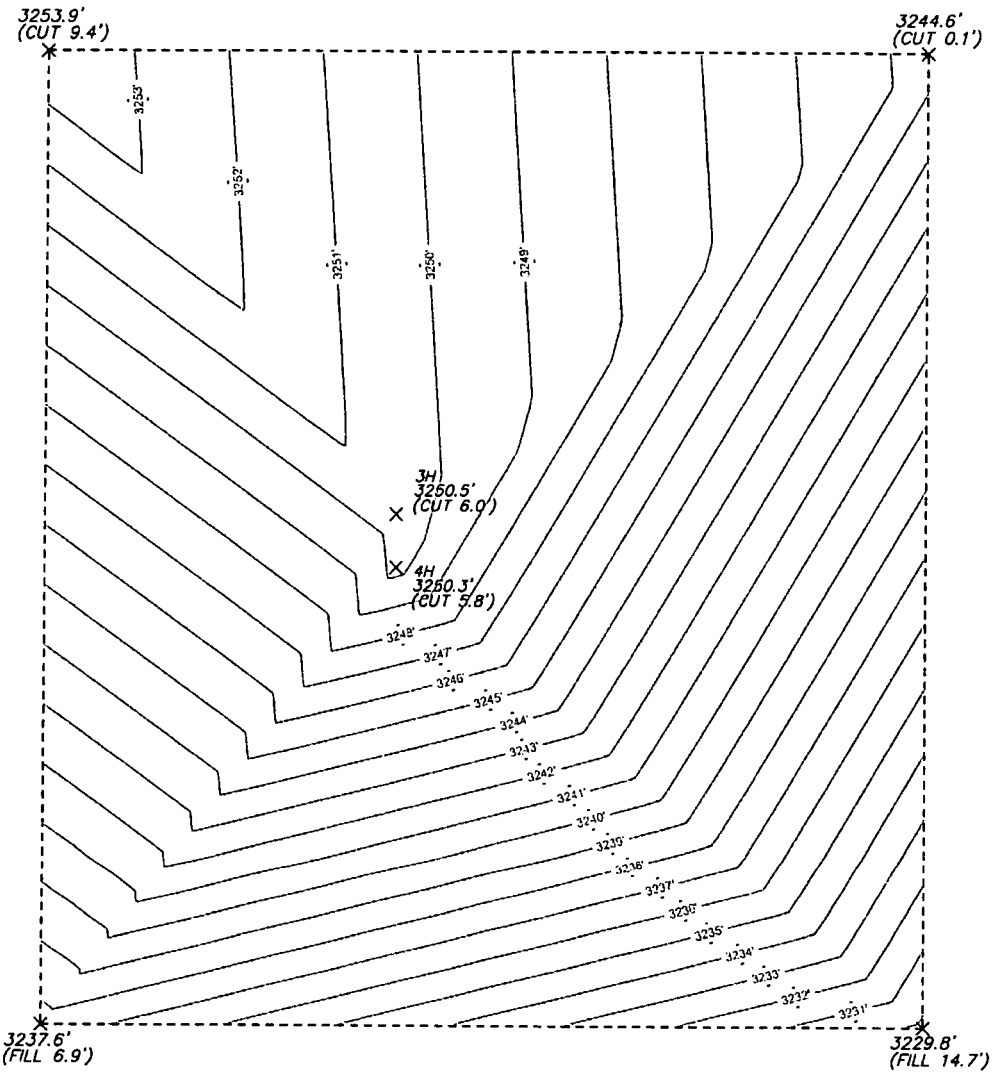


PERMITS WEST, INC.
PROVIDING PERMITS for LAND USERS

SECTION 5, TOWNSHIP 20 SOUTH, RANGE 30 EAST. N.M.P.M.,

EDDY COUNTY, NEW MEXICO.

MAP 13



N

100 0 100 200 FEET

SCALE: 1" = 100'

CL&F OPERATING LLC

REF: CRAZY HORSE 0304 FED COM #3H&4H / CUT & FILL

THE CRAZY HORSE 0304 FED COM #3H&4H LOCATED IN SECTION 5, TOWNSHIP 20 SOUTH, RANGE 30 EAST. N.M.P.M., EDDY COUNTY, NEW MEXICO.

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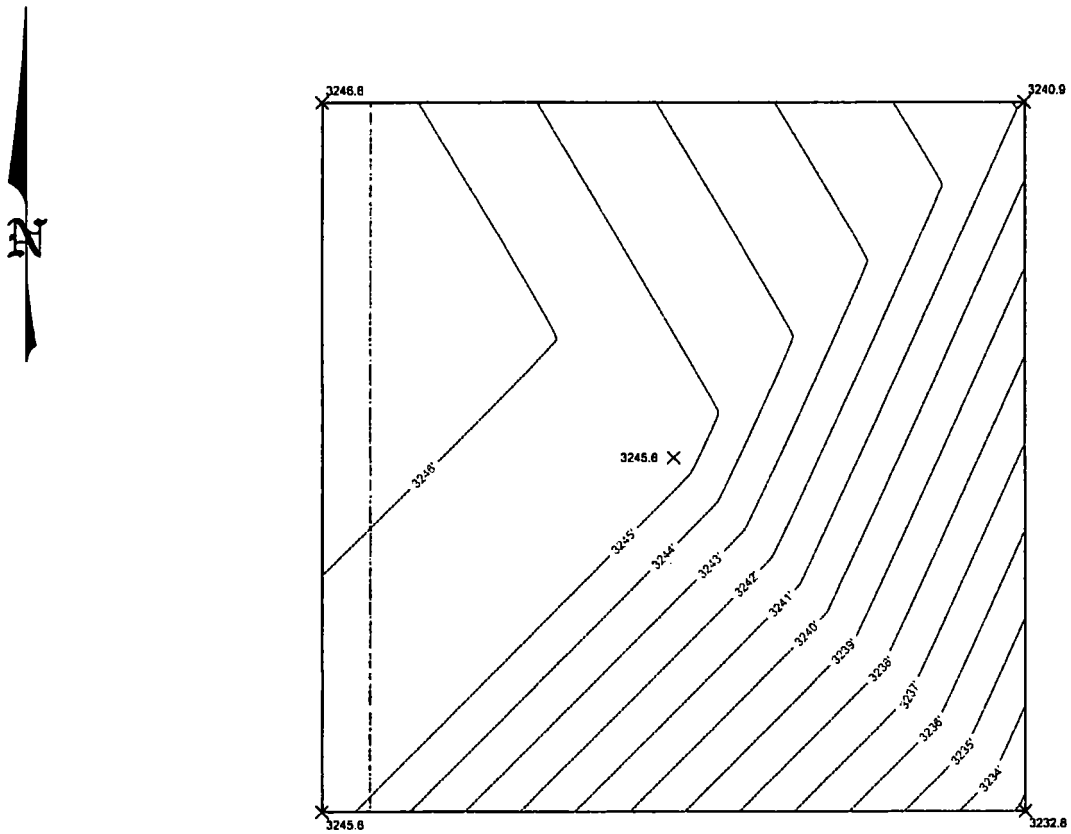
W.O. Number: 33351	Drawn By: K. GOAD	Date: 10-05-2017	Survey Date: 10-02-2017	Sheet 1 of 1 Sheets

SECTION 5, TOWNSHIP 20 SOUTH, RANGE 30 EAST. N.M.P.M.,
EDDY COUNTY, ***NEW MEXICO.***

MAP 14



I HEREBY CERTIFY THAT THIS SURVEY WAS PREPARED FROM FIELD NOTES OF AN ACTUAL SURVEY AND MEETS OR EXCEEDS ALL REQUIREMENTS FOR LAND SURVEYS AS SPECIFIED BY THIS STATE.

GARY L. JONES, P.S. No. 7977
No. 5074

100 0 100 200 FEET

CL&F OPERATING LLC

REF: PROPOSED CRAZY HORSE 3H & 4H TANK BATTERY

A TRACT OF LAND LOCATED IN
SECTION 5, TOWNSHIP 20 SOUTH, RANGE 30 EAST,
N.M.P.M., EDDY COUNTY, NEW MEXICO.

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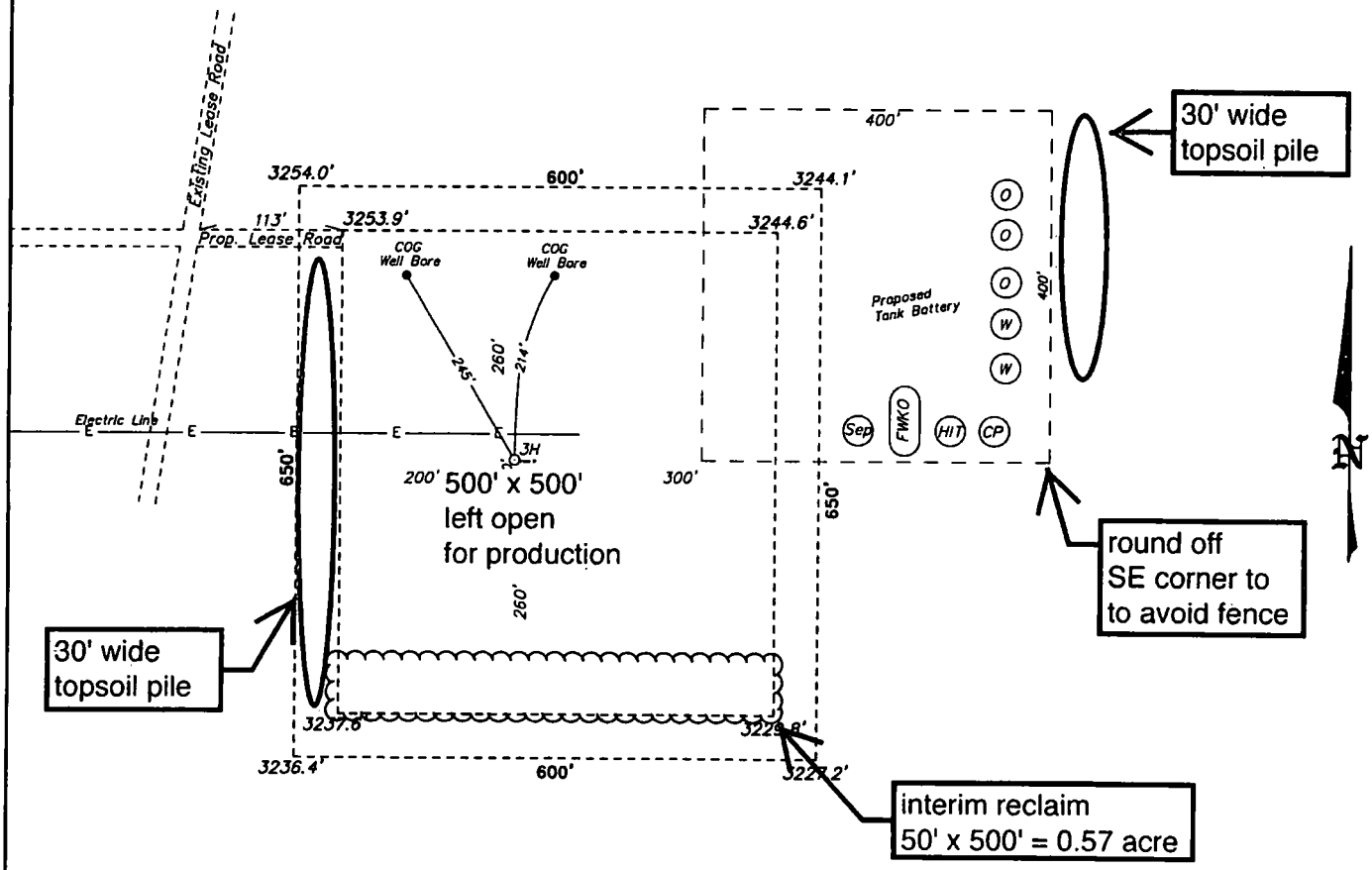
W.O. Number: 33140	Drawn By: K. GOAD	Date: 07-24-2017	Survey Date: 07-14-2017	Sheet 1 of 1 Sheets

SECTION 5, TOWNSHIP 20 SOUTH, RANGE 30 EAST. N.M.P.M.,
EDDY COUNTY, NEW MEXICO.

MAP 12



CL&F OPERATING LLC
CRAZY HORSE 0304 FED COM #3H
ELEV. - 3248'

Lat - N 32.608552°
Long - W 103.992511°
NMSPCE- N 585290.1
E 646285.0
(NAD-83)

CARLSBAD, NM IS ±25 MILES TO THE SOUTHWEST OF LOCATION.

200 0 200 400 FEET

SCALE: 1" = 200'

CL&F OPERATING LLC

CRAZY HORSE 0304 FED COM

SECTION 5, TOWNSHIP 20 SOUTH, RANGE 30 EAST.
N.M.P.M., EDDY COUNTY, NEW MEXICO.

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W.O. Number: 33350	Drawn By: K. GOAD	Date: 10-05-2017	Survey Date: 10-02-2017	Sheet 1 of 1 Sheets

Surface Use Plan

1. ROAD DIRECTIONS & DESCRIPTIONS (See MAPS 1 - 5)

From the junction of US 285 and US 62/180 in Carlsbad...
Go NE 15.6 miles on paved US 62/180 to the equivalent of Mile Post 50.7
Then turn left and go North 5.7 miles on paved NM 360
Then turn left and go NW 2.3 miles on caliche County Road 235
Then turn left and go SSW 0.9 miles on a caliche road
Then turn left and go East 113' on a proposed road to the proposed pad

Non-county roads will be maintained as needed to Gold Book standards. This includes pulling ditches, preserving the crown, and cleaning culverts. This will be done at least once a year, and more often as needed. Caliche will be hauled from Constructors, Inc. existing pit on private land in NWNE 34-21s-27e.

2. ROAD TO BE BUILT OR UPGRADED (See MAPS 4 & 5)

One hundred thirteen feet of new resource road will be built. The new road will be crowned and ditched, have a 14' wide driving surface, and be surfaced with caliche. Maximum disturbed width = 30'. Maximum grade = 1%. Maximum cut or fill = 1'. No upgrade, culvert, cattle guard, or vehicle turn out is needed.

3. EXISTING WELLS (See MAP 6)

Existing oil, gas, water, and P & A wells are within a mile. No disposal or injection well is within a mile.

4. PROPOSED PRODUCTION FACILITIES (See MAPS 7 & 8)

A 400' x 400' tank battery will be built on the northeast side of the pad. Southeast corner of the battery will be rounded off to avoid a fence. Gas pipeline and power line plans have not been finalized.

5. WATER SUPPLY (See MAP 9)

Water will be trucked from a private water well (C 03607) on private land in NENE 24-21s-27e.

6. CONSTRUCTION MATERIALS & METHODS (see MAPS 10 & 11)

COG and NM One Call (811) will be notified before construction starts. COG has 1 approved well on the north side of the pad and a second well staked. An un-energized overhead power line will be moved to the west side of the pad and reserved for future use. Top ≈6" of soil and brush will be stockpiled west of the pad. Pipe racks will be to the south. A closed loop drilling system will be used. Caliche will be hauled from existing Constructors, Inc. pit on private land in NWNE 34-21s-27e.

Tank battery will be built overlapping the northeast side of the well pad. Top ≈6" of soil and brush will be stockpiled east of the battery and west of the fence. North edge of battery is the border with State land. There will be no construction on State land.

7. WASTE DISPOSAL

All trash will be placed in a portable trash cage. It will be hauled to the Eddy County landfill. There will be no trash burning. Contents (drill cuttings, mud, salts, and other chemicals) of the mud tanks will be hauled to R360's state

approved (NM1-6-0) disposal site at Halfway. Human waste will be disposed of in chemical toilets and hauled to the Carlsbad wastewater treatment plant.

8. ANCILLARY FACILITIES

There will be no airstrip or camp. Camper trailers will be on location for the company man, tool pusher, or mud logger.

9. WELL SITE LAYOUT

See Rig Diagram for depictions of the well pad, trash cage, access onto the location, parking, living facilities, and rig orientation.

10. RECLAMATION (See MAPS 12 - 14)

Interim reclamation will shrink the well pad ≈9% by removing caliche and reclaiming the south 50', leaving 5.74 acres for 2 CL & F wells and 2 COG wells, truck turn arounds for two CL & F and COG. Disturbed areas will be contoured to match pre-construction grades. Soil and brush will be evenly spread over disturbed areas. Disturbed areas will be seeded in accordance with BLM requirements. Enough stockpiled topsoil will be retained to cover the remainder of the pad and battery when the wells are plugged. Once the last well is plugged, then the remainder of the pad, battery, and new road will be similarly reclaimed. Noxious weeds will be controlled.

11. SURFACE OWNER

All construction will be on BLM. Land use:

+ 30' x 113' road = 0.08 acre
+ 500' x 550' pad = 6.13 acres
+ 400' x 400' battery = 3.67 acres
- 75' x 250' overlap between pad & battery = 0.43 acre
short term = 9.45 acres

short term = 9.45 acres
- 50' x 500' interim reclamation on well pad = 0.57 acre
8.88 acres long term (0.08 ac. road + 8.80 pad & battery)

12. OTHER INFORMATION

On-site inspection was held with Jim Rutley, Bobby Ballard, Jim Goodbar, Chelsie Dugan, and June Hernandez (all BLM) on September 26, 2017.

CL & F Operating LLC
Crazy Horse 0304 Fed Com 4H
SHL 430' FNL & 2135' FEL Sec. 5
BHL 1927' FNL & 330' FEL Sec. 3
T. 20 S., R. 30 E., Eddy County, NM

CERTIFICATION

I hereby certify that I, or someone under my direct supervision, have inspected the drill site and access route proposed herein; that I am familiar with the conditions which currently exist; that I have full knowledge of state and Federal laws applicable to this operation; that the statements made in this APD package are, to the best of my knowledge, true and correct; and that the work associated with the operations proposed herein will be performed in conformity with this APD package and the terms and conditions under which it is approved. I also certify that I, or the company I represent, am responsible for the operations conducted under this application. These statements are subject to the provisions of 18 U. S. C. 1001 for the filing of false statements. Executed this 29th day of January, 2018.

Brian Wood, Consultant
Permits West, Inc.
37 Verano Loop, Santa Fe, NM 87508
(505) 466-8120 FAX: (505) 466-9682 Cellular: (505) 699-2276

Field representative will be:
Allison Johnson
CL & F Operating LLC
16945 Northchase Dr., Suite 500
Houston TX 77060
Phone: (281) 873-3013
FAX: (281) 872-4398

Section 1 - General

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

Section 2 - Lined Pits

Would you like to utilize Lined Pit PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner:

PWD disturbance (acres):

Lined pit PWD on or off channel:

Lined pit PWD discharge volume (bbl/day):

Lined pit specifications:

Pit liner description:

Pit liner manufacturers information:

Precipitated solids disposal:

Decribe precipitated solids disposal:

Precipitated solids disposal permit:

Lined pit precipitated solids disposal schedule:

Lined pit precipitated solids disposal schedule attachment:

Lined pit reclamation description:

Lined pit reclamation attachment:

Leak detection system description:

Leak detection system attachment:

Lined pit Monitor description:

Lined pit Monitor attachment:

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

Is the reclamation bond a rider under the BLM bond?

Lined pit bond number:

Lined pit bond amount:

Additional bond information attachment:

Section 3 - Unlined Pits

Would you like to utilize Unlined Pit PWD options? NO

Produced Water Disposal (PWD) Location:

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

Unlined pit PWD on or off channel:

Unlined pit PWD discharge volume (bbl/day):

Unlined pit specifications:

Precipitated solids disposal:

Decribe precipitated solids disposal:

Precipitated solids disposal permit:

Unlined pit precipitated solids disposal schedule:

Unlined pit precipitated solids disposal schedule attachment:

Unlined pit reclamation description:

Unlined pit reclamation attachment:

Unlined pit Monitor description:

Unlined pit Monitor attachment:

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

Beneficial use user confirmation:

Estimated depth of the shallowest aquifer (feet):

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

TDS lab results:

Geologic and hydrologic evidence:

State authorization:

Unlined Produced Water Pit Estimated percolation:

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

Is the reclamation bond a rider under the BLM bond?

Unlined pit bond number:

Unlined pit bond amount:

Additional bond information attachment:

Section 4 - Injection

Would you like to utilize Injection PWD options? NO

Produced Water Disposal (PWD) Location:

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

Injection PWD discharge volume (bbl/day):

Injection well mineral owner:

Injection well type:

Injection well number: **Injection well name:**

Assigned injection well API number? **Injection well API number:**

Injection well new surface disturbance (acres):

Minerals protection information:

Mineral protection attachment:

Underground Injection Control (UIC) Permit?

UIC Permit attachment:

Section 5 - Surface Discharge

Would you like to utilize Surface Discharge PWD options? NO

Produced Water Disposal (PWD) Location:

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

Surface discharge PWD discharge volume (bbl/day):

Surface Discharge NPDES Permit?

Surface Discharge NPDES Permit attachment:

Surface Discharge site facilities information:

Surface discharge site facilities map:

Section 6 - Other

Would you like to utilize Other PWD options? NO

Produced Water Disposal (PWD) Location:

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

Other PWD discharge volume (bbl/day):

Other PWD type description:

Other PWD type attachment:

Have other regulatory requirements been met?

Other regulatory requirements attachment:

AFMSS

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

Bond Info Data Report

08/24/2018

Bond Information

Federal/Indian APD: FED

BLM Bond number: NMB001314

BIA Bond number:

Do you have a reclamation bond? NO

Is the reclamation bond a rider under the BLM bond?

Is the reclamation bond BLM or Forest Service?

BLM reclamation bond number:

Forest Service reclamation bond number:

Forest Service reclamation bond attachment:

Reclamation bond number:

Reclamation bond amount:

Reclamation bond rider amount:

Additional reclamation bond information attachment: