# Well Release Checksheet

| | | | |
|---|---|---|---|
| Report Date | 11/19/2018 | Well File Number | 11409 |
| Well Operator | DENBURY ONSHORE, LLC | Location | 22-131N-105W NENW, 1248' FNL, 1654' FWL |
| Well Name | CEDAR HILLS 21-22 | County | BOWMAN |

## Final Inspection Report

| | | | |
|---|---|---|---|
| Well Status | Dry Hole | Date Well Status | 12/12/2015 |
| Restoration Status | Approved For Release | Field OK For Release Date | 7/16/2018 |
| Land Use | PASTURE | Site Contractor | |
| Restoration Waiver | No | | |
| Restoration Notes | Grown in nicely, and lease road was for a previously drilled well. | | |

Inspector: John Sandven
Initials: JDN/TJM

## File Check

| | RBDMS | File Review Notes |
|---|---|---|
| Completion Report ✓ | NA | N/A |
| Plugging Report ✓ | 1-2 | Rec'd 12-12-15/1985 (well file) |
| Drill Stem Tests ✓ | 2 | Rec'd No date |
| Geological Report ✓ | Yes | Rec'd 2015 (well file re-entry) |
| Core Analysis ✓ | Yes 12-9-15 | Rec'd 4-8-85 |
| Logs Available ✓ | CND, DLL, DTS, DTSM, LL 3-20-85 3-20-85 | Rec'd |
| Other Required or Requested Information | | Initials |

## Bond Information

| | | | |
|---|---|---|---|
| NDIC Bond Number | D350 Bond Type Unit Blanket Bond | Bond Amount | $100,000.00 |
| Surety Company | LIBERTY MUTUAL INS. CO. | Bond Status | Active |
| Date Well Released | 7-2-19 | Initials | RM |

# SUNDRY NOTICES AND REPORTS ON WELLS - FORM 4

INDUSTRIAL COMMISSION OF NORTH DAKOTA
OIL AND GAS DIVISION
600 EAST BOULEVARD DEPT 405
BISMARCK, ND 58505-0840
SFN 5749 (09-2006)


Well File No.
**11409**

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.
PLEASE SUBMIT THE ORIGINAL AND ONE COPY.

- ☐ Notice of Intent — Approximate Start Date
- ☑ Report of Work Done — Date Work Completed: **January 6, 2016**
- ☐ Notice of Intent to Begin a Workover Project that may Qualify for a Tax Exemption Pursuant to NDCC Section 57-51.1-03. — Approximate Start Date

- ☐ Drilling Prognosis
- ☐ Redrilling or Repair
- ☐ Casing or Liner
- ☐ Plug Well
- ☐ Supplemental History
- ☐ Temporarily Abandon
- ☐ Other
- ☐ Spill Report
- ☐ Shooting
- ☐ Acidizing
- ☐ Fracture Treatment
- ☐ Change Production Method
- ☑ Reclamation

| Well Name and Number | | | | | |
|---|---|---|---|---|---|
| **Cedar Hills 21-22** | | | | | |
| Footages | | Qtr-Qtr | Section | Township | Range |
| **2080 F N L 1654 F W L** | | **NENW** | **22** | **131 N** | **105 W** |
| Field | Pool | County | | | |
| **Cedar Hills** | **South Red River B** | **Bowman** | | | |

**24-HOUR PRODUCTION RATE**

| Before | | After | |
|---|---|---|---|
| Oil | Bbls | Oil | Bbls |
| Water | Bbls | Water | Bbls |
| Gas | MCF | Gas | MCF |

| Name of Contractor(s) | | | |
|---|---|---|---|
| **Trotter Construction** | | | |
| Address | City | State | Zip Code |
| **12651 2nd St. SW** | **Butte** | **ND** | **58634** |

## DETAILS OF WORK

**Denbury Onshore, LLC reports that the reclamation work for the subject was completed 01/06/2016 by the contractor listed above. Work done included: mobilize equipment, strip available topsoil, reclaim road and location. The topsoil was re-spread on all reclaimed areas. Seeded entire reclaimed areas. The reseed and reclaimed work was done per NDIC guidelines.**

| Company | | Telephone Number |
|---|---|---|
| **Denbury Onshore, LLC** | | **(972) 673-2893** |
| Address | | |
| **5320 Legacy Drive** | | |
| City | State | Zip Code |
| **Plano** | **TX** | **75024** |
| Signature | Printed Name | |
| | **Diana George** | |
| Title | Date | |
| **Regulatory Compliance Specialist** | **February 1, 2017** | |
| Email Address | | |
| **diana.george@denbury.com** | | |

**FOR STATE USE ONLY**

| ☑ Received | ☐ Approved |
|---|---|
| Date: 2-1-18 | |
| By: Tamara Madche | |
| Title: Reclamation Specialist | |

# PLUGGING REPORT - FORM 7

INDUSTRIAL COMMISSION OF NORTH DAKOTA
OIL AND GAS DIVISION
600 EAST BOULEVARD DEPT 405
BISMARCK, ND 58505-0840
SFN 2467 (03-2004)

Received
FEB 18 2016
ND Oil & Gas Division

Well File No. 11409

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.
PLEASE SUBMIT THE ORIGINAL AND ONE COPY.

| Operator | Telephone Number | Well Name and Number |
|---|---|---|
| Denbury Onshore LLC | (972) 673-2893 | Cedar Hills 21-22 |
| **Address** | | **Field** |
| 5320 Legacy Drive | | Cedar Hills |

| City | State | Zip Code | Deepest Pool Penetrated |
|---|---|---|---|
| Plano | TX | 75024 | South Red River B |

## LOCATION

| At Surface | Qtr-Qtr | Section | Township | Range | County |
|---|---|---|---|---|---|
| 1248 F N L 1654 F W L | NENW | 22 | 131 N | 105 W | Bowman |
| **Bottom Hole Location** | **Qtr-Qtr** | **Section** | **Township** | **Range** | **County** |
| 1248 F N L 1654 F W L | NENW | 22 | 131 N | 105 W | Bowman |

| Spud Date | Date TD Reached | KB Elevation | TD (Feet) | No. of DSTs | Directional Survey Run? |
|---|---|---|---|---|---|
| February 28, 1985 | March 21, 1985 | 2956 | 9500 MD 9500 TVD | (See Back) 2 | ☑ No ☐ Yes |

| Type of Electric and Other Logs Run (See Instructions) | Was Well Cored? | List Intervals: |
|---|---|---|
| DLL, CDL, CND | ☐ No ☑ Yes | 9328-9388 |

| Weight of Fluid Between Plugs (Lbs/Gal) | Name of Field Inspector Present During Plugging |
|---|---|
| 10 ppg | Matt Tibor |

| Date Well Plugged | Drilling Contractor and Rig Number | Plugging Contractor(s) |
|---|---|---|
| December 12, 2015 | Trinidad 35 | Schlumberger/Denbury supervised the plugging |

## CASING RECORD (Report all strings set in well)

| Casing Size (Inches) | Measured Depth Set (Feet) | Amount Pulled | Hole Size (Inches) | Weight (Lbs/Ft) | Sacks Cement | Top of Cement |
|---|---|---|---|---|---|---|
| 8 5/8 | 2018 | | 9 7/8 | 24 | 860 | surface |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

## ATTEMPTED COMPLETION DATA (If not previously reported)

| Perforations | Holes Per Foot | Swab/Prod. Potential (Oil/Water) | Acid, Frac, Sqz, Etc. | Amount and Kind of Material Used |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

## PLUGGING RECORD

| Type of Plug | Interval/Depth | Formation Isolated | Sacks of Cement/Class |
|---|---|---|---|
| Cement Plug | 8788-9488 | Red River A, B, C, & D | 203 sacks class G |
| Cement Plug | 8102-8402 | | 50 sacks class G |
| Cement Plug | 7087-7387 | | 50 sacks class G |
| Cement Plug | 6045-6345 | | 50 sacks class G |
| Cement Plug | 3700-4200 | | 50 sacks class G |
| Cement Plug | 1780-2080 | | 50 sacks class G |
| Cement Plug | 25-120 | | 50 sacks class G |
| | | | |
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| | | | |

**DRILL STEM TEST DATA (IF NOT PREVIOUSLY REPORTED), ADDITIONAL INFORMATION, AND/OR LIST OF ATTACHMENTS**

| I hereby swear or affirm that the information provided is true, complete and correct as determined from all available records. | | Date 02/17/2016 |
|---|---|---|
| Signature | Printed Name **Diana George** | Title **Regulatory Compliance Specialist** |

Above Signature Witnessed By

| Witness Signature | Witness Printed Name | Witness Title |
|---|---|---|
| Pat Calhoun | **Pat Calhoun** | **Field Clerk** |

# SUNDRY NOTICES AND REPORTS ON WELLS - FORM 4

INDUSTRIAL COMMISSION OF NORTH DAKOTA
OIL AND GAS DIVISION
600 EAST BOULEVARD DEPT 405
BISMARCK, ND 58505-0840
SFN 5749 (09-2006)

Received
FEB 18 2016
ND Oil & Gas Division

Well File No.
**11409**

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.
PLEASE SUBMIT THE ORIGINAL AND ONE COPY.

| | | | |
|---|---|---|---|
| ☐ Notice of Intent | Approximate Start Date | ☐ Drilling Prognosis | ☐ Spill Report |
| ☑ Report of Work Done | Date Work Completed: **December 12, 2015** | ☐ Redrilling or Repair | ☐ Shooting |
| ☐ Notice of Intent to Begin a Workover Project that may Qualify for a Tax Exemption Pursuant to NDCC Section 57-51.1-03. | Approximate Start Date | ☐ Casing or Liner | ☐ Acidizing |
| | | ☑ Plug Well | ☐ Fracture Treatment |
| | | ☐ Supplemental History | ☐ Change Production Method |
| | | ☐ Temporarily Abandon | ☐ Reclamation |
| | | ☐ Other **Work Completed** | |

Well Name and Number: **Cedar Hills 21-22**

| Footages | Qtr-Qtr | Section | Township | Range |
|---|---|---|---|---|
| **1248** F **N** L **1654** F **W** L | **NENW** | **22** | **131 N** | **105 W** |

| Field | Pool | County |
|---|---|---|
| **Cedar Hills** | **South Red River B** | **Bowman** |

**24-HOUR PRODUCTION RATE**

| Before | | After | |
|---|---|---|---|
| Oil | Bbls | Oil | Bbls |
| Water | Bbls | Water | Bbls |
| Gas | MCF | Gas | MCF |

Name of Contractor(s)

| Address | City | State | Zip Code |
|---|---|---|---|
| | | | |

## DETAILS OF WORK

**Denbury Onshore, LLC reports the subject well has completed the PA work on 12/12/2015. Please the attached for work done.**

| | | |
|---|---|---|
| Company: **Denbury Onshore, LLC** | | Telephone Number: **(972) 673-2893** |
| Address: **5320 Legacy Drive** | | |
| City: **Plano** | State: **TX** | Zip Code: **75024** |
| Signature: Diana George | Printed Name: **Diana George** | |
| Title: **Regulatory Compliance Specialist** | Date: **February 17, 2016** | |
| Email Address: **diana.george@denbury.com** | | |

**FOR STATE USE ONLY**

| | |
|---|---|
| ☒ Received | ☐ Approved |
| Date: 2-18-16 | |
| By: Cody Wanderk | |
| Title: Rec Tech | |

# Cedar Hills 21-22

**Surface Legal Location:** 1248 FNL & 1654 FWL

| Field Name | API/UWI | State ID# | Assoc.TB/TestSite | Well Status | Well Config | Latitude | Longitude |
|---|---|---|---|---|---|---|---|
| Cedar Hills South | 33011004290000 | 11409 | | PER - Permitted | | 46° 9' 31.964" N | 103° 47' 56.317" W |

| Ground Elevation (ft) | Orig KB Elev (ft) | KB-Grd (ft) | Total Depth (All) (ftKB) | Total Depth All (TVD) (ftKB) | PBTD (All) (ftKB) |
|---|---|---|---|---|---|
| 2,931.60 | 2,956.40 | 24.80 | Original Hole - 9,500.0 | | |

| Spud Date | TD Date | Rig Release Date | Completion Start... | Completion End D... | On Production Date | First Sales Date | First Inj Date | First Date CO2 Flo... | Abandon Date |
|---|---|---|---|---|---|---|---|---|---|
| 2/28/1985 | | | | | | | | | 12/12/2015 |

| Job Category | Primary Job Type | Secondary Job Type | Job Start Date | Job End Date |
|---|---|---|---|---|
| Plug & Abandon | Abandon Well | Plug and Abandon Operations | 11/22/2015 | 12/12/2015 |

**Job Purpose**
Offest P&A well, CHSU 1-22

**Summary**

| Rig Name | Rig # | Rig Type | Rig Start Dt | RR Date |
|---|---|---|---|---|
| Trinidad | 35 | Drilling Rig | 11/22/2015 | 12/12/2015 |

| Rpt # | Start Date | End Date | Summary |
|---|---|---|---|
| 1 | 11/22/2015 18:00 | 11/23/2015 06:00 | Rig down & prepare to move. R/D service loop, track, top drive & bridle up blocks. |
| 2 | 11/23/2015 06:00 | 11/24/2015 06:00 | MIRU, rig 100% rigged down, 20% on location, 0% rigged up. Move camps, drill pipe & misc. Prepare to squat subs. Squat subs & prepare to lower derrick. Disconnect power, water & steam lines. R/D backyard. Lower derrick. Secure location & wait on daylight. |
| 3 | 11/24/2015 06:00 | 11/25/2015 06:00 | MIRU rig 100% rigged down 35% rigged up. 100% off old location. Remove monkey board, set derrick off & load out. Load out mud tanks, mud pumps, generators, fuel & water tank, trip tank, & boiler. Set mats on new location, subs & spreader beams. Center & level subs over hole. Set center steel, draworks, dog house's, spacer house, pusher's house, change house, mud pumps, & scr house. Pin derrick onto floor. Secure location & wait on daylight. |
| 4 | 11/25/2015 06:00 | 11/26/2015 06:00 | MIRU rig 100% on location, 70% rigged up. Set engines, koomey, mud tanks, solids control equipment, gas buster. Water & fuel tanks, choke manifold, & catwalk. Release truck crane @ 09:00hrs. Release Hall Trucking @ 14:00hrs. C/O brake pads on draworks, static cables on derrick. String up blocks, put wraps on drum & deadman. Raise derrick & sub, install tarps on sub, set stairs to mud tanks & rig floor. Rig up gas buster lines. |
| 5 | 11/26/2015 06:00 | 11/27/2015 06:00 | MIRU, 95% rigged up. Rig up gasbuster lines, raise catwalk, hang wind walls on rig floor. Mount track extender arm to derrick. R/U flare lines & solid control equipment.Change out swivel packing, prepare mud tanks for fluid, Unbridle blocks. P/U top drive & track. Rig up tanks farm & solids equipment. |
| 6 | 11/27/2015 06:00 | 11/28/2015 06:00 | MIRU, Rigged up 100% Raise service loop & sec ure in derrick, connect service loop plugs.install hanger brackets & safety wire.Connect kelly hose. Function test top drive & mud pumps. Rig up Mathena choke. Straighten & organize location. Dress out rig floor. Rig Accepted on Daywork @ 20:00hrs on 11-27-15. Pre spud inspection & Safety Meeting with Crews. Inspect rig with Trinidad Rep. & Denbury Rep. HPJSM, Remove well head cap, install spacer spool, N/U Bop's. |
| 7 | 11/28/2015 06:00 | 11/29/2015 06:00 | HPJSM, finish N/U Bop's. PJSM, Test bop's: Test hydril to 250 psi low 3500 psi high, test pipe rams, kill line valves, HCR, 4" manual, & blind rams, Blind rams failed. Change out blind ram blocks. Test blind rams 250 psi low 5000 psi high, pull check valve on kill line & test 250 psi low 5000 psi high, re-install check valve & test 250 psi low 5000 psi high. Test mud lines 4200 psi. Found torn piece of hydril rubber in bops. C/O hydril element. R/D testers & blow down mud lines. N/D flowline, rotating head & pollution pan on hydril & c/o hydril element & seals on cap. R/U testers & Test hydril 250 psi low & 3500 psi high. 5min low, 10 min high. |
| 8 | 11/29/2015 06:00 | 11/30/2015 06:00 | Finish test Hydril to 3500 psi high.Install wear bushing.Nipple up rotaring head bowl, flex line to flow line, Install mouse holes.Install tarp in front of sub, Pick up tools.M/U bit and TIH picking up BHA.TIH P/U 4" drill pipe. Tag @1240', Break circ, washing with 12K WOB, 60 RPM, 300 GPM, Geting LCM and ground up black rubber back over shakers. Washed f/ 1240' to 1244'.Continue in hole washing with 450 gpm, 50 rpm, 0-10 WOB.f/ 1244' to 1322',Rig service, adjust clamp om kelly hose and turn goose neck. Continue in hole washing with 450 gpm, 50 rpm, 0-12 WOB.f/ 1322' to 1900' Found cement stringers @ 1793', 100% firm cement @ 1850' dress off to 1900'. CBU. Test 8 5/8" csg to 500 psi for 30min. Good Test. Contacted NDIC inspector Nicole & verified good test. Displace hole with 10.2ppg salt mud. Drill cement 1900' to 2018' WOB - 10-12, RPM-60, GPM- 385. CBU. Slip & Cut Drilline. Service Rig. Drop VES Gyro. TOH. |
| 9 | 11/30/2015 06:00 | 12/1/2015 06:00 | Lay dn bha. Clean rig floor. P/U 0° bend, 7/8, 6.7 XHR mud motor, MWD, Test MWD, (good test) M/U Bit, NMDC, Filter Sub & X-O. TIH to 1922'. Wash & Ream 2018' to 4015' WOB = 0-5K, RPM=70, GPM= 400, MOTOR RPM=116. Circ 30 minutes every 3 to 6 stands reamed. Average 850 - 1250 units background gas. Service Rig. |
| 10 | 12/1/2015 06:00 | 12/2/2015 06:00 | Wash & Ream 4015' to 4769' WOB = 0-5K, RPM=70, GPM= 400, MOTOR RPM=116. Circ 30 minutes every 3 to 6 stands reamed. Average 50 - 100 units background gas. No Cement plug @ 4120' to 4200'.Circ prior to wiper trip.Check flow, well statice, pump slug, POOH. Pulled 1 stand and 4' on the second stand started dragging up to 35K over.Circ slug around using as a weighted sweep to help clean hole, adding asphalt to system. No excess cuttings back over shakers.Rig Service.Back ream from 4670' to 3983', POOH on elevators 3983' to surface casing.Circ bottoms up.TIH f/ 2018' to 4160'.Wash and ream f/ 4160' to 4561', hole packed off.Attempt to back ream with pump, hole packe off, ream without pump 4561' to 4072'. Once above 4160' lost all hole drag and broke circulation, Hole drag prior to above 4160'= 25-40K. Circ bottoms up, Had increase in pea gravel size shale cuttings over shaker.Wash & Ream 4072' to 4597' WOB = 0K, RPM=90, GPM= 400, MOTOR RPM=116. Backream each stand 1 to 2 times. Attempt to packoff @ 4582' then again @ 4597'. Had increase in pea size & some splintering shale cuttings over shaker. POOH to L/D directional assembly. |

# Cedar Hills 21-22

**Surface Legal Location:** 1248 FNL & 1654 FWL

| Field Name | API/UWI | State ID# | Assoc.TB/TestSite | Well Status | Well Config | Latitude | Longitude |
|---|---|---|---|---|---|---|---|
| Cedar Hills South | 33011004290000 | 11409 | | PER - Permitted | | 46° 9' 31.964" N | 103° 47' 56.317" W |

| Ground Elevation (ft) | Orig KB Elev (ft) | KB-Grd (ft) | Total Depth (All) (ftKB) | Total Depth All (TVD) (ftKB) | PBTD (All) (ftKB) |
|---|---|---|---|---|---|
| 2,931.60 | 2,956.40 | 24.80 | Original Hole - 9,500.0 | | |

| Spud Date | TD Date | Rig Release Date | Completion Start... | Completion End D... | On Production Date | First Sales Date | First Inj Date | First Date CO2 Flo... | Abandon Date |
|---|---|---|---|---|---|---|---|---|---|
| 2/28/1985 | | | | | | | | | 12/12/2015 |

| Rpt # | Start Date | End Date | Summary |
|---|---|---|---|
| 11 | 12/2/2015 06:00 | 12/3/2015 06:00 | POOH & L/D directional assembly.Clean floor for safety.Rig Service.M/U Bit, Bit Sub, TIH with drill collars, P/U drilling jars, TIH to 4090'. Wash & Ream 4090' to 4747' WOB = 0K, RPM=90, GPM= 400,Backream each stand 1 to 2 times. Having sudden increases in pea size & some splintering shale cuttings over shaker as hole tries to packoff. Hole packed off and pipe was stuck with circulation. Set jars and pipe pulled free. TOOH T/ 4090 with very little drag. Wash & Ream F/ 4090' T/ 4659. Circulate hole clean and prepare for trip. |
| 12 | 12/3/2015 06:00 | 12/4/2015 06:00 | Circ @ 4700' lowering mud weight from 10.2+ to 9.9+.Wash & Ream 4700' to 4857' WOB = 0/5K, RPM=90/100, GPM= 400. Backream each stand 1 to 2 times. Shakers are some what cleaner, Raised mud wt back to 10.2 ppg.Rig service. Wash & Ream 4857' to 5609' WOB = 0/5K, RPM=90/100, GPM= 400. Backream each stand 1 to 2 times. Shakers are some what cleaner, Raised mud wt back to 10.2 ppg. Service rig. Circulate hole clean to short trip. H2S alarm sounded showing 20-100 ppm on the screen. Evacuated rig floor and investigated the alarm and determined that there was a bad sensor on rig floor. Called Triple A safety to come replace sensor. TOOH F/ 5609' T/ 4000'. Had several tight spots on trip out of hole. Reamed through the spots that would not pull trough @ 30K over. TIH to 4417. Tagged up. Wash and Ream F/ 4417' T/ 4612. Hole started packing off @ 4417 and unloading a lot of shale @ shakers. Decide to TOOH to displace with OBM. |
| 13 | 12/4/2015 06:00 | 12/5/2015 06:00 | POOH to change BHA, Swap to OBM.TIH w/ Bit, Bit sub, HWT DP, Dump and clean tanks.Clean Mud Tanks.Cut drilline.Wait on & P/U jars, HWT DP.FInish clean mud tanks, Fill tanks with OBM, Treat and weight up same to 10.3 ppg. TIH F/ 1881' T/ 4345'. Displace hole with 10.3 OBM and circulate and condition mud. Wash and Ream F/ 4345' T/ 4820'. Np packing off or hole drag. Backream each stand 1 to 2 times. Shakers look a lot cleaner. |
| 14 | 12/5/2015 06:00 | 12/6/2015 06:00 | Wash and Ream F/ 4820' T/ 5674'. Np packing off or hole drag. Backream each stand 1 to 2 times. Shakers look a lot cleaner. Circ prior to Wiper trip. POOH to 4345' no problems, TIH tagged @ 4485'. Wash and Ream F/ 4485' T/ 4724'. No packing off or hole drag. Backream each stand 1 to 2 times. Shakers have small size cuttings coming back. Service rig. Wash and Ream F/ 4724' T/ 5010'. No packing off or hole drag. Backream each stand 1 to 2 times. Shakers have small size cuttings coming back. Circulate hole clean. TOOH F/ 5010' T/ 4251. Had some drag not over 30K. TIH F/ 4251' T/ 5010. Had to ream through tight spots @ 4374, 4730, & 4780. Circulate hole clean. TOOH F/ 5010' T/ surface and break off PDC bit. Had more drag than the short trip. Service rig. Make up Rock bit and TIH T/ 4400' Tagged up. Wash and Ream F/ 4400' T/ 4500'. No packing off or hole drag. Backream each stand 1 to 2 times. Shakers have small size cuttings coming back. |
| 15 | 12/6/2015 06:00 | 12/7/2015 06:00 | Wash and Ream F/ 4500' T/ 5825'. Periodicallyl packing off. Backream each stand 1 to 2 times.Very 3 connections circulate 15 minutes. Shakers have small size cuttings coming back. Tagged cement @ 5825'. Drill cement plug F/ 5825' T/ 5905' for 80'. WOB=15 ROP=40fph. Wash and Ream F/ 5825' T/ 6718'. Backream each stand 1 to 2 times.Very 3 connections circulate 15 minutes. Shakers have small size cuttings coming back. Service rig. |
| 16 | 12/7/2015 06:00 | 12/8/2015 06:00 | Wash and Ream F/ 6718' T/ 7491'. Backream each stand 1 to 2 times.every 3 connections circulate 15 minutes. Shakers have small size cuttings coming back. lost partial returns @ 7402', Pumped 50 bbls of LCM pill, regained full returns.Lost 29 bbls. While reaming @ 7491' lost complete returns.<br><br>Cement Plug @ 7308' to 7392'.<br>While pumping 100#/bbl LCM pill, Hole packed off with 75 bbls of pill outside of drill pipe, 25 bbls inside.POOH attempting to pull thru packoff, Got returns back @ 5341'. Circ cutting mud wt back to 9.8 ppg. Service rig. Circ cutting mud wt back to 9.8 ppg. Wash and Ream F/ 5341' T/ 6149'. Backream each stand 1 to 2 times.every 3 connections circulate 15 minutes. Shakers have small size cuttings coming back. Well started flowing and gaining mud. Gained 30bbls. Circulate and raise mud weight to 10.2. Gained 30bbls while circulating. Service rig. Wash and Ream F/ 6149' T/ 6434'. Backream each stand 1 to 2 times.every 3 connections circulate 15 minutes. Shakers have small size cuttings coming back. |
| 17 | 12/8/2015 06:00 | 12/9/2015 06:00 | Wash and Ream F/ 6434' T/ 6915'. Backream each stand 1 to 2 times.every 3 connections circulate 15 minutes. Shakers have small size cuttings coming back. Rig service, attempt to stop swivel packing from leaking, held for just a bit then started back leaking.Check flow (well static), Pump slug and POOH f/ 6915' to 4930', Hole started giving mud back, well flowing @ 3-4 bbls hr.Mix and pump 12.0 ppg. kill pill to finish POOH to casing shoe. Check flow (well static).POOH to surface casing, Well taking proper fill, Had spot @ 4565'-4562' & 3510'.Change swivel packing. Pump thru and test same. TIH, Tag spot @ 4773', 5936', Wash thru spots with no resistance. Continue in hole to 6914'. Wash and Ream F/ 6915' T/ 8043'. Backream each stand 1 to 2 times.every 3 connections circulate 15 minutes. Shakers have small size cuttings coming back. Pump at a reduced rate 350 GPM through Mission canyon. Full returns and no losses. Service rig. |

# Cedar Hills 21-22

**Surface Legal Location:** 1248 FNL & 1654 FWL

| Field Name | API/UWI | State ID# | Assoc.TB/TestSite | Well Status | Well Config | Latitude | Longitude |
|---|---|---|---|---|---|---|---|
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| Spud Date | TD Date | Rig Release Date | Completion Start... | Completion End D... | On Production Date | First Sales Date | First Inj Date | First Date CO2 Flo... | Abandon Date |
|---|---|---|---|---|---|---|---|---|---|
| 2/28/1985 | | | | | | | | | 12/12/2015 |

| Rpt # | Start Date | End Date | Summary |
|---|---|---|---|
| 18 | 12/9/2015 06:00 | 12/10/2015 06:00 | Wash and Ream F/ 8043' T/ 9488'. Backream each stand 1 to 2 times.every 3 connections circulate 15 minutes. Shakers have small size cuttings coming back. Pump at a reduced rate 350 GPM through Mission canyon. Full returns and no losses. Service rig. Circulate hole clean. Drop Gyro @ 9488'. Pump slug and TOOH T/ 4482' checking flow every 2000'. Hole not taking proper fill. Build 100 bbls of 11.5 kill mud. Spot 100 bbls of 11.5 kill mud. TOOH F/ 4482' T/ surface and lay down heavy weight on the way out of hole. Remove Gyro tool @ bit. Service rig. TIH with drill collars and lay down same. |
| 19 | 12/10/2015 06:00 | 12/11/2015 06:00 | L/D 6 1/4" DC, Clean floor.M/U mule shoe joint, P/U 4" DP off rack.Slip drilline on drum.TIH, Tag @ 4791', Wash 4791' to 4800', Tag 5072' attempt to wash hole packed off, work pipe and clean up hole, TIH tag @ 5173' wash @ 5173', 5828' wash, TIH to 6580'.Circ bottoms up and pump slug due to U tubing.TIH to 9349'. Wash f/ 9349' to 9488'. L/D 1 joint DP, to 9475'. Circ bottoms up. Held PJSM with Schlumberger. Test lines to 5000 psi. Pump 40 bbl Mud push @ 13.0 ppg, 42 bbl cement @ 15.8 ppg, and Displace 88.4 bbls of 10.3 OBM. Rig down cement equipment. Cement in place @ 1830. Bottom of plug 9488 Top 8788. TOOH 12 stands to pull out of cement @ 30 fpm. Place nerf ball in pipe and circulate hole clean. Lay down 6 stands of drill pipe while wait on cement. Circulate and work pipe while wait on cement. Service rig. |
| 20 | 12/11/2015 06:00 | 12/12/2015 06:00 | Circ prior to tagging plug.TIH, wash f/ 8655' to 8672' TOC. Confirm with setting down weight and pump pressure increase. Notified Matthew Tibor as to be on location @ 06:00 hrs CST. He called and said to proceed with plug verification without him.L/D drill pipe to 8402'.Circ, Mix Spacer, Held PJSM with Schlumberger. Test lines to 4500 psi. Pump 24 bbl Mud push @ 13.0 ppg, 18 bbl cement @ 15.8 ppg, 5.8 BBLS Mud Push and Displace 81.8 bbls of 10.3 OBM. Rig down cement equipment. Cement in place @ 0850. POOH L/D Drill pipe to 7387'.Drop wiper ball and pump around to clear drill pipe.Circ, Mix Spacer, Held PJSM with Schlumberger. Test lines to 4500 psi. Pump 24 bbl Mud push @ 13.0 ppg, 18 bbl cement @ 15.8 ppg, 5.8 BBLS Mud Push and Displace 70 bbls of 10.3 OBM. Rig down cement equipment. Cement in place @ 1050. POOH to 6345'.Drop wiper ball and pump around to clear drill pipe.Circ, Mix Spacer, Held PJSM with Schlumberger. Test lines to 4500 psi. Pump 24 bbl Mud push @ 13.0 ppg, 18 bbl cement @ 15.8 ppg, 5.8 BBLS Mud Push and Displace 59.5 bbls of 10.3 OBM. Rig down cement equipment. Cement in place @ 1400. POOH to 4200'. Drop wiper ball and pump around to clear drill pipe. Circ, Mix Spacer, Held PJSM with Schlumberger. Test lines to 4500 psi. Pump 24 bbl Mud push @ 13.0 ppg, 30 bbl cement @ 15.8 ppg, 5.8 BBLS Mud Push and Displace 33.8 bbls of 10.3 OBM. Rig down cement equipment. Cement in place @ 1630. TOOH T/ 2967'. Service rig. Place nerf ball in drill pipe and circulate hole clean. Lay down 36 stands on drill pipe. Pull wear bushing. Service rig. Circulate and wait on cement. TIH T/ 3632. Wash down and tag cement @ 3793. |
| 21 | 12/12/2015 06:00 | 12/12/2015 19:00 | L/D DP to 2080'. Circ, Mix Spacer, Held PJSM with Schlumberger. Test lines to 4500 psi. Pump 24 bbl Mud push @ 13.0 ppg, 18.2 bbl cement @ 15.8 ppg, 5.7 BBLS Mud Push and Displace 13.4 bbls of 10.3 OBM. Rig down cement equipment. Cement in place @ 0900.L/D DP, Pull Rotating head, Run back in hole to 122'.Circ, Mix Spacer, Held PJSM with Schlumberger. Test lines to 4500 psi. Pump 24 bbl Mud push @ 13.0 ppg, 8.8 bbl cement @ 13.0 ppg,Verify cement at shale shaker (2.0 bbls).Rig down cement equipment. Cement in place @ 1130. Drain stack and flush same.N/D BOP. |

# Cedar Hills 21-22

**Surface Legal Location:** 1248 FNL & 1654 FWL

| Field Name | API/UWI | State ID# | Assoc.TB/TestSite | Well Status | Well Config | Latitude | Longitude |
|---|---|---|---|---|---|---|---|
| Cedar Hills South | 33011004290000 | 11409 | | PER - Permitted | | 46° 9' 31.964" N | 103° 47' 56.317" W |

| Ground Elevation (ft) | Orig KB Elev (ft) | KB-Grd (ft) | Total Depth (All) (ftKB) | Total Depth All (TVD) (ftKB) | PBTD (All) (ftKB) |
|---|---|---|---|---|---|
| 2,931.60 | 2,956.40 | 24.80 | Original Hole - 9,500.0 | | |

| Spud Date | TD Date | Rig Release Date | Completion Start... | Completion End D... | On Production Date | First Sales Date | First Inj Date | First Date CO2 Flo... | Abandon Date |
|---|---|---|---|---|---|---|---|---|---|
| 2/28/1985 | | | | | | | | | 12/12/2015 |

## Other In Hole

| Des | Run Date | Pull Date | Top (ftKB) | Btm (ftKB) | OD (in) | Com |
|---|---|---|---|---|---|---|
| | | | | | | |

## Cement (filtered for Type=Plug)

### Cement Plug, Plug, 12/10/2015 17:30

| Description | Type | String | Cementing Start Date | Cementing End Date | Wellbore |
|---|---|---|---|---|---|
| Cement Plug | Plug | | 12/10/2015 | 12/10/2015 | Original Hole |

Comment

**Cement Stages**

| Stg # | Description | Top Depth (ftKB) | Top (TVD) (ftKB) | Btm (ftKB) | Btm (TVD) (ftKB) | MD Tagged (ft... | Tag Method | Tag Date | Depth Plug Drille... | Drill Out Date | Drill Out Dia (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Cement Plug | 8,788 | | 9,488 | | 8,672.0 | Work String | | | | |

**Cement Fluids**

| Fluid | Est Top (ftKB) | Est Btm (ftKB) | Class | Amount (sacks) | Yield (ft³/sack) | Dens (lb/gal) | Vol Pumped (bbl) |
|---|---|---|---|---|---|---|---|
| Mud push | 8,788 | 8,088 | Standard | 0 | | 13.00 | 40.0 |
| Tail | 8,788 | 9,488 | G | 203 | 1.16 | 15.80 | 42.0 |
| Displacement | 0 | 8,700 | Standard | 0 | | 10.30 | |

| Stg # | Description | Top Depth (ftKB) | Top (TVD) (ftKB) | Btm (ftKB) | Btm (TVD) (ftKB) | MD Tagged (ft... | Tag Method | Tag Date | Depth Plug Drille... | Drill Out Date | Drill Out Dia (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | Cement Plug | 8,102 | | 8,402 | | | | | | | |

**Cement Fluids**

| Fluid | Est Top (ftKB) | Est Btm (ftKB) | Class | Amount (sacks) | Yield (ft³/sack) | Dens (lb/gal) | Vol Pumped (bbl) |
|---|---|---|---|---|---|---|---|
| Mud | | | | | | 13.00 | 24.0 |
| cement | | | | | 1.16 | 15.80 | 18.0 |
| mud push | | | | | | 10.30 | 5.8 |
| mud | | | | | | 10.30 | 81.0 |

| Stg # | Description | Top Depth (ftKB) | Top (TVD) (ftKB) | Btm (ftKB) | Btm (TVD) (ftKB) | MD Tagged (ft... | Tag Method | Tag Date | Depth Plug Drille... | Drill Out Date | Drill Out Dia (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | Cement Plug | 7,087 | | 7,387 | | | | | | | |

**Cement Fluids**

| Fluid | Est Top (ftKB) | Est Btm (ftKB) | Class | Amount (sacks) | Yield (ft³/sack) | Dens (lb/gal) | Vol Pumped (bbl) |
|---|---|---|---|---|---|---|---|
| Mud | | | | | | 13.00 | 24.0 |
| cement | | | | | 1.16 | 15.80 | 18.0 |
| mud push | | | | | | 10.30 | 5.8 |
| mud | | | | | | 10.30 | 70.0 |

| Stg # | Description | Top Depth (ftKB) | Top (TVD) (ftKB) | Btm (ftKB) | Btm (TVD) (ftKB) | MD Tagged (ft... | Tag Method | Tag Date | Depth Plug Drille... | Drill Out Date | Drill Out Dia (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | Cement Plug | 6,045 | | 6,345 | | | | | | | |

**Cement Fluids**

| Fluid | Est Top (ftKB) | Est Btm (ftKB) | Class | Amount (sacks) | Yield (ft³/sack) | Dens (lb/gal) | Vol Pumped (bbl) |
|---|---|---|---|---|---|---|---|
| Mud | | | | | | 13.00 | 24.0 |
| cement | | | | | 1.16 | 15.80 | 18.0 |
| mud push | | | | | | 10.30 | 5.8 |
| mud | | | | | | 10.30 | 59.5 |

| Stg # | Description | Top Depth (ftKB) | Top (TVD) (ftKB) | Btm (ftKB) | Btm (TVD) (ftKB) | MD Tagged (ft... | Tag Method | Tag Date | Depth Plug Drille... | Drill Out Date | Drill Out Dia (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 | Cement Plug | 3,700 | 3,699.9 | 4,200 | 4,199.9 | 3,793.0 | Work String | | | | |

**Cement Fluids**

| Fluid | Est Top (ftKB) | Est Btm (ftKB) | Class | Amount (sacks) | Yield (ft³/sack) | Dens (lb/gal) | Vol Pumped (bbl) |
|---|---|---|---|---|---|---|---|
| Mud | | | | | | 13.00 | 24.0 |
| cement | | | | | 1.16 | 15.80 | 18.0 |
| mud push | | | | | | 10.30 | 5.8 |
| mud | | | | | | 10.30 | 33.8 |

| Stg # | Description | Top Depth (ftKB) | Top (TVD) (ftKB) | Btm (ftKB) | Btm (TVD) (ftKB) | MD Tagged (ft... | Tag Method | Tag Date | Depth Plug Drille... | Drill Out Date | Drill Out Dia (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | Cement Plug | 1,780 | 1,780.0 | 2,080 | 2,080.0 | | | | | | |

**Cement Fluids**

| Fluid | Est Top (ftKB) | Est Btm (ftKB) | Class | Amount (sacks) | Yield (ft³/sack) | Dens (lb/gal) | Vol Pumped (bbl) |
|---|---|---|---|---|---|---|---|
| Mud | | | | | | 13.00 | 24.0 |
| cement | | | | | 1.16 | 15.80 | 18.2 |
| mud push | | | | | | 10.30 | 5.7 |
| mud | | | | | | 10.30 | 13.4 |

| Stg # | Description | Top Depth (ftKB) | Top (TVD) (ftKB) | Btm (ftKB) | Btm (TVD) (ftKB) | MD Tagged (ft... | Tag Method | Tag Date | Depth Plug Drille... | Drill Out Date | Drill Out Dia (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 | Cement Plug | 24.8 | | 120 | 120.0 | | | | | | |

# Cedar Hills 21-22

**Surface Legal Location:** 1248 FNL & 1654 FWL

| Field Name | API/UWI | State ID# | Assoc.TB/TestSite | Well Status | Well Config | Latitude | Longitude |
|---|---|---|---|---|---|---|---|
| Cedar Hills South | 33011004290000 | 11409 | | PER - Permitted | | 46° 9' 31.964" N | 103° 47' 56.317" W |

| Ground Elevation (ft) | Orig KB Elev (ft) | KB-Grd (ft) | Total Depth (All) (ftKB) | Total Depth All (TVD) (ftKB) | PBTD (All) (ftKB) |
|---|---|---|---|---|---|
| 2,931.60 | 2,956.40 | 24.80 | Original Hole - 9,500.0 | | |

| Spud Date | TD Date | Rig Release Date | Completion Start... | Completion End D... | On Production Date | First Sales Date | First Inj Date | First Date CO2 Flo... | Abandon Date |
|---|---|---|---|---|---|---|---|---|---|
| 2/28/1985 | | | | | | | | | 12/12/2015 |

## Cement Fluids

| Fluid | Est Top (ftKB) | Est Btm (ftKB) | Class | Amount (sacks) | Yield (ft³/sack) | Dens (lb/gal) | Vol Pumped (bbl) |
|---|---|---|---|---|---|---|---|
| Mud | | | | | | 13.00 | 24.0 |
| cement | | | | | 1.16 | 13.00 | 8.8 |

## Cement (filtered for Type=Squeeze)

| Description | String | Start Date | End Date | Wellbore | Job | Comment |
|---|---|---|---|---|---|---|
| | | | | | | |

Comment

## Cement Stages

| Stg # | Description | Top (ftKB) | Btm (ftKB) | Pump Start Date | Pump End Date | Q Pump Ini... | Q Pump Fi... | P Pump Fin... | P Held (psi) | P Rel Date |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | |

## Cement Fluids

| Fluid | Fluid Des | Est Top (ftKB) | Est Btm (ftKB) | Amount (sacks) | Vol Pumped (bbl) | Yield (ft³/sack) | Dens (lb/gal) | Com |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |

Denbury

# Casing Summary Schematic
## Cedar Hills 21-22

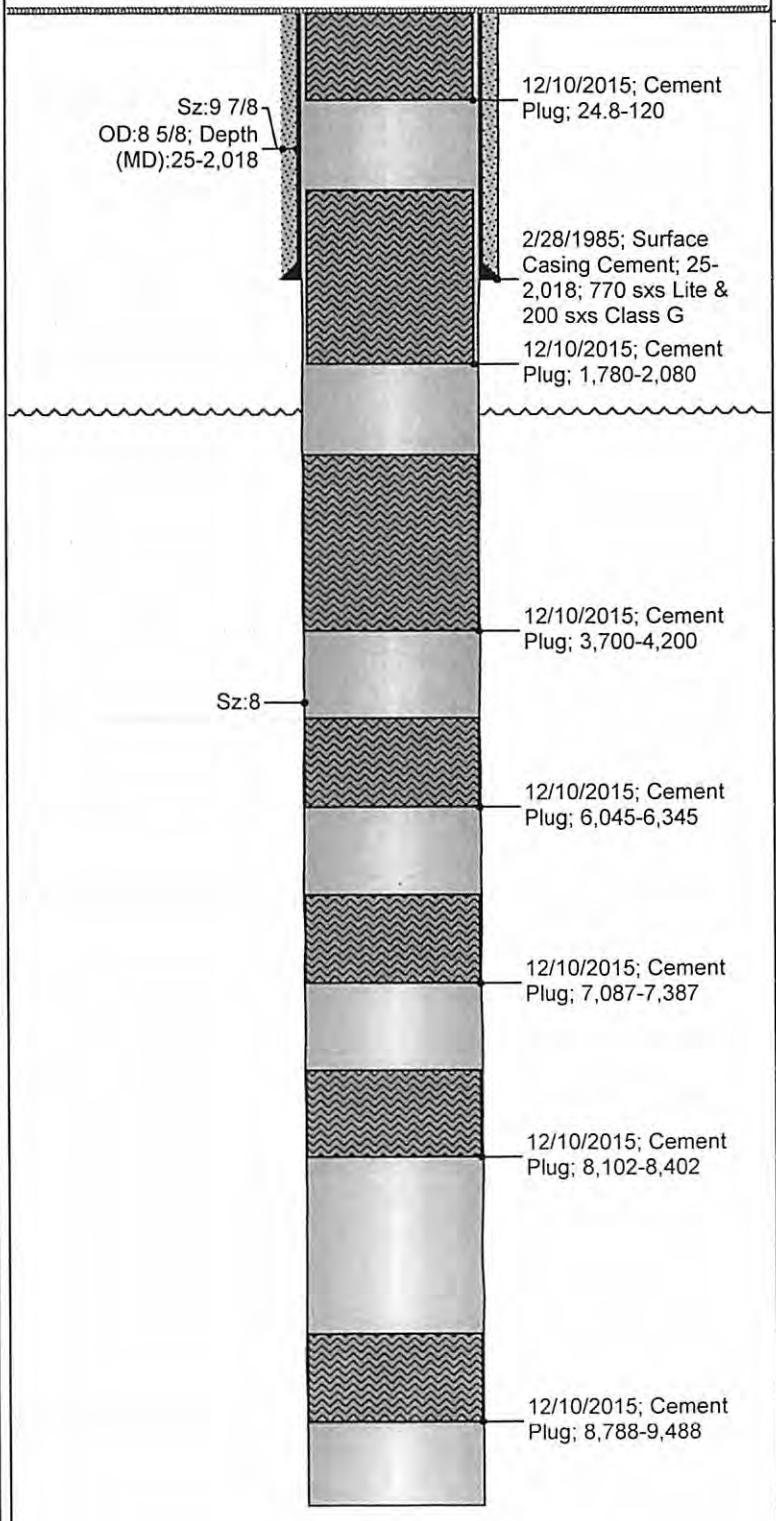
**Surface Legal Location:** 1248 FNL & 1654 FWL

| Field Name | API/UWI | State ID# | Well Status | Well Configuration Type | Assoc.TB/TestSite |
|---|---|---|---|---|---|
| Cedar Hills South | 33011004290000 | 11409 | PER - Permitted | | |

| Gr Elev (ft) | Orig KB Elev (ft) | KB-Grd (ft) | Total Depth (All) (ftKB) | Total Depth All (TVD) (ftKB) | PBTD (All) (ftKB) |
|---|---|---|---|---|---|
| 2,931.60 | 2,956.40 | 24.80 | Original Hole - 9,500.0 | | |

Original Hole, 2/15/2016 3:59:24 PM

Vertical schematic (actual)




**Casing String: Surface, 2,018ftKB**

| Run Date | Set Depth (ft... | Set Depth (TV... | OD (in) | Drift Min (in) | Centralizers | Scratchers |
|---|---|---|---|---|---|---|
| 2/28/1985 | 2,018 | 2,018.0 | 8 5/8 | | | |

| Prop Run? | Centralizer/Scratcher Info |
|---|---|
| | |

| Jts | Item Des | OD (in) | ID (in) | Wt (lb/ft) | Grade | Top (ftKB) | Btm (ftKB) |
|---|---|---|---|---|---|---|---|
| | Casing Joints | 8 5/8 | | | | 25.0 | 2,018.0 |

VES SURVEY INTERNATIONAL

Corpus Christi, Texas 78420
(361) 767-0602 (800) 606-GYRO Fax (361) 767-0612

# *SURVEY COVER LETTER*

**State of North Dakota**

| | |
|---|---|
| **Company Name:** | Denbury Resources |
| **Company Address:** | 5320 Legacy Drive |
| | Plano, TX. |
| | 75024 |

| | | | | | |
|---|---|---|---|---|---|
| **Well Name:** | Cedar Hills 1-22 | | | | |
| **County and State:** | Bowman Co., ND | | | | |
| **Job #:** | 13151802A9 | | | | |
| **Depths:** | 0 | to | 2016 | MD | |
| **Dates:** | 11/29/15 | Thru | 11/30/15 | | |

**These surveys are true to the best of our knowledge.**

Neisha Havelka

**Neisha Havelka**

Regulatory

**Daniel Gobin**

**Service Technician**

**VES Survey International**

**252 24th St. East**

**Dickinson, North Dakota 58601**

**701-483-0674**

Company: Denbury Onshore, LLC
Lease/Well: Cedar Hills/1-22

Rig Name: Trinidad 35
State/County: North Dakota/Bowman
VS-Azi: 0.000 Degrees
Latitude: 46.15888, Longitude: -103.79898
All Azimuths referenced to True North
No Grid Convergence Applied

Depth Reference : RKB=24'

DRILLOG MS GYRO SURVEY CALCULATIONS
Filename: msgyro_run01-01-de_01.ut
Minimum Curvature Method
Report Date/Time: 12/2/2015 / 15:46

VES Survey International
Dickinson, North Dakota
(Office), 701-483-0674
Surveyor: Daniel Gobin
Cedar Hills 1-22 / API 33-011-00429

| Measured Depth FT | Incl Angle Deg | Drift Direction Deg | TVD FT | +N/-S FT | +E/-W FT | Vertical Section FT | Closure Distance FT | Closure Direction Deg | Dogleg Severity Deg/100 |
|---|---|---|---|---|---|---|---|---|---|
| 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | **** |
| 30.000 | 0.112 | 208.869 | 30.000 | -0.026 | -0.014 | -0.026 | 0.029 | 208.869 | 0.373 |
| 98.070 | 0.289 | 153.467 | 98.070 | -0.237 | 0.030 | -0.237 | 0.239 | 172.719 | 0.357 |
| 189.400 | 0.121 | 173.838 | 189.399 | -0.539 | 0.143 | -0.539 | 0.557 | 165.092 | 0.198 |
| 280.730 | 0.158 | 166.465 | 280.729 | -0.757 | 0.183 | -0.757 | 0.779 | 166.390 | 0.046 |
| 372.060 | 0.094 | 327.717 | 372.059 | -0.816 | 0.173 | -0.816 | 0.834 | 168.058 | 0.273 |
| 463.390 | 0.101 | 166.863 | 463.389 | -0.831 | 0.151 | -0.831 | 0.844 | 169.720 | 0.211 |
| 554.720 | 0.221 | 177.569 | 554.718 | -1.085 | 0.176 | -1.085 | 1.100 | 170.763 | 0.135 |
| 646.050 | 0.167 | 30.505 | 646.048 | -1.146 | 0.252 | -1.146 | 1.174 | 167.619 | 0.408 |
| 737.380 | 0.220 | 188.640 | 737.378 | -1.205 | 0.293 | -1.205 | 1.240 | 166.338 | 0.417 |
| 828.710 | 0.171 | 77.245 | 828.707 | -1.349 | 0.400 | -1.349 | 1.407 | 163.487 | 0.356 |
| 920.040 | 0.122 | 140.104 | 920.037 | -1.393 | 0.595 | -1.393 | 1.515 | 156.857 | 0.174 |
| 1011.370 | 0.317 | 187.719 | 1011.367 | -1.718 | 0.624 | -1.718 | 1.828 | 160.047 | 0.276 |
| 1102.700 | 0.510 | 196.907 | 1102.694 | -2.357 | 0.472 | -2.357 | 2.404 | 168.689 | 0.223 |
| 1194.030 | 0.661 | 242.159 | 1194.020 | -2.992 | -0.112 | -2.992 | 2.994 | 182.150 | 0.516 |
| 1285.360 | 0.736 | 199.665 | 1285.344 | -3.791 | -0.775 | -3.791 | 3.869 | 191.561 | 0.560 |
| 1376.690 | 0.400 | 195.997 | 1376.669 | -4.650 | -1.061 | -4.650 | 4.769 | 192.851 | 0.370 |


V.E.S. Survey Date: 11/29/2015

| Measured Depth FT | Incl Angle Deg | Drift Direction Deg | TVD FT | +N/-S FT | +E/-W FT | Vertical Section FT | Closure Distance FT | Closure Direction Deg | Dogleg Severity Deg/100 |
|---|---|---|---|---|---|---|---|---|---|
| 1468.020 | 0.354 | 223.316 | 1467.997 | -5.161 | -1.342 | -5.161 | 5.333 | 194.576 | 0.201 |
| 1559.350 | 0.605 | 174.638 | 1559.324 | -5.847 | -1.490 | -5.847 | 6.034 | 194.302 | 0.500 |
| 1650.680 | 0.638 | 220.006 | 1650.649 | -6.716 | -1.772 | -6.716 | 6.946 | 194.782 | 0.526 |
| 1742.010 | 0.645 | 149.576 | 1741.975 | -7.548 | -1.839 | -7.548 | 7.769 | 193.691 | 0.810 |
| 1833.340 | 0.294 | 145.063 | 1833.302 | -8.183 | -1.445 | -8.183 | 8.310 | 190.012 | 0.386 |
| 1924.670 | 0.157 | 141.828 | 1924.631 | -8.473 | -1.233 | -8.473 | 8.563 | 188.281 | 0.150 |
| 2016.000 | 0.217 | 222.203 | 2015.961 | -8.700 | -1.272 | -8.700 | 8.792 | 188.319 | 0.269 |


V.E.S. Survey Date: 11/29/2015

VES SURVEY INTERNATIONAL

I Daniel Gobin certify that I am employed by VES Survey International. That I did on the day(s) of 11/29/15 through 11/29/15 conduct or supervise the taking of a Rate Gyro survey from a depth of 0.00 feet to a depth of 2,016.00 feet; that the data is true, correct, complete and within the limitations of the tool as set forth by Vaughn Energy Services, that I am authorized and qualified to make this report; that this survey was conducted at the request of Denbury for the Cedar Hills Well # 1-22 API # 33-011-00429 in Bowman County / Parish North Dakota ; and that I have reviewed this report and find that it conforms to the principles and procedures as set forth by Vaughn Energy Services

Daniel Gobin
Service Technician
Vaughn Energy Services

**RYAN DIRECTIONAL SERVICES, INC.**
A NABORS COMPANY

19510 Oil Center Blvd
Houston, TX 77073
Bus 281.443.1414
Fax 281.443.1676

Tuesday, January 26, 2016

State of North Dakota

Subject: **Surveys**

Re: **Denbury Onshore, LLC**
**Cedar Hills 21-22**
**Bowman, ND**
**A.P.I. No: 33-011-00429**

Enclosed, please find the original and one copy of the survey performed on the above-referenced well by Ryan Directional Services, Inc.. Other information required by your office is as follows:

| *Surveyor Name* | *Surveyor Title* | *Borehole Number* | *Start Depth* | *End Depth* | *Start Date* | *End Date* | *Type of* | *TD Straight Line Projection* |
|---|---|---|---|---|---|---|---|---|
| Nick Cevasco | MWD Operator | O.H. | 2016' | 4704' | 11/30/15 | 12/06/15 | MWD | 4767' |

If any other information is required please contact the undersigned at the letterhead address or phone number.

**Annette Meardle**
Technical Support Technician

**RYAN DIRECTIONAL SERVICES, INC.**
A NABORS COMPANY

Ryan Directional Services, Inc.
19510 Oil Center Blvd.
Houston, Texas 77073
Bus: 281.443.1414
Fax: 281.443.1676

Sunday, December 06, 2015

State of North Dakota
County of Bowman

Subject: **Survey Certification Letter**

| | | | |
|---|---|---|---|
| Survey Company: | **Ryan Directional Services, Inc.** | | |
| Job Number: | **9420** | Surface: | **Lat 46.158874 Long -103.798397** |
| Survey Job Type: | **Ryan MWD** | A.P.I. No: | **33-011-00429** |
| Customer: | **Denbury Onshore LLC** | Location: | **Bowman, ND** |
| Well Name: | **Cedar Hills 21-22** | RKB Height: | **25ft** |
| Rig Name: | **Trinidad 35** | Distance to Bit: | **63'** |

| *Surveyor Name* | *Surveyor Title* | *Borehole Number* | *Start Depth* | *End Depth* | *Start Date* | *End Date* | *Type of* | *TD Straight Line Projection* |
|---|---|---|---|---|---|---|---|---|
| Nick Cevasco | MWD Supervisor | OH | 2016' | 4704' | 11/30/15 | 12/06/15 | MWD | 4767' |

The data and calculations for this survey have been checked by me and conform to the calibration standards and operational procedures set forth by Ryan Directional Services, Inc. I am authorized and qualified to review the data, calculations and these reports; the reports represents true and correct Directional Surveys of this well based on the original data, the minimum curvature method, corrected to True North and obtained at the well site.

**Nick Cevasco**
MWD Supervisor
Ryan Directional Services, Inc.

Report #: 1

Date: 6-Dec-15

**RYAN DIRECTIONAL SERVICES, INC.**
A NABORS COMPANY

Ryan Job # 9420

Kit #

## SURVEY REPORT

Customer: **Denbury Onshore LLC**
Well Name & No.: **Cedar Hills 21-22**
County, State: **Bowman, ND**
Rig Contractor & No.: **Trinidad 35**
Surface Location: Y or Lat: **46.158874N**
X or Long **103.798397W**
NAD27 or NAD83: **NAD83**
Survey Corrected To: **True North**

MWD Operator: **Michael Orbach**
RKB: **25**
API Number: **33-011-00429**
Vertical Section Direction: **0.00**

Minimum Curvature Calculation

| Sur # | Meas. Depth | Inc. | Azm. | Course Len. | TVD | Ver.Sect. | +N / -S | +E / -W | DLS | Cls Dir | Cls Azm |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Tie in to Gyro Surveys** | | | | | | | | | | | |
| Tie In | 2016 | 0.22 | 222.20 | 2016.00 | 2015.96 | -8.70 | -8.70 | -1.27 | 0.27 | 8.79 | 188.31 |
| 1 | 2049 | 0.09 | 208.48 | 33.00 | 2048.96 | -8.77 | -8.77 | -1.32 | 0.41 | 8.87 | 188.59 |
| **2** | **2144** | **0.13** | **143.09** | **95.00** | **2143.96** | **-8.92** | **-8.92** | **-1.30** | **0.13** | **9.02** | **188.26** |
| 3 | 2238 | 0.09 | 318.43 | 94.00 | 2237.96 | -8.95 | -8.95 | -1.28 | 0.23 | 9.04 | 188.14 |
| 4 | 2332 | 0.09 | 310.78 | 94.00 | 2331.96 | -8.85 | -8.85 | -1.39 | 0.01 | 8.96 | 188.90 |
| 5 | 2426 | 0.13 | 291.45 | 94.00 | 2425.96 | -8.76 | -8.76 | -1.54 | 0.06 | 8.90 | 189.97 |
| 6 | 2520 | 0.35 | 255.94 | 94.00 | 2519.96 | -8.79 | -8.79 | -1.92 | 0.27 | 9.00 | 192.31 |
| **7** | **2615** | **0.26** | **258.49** | **95.00** | **2614.96** | **-8.91** | **-8.91** | **-2.41** | **0.10** | **9.23** | **195.15** |
| 8 | 2710 | 0.31 | 233.26 | 95.00 | 2709.96 | -9.10 | -9.10 | -2.83 | 0.14 | 9.53 | 197.26 |
| 9 | 2806 | 0.22 | 276.59 | 96.00 | 2805.96 | -9.24 | -9.24 | -3.22 | 0.22 | 9.78 | 199.22 |
| 10 | 2901 | 0.35 | 241.53 | 95.00 | 2900.95 | -9.35 | -9.35 | -3.66 | 0.22 | 10.04 | 201.35 |
| 11 | 2995 | 0.26 | 230.98 | 94.00 | 2994.95 | -9.62 | -9.62 | -4.07 | 0.11 | 10.45 | 202.94 |
| **12** | **3090** | **0.35** | **231.95** | **95.00** | **3089.95** | **-9.94** | **-9.94** | **-4.47** | **0.09** | **10.90** | **204.21** |
| 13 | 3186 | 0.44 | 256.29 | 96.00 | 3185.95 | -10.21 | -10.21 | -5.06 | 0.20 | 11.39 | 206.36 |
| 14 | 3281 | 0.40 | 244.43 | 95.00 | 3280.95 | -10.44 | -10.44 | -5.71 | 0.10 | 11.90 | 208.69 |
| 15 | 3375 | 0.57 | 264.11 | 94.00 | 3374.94 | -10.63 | -10.63 | -6.47 | 0.25 | 12.44 | 211.35 |
| 16 | 3470 | 0.53 | 247.41 | 95.00 | 3469.94 | -10.84 | -10.84 | -7.35 | 0.17 | 13.10 | 214.13 |
| **17** | **3565** | **0.48** | **268.33** | **95.00** | **3564.94** | **-11.02** | **-11.02** | **-8.15** | **0.20** | **13.71** | **216.48** |
| 18 | 3660 | 0.44 | 253.48 | 95.00 | 3659.93 | -11.14 | -11.14 | -8.90 | 0.13 | 14.26 | 218.62 |
| 19 | 3755 | 0.62 | 258.58 | 95.00 | 3754.93 | -11.34 | -11.34 | -9.75 | 0.20 | 14.96 | 220.69 |
| 20 | 3850 | 0.79 | 251.28 | 95.00 | 3849.92 | -11.66 | -11.66 | -10.88 | 0.20 | 15.94 | 223.02 |
| 21 | 3945 | 0.75 | 249.34 | 95.00 | 3944.91 | -12.09 | -12.09 | -12.08 | 0.05 | 17.09 | 224.98 |
| **22** | **4040** | **1.10** | **254.00** | **95.00** | **4039.90** | **-12.56** | **-12.56** | **-13.54** | **0.38** | **18.47** | **227.15** |
| 23 | 4135 | 1.19 | 264.73 | 95.00 | 4134.88 | -12.90 | -12.90 | -15.40 | 0.24 | 20.09 | 230.04 |
| 24 | 4230 | 1.27 | 264.29 | 95.00 | 4229.86 | -13.09 | -13.09 | -17.43 | 0.08 | 21.80 | 233.08 |
| 25 | 4325 | 1.41 | 253.39 | 95.00 | 4324.83 | -13.53 | -13.53 | -19.59 | 0.31 | 23.81 | 235.37 |
| 26 | 4420 | 1.19 | 252.95 | 95.00 | 4419.81 | -14.16 | -14.16 | -21.66 | 0.23 | 25.87 | 236.83 |
| **27** | **4514** | **1.49** | **256.99** | **94.00** | **4513.78** | **-14.72** | **-14.72** | **-23.78** | **0.33** | **27.97** | **238.25** |
| 28 | 4609 | 1.23 | 242.40 | 95.00 | 4608.76 | -15.47 | -15.47 | -25.89 | 0.45 | 30.16 | 239.14 |
| 29 | 4704 | 1.01 | 243.37 | 95.00 | 4703.74 | -16.32 | -16.32 | -27.54 | 0.23 | 32.01 | 239.36 |
| **PTB** | 4767 | 1.01 | 243.37 | 63.00 | 4766.73 | -16.81 | -16.81 | -28.53 | 0.00 | 33.12 | 239.49 |
| | | | | | | | | | | | |

# Denbury Onshore, LLC

# Cedar Hills 21-22

## 1,248' FNL & 1,654' FWL
## Section 22, T131N, R105W
## Cedar Hills Field / Red River Formation
## Bowman County, North Dakota


**Prepared for:**
Allen Kimble
Denbury Onshore, LLC
5320 Legacy Drive
Plano, Texas 75204

**Prepared by:**
Cole Jack, Kyle Eno
PO Box 80507; Billings, MT 59108
(406) 259-4124
geology@sunburstconsulting.com
www.sunburstconsulting.com

# WELL DATA SUMMARY

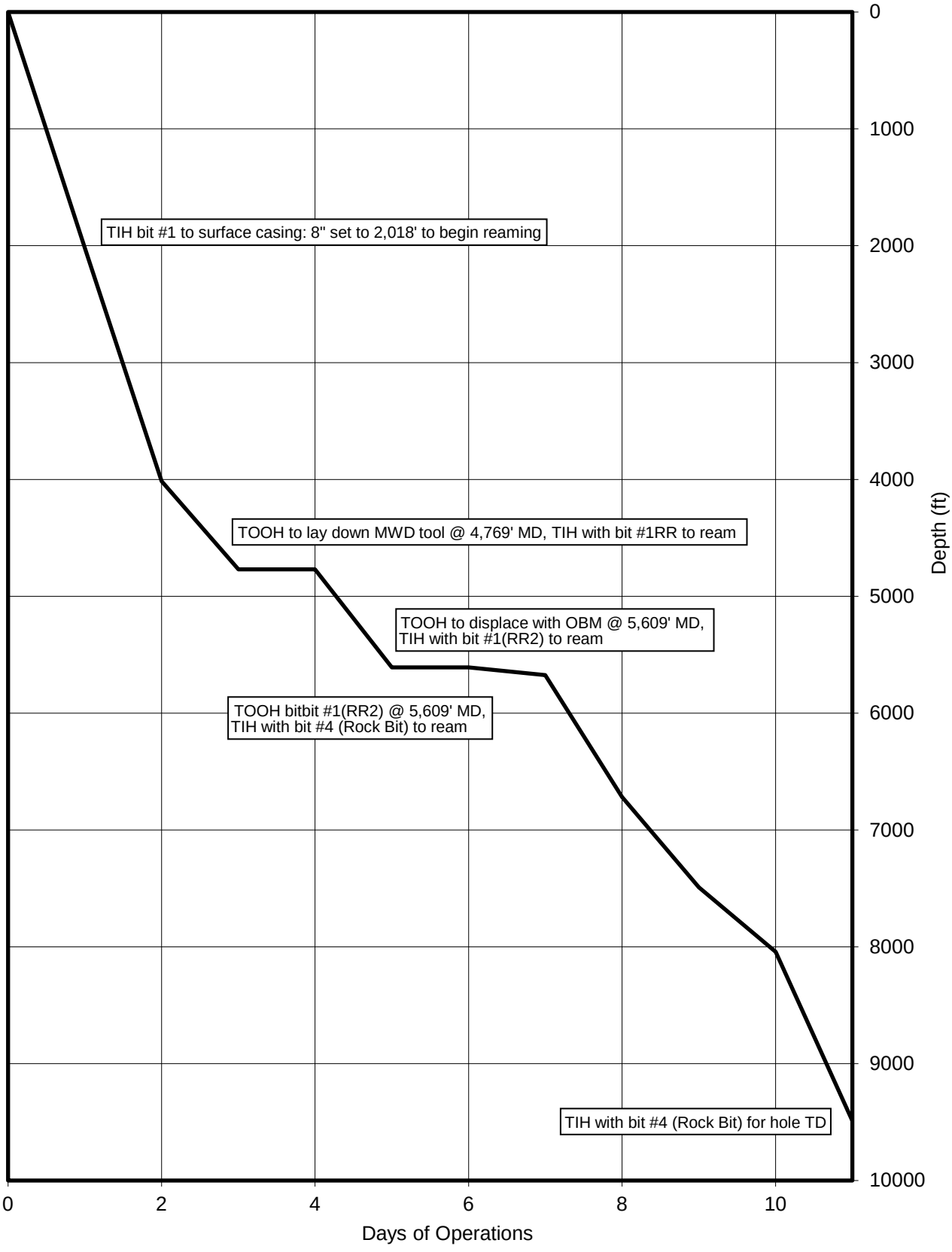
| | |
|---|---|
| **OPERATOR:** | **Denbury Onshore, LLC** |
| **ADDRESS:** | 5320 Legacy Drive<br>Plano, Texas 75204 |
| **WELL NAME:** | **Cedar Hills 21-22** |
| **API #:** | 33-011-00429 |
| **WELL FILE #:** | 11409 |
| **SURFACE LOCATION:** | 1,248' FNL & 1,654' FWL<br>Section 22, T131N, R105W |
| **FIELD/ OBJECTIVE:** | Cedar Hills Field / Red River Formation |
| **COUNTY, STATE** | Bowman County, North Dakota |
| **BASIN:** | Williston |
| **WELL TYPE:** | Red River Vertical Clean-out |
| **ELEVATION:** | GL: 2931.6'<br>KB: 2,956.4' |
| **Re-Entry DATE:** | November 29th, 2015 |
| **CONTRACTOR:** | Trinidad 35 |
| **PUMPS:** | EMSCO FB-1300 (stroke length - 12") |
| **TOOLPUSHERS:** | Michael Hutchinson, Darren Senum |
| **FIELD SUPERVISORS:** | Tod Wisum, William Crane, Will Crane, Bill Long |
| **CHEMICAL COMPANY:** | Newpark Drilling Fluids |
| **MUD ENGINEER:** | Leroy Lange, Jerry Umbdenstock |
| **MUD TYPE:** | Salt water to 5,609'<br>Diesel invert to 9,489' |

| | |
|---|---|
| **MUD LOSSES:** | Salt Water: 232.3 bbls; Oil Based Much: 781.4 bbls |
| **PROSPECT GEOLOGIST:** | Allen Kimble |
| **WELLSITE GEOLOGISTS:** | Cole Jack, Kyle Eno |
| **GEOSTEERING SYSTEM:** | Sunburst Digital Wellsite Geological System |
| **ROCK SAMPLING:** | Based on Company Man discretion |
| **SAMPLE EXAMINATION:** | Binocular microscope & fluoroscope |
| **SAMPLE CUTS:** | Trichloroethylene |
| **GAS DETECTION:** | MSI (Mudlogging Systems, Inc.) TGC - total gas with chromatograph<br>Serial Number(s): ML-055 |
| **ELECTRIC LOGS:** | N/A |
| **DRILL STEM TESTS:** | N/A |
| **DIRECTIONAL DRILLERS:** | Ryan Directional<br>NA |
| **MWD:** | Ryan Directional<br>Micheal Orbach |
| **CASING:** | Surface: 8" 36# J-24 set to 2,018' |
| **SAFETY/ $H_2S$ MONITORING:** | H2S personal meters |

# TIME VS. DEPTH

**Denbury Onshore, LLC**

**Cedar Hills 21-22**



# MORNING REPORT SUMMARY

| Day | Date 2015 | Depth (0500 Hrs) | 24 Hr Footage | Bit # | WOB (Klbs) RT | RPM (RT) | WOB (Klbs) MM | RPM (MM) | PP | SPM 1 | SPM 2 | GPM | 24 Hr Activity Summary | Formation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 11/29 | 1' | - | - | - | - | - | - | - | - | - | - | HPJSM, finish N/U Bop's. PJSM, Test bop's: Test hydril to 250 psi low 3500 psi high, test pipe rams, kill line valves,HCR, 4" manual, & blind rams, Blind rams failed. Change out blind ram blocks. Test blind rams 250 psi low 5000 psi high, pull check valve on kill line & test 250 psi low 5000 psi high, re-install check valve & test 250 psi low 5000 psi high. Test mud lines 4200 psi. Found torn piece of hydril rubber in bops. C/O hydril element. R/D testers & blow down mud lines. N/D flowline, rotating head & pollution pan on hydril & c/o hydril element & seals on cap. R/U testers & Test hydril 250 psi low & 3500 psi high. 5min low, 10 min high. | - |
| 1 | 11/30 | 2,018' | 2017 | 1 | 17 | 50 | - | - | 984 | 67 | 67 | 386 | Finish test Hydril to 3500 psi high.Install wear bushing.Nipple up rotaring head bowl, flex line to flow line, Install mouse holes.Install tarp in front of sub, Pick up tools.M/U bit and TIH picking up BHA.TIH P/U 4" drill pipe. Tag @1240', Break circ, washing with 12K WOB, 60 RPM, 300 GPM, Geting LCM and ground up black rubber back over shakers. Washed f/ 1240' to 1244'.Continue in hole washing with 450 gpm, 50 rpm, 0-10 WOB.f/ 1244' to 1322',Rig service, adjust clamp om kelly hose and turn goose neck. Continue in hole washing with 450 gpm, 50 rpm, 0-12 WOB.f/ 1322' to 1900' Found cement stringers @ 1793', 100% firm cement @ 1850' dress off to 1900'. CBU.Test 8 5/8" csg to 500 psi for 30min. Good Test. Contacted NDIC inspector Nicole & verified good test. Displace hole with 10.2ppg salt mud. Drill cement 1900' to 2018' WOB - 10-12, RPM-60, GPM- 385. CBU. Slip & Cut Drilline.Service Rig. Drop VES Gyro. TOH. | Pierre |
| 2 | 12/1 | 4,015' | 1997 | 1 | 5 | 75 | - | - | 1860 | 67 | 67 | 400 | Lay dn bha. Clean rig floor. P/U 0° bend, 7/8, 6.7 XHR mud motor, MWD, Test MWD, (good test) M/U Bit, NMDC,Filter Sub & X-O. TIH to 1922'. Wash & Ream 2018' to 4015' WOB = 0-5K, RPM=70, GPM= 400, MOTOR RPM=116. Circ 30 minutes every 3 to 6 stands reamed. Average 850 - 1250 units background gas. Service Rig. | Mowry |
| 3 | 12/2 | 4,769' | 754 | 2(1RR) | 5 | 75 | - | - | 1860 | 67 | 67 | 400 | Wash & Ream 4015' to 4769' WOB = 0-5K, RPM=70, GPM= 400, MOTOR RPM=116. Circ 30 minutes every 3 to 6 stands reamed. Average 50 - 100 units background gas. No Cement plug @ 4120' to 4200'.Circ prior to wiper trip.Check flow, well statice, pump slug, POOH. Pulled 1 stand and 4' on the second stand started dragging up to35K over.Circ slug around using as a weighted sweep to help clean hole, adding asphalt to system. No excess cuttings back over shakers.Rig Service.Back ream from 4670' to 3983', POOH on elevators 3983' to surface casing.Circ bottoms up.TIH f/ 2018' to 4160'.Wash and ream f/ 4160' to 4561', hole packed off.Attempt to back reamwith pump, hole packe off, ream without pump 4561' to 4072'. Once above 4160' lost all hole drag and broke circulation, Hole drag prior to above 4160'= 25-40K. Circ bottoms up, Had increase in pea gravel size shale cuttings over shaker.Wash & Ream 4072' to 4597' WOB = 0K, RPM=90, GPM= 400, MOTOR RPM=116. Backream eachstand 1 to 2 times. Attempt to packoff @ 4582' then again @ 4597'. Had increase in pea size & some splintering shale cuttings over shaker. POOH to L/D directional assembly. | Inyan Kara |

# MORNING REPORT SUMMARY

| Day | Date 2015 | Depth (0500 Hrs) | 24 Hr Footage | Bit # | WOB (Klbs) RT | RPM (RT) | WOB (Klbs) MM | RPM (MM) | PP | SPM 1 | SPM 2 | GPM | 24 Hr Activity Summary | Formation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 12/3 | 4,769' | 0 | 2(1RR) | 5 | 75 | - | - | 1564 | 75 | 75 | 400 | POOH & L/D directional assembly.Clean floor for safety.Rig Service.M/U Bit, Bit Sub, TIH with drill collars, P/Udrilling jars, TIH to 4090'. Wash & Ream 4090' to 4747' WOB = 0K, RPM=90, GPM= 400,Backream each stand 1 to2 times. Having sudden increases in pea size & some splintering shale cuttings over shaker as hole tries to packoff. Hole packed off and pipe was stuck with circulation. Set jars and pipe pulled free. TOOH T/ 4090 with very little drag. Wash & Ream F/ 4090' T/ 4659. | Inyan Kara |
| 5 | 12/4 | 5,609' | 840 | 2(1RR) | 5 | 75 | - | - | 1564 | 75 | 75 | 400 | Circ @ 4700' lowering mud weight from 10.2+ to 9.9+.Wash & Ream 4700' to 4857' WOB = 0/5K, RPM=90/100,GPM= 400. Backream each stand 1 to 2 times. Shakers are some what cleaner, Raised mud wt back to 10.2ppg. Rig service. Wash & Ream 4857' to 5609' WOB = 0/5K, RPM=90/100, GPM= 400. Backream each stand 1 to 2times. Shakers are some what cleaner, Raised mud wt back to 10.2 ppg. Service rig. Circulate hole clean to shorttrip. H2S alarm sounded showing 20-100 ppm on the screen. Evacuated rig floor and investigated the alarm and determined that there was a bad sensor on rig floor. Called Triple A safety to come replace sensor. TOOH F/ 5609'T/ 4000'. Had several tight spots on trip out of hole. Reamed through the spots that would not pull trough @ 30Kover. TIH to 4417. Tagged up. Wash and Ream F/ 4417' T/ 4612. Hole started packing off @ 4417 and unloading a lot of shale @ shakers. Decide to TOOH to displace with OBM. | Spearfish |
| 6 | 12/5 | 5,609' | 0 | 3(1RR) | 0-5 | 100 | - | - | 2137 | 75 | 75 | 440 | POOH to change BHA, Swap to OBM.TIH w/ Bit, Bit sub, HWT DP, Dump and clean tanks.Clean Mud Tanks.Cutdrilline.Wait on & P/U jars, HWT DP.FInish clean mud tanks, Fill tanks with OBM, Treat and weight up same to 10.3 ppg. TIH F/ 1881' T/ 4345'. Displace hole with 10.3 OBM and circulate and condition mud. Wash and Ream F/ 4345' T/ 4820'. Np packing off or hole drag. Backream each stand 1 to 2 times. Shakers look a lot cleaner. | Spearfish |
| 7 | 12/6 | 5,674' | 65 | 4 | 0-5 | 100 | - | - | 2178 | 75 | 75 | 437 | Wash and Ream F/ 4820' T/ 5674'. Np packing off or hole drag. Backream each stand 1 to 2 times. Shakers look alot cleaner. Circ prior to Wiper trip. POOH to 4345' no problems, TIH tagged @ 4485'. Wash and Ream F/ 4485' T/4724'. No packing off or hole drag. Backream each stand 1 to 2 times. Shakers have small size cuttings coming back. Service rig. Wash and Ream F/ 4724' T/ 5010'. No packing off or hole drag. Backream each stand 1 to 2 times. Shakers have small size cuttings coming back. Circulate hole clean. TOOH F/ 5010' T/ 4251. Had some dragnot over 30K. TIH F/ 4251' T/ 5010. Had to ream through tight spots @ 4374, 4730, & 4780. Circulate hole clean. TOOH F/ 5010' T/ surface and break off PDC bit. Had more drag than the short trip. Service rig. Wash and Ream F/ 4400' T/ 4500'. No packing off or hole drag. Backream each stand 1 to 2 times. Shakers have small size cuttings coming back. | Spearfish |

# MORNING REPORT SUMMARY

| Day | Date 2015 | Depth (0500 Hrs) | 24 Hr Footage | Bit # | WOB (Klbs) RT | RPM (RT) | WOB (Klbs) MM | RPM (MM) | PP | SPM 1 | SPM 2 | GPM | 24 Hr Activity Summary | Formation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 12/7 | 6,718' | 1044 | 4 | 0-5 | 100 | - | - | 2534 | 75 | 75 | 433 | Wash and Ream F/ 4500' T/ 5825'. Periodicallyl packing off. Backream each stand 1 to 2 times.Very 3 connections circulate 15 minutes. Shakers have small size cuttings coming back. Tagged cement @ 5825'. Drill cement plug F/5825' T/ 5905' for 80'. WOB=15 ROP=40fph. Wash and Ream F/ 5825' T/ 6718'. Backream each stand 1 to 2 times.Very 3 connections circulate 15 minutes. Shakers have small size cuttings coming back. Service rig. | Amsden |
| 9 | 12/8 | 7,491' | 773 | 4 | 0-5 | 100 | - | - | 2441 | 70 | 70 | 411 | Wash and Ream F/ 6718' T/ 7491'. Backream each stand 1 to 2 times.every 3 connections circulate 15 minutes.Shakers have small size cuttings coming back. lost partial returns @ 7402', Pumped 50 bbls of LCM pill, regained full returns.Lost 29 bbls. While reaming @ 7491' lost complete returns. Cement Plug @ 7308' to 7392'. While pumping 100#/bbl LCM pill, Hole packed off with 75 bbls of pill outside of drill pipe, 25 bbls inside.POOH attempting to pull thru packoff, Got returns back @ 5341'. Circ cutting mud wt back to 9.8 ppg. Service rig. Circ cutting mud wt back to 9.8 ppg. Wash and Ream F/ 5341' T/ 6149'. Backream each stand 1 to 2 times.every 3 connections circulate 15 minutes. Shakers have small size cuttings coming back. Well started flowing and gainingmud. Gained 30bbls. Circulate and raise mud weight to 10.2. Gained 30bbls while circulating. Service rig. Wash and Ream F/ 6149' T/ 6434'. Backream each stand 1 to 2 times.every 3 connections circulate 15 minutes. Shakers have small size cuttings coming back. | Mission Canyon |
| 10 | 12/9 | 8,043' | 552 | 4 | 0-5 | 100 | - | - | 2623 | 75 | 75 | 428 | Wash and Ream F/ 6434' T/ 6915'. Backream each stand 1 to 2 times.every 3 connections circulate 15 minutes.Shakers have small size cuttings coming back. Rig service, attempt to stop swivel packing from leaking, held for just a bit then started back leaking.Check flow (well static), Pump slug and POOH f/ 6915' to 4930', Hole started givingmud back, well flowing @ 3-4 bbls hr.Mix and pump 12.0 ppg. kill pill to finish POOH to casing shoe. Check flow(well static).POOH to surface casing, Well taking proper fill, Had spot @ 4565'-4562' & 3510'.Change swivel packing. Pump thru and test same. TIH, Tag spot @ 4773', 5936', Wash thru spots with no resistance. Continue inhole to 6914'. Wash and Ream F/ 6915' T/ 8043'. Backream each stand 1 to 2 times.every 3 connections circulate15 minutes. Shakers have small size cuttings coming back. Pump at a reduced rate 350 GPM through Mission canyon. Full returns and no losses. Service rig. | Lodgepole |
| 11 | 12/10 | 9,489' | 1446 | 4 | 0-5 | 100 | - | - | - | - | - | - | Wash and Ream F/ 8043' T/ 9488'. Backream each stand 1 to 2 times.every 3 connections circulate 15 minutes. Shakers have small size cuttings coming back. Pump at a reduced rate 350 GPM through Mission canyon. Full returns and no losses. Service rig. Circulate hole clean. Drop Gyro @ 9488'. Pump slug and TOOH T/ 4482' checking flow every 2000'. Hole not taking proper fill. Build 100 bbls of 11.5 kill mud. Spot 100 bbls of 11.5 kill mud. TOOH F/ 4482' T/ surface and lay down heavy weight on the way out of hole. Remove Gyro tool @ bit. Service rig. TIH with drill collars and lay down same. | Red River D |

# DAILY MUD SUMMARY

| Date 2015 | Mud Depth | Mud WT (ppg) | VIS (sec/ qt) | PV (cP) | YP (lbs/ 100 $ft^2$) | Gels (lbs/ 100 $ft^2$) | 600/ 300 | NAP/ $H_20$ (ratio) | NAP/ $H_20$ (% by vol) | Cake (API/ HTHP) | Cor. Solids (%) | HPHT Filtrate | POM | pH | Excess Lime (lb/bbl) | $Cl^-$ (mg/L) | LGS/ HGS (%) | CaCl (ppm) | Electrical Stability | Gain/ Loss (bbls) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11/29 | 1,900' | 9.9 | 29 | 2 | 1 | 1/1/1 | 4/3 | - | -/98 | - | - | - | - | 10.5 | - | 168k | -/- | - | - | 0/15.6 |
| 11/30 | 2,809' | 10.1 | 55 | 12 | 13 | 10/18/21 | '6/5 | - | -95.6 | - | 1.6 | - | - | 9.5 | - | 180k | -/- | - | - | 0/24.3 |
| 12/01 | 4,769' | 10.2 | 62 | 12 | 18 | 13/17/22 | 42/30 | - | -/93.8 | - | 3.2 | - | - | 8.5 | - | 169k | - | - | - | 0/26.6 |
| 12/02 | 4,769' | 10.1 | 61 | 11 | 19 | 11/18/23 | 41/30 | - | -/81.5 | - | 3.9 | - | - | 8.5 | - | 158k | - | - | - | 0/104.2 |
| 12/03 | 5,228' | 10.2 | 62 | 18 | 18 | 13/19/25 | 54/36 | - | -/77 | - | 5.1 | - | - | 8.5 | - | 170k | - | - | - | 0/61.6 |
| Change mud from Salt Water Mud to Diesel invert | | | | | | | | | | | | | | | | | | | | |
| 12/04 | 4,612' | 10.2 | 58 | 16 | 14 | 8/11/15 | 46/30 | - | -/79 | 1/- | 4.6 | 7 | - | 8.5 | - | 175k | 4.4/3.1 | - | - | 0/0 |
| 12/05 | 4,891' | 10.45 | 47 | 15 | 8 | 5/6/7 | 38/23 | 72/28 | 63/25 | -/2 | 11 | 14 | 1.8 | - | 2.33 | 50k | 3/8 | 242k | 367 | 0/361.3 |
| 12/06 | 5,835' | 10.5 | 47 | 17 | 7 | 4/5/6 | 35/21 | 75/25 | 65/22 | -/2 | 11.2 | 10 | 2.2 | - | 2.84 | 45k | 2.4/8.8 | 242k | 451 | 0/32.5 |
| 12/07 | 6,912' | 9.95 | 47 | 13 | 4 | 4/5/5 | 38/23 | 67/33 | 59/29 | -/2 | 10.2 | 13 | 2.3 | - | 2.98 | 46k | 2.3/7.9 | 198k | 238 | 0/150.3 |
| 12/08 | 7,066' | 10.35 | 49 | 15 | 8 | 4/5/5 | 38/23 | 67/33 | 59/29 | -/2 | 10.2 | 13 | 2.3 | - | 2.98 | 46k | 2.3/7.9 | 198k | 238 | 0/5 |

# BOTTOM HOLE ASSEMBLY RECORD

| Bit Data | | | | | | | | | | | Motor Data | | | | Reason For Removal |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bit # | Size (in.) | Type | Make | Model | Depth In | Depth Out | Footage | Hours | Σ hrs | Vert. Dev. | Make | Model | Bend | Rev/Gal | |
| 1 | 7 7/8 | PDC | Varel | DT1GJMR | 2,018' | 4,769' | 2,751' | 18.1 | 18.1 | Vertical | Hunting | - | .00° | 0.24 | Hole Sloughing Off |
| 2(1RR) | 7 7/8 | PDC | Varel | DT1GJMR | 4,769' | 5,609' | 840' | 22.1 | 40.2 | Vertical | Hunting | - | .00° | 0.24 | Change to Invert |
| 3(1RR) | 7 7/8 | PDC | Varel | DT1GJMR | 5,609' | 5,674' | 65' | 15.4 | 55.6 | Vertical | Hunting | - | .0° | 0.24 | Tight Hole |
| 4 | 7 7/8 | Rock Bit | Varel | - | 5,674' | 9,489' | 3,815' | 55 | 110.6 | Vertical | Ryan | - | .0° | 0.24 | TD Hole |

# GEOLOGIC MORNING REPORT

SUNBURST CONSULTING
A GEOLOGY SERVICE

**Operator:** Denbury Onshore LLC.
**Well Name:** Cedar Hills 21-22
**Field** Cedar Hills
**Location:** 1248' FNL & 1,654' FWL
Sec. 22, T131N, R105W
Cedar Hills / Red River

**Date:** November 30, 2015
**Report #:** 2

**Rig:** Trinidad 35
**GL elevation:** -
**KB elevation:** 2,955'

**6am Depth:** 2,018'
**Estimated TVD:** 2,018'
**Estimated VS:** 0'
**Previous depth:** 1'
**24 hr. footage:** 2,017'
**Weather:** 30°/11°F; Light Snow, Winds 5-10 MPH

**Planned TD (MD):** 9,500'
**Ft. to plan TD:** 7,482'

**Objective:** Red River D
**Present zone:** Red River D

**Current Activity:** Picking up BHA to ream vertical

**Drilling Parameters:**

| WOB (klbs) RT: | RPM (RT): | WOB(klbs) MM: | RPM (MM): | PP (psi): | SPM 1: | SPM 2: | GPM: |
|---|---|---|---|---|---|---|---|
| 18 | 50 | - | 93 | 983 | 67 | 67 | 386 |

**BHA:**

| Bit #: | Diameter (in): | Make: | Model: | Serial #: | Depth in: | Footage: | Hours: |
|---|---|---|---|---|---|---|---|
| 1 | 8 3/4 | Varel | DT1GJMR | 14441919 | 2,018' | 0' | - |
| **Motor (make):** | **Motor (model):** | **Motor (bend):** | **Motor (rev/gal):** | **Gamma to bit (ft):** | | **Survey to bit (ft):** | |
| Hunting | - | .0° | 0.24 | - | | 60' | |

**Mud Data:**

| Wt (ppg): | Vis (sec/qt): | Depth of Data: | Mud Type: | 24-hr mud losses (bbls): | Cumulative mud losses (bbls): | |
|---|---|---|---|---|---|---|
| 9.9 | 29 | 1,900' | Saltwater/ Brine | 15.6 | 15.6 | |
| **Hydrostatic Pressure (psi):** | | **Casing Back Pressure (psi)** | | **Gas buster status** | **Lag (min/strokes):** | |
| 1039 | | - | | off | 7min | 915 strokes |

**Gas:**

| Gas Show (units/depth): | | Gas Show (units/depth): | | Gas Show (units/depth): | | Gas Show (units/depth): | |
|---|---|---|---|---|---|---|---|
| 10,177u | 1,650' | 5,015u | 1,689' | - | - | - | - |
| **Background gas (max):** | | **Background gas (min):** | | **Background gas (avg):** | | **Connection gas (max/min):** | |
| 100u | | 5u | | 55u | | - | - |
| **Trip gas:** | | **Down-Time Gas (units/depth):** | | **Flare:** | | **Gas Buster** | |
| 56u | | - | - | None | | Off | |

**Sample Description:**

| Sample quality: | Oil stain: | Porosity: | Cut: |
|---|---|---|---|
| - | - | - | - |

**Present Activity Summary:** Picking up BHA to ream vertical

**Comments:** *Sunburst rigged up on location 11/28/2015*

**Contact:**

| | | |
|---|---|---|
| Cole Jack | 320-290-9671 | 5am-5pm |
| Kyle Eno | 231-445-0555 | 5pm-5am |
| Geology rig phone: | - | |

# GEOLOGIC MORNING REPORT

SUNBURST CONSULTING
A GEOLOGY SERVICE

**Operator:** Denbury Onshore LLC.
**Well Name:** Cedar Hills 21-22
**Field** Cedar Hills
**Location:** 1248' FNL & 1,654' FWL
Sec. 22, T131N, R105W
Cedar Hills / Red River

**Date:** December 1, 2015
**Report #:** 3

**Rig:** Trinidad 35
**GL elevation:** -
**KB elevation:** 2,955'

**6am Depth:** 4,769'
**Estimated TVD:** 4,768'
**Estimated VS:** -12'
**Previous depth:** 4,007'
**24 hr. footage:** 762'
**Weather:** 30°/11°F; Light Snow, Winds 5-10 MPH

**Planned TD (MD):** 9,500'
**Ft. to plan TD:** 4,731'

**Objective:** Red River D
**Present zone:** Red River D

**Current Activity:** TOOH to lay down MWD tool

**Drilling Parameters:**

| WOB (klbs) RT: | RPM (RT): | WOB(klbs) MM: | RPM (MM): | PP (psi): | SPM 1: | SPM 2: | GPM: |
|---|---|---|---|---|---|---|---|
| 5 | 75 | - | - | 1700 | 67 | 70 | 400 |

**BHA:**

| Bit #: | Diameter (in): | Make: | Model: | Serial #: | Depth in: | Footage: | Hours: |
|---|---|---|---|---|---|---|---|
| 1 | 8 3/4 | Varel | DT1GJMR | 14441919 | 2,018' | 2,751' | - |
| **Motor (make):** | **Motor (model):** | **Motor (bend):** | **Motor (rev/gal):** | **Gamma to bit (ft):** | | **Survey to bit (ft):** | |
| Hunting | - | .0° | 0.24 | - | | 60' | |

**Mud Data:**

| Wt (ppg): | Vis (sec/qt): | Depth of Data: | Mud Type: | 24-hr mud losses (bbls): | Cumulative mud losses (bbls): | |
|---|---|---|---|---|---|---|
| 10.2 | 62 | 4,769' | Saltwater/ Brine | 26.6 | 66.5 | |
| **Hydrostatic Pressure (psi):** | | **Casing Back Pressure (psi)** | | **Gas buster status** | **Lag (min/strokes):** | |
| 2529 | | - | | on | 15min | 2,094 strokes |

**Gas:**

| Gas Show (units/depth): | | Gas Show (units/depth): | | Gas Show (units/depth): | | Gas Show (units/depth): | |
|---|---|---|---|---|---|---|---|
| 444u | 4,200' | 431u | 4,100' | 329u | 4,270u | - | - |
| **Background gas (max):** | | **Background gas (min):** | | **Background gas (avg):** | | **Connection gas (max/min):** | |
| 400u | | 50u | | 250u | | - | - |
| **Trip gas:** | | **Down-Time Gas (units/depth):** | | **Flare:** | | **Gas Buster** | |
| - | | - | - | None | | On | |

**Sample Description:** 4280 - 4300 SHALE: black- dark gray, firm-hard, sub-blocky, earthy-smooth; SANDSTONE: light gray, fine grained, firm-hard, angular, moderately sorted, calcareous cement, moderately cemented; common cement

| Sample quality: | Oil stain: | Porosity: | Cut: |
|---|---|---|---|
| good | - | - | - |

**Present Activity Summary:** TOOH to lay down MWD tool

**Comments:** *Sunburst rigged up on location 11/28/2015*

**Contact:**

| | | |
|---|---|---|
| Cole Jack | 320-290-9671 | 5am-5pm |
| Kyle Eno | 231-445-0555 | 5pm-5am |
| Geology rig phone: | - | |

# GEOLOGIC MORNING REPORT

SUNBURST CONSULTING
A GEOLOGY SERVICE

**Operator:** Denbury Onshore LLC.
**Well Name:** Cedar Hills 21-22
**Field** Cedar Hills
**Location:** 1248' FNL & 1,654' FWL
Sec. 22, T131N, R105W
Cedar Hills / Red River

**Date:** December 2, 2015
**Report #:** 4

**Rig:** Trinidad 35
**GL elevation:** -
**KB elevation:** 2,955'

**6am Depth:** 4,769'
**Estimated TVD:** 4,768'
**Estimated VS:** -12'
**Previous depth:** 4,007'
**24 hr. footage:** 762'
**Weather:** 30°/11°F; Light Snow, Winds 5-10 MPH

**Planned TD (MD):** 9,500'
**Ft. to plan TD:** 4,731'

**Objective:** Red River D
**Present zone:** Red River D

**Current Activity:** TOOH to lay down MWD tool

**Drilling Parameters:**

| WOB (klbs) RT: | RPM (RT): | WOB(klbs) MM: | RPM (MM): | PP (psi): | SPM 1: | SPM 2: | GPM: |
|---|---|---|---|---|---|---|---|
| 5 | 75 | - | - | 1700 | 67 | 70 | 400 |

**BHA:**

| Bit #: | Diameter (in): | Make: | Model: | Serial #: | Depth in: | Footage: | Hours: |
|---|---|---|---|---|---|---|---|
| 1 | 8 3/4 | Varel | DT1GJMR | 14441919 | 2,018' | 2,751' | - |
| **Motor (make):** | **Motor (model):** | **Motor (bend):** | **Motor (rev/gal):** | **Gamma to bit (ft):** | | **Survey to bit (ft):** | |
| Hunting | - | .0° | 0.24 | - | | 60' | |

**Mud Data:**

| Wt (ppg): | Vis (sec/qt): | Depth of Data: | Mud Type: | 24-hr mud losses (bbls): | Cumulative mud losses (bbls): | |
|---|---|---|---|---|---|---|
| 10.2 | 62 | 4,769' | Saltwater/ Brine | 26.6 | 66.5 | |
| **Hydrostatic Pressure (psi):** | | **Casing Back Pressure (psi)** | | **Gas buster status** | **Lag (min/strokes):** | |
| 2529 | | - | | on | 15min | 2,094 strokes |

**Gas:**

| Gas Show (units/depth): | | Gas Show (units/depth): | | Gas Show (units/depth): | | Gas Show (units/depth): | |
|---|---|---|---|---|---|---|---|
| 444u | 4,200' | 431u | 4,100' | 329u | 4,270u | - | - |
| **Background gas (max):** | | **Background gas (min):** | | **Background gas (avg):** | | **Connection gas (max/min):** | |
| 400u | | 50u | | 250u | | - | - |
| **Trip gas:** | | **Down-Time Gas (units/depth):** | | **Flare:** | | **Gas Buster** | |
| - | | - | - | None | | On | |

**Sample Description:** 4280 - 4300 SHALE: black- dark gray, firm-hard, sub-blocky, earthy-smooth; SANDSTONE: light gray, fine grained, firm-hard, angular, moderately sorted, calcareous cement, moderately cemented; common cement

| Sample quality: | Oil stain: | Porosity: | Cut: |
|---|---|---|---|
| good | - | - | - |

**Present Activity Summary:** TOOH to lay down MWD tool

**Comments:** *Sunburst rigged up on location 11/28/2015*

**Contact:**

| | | |
|---|---|---|
| Cole Jack | 320-290-9671 | 5am-5pm |
| Kyle Eno | 231-445-0555 | 5pm-5am |
| Geology rig phone: | - | |

# GEOLOGIC MORNING REPORT

SUNBURST CONSULTING
A GEOLOGY SERVICE

**Operator:** Denbury Onshore LLC.
**Well Name:** Cedar Hills 21-22
**Field** Cedar Hills
**Location:** 1248' FNL & 1,654' FWL
Sec. 22, T131N, R105W
Cedar Hills / Red River

**Date:** December 3, 2015
**Report #:** 5

**Rig:** Trinidad 35
**GL elevation:** -
**KB elevation:** 2,955'

**6am Depth:** 4,685'
**Estimated TVD:** 4,684'
**Estimated VS:** -11'
**Previous depth:** 4,769'
**24 hr. footage:** -84'
**Weather:** 42°/26°F; Sunny, Winds 5-10 MPH

**Planned TD (MD):** 9,500'
**Ft. to plan TD:** 4,815'

**Objective:** Red River D
**Present zone:** Red River D

**Current Activity:** Washing & Reaming to Bottom

**Drilling Parameters:**

| WOB (klbs) RT: | RPM (RT): | WOB(klbs) MM: | RPM (MM): | PP (psi): | SPM 1: | SPM 2: | GPM: |
|---|---|---|---|---|---|---|---|
| 5 | 100 | - | - | 1600 | 75 | 75 | 400 |

**BHA:**

| Bit #: | Diameter (in): | Make: | Model: | Serial #: | Depth in: | Footage: | Hours: |
|---|---|---|---|---|---|---|---|
| 1 | 8 3/4 | Varel | DT1GJMR | 14441919 | 2,018' | 2,667' | - |
| **Motor (make):** | **Motor (model):** | **Motor (bend):** | **Motor (rev/gal):** | **Gamma to bit (ft):** | | **Survey to bit (ft):** | |
| Hunting | - | .0° | 0.24 | - | | 60' | |

**Mud Data:**

| Wt (ppg): | Vis (sec/qt): | Depth of Data: | Mud Type: | 24-hr mud losses (bbls): | Cumulative mud losses (bbls): | |
|---|---|---|---|---|---|---|
| 10.2 | 62 | 4,341' | Saltwater/ Brine | 26.6 | 66.5 | |
| **Hydrostatic Pressure (psi):** | | **Casing Back Pressure (psi)** | | **Gas buster status** | **Lag (min/strokes):** | |
| 2484 | | - | | on | 14min | 1,969 strokes |

**Gas:**

| Gas Show (units/depth): | | Gas Show (units/depth): | | Gas Show (units/depth): | | Gas Show (units/depth): | |
|---|---|---|---|---|---|---|---|
| 470u | 4,200' | 265u | 4,425' | - | - | - | - |
| **Background gas (max):** | | **Background gas (min):** | | **Background gas (avg):** | | **Connection gas (max/min):** | |
| 200u | | 100u | | 150u | | - | - |
| **Trip gas:** | | **Down-Time Gas (units/depth):** | | **Flare:** | | **Gas Buster** | |
| 470u | | - | - | None | | On | |

**Sample Description:** 4280 - 4300 SHALE: black- dark gray, firm-hard, sub-blocky, earthy-smooth; SANDSTONE: light gray, fine grained, firm-hard, angular, moderately sorted, calcareous cement, moderately cemented; common cement

| Sample quality: | Oil stain: | Porosity: | Cut: |
|---|---|---|---|
| good | - | - | - |

**Present Activity Summary:** Washing & Reaming to Bottom

**Comments:** *Encountered tight hole at 4,160' to bottom, TOOH to lay down MWD tool, TIH to wash & ream to bottom*

**Contact:**

| | | |
|---|---|---|
| Cole Jack | 320-290-9671 | 5am-5pm |
| Kyle Eno | 231-445-0555 | 5pm-5am |
| Geology rig phone: | - | |

# GEOLOGIC MORNING REPORT

SUNBURST CONSULTING
A GEOLOGY SERVICE

**Operator:** Denbury Onshore LLC.
**Well Name:** Cedar Hills 21-22
**Field** Cedar Hills
**Location:** 1248' FNL & 1,654' FWL
Sec. 22, T131N, R105W
Cedar Hills / Red River

**Date:** December 4, 2015
**Report #:** 6

**Rig:** Trinidad 35
**GL elevation:** 2,932'
**KB elevation:** 2,956'

**6am Depth:** 5,609'
**Estimated TVD:** 5,609'
**Estimated VS:** -11'
**Previous depth:** 4,684'
**24 hr. footage:** 925'
**Weather:** 45°/26°F; Sunny, Winds 15-23 MPH

**Planned TD (MD):** 9,500'
**Ft. to plan TD:** 3,891'

**Objective:** Red River D
**Present zone:** Red River D

**Current Activity:** Circulating bottoms up to TOOH; Swap over to Invert

**Drilling Parameters:**

| WOB (klbs) RT: | RPM (RT): | WOB(klbs) MM: | RPM (MM): | PP (psi): | SPM 1: | SPM 2: | GPM: |
|---|---|---|---|---|---|---|---|
| 5 | 80 | - | - | 1750 | 75 | 75 | 529 |

**BHA:**

| Bit #: | Diameter (in): | Make: | Model: | Serial #: | Depth in: | Footage: | Hours: |
|---|---|---|---|---|---|---|---|
| 1 | 8 3/4 | Varel | DT1GJMR | 14441919 | 2,018' | 3,591' | - |
| **Motor (make):** | **Motor (model):** | **Motor (bend):** | **Motor (rev/gal):** | **Gamma to bit (ft):** | | **Survey to bit (ft):** | |
| Hunting | - | .0° | 0.24 | - | | 60' | |

**Mud Data:**

| Wt (ppg): | Vis (sec/qt): | Depth of Data: | Mud Type: | 24-hr mud losses (bbls): | Cumulative mud losses (bbls): | |
|---|---|---|---|---|---|---|
| 10.2 | 62 | 5,228' | Saltwater/ Brine | 19 | 85 | |
| **Hydrostatic Pressure (psi):** | | **Casing Back Pressure (psi)** | | **Gas buster status** | **Lag (min/strokes):** | |
| 2975 | | - | | on | 14min | 1,969 strokes |

**Gas:**

| Gas Show (units/depth): | | Gas Show (units/depth): | | Gas Show (units/depth): | | Gas Show (units/depth): | |
|---|---|---|---|---|---|---|---|
| 120u | 5,196' | 123u | 5,379' | 133u | 5,594u | - | - |
| **Background gas (max):** | | **Background gas (min):** | | **Background gas (avg):** | | **Connection gas (max/min):** | |
| 120u | | 90u | | 105u | | - | - |
| **Trip gas:** | | **Down-Time Gas (units/depth):** | | **Flare:** | | **Gas Buster** | |
| - | | - | - | None | | On | |

**Sample Description:** 4280 - 4300 SHALE: black- dark gray, firm-hard, sub-blocky, earthy-smooth; SANDSTONE: light gray, fine grained, firm-hard, angular, moderately sorted, calcareous cement, moderately cemented; common cement

| Sample quality: | Oil stain: | Porosity: | Cut: |
|---|---|---|---|
| good | - | - | - |

**Present Activity Summary:** Circulating bottoms up to TOOH; Swap over to Invert

**Comments:** *Made it to 5,609' MD, wiper trip back to 4,000', wash & ream the tight spots back to bottom*

**Contact:**

| | | |
|---|---|---|
| Cole Jack | 320-290-9671 | 5am-5pm |
| Kyle Eno | 231-445-0555 | 5pm-5am |
| Geology rig phone: | - | |

# GEOLOGIC MORNING REPORT

SUNBURST CONSULTING
A GEOLOGY SERVICE

**Operator:** Denbury Onshore LLC.
**Well Name:** Cedar Hills 21-22
**Field** Cedar Hills
**Location:** 1248' FNL & 1,654' FWL
Sec. 22, T131N, R105W
Cedar Hills / Red River

**Date:** December 5, 2015
**Report #:** 7

**Rig:** Trinidad 35
**GL elevation:** 2,932'
**KB elevation:** 2,956'

**6am Depth:** 4,807'
**Estimated TVD:** 4,806'
**Estimated VS:** -11'
**Previous depth:** 5,609'
**24 hr. footage:** -802'
**Weather:** 45°/26°F; Sunny, Winds 15-23 MPH

**Planned TD (MD):** 9,500'
**Ft. to plan TD:** 4,693'

**Objective:** Red River D
**Present zone:** Red River D

**Current Activity:** Wash & Ream to Bottom

**Drilling Parameters:**

| WOB (klbs) RT: | RPM (RT): | WOB(klbs) MM: | RPM (MM): | PP (psi): | SPM 1: | SPM 2: | GPM: |
|---|---|---|---|---|---|---|---|
| 5 | 100 | - | - | 2100 | 75 | 75 | 529 |

**BHA:**

| Bit #: | Diameter (in): | Make: | Model: | Serial #: | Depth in: | Footage: | Hours: |
|---|---|---|---|---|---|---|---|
| 1RR#2 | 8 3/4 | Varel | DT1GJMR | 14441919 | 2,018' | 2,789' | - |
| **Motor (make):** | **Motor (model):** | **Motor (bend):** | **Motor (rev/gal):** | **Gamma to bit (ft):** | | **Survey to bit (ft):** | |
| Hunting | - | .0° | 0.24 | - | | 60' | |

**Mud Data:**

| Wt (ppg): | Vis (sec/qt): | Depth of Data: | Mud Type: | 24-hr mud losses (bbls): | Cumulative mud losses (bbls): | |
|---|---|---|---|---|---|---|
| 10.2 | 58 | 4,612' | Invert | 19 | 85 | |
| **Hydrostatic Pressure (psi):** | | **Casing Back Pressure (psi)** | | **Gas buster status** | **Lag (min/strokes):** | |
| 2549 | | - | | on | 14min | 1,969 strokes |

**Gas:**

| Gas Show (units/depth): | | Gas Show (units/depth): | | Gas Show (units/depth): | Gas Show (units/depth): | |
|---|---|---|---|---|---|---|
| | | | | | - | - |
| **Background gas (max):** | | **Background gas (min):** | | **Background gas (avg):** | **Connection gas (max/min):** | |
| 35u | | 20u | | 25u | - | - |
| **Trip gas:** | | **Down-Time Gas (units/depth):** | | **Flare:** | **Gas Buster** | |
| 156u | | - | - | None | No | |

**Sample Description:** 4280 - 4300 SHALE: black- dark gray, firm-hard, sub-blocky, earthy-smooth; SANDSTONE: light gray, fine grained, firm-hard, angular, moderately sorted, calcareous cement, moderately cemented; common cement

| Sample quality: | Oil stain: | Porosity: | Cut: |
|---|---|---|---|
| good | - | - | - |

**Present Activity Summary:** Wash & Ream to Bottom

**Comments:** *Switched to invert mud from salt water, TIH and wash & ream to bottom, work tight spots*

**Contact:**

| | | |
|---|---|---|
| Cole Jack | 320-290-9671 | 5am-5pm |
| Kyle Eno | 231-445-0555 | 5pm-5am |
| Geology rig phone: | - | |

# GEOLOGIC MORNING REPORT

SUNBURST CONSULTING
A GEOLOGY SERVICE

**Operator:** Denbury Onshore LLC.
**Well Name:** Cedar Hills 21-22
**Field** Cedar Hills
**Location:** 1248' FNL & 1,654' FWL
Sec. 22, T131N, R105W
Cedar Hills / Red River

**Date:** December 6, 2015
**Report #:** 8

**Rig:** Trinidad 35
**GL elevation:** 2,932'
**KB elevation:** 2,956'

**6am Depth:** 4,550'
**Estimated TVD:** 4,549'
**Estimated VS:** -11'
**Previous depth:** 5,674'
**24 hr. footage:** -1,124'
**Weather:** 48°/26°F; Sunny, Winds 15-23 MPH

**Planned TD (MD):** 9,500'
**Ft. to plan TD:** 4,950'

**Objective:** Red River D
**Present zone:** Red River D

**Current Activity:** Wash & Ream to Bottom

**Drilling Parameters:**

| WOB (klbs) RT: | RPM (RT): | WOB(klbs) MM: | RPM (MM): | PP (psi): | SPM 1: | SPM 2: | GPM: |
|---|---|---|---|---|---|---|---|
| 5 | 100 | - | - | 2100 | 75 | 75 | 529 |

**BHA:**

| Bit #: | Diameter (in): | Make: | Model: | Serial #: | Depth in: | Footage: | Hours: |
|---|---|---|---|---|---|---|---|
| 4 | 8 3/4 | - | - | - | 5,674' | -1,124' | - |
| **Motor (make):** | **Motor (model):** | **Motor (bend):** | **Motor (rev/gal):** | **Gamma to bit (ft):** | | **Survey to bit (ft):** | |
| Hunting | - | .0° | 0.24 | - | | - | |

**Mud Data:**

| Wt (ppg): | Vis (sec/qt): | Depth of Data: | Mud Type: | 24-hr mud losses (bbls): | Cumulative mud losses (bbls): | |
|---|---|---|---|---|---|---|
| 10.45 | 47 | 4,891' | Invert | 361.3 | 593.6 | |
| **Hydrostatic Pressure (psi):** | | **Casing Back Pressure (psi)** | | **Gas buster status** | **Lag (min/strokes):** | |
| 2472 | | - | | on | 13min | 2,000 strokes |

**Gas:**

| Gas Show (units/depth): | | Gas Show (units/depth): | | Gas Show (units/depth): | | Gas Show (units/depth): | |
|---|---|---|---|---|---|---|---|
| 94u | 4,416' | | | | | - | - |
| **Background gas (max):** | | **Background gas (min):** | | **Background gas (avg):** | | **Connection gas (max/min):** | |
| 35u | | 20u | | 25u | | - | - |
| **Trip gas:** | | **Down-Time Gas (units/depth):** | | **Flare:** | | **Gas Buster** | |
| 58u | | - | - | None | | No | |

**Sample Description:** 4280 - 4300 SHALE: black- dark gray, firm-hard, sub-blocky, earthy-smooth; SANDSTONE: light gray, fine grained, firm-hard, angular, moderately sorted, calcareous cement, moderately cemented; common cement

| Sample quality: | Oil stain: | Porosity: | Cut: |
|---|---|---|---|
| good | - | - | - |

**Present Activity Summary:** Wash & Ream to Bottom

**Comments:** *Reached 5,010' MD, tripped out for a tri-cone bit, TIH, wash & ream to bottom*

**Contact:**

| | | |
|---|---|---|
| Cole Jack | 320-290-9671 | 5am-5pm |
| Kyle Eno | 231-445-0555 | 5pm-5am |
| Geology rig phone: | - | |

# GEOLOGIC MORNING REPORT

SUNBURST CONSULTING
A GEOLOGY SERVICE

**Operator:** Denbury Onshore LLC.
**Well Name:** Cedar Hills 21-22
**Field** Cedar Hills
**Location:** 1248' FNL & 1,654' FWL
Sec. 22, T131N, R105W
Cedar Hills / Red River

**Date:** December 7, 2015
**Report #:** 9

**Rig:** Trinidad 35
**GL elevation:** 2,932'
**KB elevation:** 2,956'

**6am Depth:** 6,785'
**Estimated TVD:** 6,784'
**Estimated VS:** -12'
**Previous depth:** 5,674'
**24 hr. footage:** 1,111'
**Weather:** 50°/35°F; Sunny, Winds 15-23 MPH

**Planned TD (MD):** 9,500'
**Ft. to plan TD:** 2,715'

**Objective:** Red River D
**Present zone:** Red River D

**Current Activity:** Wash & Ream to Bottom

**Drilling Parameters:**

| WOB (klbs) RT: | RPM (RT): | WOB(klbs) MM: | RPM (MM): | PP (psi): | SPM 1: | SPM 2: | GPM: |
|---|---|---|---|---|---|---|---|
| 5 | 100 | - | - | 2500 | 75 | 75 | 529 |

**BHA:**

| Bit #: | Diameter (in): | Make: | Model: | Serial #: | Depth in: | Footage: | Hours: |
|---|---|---|---|---|---|---|---|
| 4 | 8 3/4 | - | - | - | 5,674' | 1,111' | - |
| **Motor (make):** | **Motor (model):** | **Motor (bend):** | **Motor (rev/gal):** | **Gamma to bit (ft):** | | **Survey to bit (ft):** | |
| Hunting | - | .0° | 0.24 | - | | - | |

**Mud Data:**

| Wt (ppg): | Vis (sec/qt): | Depth of Data: | Mud Type: | 24-hr mud losses (bbls): | Cumulative mud losses (bbls): | |
|---|---|---|---|---|---|---|
| 10.5 | 47 | 5,835' | Invert | 32.5 | 626.1 | |
| **Hydrostatic Pressure (psi):** | | **Casing Back Pressure (psi)** | | **Gas buster status** | **Lag (min/strokes):** | |
| 3704 | | - | | on | 20min | 2,964 strokes |

**Gas:**

| Gas Show (units/depth): | | Gas Show (units/depth): | | Gas Show (units/depth): | Gas Show (units/depth): | |
|---|---|---|---|---|---|---|
| 65u | 6,170' | | | | - | - |
| **Background gas (max):** | | **Background gas (min):** | | **Background gas (avg):** | **Connection gas (max/min):** | |
| 55u | | 50u | | 52u | - | - |
| **Trip gas:** | | **Down-Time Gas (units/depth):** | | **Flare:** | **Gas Buster** | |
| - | | - | - | None | No | |

**Sample Description:** 6400 - 6430 SHALE: light-medium gray,fri-frm, sub-blocky, laminated in part, earthy texture, carbonaceous; LIMESTONE: gray-black,argillaceous in part, frm, microcrystalline, anhydritic in part

| Sample quality: | Oil stain: | Porosity: | Cut: |
|---|---|---|---|
| good | - | - | - |

**Present Activity Summary:** Wash & Ream to Bottom

**Comments:** *Drilled through plug at 5,825' MD, maximum cement seen was ~40%*

**Contact:**

| | | |
|---|---|---|
| Cole Jack | 320-290-9671 | 5am-5pm |
| Kyle Eno | 231-445-0555 | 5pm-5am |
| Geology rig phone: | - | |

# GEOLOGIC MORNING REPORT

SUNBURST CONSULTING
A GEOLOGY SERVICE

**Operator:** Denbury Onshore LLC.
**Well Name:** Cedar Hills 21-22
**Field** Cedar Hills
**Location:** 1248' FNL & 1,654' FWL
Sec. 22, T131N, R105W
Cedar Hills / Red River

**Date:** December 8, 2015
**Report #:** 10

**Rig:** Trinidad 35
**GL elevation:** 2,932'
**KB elevation:** 2,956'

**6am Depth:** 7,492'
**Estimated TVD:** 7,491'
**Estimated VS:** -12'
**Previous depth:** 5,674'
**24 hr. footage:** 1,818'
**Weather:** 53°/32°F; Sunny, Winds 15-23 MPH

**Planned TD (MD):** 9,500'
**Ft. to plan TD:** 2,008'

**Objective:** Red River D
**Present zone:** Red River D

**Current Activity:** Wash & Ream to Bottom

**Drilling Parameters:**

| WOB (klbs) RT: | RPM (RT): | WOB(klbs) MM: | RPM (MM): | PP (psi): | SPM 1: | SPM 2: | GPM: |
|---|---|---|---|---|---|---|---|
| 5 | 100 | - | - | 2500 | 75 | 75 | 529 |

**BHA:**

| Bit #: | Diameter (in): | Make: | Model: | Serial #: | Depth in: | Footage: | Hours: |
|---|---|---|---|---|---|---|---|
| 4 | 8 3/4 | - | - | - | 5,674' | 1,818' | - |
| **Motor (make):** | **Motor (model):** | **Motor (bend):** | **Motor (rev/gal):** | **Gamma to bit (ft):** | | **Survey to bit (ft):** | |
| Hunting | - | .0° | 0.24 | - | | - | |

**Mud Data:**

| Wt (ppg): | Vis (sec/qt): | Depth of Data: | Mud Type: | 24-hr mud losses (bbls): | Cumulative mud losses (bbls): | |
|---|---|---|---|---|---|---|
| 9.95 | 47 | 7,491' | Invert | 150 | 776 | |
| **Hydrostatic Pressure (psi):** | | **Casing Back Pressure (psi)** | | **Gas buster status** | **Lag (min/strokes):** | |
| 3876 | | - | | on | 20min | 2,964 strokes |

**Gas:**

| Gas Show (units/depth): | | Gas Show (units/depth): | | Gas Show (units/depth): | | Gas Show (units/depth): | |
|---|---|---|---|---|---|---|---|
| 87u | 7,098' | 122u | 7,290' | 122u | 7,344u | - | - |
| **Background gas (max):** | | **Background gas (min):** | | **Background gas (avg):** | | **Connection gas (max/min):** | |
| 90u | | 70u | | 80u | | - | - |
| **Trip gas:** | | **Down-Time Gas (units/depth):** | | **Flare:** | | **Gas Buster** | |
| 150u | | - | - | None | | No | |

**Sample Description:**

| Sample quality: | Oil stain: | Porosity: | Cut: |
|---|---|---|---|
| good | - | - | - |

**Present Activity Summary:** Wash & Ream to Bottom

**Comments:** *Drilled through plug at ~7,300', max cement 30%*

**Contact:**

| | | |
|---|---|---|
| Cole Jack | 320-290-9671 | 5am-5pm |
| Kyle Eno | 231-445-0555 | 5pm-5am |
| Geology rig phone: | - | |

# GEOLOGIC MORNING REPORT

SUNBURST CONSULTING
A GEOLOGY SERVICE

**Operator:** Denbury Onshore LLC.
**Well Name:** Cedar Hills 21-22
**Field** Cedar Hills
**Location:** 1248' FNL & 1,654' FWL
Sec. 22, T131N, R105W
Cedar Hills / Red River

**Date:** December 9, 2015
**Report #:** 11

**Rig:** Trinidad 35
**GL elevation:** 2,932'
**KB elevation:** 2,956'

**6am Depth:** 8,045'
**Estimated TVD:** 8,044'
**Estimated VS:** -15'
**Previous depth:** 7,492'
**24 hr. footage:** 553'
**Weather:** 61°/35°F; Sunny, Winds 13-23 MPH

**Planned TD (MD):** 9,500'
**Ft. to plan TD:** 1,455'

**Objective:** Red River D
**Present zone:** Red River D

**Current Activity:** Wash & Ream to Bottom

**Drilling Parameters:**

| WOB (klbs) RT: | RPM (RT): | WOB(klbs) MM: | RPM (MM): | PP (psi): | SPM 1: | SPM 2: | GPM: |
|---|---|---|---|---|---|---|---|
| 5 | 100 | - | - | 2500 | 66 | 66 | 465 |

**BHA:**

| Bit #: | Diameter (in): | Make: | Model: | Serial #: | Depth in: | Footage: | Hours: |
|---|---|---|---|---|---|---|---|
| 4 | 8 3/4 | - | - | - | 5,674' | 2,371' | - |
| **Motor (make):** | **Motor (model):** | **Motor (bend):** | **Motor (rev/gal):** | **Gamma to bit (ft):** | | **Survey to bit (ft):** | |
| Hunting | - | .0° | 0.24 | - | | - | |

**Mud Data:**

| Wt (ppg): | Vis (sec/qt): | Depth of Data: | Mud Type: | 24-hr mud losses (bbls): | Cumulative mud losses (bbls): |
|---|---|---|---|---|---|
| 10.35 | 49 | 7,066' | Invert | 5 | 781 |
| **Hydrostatic Pressure (psi):** | | **Casing Back Pressure (psi)** | | **Gas buster status** | **Lag (min/strokes):** |
| 4329 | | - | | on | 19min / 2,523 strokes |

**Gas:**

| Gas Show (units/depth): | | Gas Show (units/depth): | | Gas Show (units/depth): | | Gas Show (units/depth): | |
|---|---|---|---|---|---|---|---|
| 66u | 7,668' | 65u | 7,855' | - | - | - | - |
| **Background gas (max):** | | **Background gas (min):** | | **Background gas (avg):** | | **Connection gas (max/min):** | |
| 60u | | 50u | | 55u | | - | - |
| **Trip gas:** | | **Down-Time Gas (units/depth):** | | **Flare:** | | **Gas Buster** | |
| - | | - | - | None | | No | |

**Sample Description:**

| Sample quality: | Oil stain: | Porosity: | Cut: |
|---|---|---|---|
| good | - | - | - |

**Present Activity Summary:** Wash & Ream to Bottom

**Comments:**

**Contact:**

| | | |
|---|---|---|
| Cole Jack | 320-290-9671 | 5am-5pm |
| Kyle Eno | 231-445-0555 | 5pm-5am |
| Geology rig phone: | - | |

# SUNDRY NOTICES AND REPORTS ON WELLS - FORM 4

INDUSTRIAL COMMISSION OF NORTH DAKOTA
OIL AND GAS DIVISION
600 EAST BOULEVARD DEPT 405
BISMARCK, ND 58505-0840
SFN 5749 (09-2006)

Well File No.
11409

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.
PLEASE SUBMIT THE ORIGINAL AND ONE COPY.

| | | | |
|---|---|---|---|
| ☑ Notice of Intent | Approximate Start Date | ☑ Drilling Prognosis | ☐ Spill Report |
| ☐ Report of Work Done | Date Work Completed | ☐ Redrilling or Repair | ☐ Shooting |
| ☐ Notice of Intent to Begin a Workover Project that may Qualify for a Tax Exemption Pursuant to NDCC Section 57-51.1-03. | Approximate Start Date | ☐ Casing or Liner | ☐ Acidizing |
| | | ☐ Plug Well | ☐ Fracture Treatment |
| | | ☐ Supplemental History | ☐ Change Production Method |
| | | ☐ Temporarily Abandon | ☐ Reclamation |
| | | ☑ Other | **Filter Media Container Waiver** |

| Well Name and Number | | | | | |
|---|---|---|---|---|---|
| **Cedar Hills 21-22** | | | | | |
| Footages | Qtr-Qtr | Section | Township | Range | |
| **1248 F N L 1654 F W L** | **NENW** | **22** | **131 N** | **105 W** | |
| Field | Pool | County | | | |
| **Cedar Hills** | **South Red River B** | **Bowman** | | | |

**24-HOUR PRODUCTION RATE**

| Before | | After | |
|---|---|---|---|
| Oil | Bbls | Oil | Bbls |
| Water | Bbls | Water | Bbls |
| Gas | MCF | Gas | MCF |

| Name of Contractor(s) | | | |
|---|---|---|---|
| Address | City | State | Zip Code |
| | | | |

## DETAILS OF WORK

**Denbury Onshore, LLC requests a waiver from providing a container on this location to receive used filter media. Denbury does not plan to utilize any disposable filter media at this well site to drill, complete, or produce this well.**

| Company | | Telephone Number |
|---|---|---|
| **Denbury Onshore, LLC** | | **972-673-2677** |
| Address | | |
| **5320 Legacy Drive** | | |
| City | State | Zip Code |
| **Plano** | **TX** | **75024** |
| Signature | Printed Name | |
| | **Tommy J. Yates** | |
| Title | Date | |
| **Regulatory Compliance Manager** | **October 21, 2015** | |
| Email Address | | |
| tommy.yates@denbury.com | | |

**FOR STATE USE ONLY**

| ☐ Received | ☒ Approved |
|---|---|
| Date | 11/3/2015 |
| By | Todd L. Holweger |
| Title | DMR Permit Manager |

# Oil and Gas Division

Lynn D. Helms - Director  Bruce E. Hicks - Assistant Director

**Department of Mineral Resources**

Lynn D. Helms - Director

**North Dakota Industrial Commission**

www.oilgas.nd.gov


November 5, 2015

Tommy J. Yates
Regulatory Compliance Manager
DENBURY ONSHORE, LLC
5320 Legacy Dr
Plano, TX 75024

**RE: VERTICAL WELL**
**CEDAR HILLS 21-22**
**NENW Section 22-131N-105W**
**Bowman County, North Dakota**
**Well File # 11409**

Dear Tommy :

Pursuant to Commission Order No. 8814 & 9276, approval to drill the above captioned well is hereby given.

**PERMIT STIPULATIONS:**

- Effective June 1, 2014, a covered leak-proof container (with placard) for filter sock disposal must be maintained on the well site beginning when the well is spud, and must remain on-site during clean-out, completion, and flow-back whenever filtration operations are conducted.
- A dike surrounding the entire location may be required at the discretion of the NDIC field inspector.
- Denbury must record any plugs encountered when re-entering the well and submit the information on a Form 4 (Sundry Notice).
- Denbury must obtain NDIC Field inspector approval 24hrs prior to any plugging operations.
- DENBURY ONSHORE must contact NDIC Field Inspector Matthew Tibor at (701) 590-2140 prior to location construction.

**Drilling pit**

NDAC 43-02-03-19.4 states that "a pit may be utilized to bury drill cuttings and solids generated during well drilling and completion operations, providing the pit can be constructed, used and reclaimed in a manner that will prevent pollution of the land surface and freshwaters. Reserve and circulation of mud system through earthen pits are prohibited. All pits shall be inspected by an authorized representative of the director prior to lining and use. Drill cuttings and solids must be stabilized in a manner approved by the director prior to placement in a cuttings pit."

**Permit Fee & Notification**

Payment was received in the amount of $100 via credit card. It is requested that notification be given immediately upon the spudding of the well. This information should be relayed to the Oil & Gas Division, Bismarck, via telephone (701) 328-8020. The following information must be included: Well name, legal location, permit number, drilling contractor and rig number, company representative, date and time of spudding. Office hours are 8:00 a.m. to 12:00 p.m. and 1:00 p.m. to 5:00 p.m. Central Time. Please leave a message if after hours or on the weekend.

**Confidential status**

Your request for confidential status of all information furnished to the Director, or his representatives, is hereby granted. Such information, except production runs, shall remain confidential for six months and expires on May 5, 2016.

Confidential status notwithstanding, the Director and his representatives shall have access to all well records wherever located. Your company personnel, or any person performing work for your company shall permit the Director and his representatives to come upon any lease, property, well, or drilling rig operated or controlled by them, complying with all safety rules, and to inspect the records and operation of such wells and to have access at all times to any and all records of wells. The Commission's field personnel periodically inspect producing and drilling wells. Any information regarding such wells shall be made available to them at any time upon request. The information so obtained by the field personnel shall be maintained in strict confidence and shall be available only to the Commission and its staff.

**Conductors, Rat holes, and Mouse holes**

To protect near surface groundwater any conductor, rat, or mouse hole drilled must be constructed with a string of casing and cemented to ground level. Any such string must be secured at the surface when not in use. In addition, all rat and mouse holes must be plugged with cement and cut off at least 4' below final grade within a reasonable timeframe after the rig completes drilling operations on the pad.

**Surface casing cement**

Tail cement utilized on surface casing must have a minimum compressive strength of 500 psi within 12 hours, and tail cement utilized on production casing must have a minimum compressive strength of 500 psi before drilling the plug or initiating tests.

**Logs**

NDAC Section 43-02-03-31 requires the running of (1) a suite of open hole logs from which formation tops and porosity zones can be determined, (2) a Gamma Ray Log run from total depth to ground level elevation of the well bore, and (3) a log from which the presence and quality of cement can be determined (Standard CBL or ultrasonic cement evaluation log) in every well in which production or intermediate casing has been set, this log must be run prior to completing the well. All logs run must be submitted free of charge, as one digital TIFF (tagged image file format) copy and one digital LAS (log ASCII) formatted copy. Digital logs may be submitted on a standard CD, DVD, or attached to an email sent to digitallogs@nd.gov Thank you for your cooperation.

Sincerely,

Todd L. Holweger
Mineral Resources Permit Manager

# APPLICATION FOR PERMIT TO DRILL - FORM 1

INDUSTRIAL COMMISSION OF NORTH DAKOTA
OIL AND GAS DIVISION
600 EAST BOULEVARD DEPT 405
BISMARCK, ND 58505-0840
SFN 4615 (03-2006)

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.
PLEASE SUBMIT THE ORIGINAL AND ONE COPY.

| Type of Work | Type of Well | Approximate Date Work Will Start | Confidential Status |
|---|---|---|---|
| **New Location** | **Oil & Gas** | **11 / 10 / 2015** | **Yes** |

| Operator | Telephone Number |
|---|---|
| **DENBURY ONSHORE, LLC** | **(972) 673-2000** |

| Address | City | State | Zip Code |
|---|---|---|---|
| **5320 Legacy Dr** | **Plano** | **TX** | **75024** |

Name of Surface Owner or Tenant: **Leo & Debra McDonnell**

| Address | City | State | Zip Code |
|---|---|---|---|
| **13 Bull Drive {PO Box 1112}** | **Columbus** | **MT** | **59019** |

## WELL INFORMATION

☑ Notice has been provided to the owner of any permanently occupied dwelling within 1,320 feet.

☑ This well is not located within five hundred feet of an occupied dwelling.

| Well Name | Well Number |
|---|---|
| **CEDAR HILLS** | **21-22** |

| | Qtr-Qtr | Section | Township | Range | County |
|---|---|---|---|---|---|
| At Surface: **1248** F **N** L **1654** F **W** L | **NENW** | **22** | **131 N** | **105 W** | **Bowman** |
| If Directional, Top of Pay: F L F L | | | **N** | **W** | |
| Proposed Bottom Hole Location: F L F L | | | **N** | **W** | |

| Latitude of Well Head | Longitude of Well Head | NAD Reference | Description of (Subject to NDIC Approval) |
|---|---|---|---|
| **46 ° 09 ' 31.96 "** | **-103 ° 47 ' 55.96 "** | **NAD83** | **SPACING UNIT: Cedar Hills South-RR"B" Unit** |

| Ground Elevation | Acres in Spacing/Drilling Unit | Spacing/Drilling Unit Setback Requirement | Industrial Commission Order |
|---|---|---|---|
| **2930** Feet Above S.L. | **55040** | **660** Feet | **8814/9276** |

| Objective Horizons | Pierre Shale Top |
|---|---|
| **Red River - B** | **355** |

| | Size | Weight | Depth | Cement Volume | |
|---|---|---|---|---|---|
| Existing Surface Casing | **8 - 5/8 "** | **24** Lb./Ft. | **2018** Feet | **860** Sacks | **NOTE: Surface hole must be drilled with fresh water and surface casing must be cemented back to surface.** |

| | Size | Weight(s) | Longstring Total Depth | Cement Volume | Cement Top | Top Dakota Sand |
|---|---|---|---|---|---|---|
| Proposed Longstring Casing | **- "** | Lb./Ft. | Feet MD Feet TVD | Sacks | Feet | **4016** Feet |

| Base Last Charles Salt (If Applicable) | Estimated Total Depth (feet) | Drilling Mud Type (Vertical Hole - Below Surface Casing) |
|---|---|---|
| **7382** Feet | **9500** Feet MD **9500** Feet TVD | **INVERT** |

Proposed Logs: **Open Hole: NA Cased Hole: NA**

Comments

**Will re-enter PA'd Cedar Hills 1-22 {W11409} welll bore. Will drill out existing cement plugs to 9500' & re-plug well per NDIC requirements. Re-plug objective is to isolate entire Red River A, B, C, & D intervals in order to prevent conformance issues.**

I hereby swear or affirm that the information provided is true, complete and correct as determined from all available records. Date: **10 / 27 / 2015**

| | Printed Name | Title |
|---|---|---|
| **ePermit** | **Tommy J. Yates** | **Regulatory Compliance Manager** |

**FOR STATE USE ONLY**

| Permit and File Number | API Number |
|---|---|
| **11409** | **33 - 011 - 00429** |
| Field: **CEDAR HILLS** | |
| Pool: **SOUTH RED RIVER B** | Permit Type: **DEVELOPMENT** |

**FOR STATE USE ONLY**

| |
|---|
| Date Approved: **11 / 5 / 2015** |
| By: **Todd L. Holweger** |
| Title: **Mineral Resources Permit Manager** |

**REQUIRED ATTACHMENTS: Certified surveyors plat, estimated geological tops, proposed mud/cementing plans, $100 fee.**

# WELL LOCATION PLAT

*DENBURY ONSHORE, LLC*

*5320 LEGACY DRIVE PLANO, TX 75024*

## CEDAR HILLS 21-22

***1248 feet from the north line and 1654 feet from the west line (surface location Section 22)***

*Section 22, T131N, R105W - 5th Principal Meridian*

*Bowman County, North Dakota*

*Surface Owner at well site - Leo & Debra Mcdonnell*

*SURFACE HOLE:*

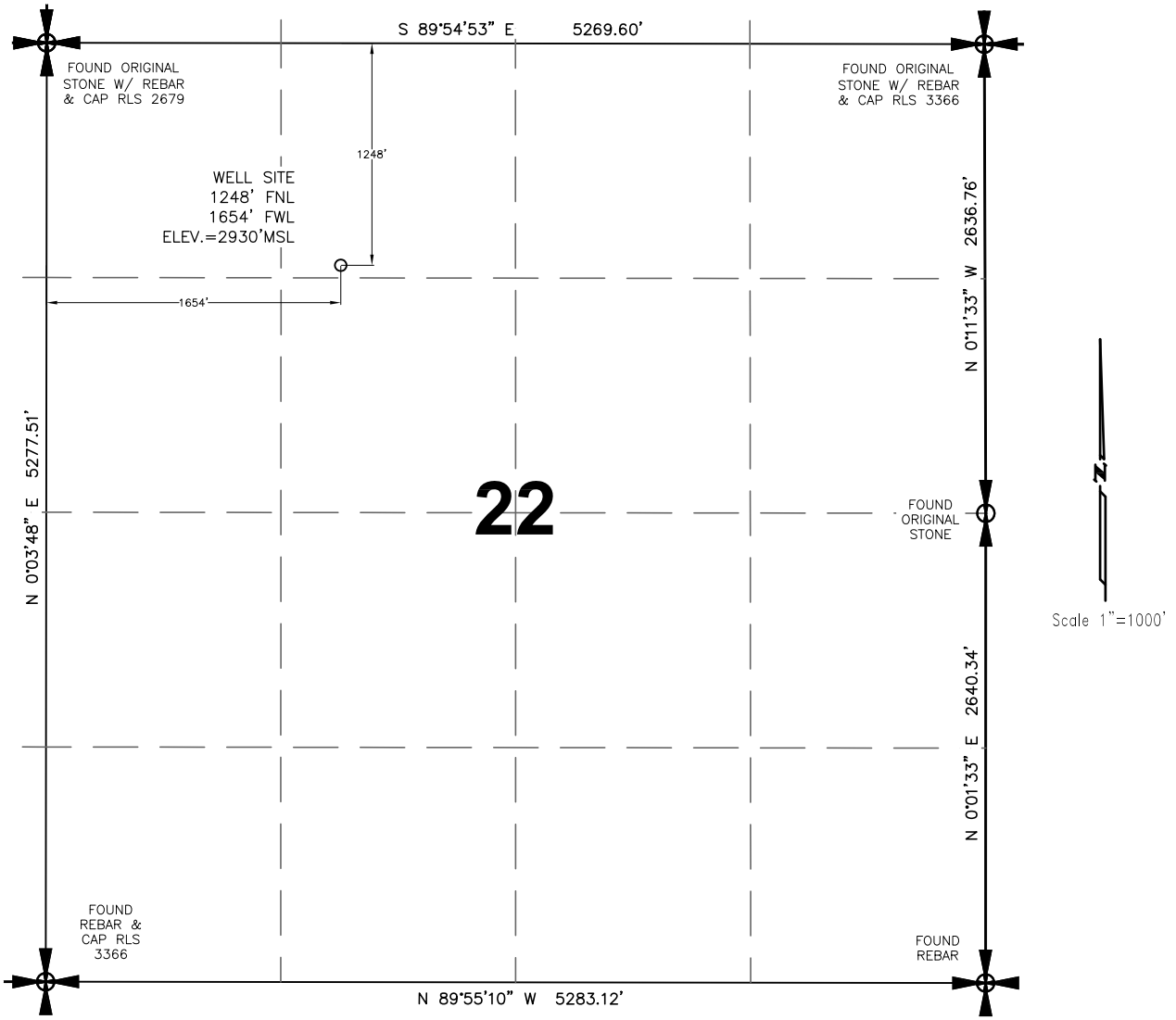
***Latitude 46°09'31.96" (46.158879°) North - Longitude 103°47'55.96" (103.798977°) West - [NAD-83]***

*Latitude 46°09'31.95" (46.158874°) North - Longitude 103°47'54.23" (103.798397°) West - [NAD-27]*

***North Dakota State Plane NAD-83 Northing : 197,055.279 - Easting : 1,132,756.470***

*North Dakota State Plane NAD-27 Northing : 197,047.885 - Easting : 1,164,352.686*

*[derived from N.G.S. O.P.U.S. Solution REF FRAME: NAD_83 (CORS96)(EPOCH:2002.000)]*




NOTE: Drawing is shown based on a local coordinate system. Distances are ground distances, international feet.

NOTE: All land corners are assumed unless otherwise noted. Location shown hereon is a preliminary staked location and is not an as-built.

JAMES D. GLASSER 10/12/15

Surveyed by N.D.R.L.S. #5771 Date

*I, James D. Glasser, Registered Land Surveyor, N.D. No. 5771, do hereby certify that the well plat shown hereon was made by me, or under my direction, and is true and correct to the the best of my knowledge and belief.*

REGISTERED LAND SURVEYOR
JAMES D. GLASSER
LS - 5771
NORTH DAKOTA

10/19/15
DATE

*Vertical Control Datum Used*
*Sea-Level Datum of NAVD 88*
*Based on elevation derived from OPUS Solution on GPS Base Station (Base) in the SW¼NW¼ of Section 23, T131N, R105W, 5th P.M. located S29°31'31"E a distance of 2006.26' from the northwest corner of said Section 23, being at 3057.27' Elevation MSL.*


**HIGHLANDS ENGINEERING & SURVEYING, PLLC**
319 24th Street East
Dickinson, ND 58601
701.483.2444 office
701.483.2610 fax
www.highlandseng.com


HIGHLANDS ENGINEERING

PROJECT NO. 157827

# Oil and Gas Division

Lynn D. Helms - Director  Bruce E. Hicks - Assistant Director

**Department of Mineral Resources**

Lynn D. Helms - Director

**North Dakota Industrial Commission**

www.oilgas.nd.gov


April 9, 2014

RE: **Filter Socks and Other Filter Media**
**Leakproof Container Required**
**Oil and Gas Wells**

Dear Operator,

North Dakota Administrative Code Section 43-02-03-19.2 states in part that all waste material associated with exploration or production of oil and gas must be properly disposed of in an authorized facility in accord with all applicable local, state, and federal laws and regulations.

Filtration systems are commonly used during oil and gas operations in North Dakota. The Commission is very concerned about the proper disposal of used filters (including filter socks) used by the oil and gas industry.

Effective June 1, 2014, a container must be maintained on each well drilled in North Dakota beginning when the well is spud and must remain on-site during clean-out, completion, and flow-back whenever filtration operations are conducted. The on-site container must be used to store filters until they can be properly disposed of in an authorized facility. Such containers must be:

- leakproof to prevent any fluids from escaping the container
- covered to prevent precipitation from entering the container
- placard to indicate only filters are to be placed in the container

If the operator will not utilize a filtration system, a waiver to the container requirement will be considered, but only upon the operator submitting a Sundry Notice (Form 4) justifying their request.

As previously stated in our March 13, 2014 letter, North Dakota Administrative Code Section 33-20-02.1-01 states in part that every person who transports solid waste (which includes oil and gas exploration and production wastes) is required to have a valid permit issued by the North Dakota Department of Health, Division of Waste Management. Please contact the Division of Waste Management at (701) 328-5166 with any questions on the solid waste program. Note oil and gas exploration and production wastes include produced water, drilling mud, invert mud, tank bottom sediment, pipe scale, filters, and fly ash.

Thank you for your cooperation.

Sincerely,

*Bruce E. Hicks*
Assistant Director

Denbury

# Re-entry Geologic Prognosis

# Cedar Hills 21-22

Origination date: 20 Oct 2015
Revised: 10/27/15 Tyates

Originator: Allen Kimble
Geologist: Allen Kimble
email: allen.kimble@denbury.com
Office: 972-673-2722

**FIELD: Cedar Hills**

**COUNTY: Bowman** **STATE: North Dakota**

**ELEVATIONS: GL 2930' PAD: 2931' FLOOR HEIGHT : 24.5' KB: (GRD + DF) : 2955'**

**SURFACE LOC: NAD 27, lat 46.158874, Long -103.798397, 1248' FNL & 1654' FWL, NENW Sec. 22-T131N-R105W**

**PRIMARY OBJECTIVES: Re-enter, drill out old plugs and cement off all of the Red River Formation. Re-PA well.**

**PROPOSED / PERMIT TD: 9500'**

**KNOWN DRILLING HAZARDS: Salt water disposal in Cretaceous Sands, Salts, nitrogen and salt water disposal in the Permian Section, Lost Circulation in the Mission Canyon.**

**RECOMMENDED LOGGING PROGRAM: VERTICAL: n/a**

**RECOMMENDED LOGGING PROGRAM: HORIZONTAL: n/a**

**RECOMMENDED CORING AND TESTING PROGRAM: n/a**

**MUDLOGGER: The Sunburst consulting wellsite geologists … as required to moniter gas.**

## GEOLOGIC TOPS PROGNOSIS

### SUBJECT WELL: Cedar Hills 21-22

| | KB: | 2955 | | |
|---|---|---|---|---|
| **FORMATION** | **TVD** | **SUBSEA** | **Formation Highlights** | **NDIC Names** |
| Pierre | 355 | 2600 | | K-P |
| Niobrara | 3027 | -14 | | K-Nb |
| Greenhorn | 3478 | -523 | | K-Gh |
| Mowry | 4016 | -1061 | | K-M |
| Newcastle | 4203 | -1248 | | K-N |
| Muddy Sand | 4230 | -1275 | SWD | K-Ms |
| Skull Creek Shale | 4310 | -1355 | | K-Sc |
| Inyan Kara **FlowHazard** | 4458 | -1503 | SWD | K-Ik |
| Swift | 4833 | -1878 | | J-S |
| Rierdon | 5289 | -2334 | | J-R |
| Piper Lime | 5385 | -2430 | | J-Pl |
| Spearfish | 5612 | -2657 | | T-S |
| Pine salt | 5770 | -2815 | Salt | Pm |
| Base of Pine Salt | 6077 | -3122 | Salt | Pm |
| Minnekahta | 6231 | -3276 | Nitrogen | Pm-Mk |
| Opeche | 6280 | -3325 | Nitrogen | Pm-Op |
| Minnelusa **Flow Hazard** | 6341 | -3386 | SWD, Nitrogen | Pm-Eba |
| **Amsden** | 6518 | -3563 | SWD, Nitrogen | Pn-A |
| Kibbey | 6942 | -3987 | | M-Kl |
| Madison | 7056 | -4101 | | M-Md |
| Ratcliffe | 7282 | -4327 | | M-Chrl |
| Base of Last Salt | 7382 | -4427 | | M-MDLS |
| Mission Canyon | 7438 | -4483 | Lost Cir | M-Mc |
| Lodgepole | 7874 | -4919 | | M-MdLp |
| Miss Fossil Bank | 8233 | -5278 | WSW | M-Fb |
| Devonian | 8387 | -5432 | | D-Dv |
| Silurian Interlake | 8658 | -5703 | | S-IL |
| Ordovician Gunton | 9034 | -6079 | | O-G |
| Stoughton | 9082 | -6127 | | O-St |
| Red River | 9152 | -6197 | | O-RR |
| Red River "A" | 9165 | -6210 | | O-RR-a |
| Top of Unitized Formation | 9179 | -6224 | | |
| Red River "B" Porosity | 9199 | -6244 | | O-RR-b |
| Red River "C" Porosity | 9271 | -6316 | | O-RR-c |
| Red River "D" Porosity | 9331 | -6376 | | O-RR-d |
| Drilled TD | 9500 | -6545 | | |

This will be a re-entry of Total's Cedar Hills No. 1-22, API No 3301100429, NDIC No. 11409
Existing Cement Plugs at: 1968-2018, 4120-4200, 6270-6350, 7290-7370, 8327-8407, 9060-9140

Denbury

RE: Denbury Request to Re-Enter, Re-Drill, and Re-Plug the Cedar Hills 21-22 (FKA Total Petroleum Cedar Hills 1-22)

To assure present day water flood conformance and efficient injection of future CO2, Denbury would like to set an open-hole cement plug across the entire Red River formation as drilled by Total in their Cedar Hills 1-22 (33-011-00429). Hopefully, this will eliminate potential cross flow from the Red River "B" into other zones of permeability not dedicated to the Cedar Hills South Unit.

Of particular concern is the Total drill stem test of the Red River "D" (9321-9388) which recovered 8715' of salt water and recorded high flowing pressures (FF 3818-4067). If this interval is capable of giving up this much water at these high flowing pressures, then it is conceivable that the interval could thief water, oil or CO2 from the Red River "B" just as easily. From the open-hole logs, we also see an additional 55' (gross) of Red River "A" and "C" that could contribute to out of zone cross flow. Please note the Total Petroleum open-hole log in figure 1.

In summary, the Total Cedar Hill 1-22 surface location is approximately 110' southeast of the proposed Denbury CHSU 43A-21NH 15. (see figure 2. map) There are potential long term conformance – cross flow issues in addition to a collision risk between the proposed lateral and the old Total Petroleum vertical Red River test. Denbury would like to address these issues before they become a problem. From our experience, we have found that it is much easier to re-plug an abandoned well before secondary-tertiary operations re-pressure the reservoir.

Allen J. Kimble
Senior Geologist
Denbury Resources

4 November 2015

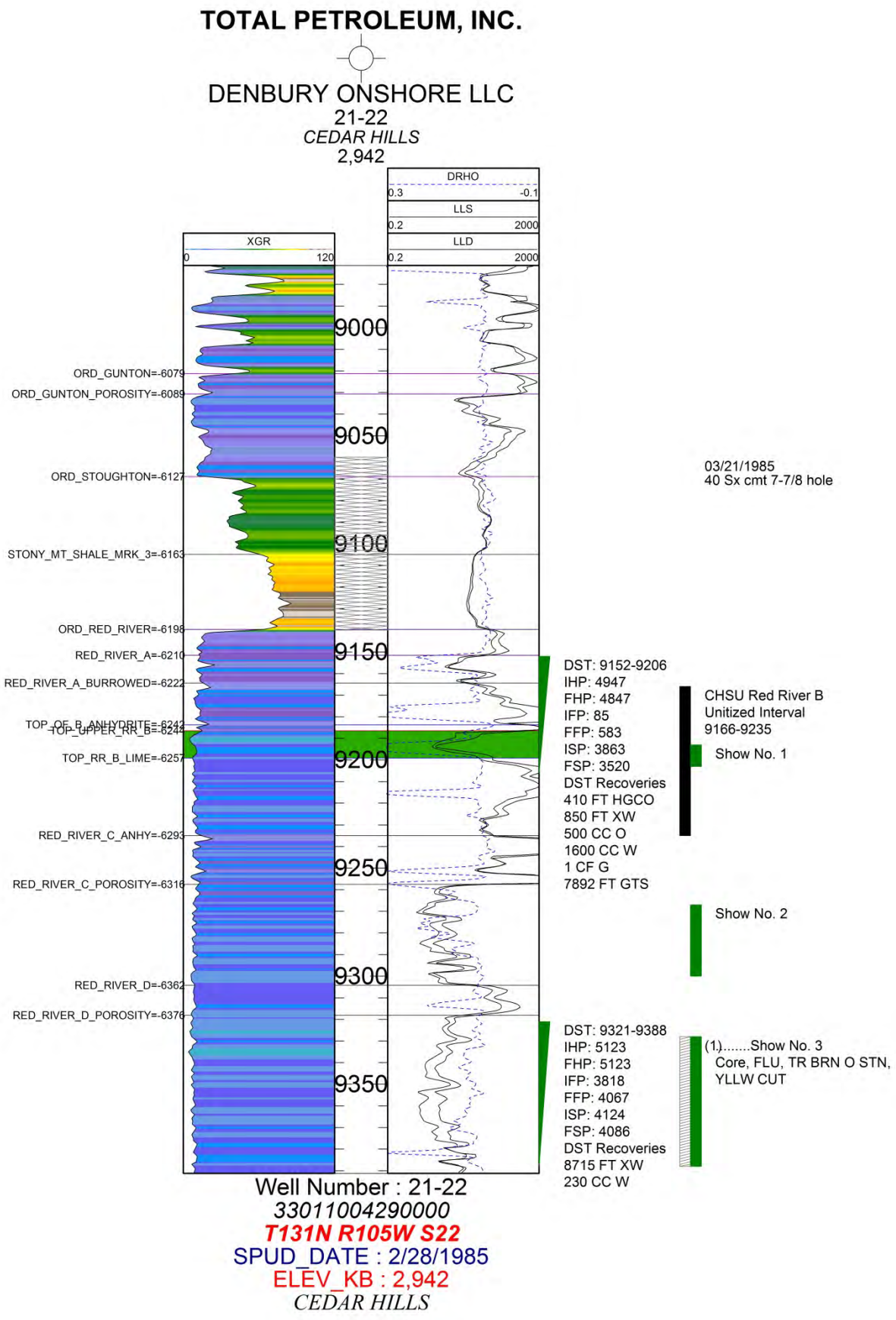
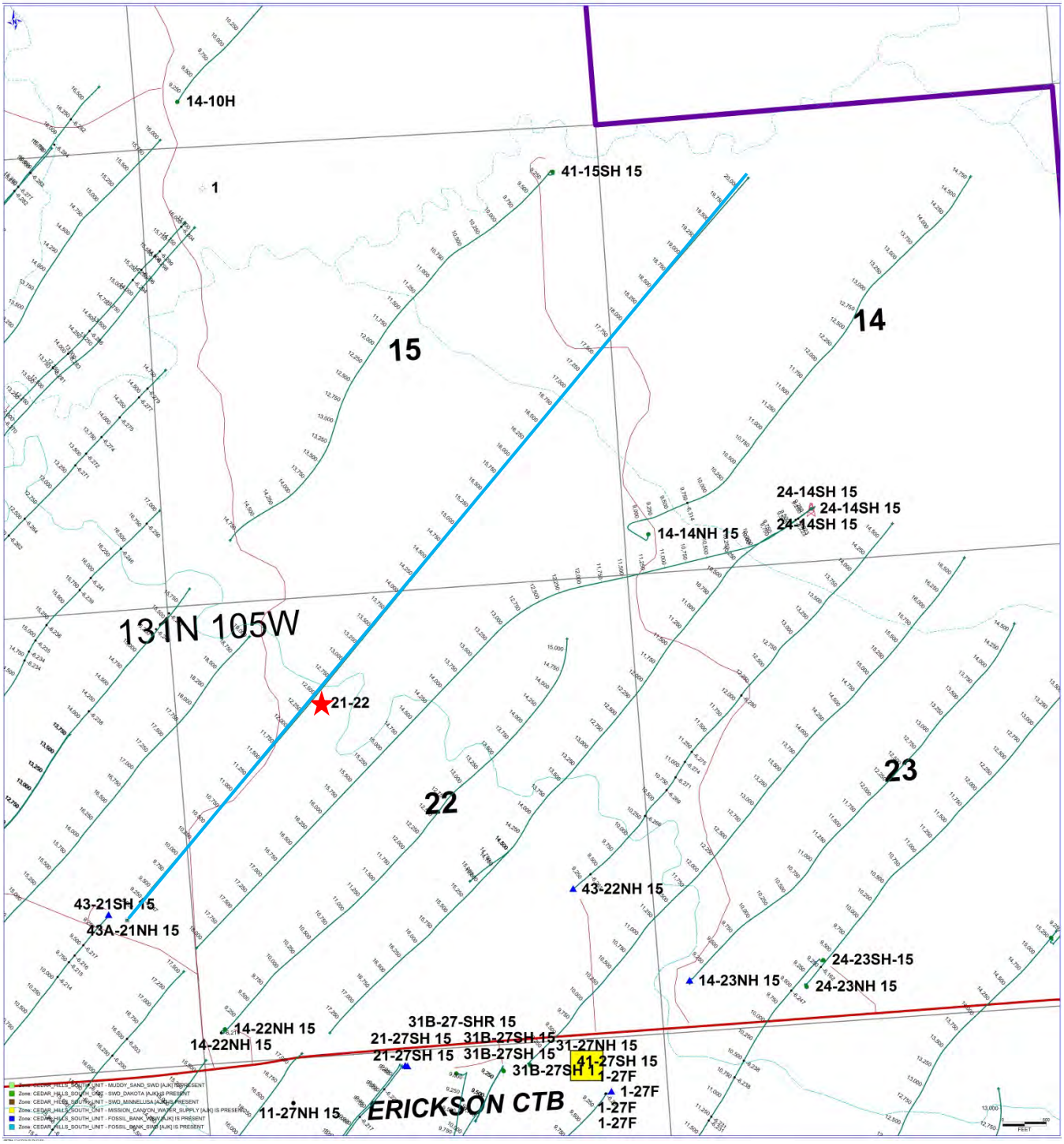



*Figure 1: Open-hole log with DSTs, Cores, Formation Tops, Cement plug, Unitized Interval, and Oil shows annotated.*




*<u>Figure 2</u>: Map Cedar Hills South Unit, Bowman Co., N.D. Note location of the Total 21-22 relative to the proposed 43A -21NH 15 (future Red River "B" injection well).*

## Tommy Yates

**From:** Tommy Yates
**Sent:** Wednesday, October 21, 2015 9:37 AM
**To:** Dressler, Ty R. (tdressler@nd.gov); kkading@nd.gov
**Cc:** Todd Holweger (tholweger@nd.gov)
**Subject:** Denbury's Proposed Cedar Hills 21-22 Well, NE-NW Sec. 22-T131N-R105W, Bowman County, ND
**Attachments:** CEDAR HILLS 21-22 WELL PACKAGE 10-20-15.pdf

Ty & Kevin,
Pending NDIC permit approval, Denbury is planning to re-enter and re-drill a previously plugged and abandoned well bore in the NE-NW of section 22, T131N-R105W, in Bowman County. The re-drilled well will be known as the Denbury Cedar Hills 21-22. Per the inactive PLOTS map on the ND Game and Fish website, it appears that this Land is currently subscribed to PLOTS.
A copy of the Land survey package is included for reference. The initial proposed surface disturbance will be 3.7 acres. Once the drilling rig is removed and the well is completed, the site will be partially reclaimed to 1.91 acres of surface disturbance.
Please let me know if you require additional information regarding this project proposal.
Thanks!

***Tommy Yates***
*Regulatory Compliance Manager – Northern Region*
*Denbury Onshore, LLC*
*Denbury Resources, Inc.*
*Direct: 972.673.2677*
*Mobile: 214.724.0076*
*Fax: 972.673.2299*
*tommy.yates@denbury.com*

# Re-Entry Plan

Cedar Hills 21-22

**Procedure:**

**Notify the NDIC field inspector Matt Tibor at 701-590-2140 prior to beginning drilling or plugging operations.**

Denbury plans to re-enter the existing plugged and abandoned Cedar Hills 1-22 well bore (circa 1985), drill out the cement plugs to the original 9500' TD, and re-plug to abandon the well.

Drilling fluid will consist of 9.5 – 10 ppg oil-water inverted emulsion (75/25 to 80/20) mud system with 45-60 viscosity units and less than 20 fluid loss units. Solids will be limited to less than 5%.

A closed loop pitless drilling system will be employed. All drill cuttings will be hauled to a properly licensed disposal facility (Oaks Landfill located in the NW sec.35-T18N-R52E, Dawson County, MT).

All cement plugs will consist of a class G base slurry containing additives appropriate for permanently plugging the well bore for abandonment. Cement volumes were calculated using an 8.0" hole size with no washout and a cement yield of 1.0 cuft/sk.

Weighted mud or spacer will be placed between the cement plugs and a balanced mud method will be utilized to place each plug. See the proposed well bore diagram for plugging details.

During the re-plugging operations, plans are to plug the entire Red River A, B, C, and D intervals to prevent conformance issues during ongoing secondary EOR water flood development, that's now underway. The isolation will also prevent future conformance issues if tertiary EOR using CO2 is utilized.

All work will be conducted using the drilling rig, Trinidad 35.

**Hydraulic Fracturing Statement:**

No hydraulic fracture stimulation treatments are planned for the subject well.

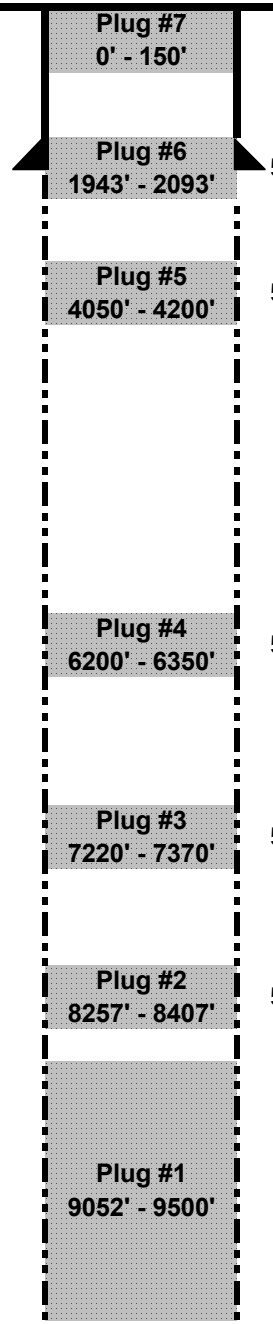
**Gas Capture Plan Statement:**

No flaring of produced gas is planned to occur on the well site.

# Denbury Onshore, LLC  Cedar Hills 21-22
# Re-entry, Re-drill, & Re-plug to Abandon of Cedar Hills 1-22 (W11409)
# Proposed Wellbore Schematic

Revised 11-5-15 Tyates

| Formation | KB Depth |
|---|---|
| Pierre | 355' |
| Niobrara | 3027' |
| Greenhorn | 3478' |
| Mowry | 4016' |
| Newcastle | 4203' |
| Muddy Sand | 4230' |
| Skull Creek Shale | 4310' |
| Inyan Kara **FlowHazard** | 4458' |
| Swift | 4833' |
| Rierdon | 5289' |
| Piper Lime | 5385' |
| Spearfish | 5612' |
| Pine salt | 5770' |
| Base of Pine Salt | 6077' |
| Minnekahta | 6231' |
| Opeche | 6280' |
| Minnelusa **Flow Hazard** | 6341' |
| Amsden | 6518' |
| Kibbey | 6942' |
| Madison | 7056' |
| Ratcliffe | 7282' |
| Base of Last Salt | 7382' |
| Mission Canyon | 7438' |
| Lodgepole | 7874' |
| Fossil Bank | 8233' |
| Devonian | 8387' |
| Silurian Interlake | 8658' |
| Ordovician Gunton | 9034' |
| Stoughton | 9082' |
| Red River | 9152' |
| Red River "A" | 9165' |
| Top of Unitized Formation | 9179' |
| Red River "B" Porosity | 9199' |
| Red River "C" Porosity | 9271' |
| Red River "D" Porosity | 9331' |
| Drilled TD | 9500' |




50 sx G cement

50 sx G cement

50 sx G cement

50 sx G cement

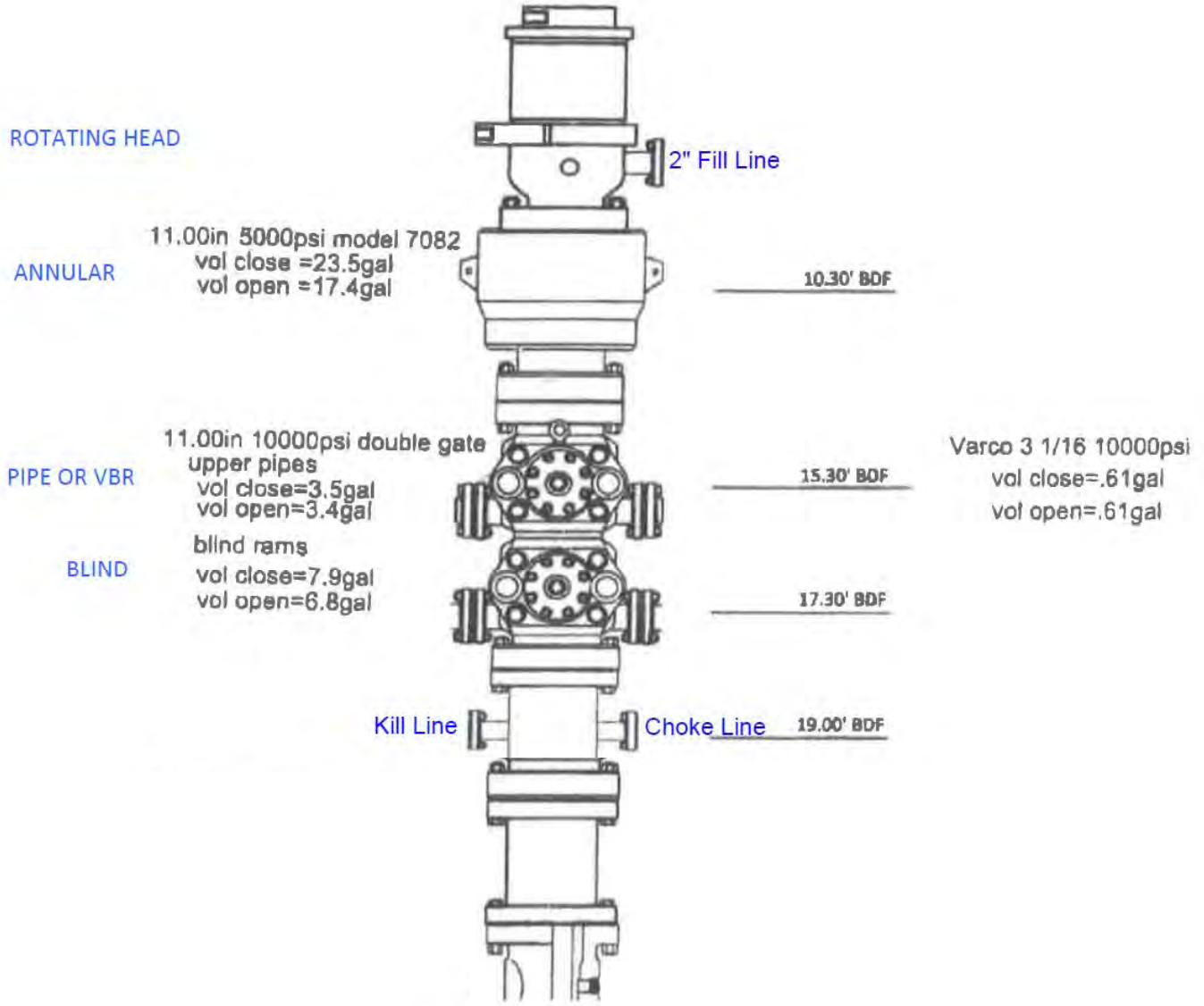
50 sx G cement

140 sx G cement + 35% Silica if BHST is > 220°F

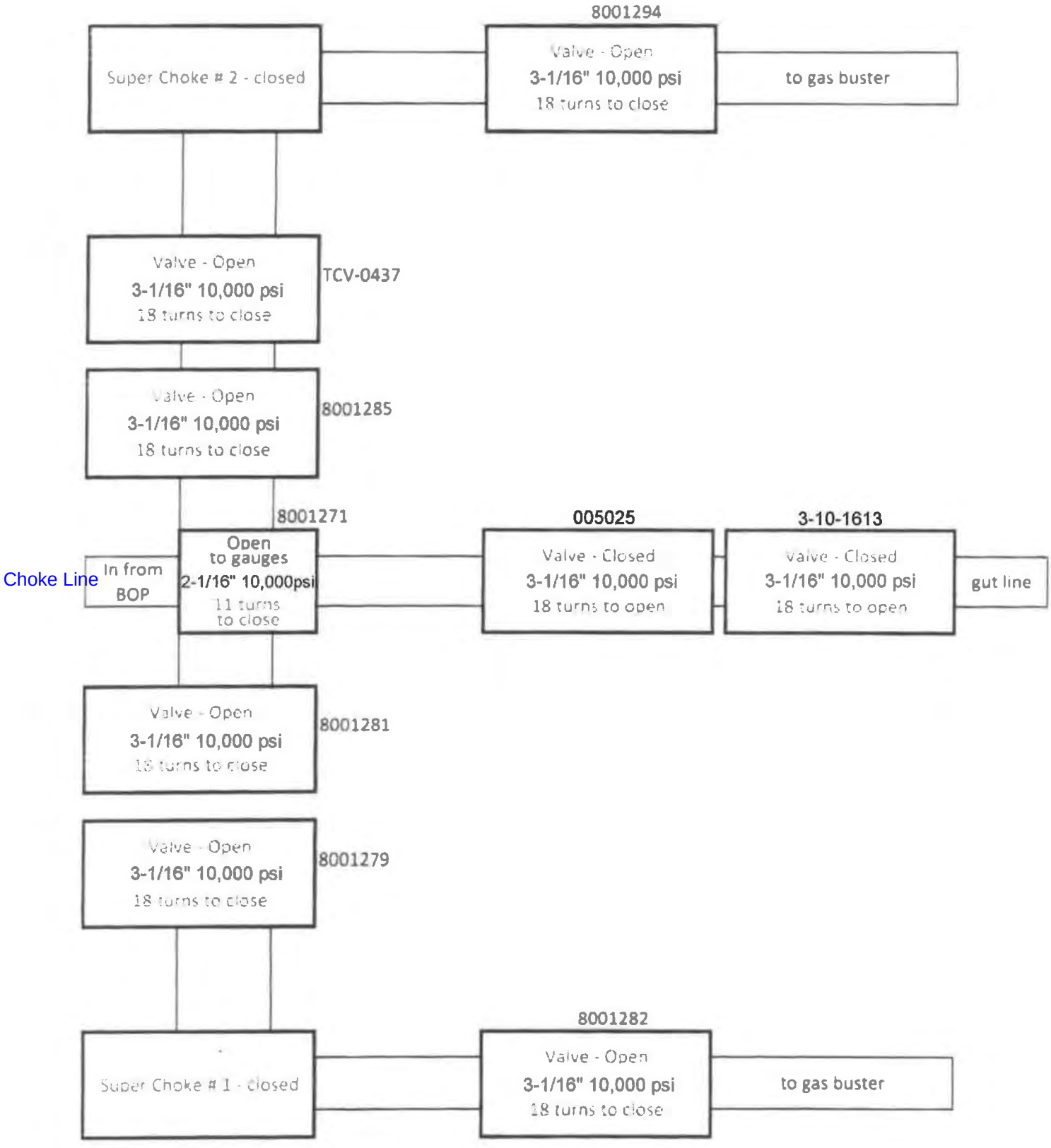
Assuming 8.0" Hole Size from 2018' - 9500'

**OBM**
**9.5 - 10.0 ppg**

# TRINIDAD RIG 35
# BOP CONFIGURATION



# TRINIDAD RIG 35
# CHOKE MANIFOLD ALIGNMENT



Denbury

October 21, 2015

North Dakota Industrial Commission
Department of Mineral Resources
Oil and Gas Division
1016 East Calgary Ave.
Bismarck, ND 58503-5512

Re: **Legal Street Address Request**
Cedar Hills 21-22

Dear Mr. Holweger:

Pursuant to NDAC 43-02-03-16, this letter is to serve as confirmation that Denbury Onshore, LLC has requested a legal street address for our Cedar Hills 21-22 observation well to be drilled from a single well pad site. The well pad will be located in (NENW) of Section 22-T131N-R105W, Bowman County, ND.

The request was sent via email to the Bowman County Emergency Services Coordinator, Karla Germann, on 10/21/2015. Ms. Germann confirmed receipt of our request on 10/21/2015.

Sincerely,

Tommy J. Yates
Regulatory Compliance Manager
(972) 673-2677

## Tommy Yates

**From:** Karla Germann <kgermann@bowmancountynd.gov>
**Sent:** Thursday, October 22, 2015 10:43 AM
**To:** Tommy Yates
**Subject:** RE: Legal Street Address Request - Observation Well in Bowman County (Denbury Cedar Hill 21-22)

We have received your request. We do not address well sites in Bowman and Slope counties. Thanks. Karla

**Karla Germann**
Emergency Services - Bowman/Slope Counties

---

**From:** Tommy Yates [mailto:Tommy.Yates@denbury.com]
**Sent:** Wednesday, October 21, 2015 8:46 AM
**To:** Karla Germann
**Subject:** Legal Street Address Request - Observation Well in Bowman County (Denbury Cedar Hill 21-22)

Hi Karla,

Per NDIC rules, Denbury is requesting that a legal street address be provided for the following proposed oil well surface location in Bowman County.

Proposed Well Site:

**Cedar Hills 21-22 (NENW Sec. 22-T131N-R105W).**

The legal plat for the proposed oil well location is attached, along with maps showing access from the nearest county roads.

Would you please acknowledge that you have received this email and my request for this legal street address?
My understanding is that you will not actually be giving out addresses until the 911 Emergency Services committee has time to meet and discuss it more depth.

Thank you for your time.
Tommy

*Tommy Yates*
*Regulatory Compliance Manager – Northern Region*
*Denbury Onshore, LLC*
*Denbury Resources, Inc.*
*Direct: 972.673.2677*
*Mobile: 214.724.0076*
*Fax: 972.673.2299*
*tommy.yates@denbury.com*

# HORIZONTAL SECTION PLAT

*DENBURY ONSHORE, LLC*

*5320 LEGACY DRIVE PLANO, TX 75024*

## CEDAR HILLS 21-22

***1248 feet from the north line and 1654 feet from the west line (surface location Section 22)***

*Section 22, T131N, R105W - 5th Principal Meridian*

*Bowman County, North Dakota*

*Surface Owner at well site - Leo & Debra Mcdonnell*

*SURFACE HOLE:*

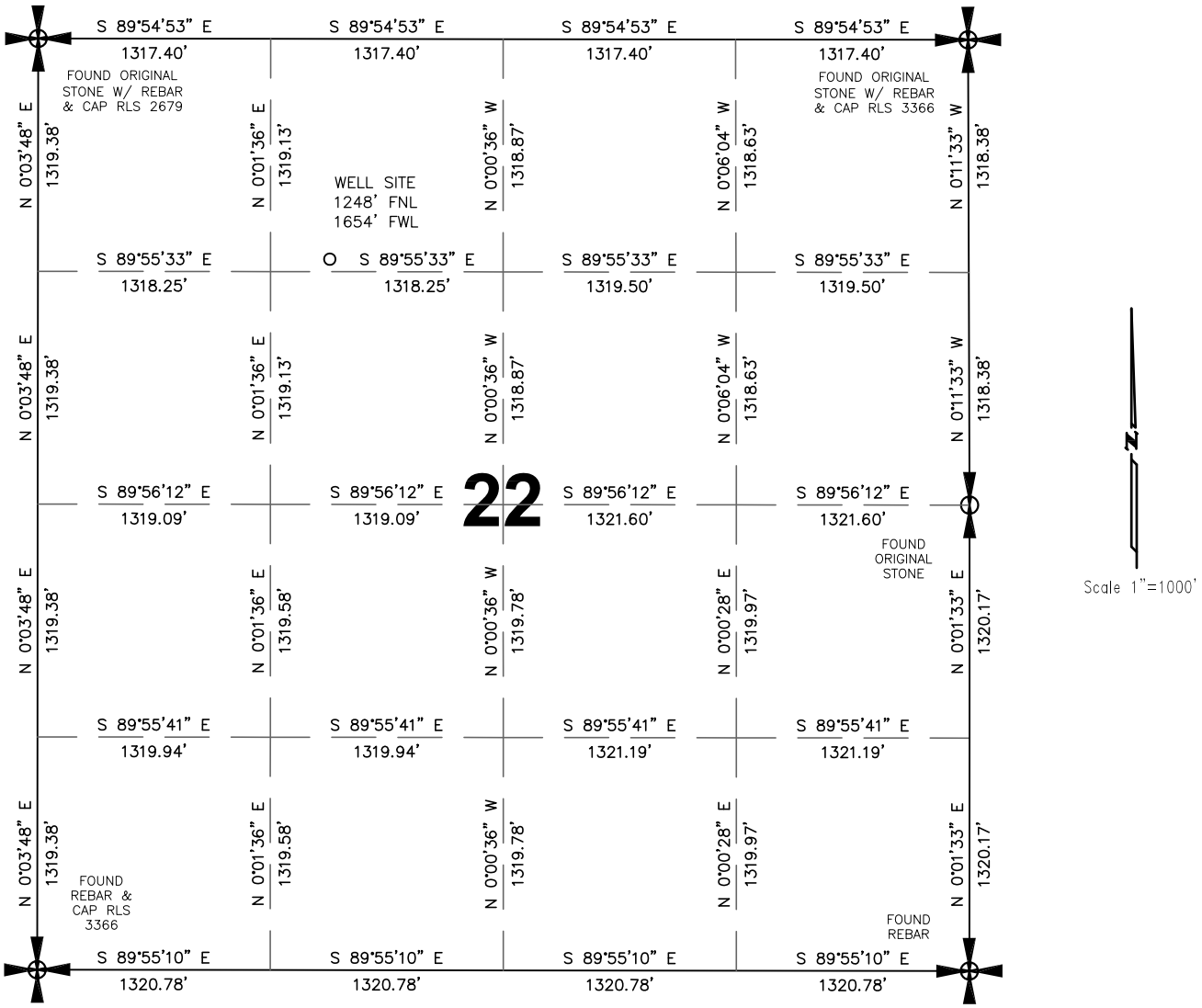
***Latitude 46°09'31.96" (46.158879°) North - Longitude 103°47'55.96" (103.798977°) West - [NAD-83]***

*Latitude 46°09'31.95" (46.158874°) North - Longitude 103°47'54.23" (103.798397°) West - [NAD-27]*

***North Dakota State Plane NAD-83 Northing : 197,055.279 - Easting : 1,132,756.470***

*North Dakota State Plane NAD-27 Northing : 197,047.885 - Easting : 1,164,352.686*

*[derived from N.G.S. O.P.U.S. Solution REF FRAME: NAD_83 (CORS96)(EPOCH:2002.000)]*




All corners shown on this plat were found in the field during Denbury Onshore, LLC Cedar Hills 21–22 oil well survey on September 30, 2015. Distances to all others are calculated.

*I, James D. Glasser, Registered Land Surveyor, N.D. No. 5771, do hereby certify that the well plat shown hereon was made by me, or under my direction, and is true and correct to the the best of my knowledge and belief.*

REGISTERED LAND SURVEYOR
JAMES D. GLASSER
LS - 5771
NORTH DAKOTA

10/19/15
DATE


**HIGHLANDS ENGINEERING & SURVEYING, PLLC**

319 24th Street East
Dickinson, ND 58601
701.483.2444 office
701.483.2610 fax
www.highlandseng.com


NOTE: Drawing is shown based on a local coordinate system. Distances are ground distances, international feet.

HIGHLANDS ENGINEERING

PROJECT NO. 157827

*DENBURY ONSHORE, LLC*

# CEDAR HILLS 21-22

# 1248' FNL & 1654' FWL

*NW 1/4 Section 22, T131N, R105W - 5th Principal Meridian*
*Bowman County, North Dakota*

| | |
|---|---|
| EXISTING SITE ELEVATION | 2,929.8' MSL |
| PROPOSED PAD ELEVATION | 2,930.5' MSL |

| | |
|---|---|
| EXCAVATION (INCLUDES 6" TOPSOIL STRIPPING) | 13,062 CY |
| PLUS PIT | 0 CY |
| | 13,062 CY |
| EMBANKMENT | 7,828 CY |
| PLUS SHRINKAGE (30%) | 2,348 CY |
| | 10,176 CY |
| STOCKPILE PIT | 0 CY |
| STOCKPILE TOP SOIL (6") | 2,422 CY |
| ROAD EMBANKMENT OR STOCKPILE FROM PAD | 464 CY |
| DISTURBED AREA FROM PAD AND STOCKPILE | 3.70 ACRES |
| DISTURBED AREA AFTER RECLAMATION | 1.91 ACRES |

NOTE: REQUIRED EMBANKMENT IS CALCULATED AFTER 6" TOPSOIL IS STRIPPED FROM THE LOCATION.

NOTE: ALL CUT END SLOPES ARE 2:1 AND FILL END SLOPES ARE 2:1

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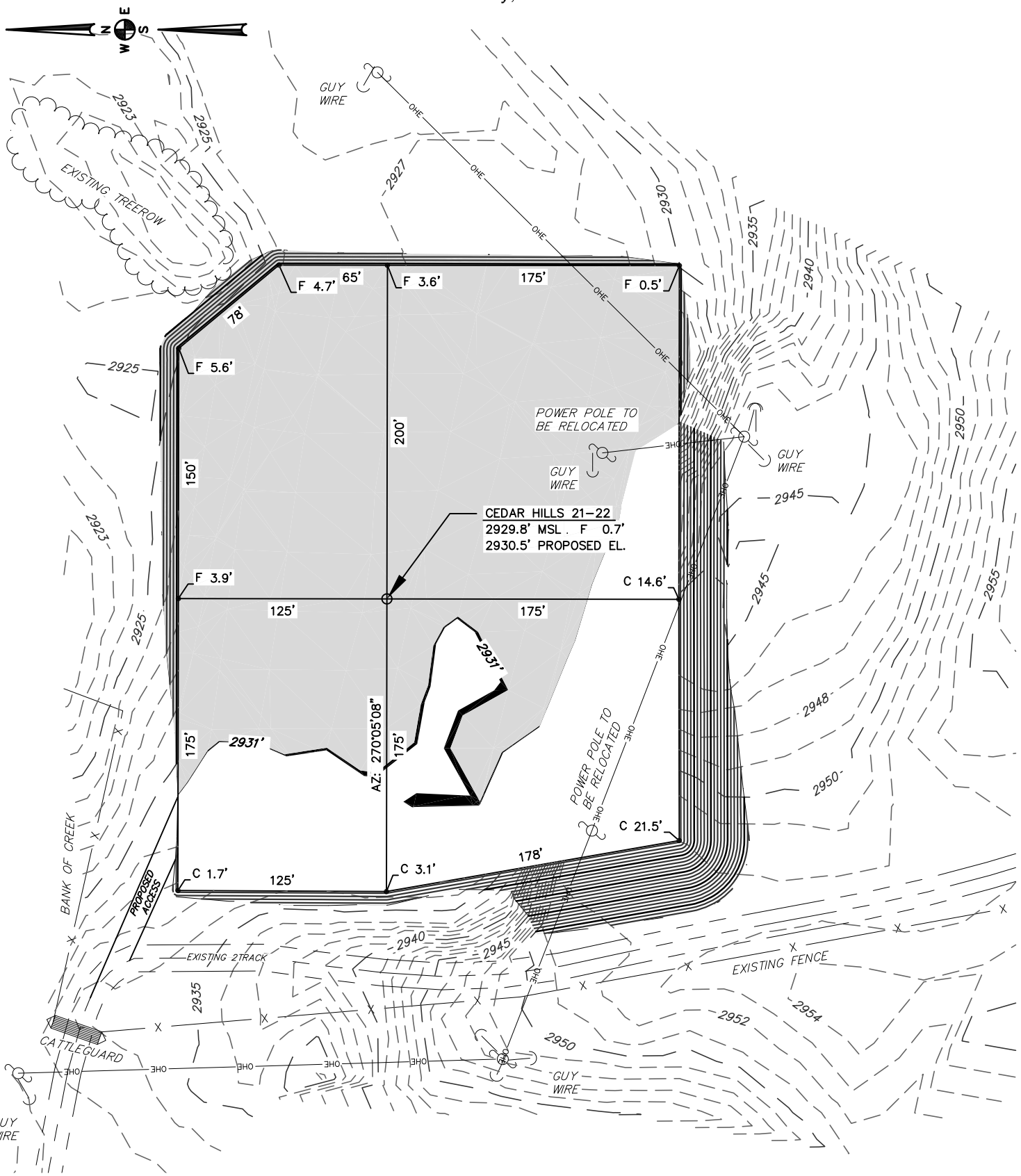
OFFICE: 701.483.2444
WWW.HIGHLANDSENG.COM

| SHEET NAME: | DATE: | DRAWN BY: | SCALE: | PROJ. NO. | SHEET NO. |
|---|---|---|---|---|---|
| QUANTITIES | 10/19/15 | KBK | N/A | 157827 | 1 of 10 |

# DENBURY ONSHORE, LLC
# CEDAR HILLS 21-22
# 1248' FNL & 1654' FWL

*NW 1/4 Section 22, T131N, R105W - 5th Principal Meridian*
*Bowman County, North Dakota*

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| SHEET NAME: | DATE: | DRAWN BY: | SCALE: | PROJ. NO. | SHEET NO. |
|---|---|---|---|---|---|
| PAD LAYOUT | 10/19/15 | KBK | 1"=80' | 157827 | 2 of 10 |

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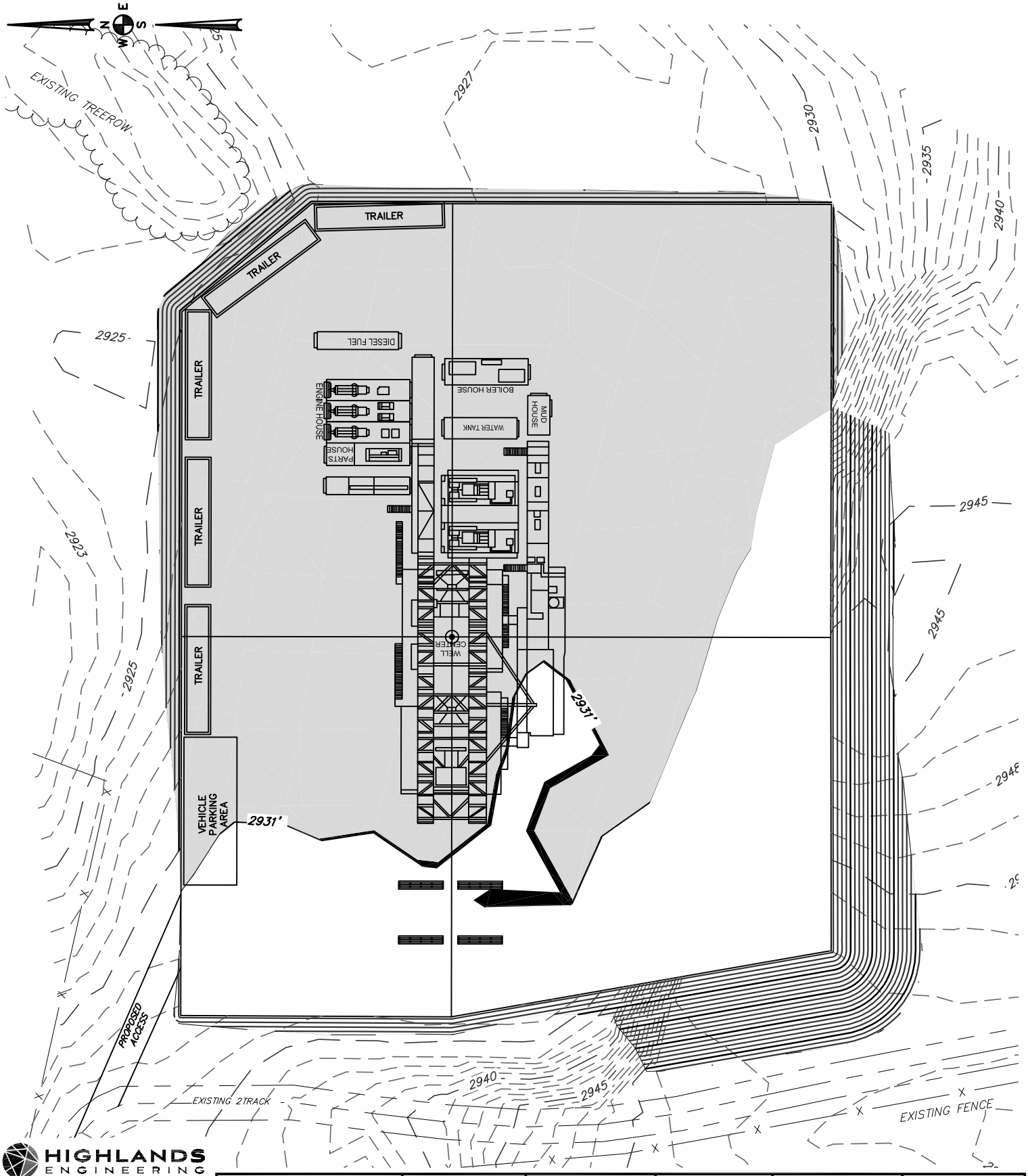
# DENBURY ONSHORE, LLC
# CEDAR HILLS 21-22
# 1248' FNL & 1654' FWL

*NW 1/4 Section 22, T131N, R105W - 5th Principal Meridian*
*Bowman County, North Dakota*

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| SHEET NAME: | DATE: | DRAWN BY: | SCALE: | PROJ. NO. | SHEET NO. |
|---|---|---|---|---|---|
| RIG LAYOUT | 10/19/15 | KBK | 1"=60' | 157827 | 3 of 10 |

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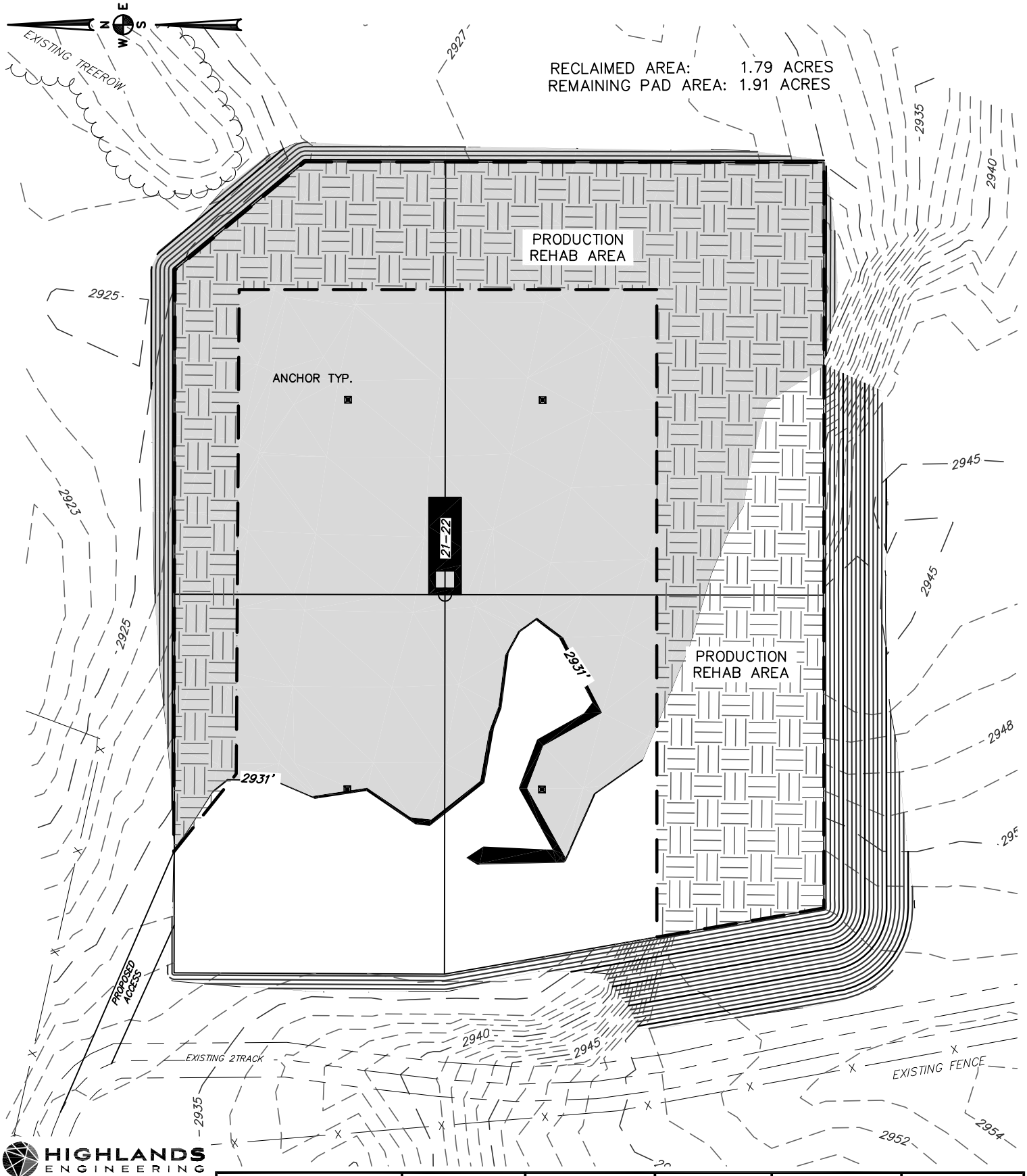
# DENBURY ONSHORE, LLC
# CEDAR HILLS 21-22
# 1248' FNL & 1654' FWL

*NW 1/4 Section 22, T131N, R105W - 5th Principal Meridian*
*Bowman County, North Dakota*

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| SHEET NAME: | DATE: | DRAWN BY: | SCALE: | PROJ. NO. | SHEET NO. |
|---|---|---|---|---|---|
| PRODUCTION LAYOUT | 10/19/15 | KBK | 1"=60' | 157827 | 4 of 10 |

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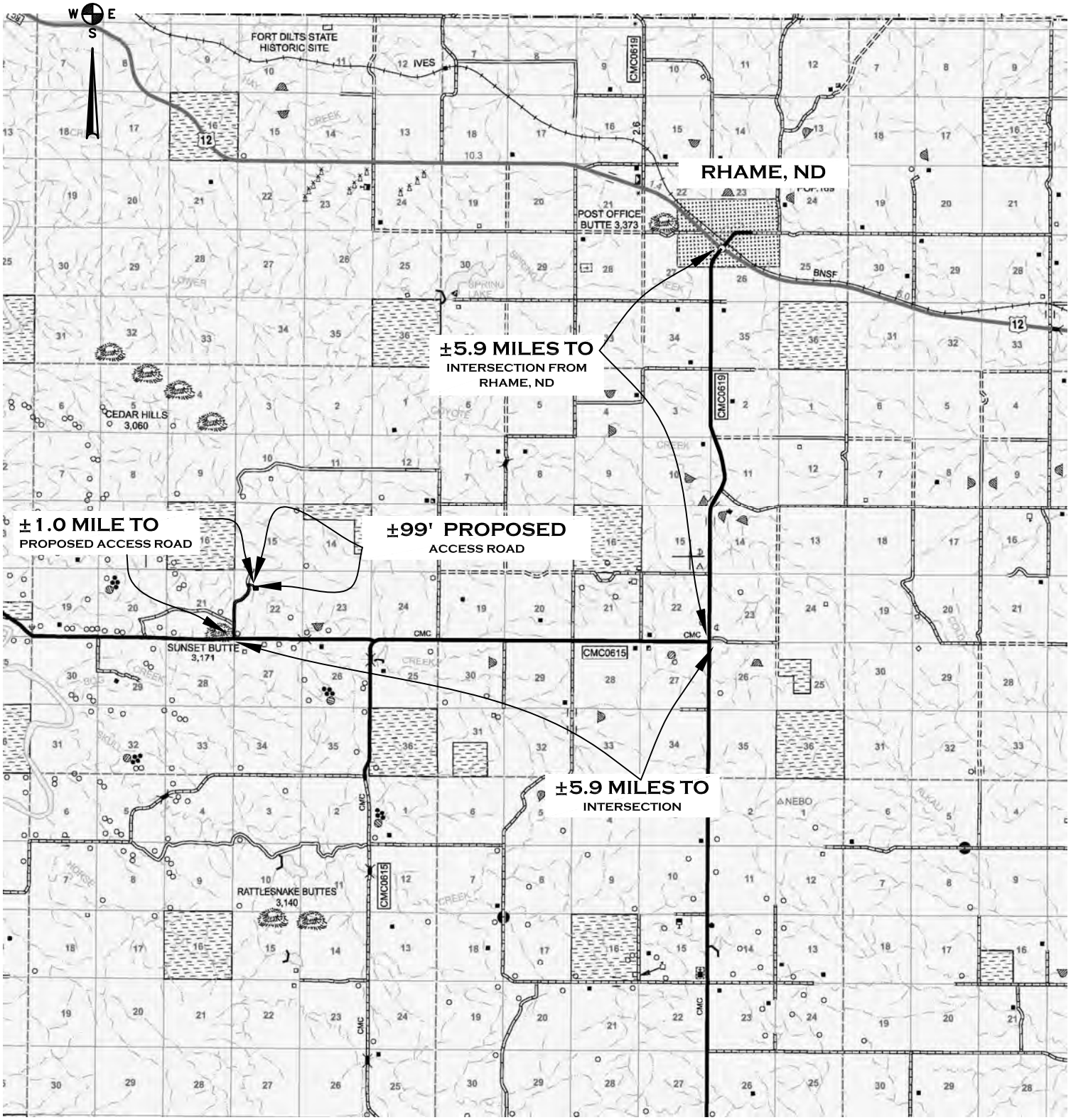
*DENBURY ONSHORE, LLC*

# CEDAR HILLS 21-22

## 1248' FNL & 1654' FWL

*NW 1/4 Section 22, T131N, R105W - 5th Principal Meridian*

*Bowman County, North Dakota*




## LEGEND

*PROPOSED ROAD* - - - - -

*EXISTING ROAD* ———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OFFICE: 701.483.2444

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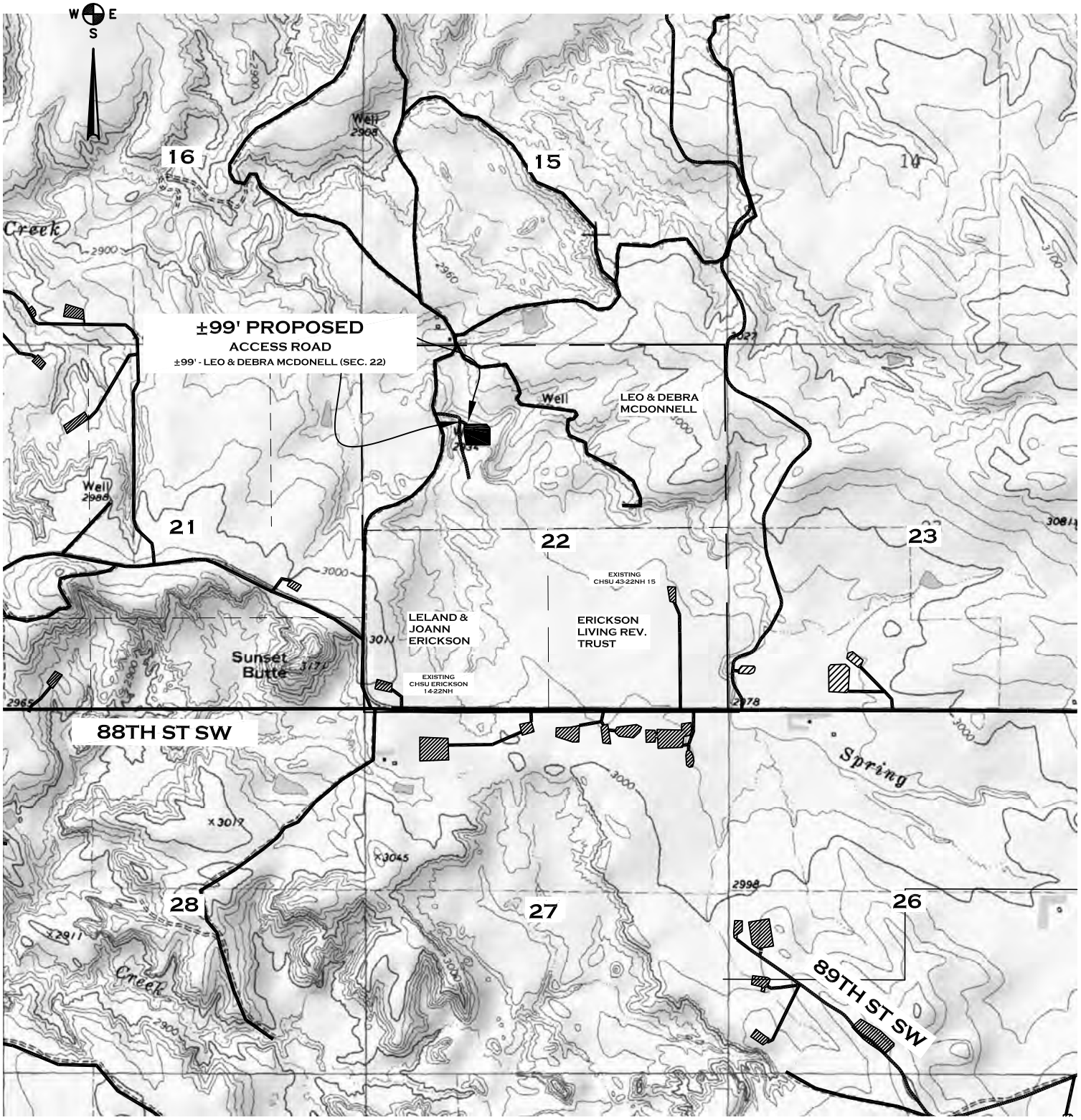
| SHEET NAME: | DATE: | DRAWN BY: | SCALE: | PROJ. NO. | SHEET NO. |
|---|---|---|---|---|---|
| COUNTY ACCESS | 10/19/15 | KBK | 1/2" = MILE | 157827 | 5 of 10 |

*DENBURY ONSHORE, LLC*

# CEDAR HILLS 21-22
# 1248' FNL & 1654' FWL

*NW 1/4 Section 22, T131N, R105W - 5th Principal Meridian*
*Bowman County, North Dakota*




## LEGEND

*PROPOSED ROAD* – – – – –
*EXISTING ROAD* ————

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OFFICE: 701.483.2444
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| SHEET NAME: | DATE: | DRAWN BY: | SCALE: | PROJ. NO. | SHEET NO. |
|---|---|---|---|---|---|
| QUAD ACCESS | 10/19/15 | KBK | 1"=2000' | 157827 | 6 of 10 |

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LAST SAVED: 10/20/2015 11:52 AM BY HONGZHI.QILIN

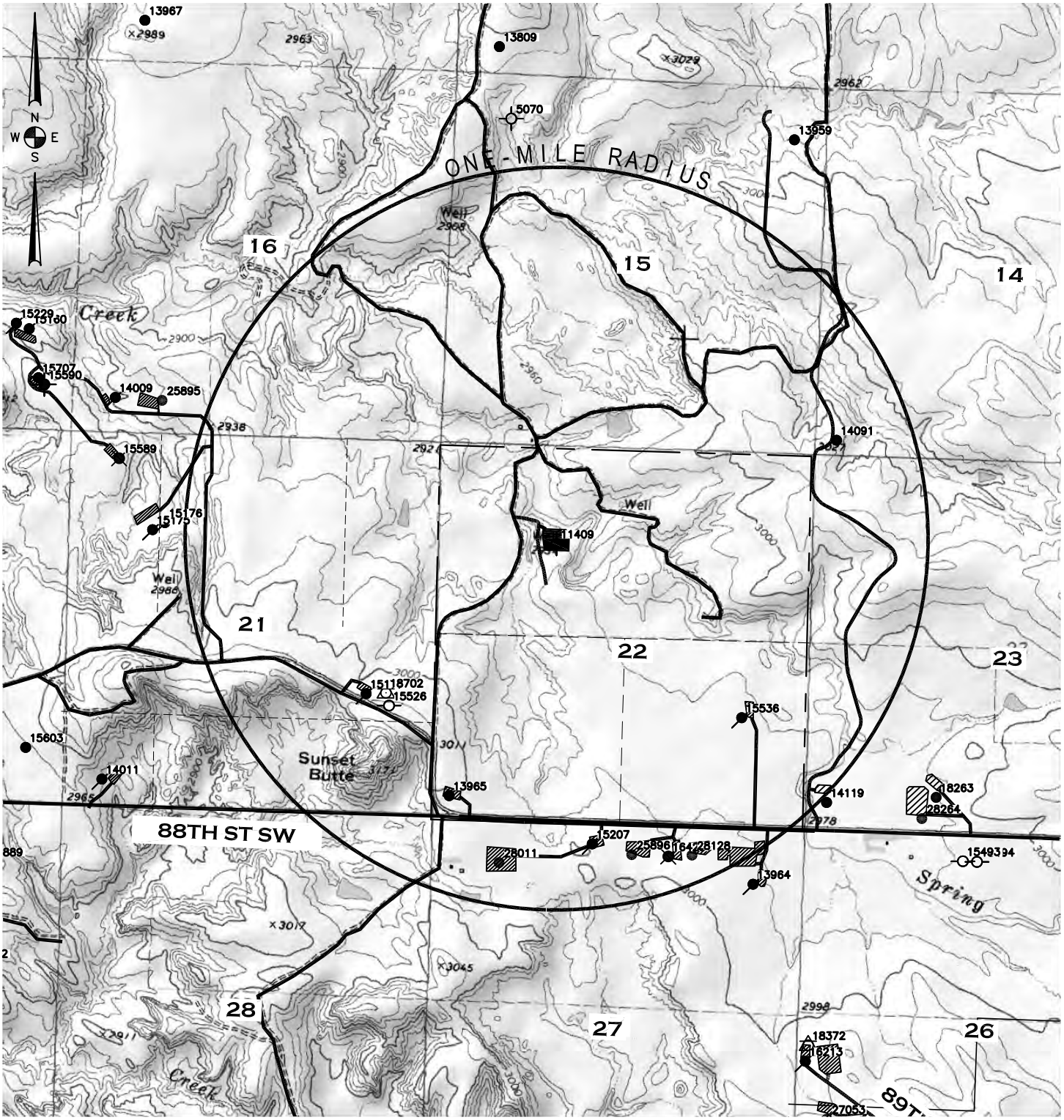
*DENBURY ONSHORE, LLC*

# CEDAR HILLS 21-22

## 1248' FNL & 1654' FWL

*NW 1/4 Section 22, TT131NN, R R105WW - 5th Principal Meridian*

*Bowman County, North Dakota*

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| SHEET NAME: | DATE: | DRAWN BY: | SCALE: | PROJ. NO. | SHEET NO. |
|---|---|---|---|---|---|
| ONE-MILE RADIUS | 10/19/15 | KBK | 1"=2000' | 157827 | 7 of 10 |

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*DENBURY ONSHORE, LLC*

# CEDAR HILLS 21-22

# 1248' FNL & 1654' FWL

*NW 1/4 Section 22, TT131NN, R R105WW - 5th Principal Meridian*

*Bowman County, North Dakota*

## *WELLS WITHIN ONE-MILE RADIUS*

| File | Operator | Well Name | Section | Township | Range | Feet NS | FNSL | Feet EW | FEWL | Status |
|---|---|---|---|---|---|---|---|---|---|---|
| 25896 | DENBURY ONSHORE, LLC | CHSU 31B-27SHR 15 | 27 | 131 | 105 | 325 | N | 2400 | E | A |
| 11409 | TOTAL PETROLEUM, INC. | CEDAR HILLS 1-22 | 22 | 131 | 105 | 1250 | N | 1650 | W | DRY |
| 15177 | DENBURY ONSHORE, LLC | CHSU 43-21SH 15 | 21 | 131 | 105 | 1780 | S | 980 | E | A |
| 15536 | DENBURY ONSHORE, LLC | CHSU 43-22NH 15 | 22 | 131 | 105 | 1695 | S | 925 | E | A |
| 28128 | DENBURY ONSHORE, LLC | CHSU 31-27NH 15 | 27 | 131 | 105 | 290 | N | 1545 | E | A |
| 13965 | DENBURY ONSHORE, LLC | CHSU ERICKSON 14-22NH 15 | 22 | 131 | 105 | 385 | S | 245 | W | A |
| 14119 | DENBURY ONSHORE, LLC | CHSU CAPTAIN 14-23NH 15 | 23 | 131 | 105 | 550 | S | 330 | W | A |
| 15207 | DENBURY ONSHORE, LLC | CHSU 21-27SH 15 | 27 | 131 | 105 | 200 | N | 2300 | W | A |
| 14091 | DENBURY ONSHORE, LLC | CHSU SPRING CREEK 14-14NH 15 | 14 | 131 | 105 | 400 | S | 250 | W | A |
| 16423 | DENBURY ONSHORE, LLC | CHSU 31B-27SH 15 | 27 | 131 | 105 | 325 | N | 1880 | E | TA |
| 18702 | BURLINGTON RESOURCES OIL & GAS COMPANY LP | CHSU 43-21NH 15 | 21 | 131 | 105 | 1805 | S | 700 | E | PNC |
| 15526 | BURLINGTON RESOURCES OIL & GAS COMPANY LP | CHSU 43-21NH 15 | 21 | 131 | 105 | 1625 | S | 650 | E | PNC |

# Legend

**wells**

**STATUS, WELL_TYPE**

- A, AGD
- A, AI
- A, CBM
- A, DF
- A, DFP
- A, GASC
- A, GASD
- A, GASN
- A, OG
- A, SWD
- A, WI
- A, WS
- A,AI
- AB, AI
- AB, DF
- AB, DFP
- AB, GASC
- AB, GASD
- AB, GI
- AB, OG
- AB, SWD
- AB, WI
- AB, WS
- Confidential, Confidential
- DRL, AI
- DRL, GASC
- DRL, GASD
- DRL, OG
- DRL, SWD
- DRL, WI
- DRY, GASC
- DRY, GASD
- DRY, OG
- DRY, ST
- EXP, GASD
- EXP, OG
- EXP, SWD
- EXP, WS
- IA, AI
- IA, CBM
- IA, DF
- IA, DFP
- IA, GASC
- IA, GASD
- IA, OG
- IA, SWD
- IA, WI
- IA, WS
- IA,AI
- LOC, GASC
- LOC, GASD
- LOC, OG
- LOC, SWD
- LOC, WI
- PA, DF
- PA, GASC
- PA, GASD
- PA, GS
- PA, OG
- PA, SWD
- PA, WI
- PA, WS
- PNC, GASD
- PNC, OG
- PNC, SWD
- TA, AI
- TA, GASC
- TA, GASD
- TA, OG
- TA, SWD
- TA, WI
- TA, WS
- TAO, GI
- TAO, OG
- TAO, WI

A = Active, AB = Abandoned, DRL = Drilling, Dry = Dry, EXP = Expired, IA = Inactive, LOC = Location, PA = Producer Abandoned, PNC = Permit Now Cancelled, TA = Temporarily Abandoned, TAO = Temporarily Abandoned Observation

AGD = Acid Gas Disposal, AI = Air Injection, DF = Dump Flood, DFP = Dump Flood Producing, GASN = Nitrogen Gas Well, GASC = Gas Condensate, GASD = Gas Dry, GI = Gas Injection, GS = Gas Storage, OG = Oil or Gas Well, SWD = Salt Water Disposal, WI = Water Injection, WS = Water Supply, ST = Strat Test

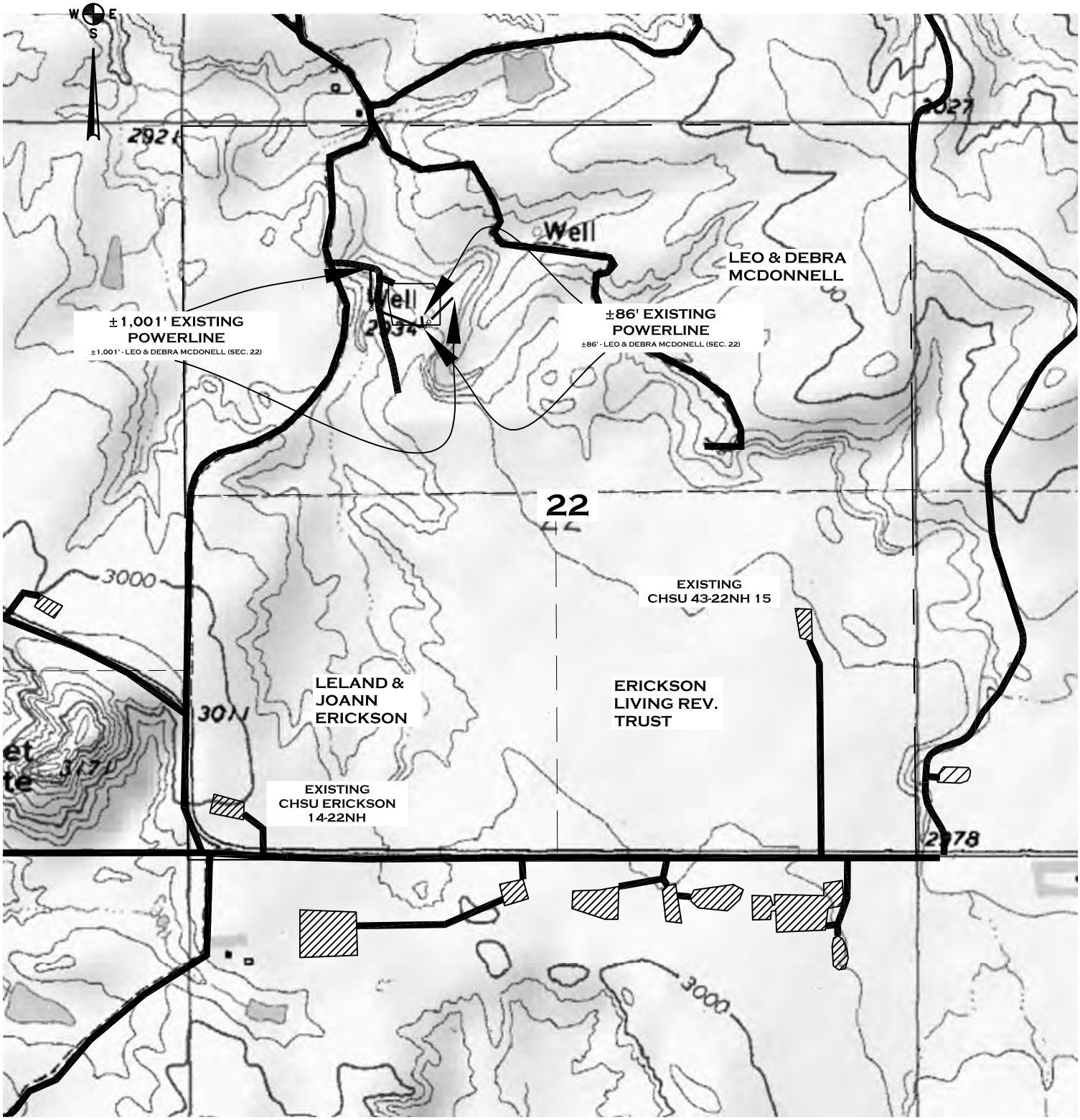
HIGHLANDS ENGINEERING
OFFICE: 701.483.2444
WWW.HIGHLANDSENG.COM

| SHEET NAME: | DATE: | DRAWN BY: | SCALE: | PROJ. NO. | SHEET NO. |
|---|---|---|---|---|---|
| GIS SYMBOLS | 10/19/15 | KBK | N/A | 157827 | 9 of 10 |

*DENBURY ONSHORE, LLC*

# CEDAR HILLS 21-22
# 1248' FNL & 1654' FWL

*NW 1/4 Section 22, T131N, R105W - 5th Principal Meridian*
*Bowman County, North Dakota*




## LEGEND

*PROPOSED ROAD* — — — — —
*EXISTING ROAD* ————
*POWER LINE* ———— OHE ————


HIGHLANDS ENGINEERING
OFFICE: 701.483.2444
WWW.HIGHLANDSENG.COM


| SHEET NAME: | DATE: | DRAWN BY: | SCALE: | PROJ. NO. | SHEET NO. |
|---|---|---|---|---|---|
| UTILITY MAP | 10/19/15 | KBK | 1"=1000' | 157827 | 10 of 10 |

NORTH DAKOTA INDUSTRIAL COMMISSION

# OIL AND GAS DIVISION



April 28, 1987

Total Petroleum Inc.
One Allen Center
Suite 2950
Houston, TX 77002

Dear Sirs:

This letter is to notify you that the well sites(s) listed below have been approved by our field personnel in regard to surface restoration.

Also, our files indicate that all reports and logs have been properly filed, and the well(s) listed are hereby removed from your bond.

However, if in the future, slumping of the pit and or trenches, erosion, casing leaks, etc. should occur, you will be required to correct the problem.

Sincerely,

Donna Bauer

Donna Bauer
Permit/Bond Secretary

DB/tp

#11409 - Cedar Hills #1-22, NE NW Sec. 22-131N-105W, Bowman County.

11409

RECEIVED
APR 1985
OIL & GAS DIVISION

# RESUME

The Total Petroleum 1-22 Cedar Hills prospect was drilled 1250' FNL and 1650' FWL in Section 22, T 131 N-R 105 W, Bowman County, North Dakota. The well was spudded 2/28/85 and finished running electric logs 3/20/85. Total depth was 9500' in the Red River Formation. 8 5/5" surface casing was set at a depth of 2013' KB and cemented with 770 sax lite and 200 sax class G with 2% calcuim and 1/4# Flo seal.

The well was drilled by Noble Drilling rig #75, under the supervision of Randy Martin, tool pusher; L. F. Scott, drilling engineer; and Tom Graff, geologist. Continental Lab did the mud logging with Gordon McPherson as technician.

## SUMMARY AND CONCLUSIONS

I arrived on location Monday, March 11, 1985, at a depth of 8200'. The well was drilling in the Mississippian Lodgepole formation. No significant sample or mud log shows were present in up hole formations from the Lower Mississippian to the top of the Red River formation. Oil Shows existed in four zones within the Red River formation. The Red River "A" zone had a good sample and mud log show (Show Report #1) and was drill stem tested with significant oil recovery (DST #1). The zone also made salt water and the ratio of water to oil would indicate non-commerical production. The Red River "B" zone had good shows of oil in the samples but very little gas increase while drilling (Show Report #2). The zone was not drill stem tested and electric logs calculate salt water. The Red River "C" zone was cored (see Core Description). It was also drill stem tested with salt water almost flowing to the surface (DST #2). Logs and core analysis confirm the negative drill stem test. The Red River "D" zone had poor dolomite porosity development with a minor sample show. No gas increase was logged and electric logs show it to be tight. In conclusion the Red River "A" zone offers the only possibility for hydrocarbon production and all indications are that this would be non-commerical, consequently the well was plugged and abandoned.

## FORMATION TOPS

| Formation | Sample | Electric Log | Subsea |
|---|---|---|---|
| Duperow | 8406 | 8407 | (-5465) |
| Interlake | 8645 | 8647 | (-5705) |
| Stoney Mountain | 9077 | 9070 | (-6128) |
| Red River | 9147 | 9140 | (-6198) |
| Red River "A" | 9193 | 9188 | (-6246) |
| Red River "B" | 9262 | 9256 | (-6314) |
| Red River "C" | 9323 | 9318 | (-6376) |
| Red River "D" | 9410 | 9408 | (-6466) |
| Total Depth | 9500 | 9500' | (-6558) |
| KB 2942 | | | |

## SHOW REPORTS

Show #1 Red River "A" 9193-9203
drlg rate before 8 min/ft, during 1 min/ft, after 7 min/ft.
Total gas before 5 units, during 88 units, after 50 units

| | | |
|---|---|---|
| $C_1$ before, .01%, | during .3750%, | after .1860% |
| $C_2$ before, .002%, | during .21%, | after .1060% |
| $C_3$ before, .002%, | during .1570%, | after .0952% |
| $IC_4$ before, --, | during .01% | after .0080% |
| $NC_4$ before, --, | during .034%, | after .023% |

Show #2 Red River "B" 9267-9300
drlg. rate before 9 min/ft, during 1-2 min/ft, after 6 min/ft
Total gas before, 6 units, during 17 units, after 8 units

| | | |
|---|---|---|
| $C_1$ before, .092%, | during .0445%, | after .0145% |
| $C_2$ before, .04%, | during .032%, | after .0065% |
| $C_3$ before, .043%, | during .0312%, | after .0057% |
| $IC_4$ before, --, | during .0010%, | after -- |
| $NC_4$ before, .0112%, | during .0170%, | after .017% |

## DST REPORTS

DST No. 1 9152'-9206' Lynes
Red River "A"

| | | |
|---|---|---|
| IH | 4947 | |
| IF | 85-158 | 5 min |
| ISI | 3865 | 60 |
| 2F | 183-360 | 180 |
| FSI | 3520 | 180 |
| 3F | 415-523 | 180 |
| FH | 4847 | |
| BHT | 218°F | |

1F open at 1/2", 2" 1 min through 5 min
2F open at 1/2", 8" at 10 min. 1 lbs at 20 min, 2 lbs at 40 min. 2 1/2 lbs at 50 min, 2 bls at 60 min, 2 1/2 lbs at 70 min, 3 lbs at 110-180 min
GTS 55 min into FSI
3F open at 1", 4" at 15 min, 1 lbs at 30 min, 1/2 lbs at 60 min, 10" at 80 min, 8" at 120 min, 5" at 150 min, 6" at 160 min, 7" at 170-180 min

Recovery
Pipe
410' HGCO API 41° at 62°
850' SW .26 at 60° = 28,000 ppm $CL^-$
Sampler
.15 cu ft gas at 120 psi
500 cc oil API 41 at 60°
1600 cc water .15 at 62° = 65,000 ppm $CL^-$
Pit mud = .06 at 53° = 195,000 ppm $CL^-$

DST No. 2 9321'-9388' Lynes
Red River "C"

| | | |
|---|---|---|
| IH | 5123 | |
| IF | 680-1003 | 5 min |
| ISI | 4124 | 60 |
| 2F | 1022-3795 | 180 |
| FSI | 4086 | 180 |
| 3F | 3818-4067 | 180 |
| FS | 5123 | |
| BHT | 225°F | |

IF open with SB, 3" at 1 min, 9" at 3 min, 18" at 5 min
2F open at 1/2", 15" at 5 min, 22" at 10 min, 21" at 20 min, 7" at 60 min, 3" at 90 min, 1 1/2" at 120 min, SB at 180 min
3F open at 1/2", 1/8" at 20 min, SB 30-50 min, weak SB 60-120 min, dead 130-180 min

Recovery
Pipe
310' amon 8 inhib cut mud
8715' water .35 at 65° = 20,000 ppm $CL^-$
Sampler
2300 cc water .29 at 65° = 25,000 ppm $CL^-$
pit mud = .05 at 68° = 190,000 ppm $CL^-$

BIT RECORD

| Bit No. | MAKE | Size | Type | Serial | Depthout | Feet | Hours | Com Hours | Dev. |
|---|---|---|---|---|---|---|---|---|---|
| 1 | HTC | 12 1/4 | OSC-3AJ | VW480 | 2018 | 1956 | 20 | 20 | 1° |
| 2 | HTC | 7 7/8 | J1 | HE202 | 4567 | 2549 | 31 | 51 | 1 1/4° |
| 3 | SEC | 7 7/8 | S-86-F | 411342 | 6583 | 2016 | 70 | 121 | 1/2° |
| 4 | SEC | 7 7/8 | M84F | 185930 | 8235 | 1652 | 84 1/2 | 205 1/2 | 3/4° |
| 5 | STC | 7 7/8 | F57 | EP5861 | 9206 | 971 | 76 1/2 | 282 | 1° |
| 6 | HTC | 7 7/8 | J44 | DR990 | 9328 | 122 | 11 | 293 | -- |
| 7 | CHRIS ◇ | 7 7/8 | SC-276 | 0111030 | 9388 | 60 | 6 1/2 | 299 1/2 | -- |
| RR#6 | HTC | 7 7/8 | J44 | DR990 | 9500 | 112 | 8 1/2 | 308 | 1° |

MUD DATA

| DATE | DEPTH | WT | VIS | PV | YP | GEL STRENGTH | PH | WL | CHLOR. | SALT |
|---|---|---|---|---|---|---|---|---|---|---|
| 3/11 | 8114 | 10.3 | 31 | 4 | 2 | 1/2 | 7.4 | 10 | 195K | 322K |
| 3/12 | 8376 | 10.4 | 32 | 6 | 4 | 2/4 | 7 | 12 | 192K | 316K |
| 3/13 | 8664 | 10.3 | 32 | 4 | 2 | 1/3 | 7.2 | 24 | 192K | 317K |
| 3/14 | 9011 | 10.3 | 37 | 9 | 7 | 3/5 | 7.1 | 20 | 191K | 315K |
| 3/15 | 9195 | 10.3 | 35 | 8 | 6 | 2/5 | 7.0 | 10 | 195K | 322K |
| 3/16 | 9206 | 10.3 | 36 | 9 | 5 | 2/5 | 7.1 | 10 | 195K | 322K |
| 3/17 | 9503 | 10.3 | 39 | 12 | 8 | 3/7 | 7.2 | 8 | 191K | 315K |
| 3/18 | 9538 | 10.4 | 38 | 11 | 9 | 4/10 | 7.0 | 10.2 | 191K | 315K |
| 3/19 | 9463 | 10.5 | 36 | 9 | 7 | 3/8 | 7.0 | 11.4 | 200K | 300K |
| 3/20 | Logging | | | | | | | | | |

## CORE DESCRIPTION

Core #1 9328-9388

9328-31 Dolomite medium to dark brown, very finely crystalline, microsucrosic, limy in part, vugular, dark brown oil stain, uneven yellow gold fluorescence, bleeding dark brown to black oil, fair intercrystalline porosity.

9331-33 Dolomitic limestone dark brown, microcrystalline, firm, hard, dense, tight, slightly argillaceous, no stain, odor, fluorescence or cut, calcareous inclusions.

9333-40 Dolomite medium to dark brown, very finely crystalline, microsucrosic, vugular, burrowed, calcareous inclusions, spotty dark brown oil stain, uneven dull yellow gold fluorescence, fast streaming yellow-blue cut, black dead oil in spots, fair oil show, possible water.

9340-47 Dolomite, medium to light brown, very finely crystalline, microsucrosic, fair intercrystalline porosity, calcareous inclusions, uneven brown oil stain and black asphaltic oil in places, no fluorescence, still cuts due to dead oil, probable water.

9347-50 Dolomite, medium to dark brown, microcrystalline firm, hard, tight, and anhydrite light brown, cryptocrystalline, dense, tight, no vugs, minor black dead oil stain, shale partings, still cuts due to dead oil.

9350-54 Dolomite medium to dark brown, microcrystalline to very finely crystalline, dense, tight, trace poor intercrystalline porosity, calcareous inclusions, scattered dark brown to black oil stain, core bleeding black oil unevenly, probable water.

9354-56 Dolomite, medium to light brown, microcrystalline to very finely crystalline, firm, dense, tight, no stain, odor, fluorescence or cut, trace dark brown to black dead oil, mottled with calcareous inclusions

9356-62 Dolomite medium brown, microcrystalline, occasionally very finely crystalline, firm, dense, tight, slightly argillaceous, limy calcareous inclusions, no stain, odor, fluorescence or cut, grades to dolomitic limestone.

9362-68 Dolomite and dolomitic limestone, medium brown, microcrystalline, firm, hard to soft and earthy, vugular, burrowed, mottled with limestone inclusions, no stain, odor, fluorescence or cut, probable water.

9368-75 Dolomite, medium to dark brown, microcyrstalline to very finely crystalline, uniformly even textured, no vugs or burrows, earthy, very slightly argillaceous, no stain, odor, fluorescence or cut, tight, probable water.

9375-79 Dolomite, medium brown, very finely crystalline, firm, poor intercrystalline porosity, microsucrosic, mottled with calcareous inclusions, uneven brown oil stain, uneven dull gold fluorescence, minor black dead oil, very slow streaming yellow-blue cut, poor oil show, probable water.

9379-82 Dolomitic limestone, dark brown, microcrystalline, firm, dense, tight, minor shale partings, fossiliferous, calcareous inclusions, no stain, odor, fluorescence or cut.

9382-85 Dolomite, medium brown, microcrystalline, occasionally very finely crystalline and microsucrosic, calcareous inclusions, poor intercrystalline porosity, very uneven dull gold fluorescence, uneven dark brown oil stain, fast streaming yellow-blue cut, fair to poor oil show, possible water.

9385-87 Limestone, dark brown, microcrystalline, argillaceous, carbonaceous, tight, spotty yellow fluorescence, fast streaming yellow-blue cut, poor oil show.

9378-88 Dolomite, medium brown, very finely crystalline, microsucrosic, limy calcareous inclusions, very weak and spotty dull gold fluorescence, trace brown oil stain, very slow streaming yellow-blue cut, tight to poor intercrystalline porosity, probable water.

## FORMATION SUMMARY

### Lodgepole

Samples in the interval 8330-8406 consisted of limestone, white-buff-light brown, very fine to fine crystalline and occasionally microcyrstalline. Fair intercrystalline porosity was present but there were no hydrocarbon shows in the samples and no gas increases. The samples displayed only dull mineral fluorescence. The lower portion of the interval had minor interbeds of medium to dark gray slightly calcareous shale.

### Duperow 8406-8645

The Duperow consists of dolomite and slightly dolomitic limestone with interbeds of shale. The dolomite is tan-cream-buff-pink-gray brown. It's hard and fine, cryptocrystalline to very finely crystalline, slightly to moderately argillaceous. Only very poor intercrystalline porosity was present. Samples displayed abundant yellow mineral fluorescence. The dolomitic limestone is white-gray brown, cryptocrystalline to microcrystalline, chalky and very slightly argillaceous. Only poor and

scattered intercrystalline porosity was present. No hydrocarbon shows were logged. Interbeds in the Upper Duperow consist of dark gray to gray brown calcareous to non-calcareous shale. The lower units above the Interlake are multicolored gray, green, orange and purple shales with minor interbedded anhydrite.

Interlake 8645-9077

The Interlake consists of dolomite and thin interbeds of shale and anhydrite. The dolomite is white to light brown to mottled pink and lavender. It ranges from cryptocrystalline to very finely crystalline and is slightly to moderately argillaceous in part. Certain zones display fair to good intercrystalline porosity. Bright yellow mineral fluorescence was present but there was no indication of hydrocarbons except for a 2 unit increase in background gas. Shale interbeds were gray to gray green to orange to purple, soft, blocky, silty and slightly calcareous. Minor white microcrystalline to very finely crystalline anhydrite was also present.

Stoney Mountain 9077-9147

The Stoney Mountain is a sequence of very argillaceous limestone, dolomite, and calcareous shale. The limestone is white to light gray brown to dark gray. It's mottled and very argillaceous and grades to very calcareous shale and soft earthy dolomite. The interval contains numerous fossil shell fragments and worm burrows. No rocks of reservoric quality exist.

Red River 9147-9500

The only significant shows of oil and gas in the 1-22 Cedar Hills well were found in the Red River formation. It consists of an interbedded sequence of limestone, dolomite and anhydrite with distinct zones of dolomite porosity. For convenience, the Red River porosity is separated and will be discussed in order from top to bottom.

Red River "A" 9147-9237

The Red River "A" consists of a sequence of limestone, dolomite, and anhydrite. The limestone is light to medium brown, cryptocrystalline to microcrystalline, firm, dense, and tight. Porosity develops where dolomite is present. The dolomite is dark brown, very finely crystalline and microsucrosic. It has fair to good intercrystalline porosity, dark brown oil stain, yellow gold fluorescence and bright yellow-green fast streaming cut. A good drilling break and gas increase was logged in the interval 9193-9203. Drilling penetration averaged 1 min/ft and an eighty-three unit gas increase was logged with $C_1$-$NC_4$ being present (Show Report #1). In addition, the interval 9152-9206 was drill stem tested and recovered 410' of heavily gas cut oil and 850' of salt water. The sample chamber contained .15 cubic feet of gas, 500 cc of oil and 1600 cc of salt water (DST #1 ). In conclusion, samples, tests, gas analysis, and electric logs indicate oil and salt water production from the "A" zone.

Red River "B" 9273-9323

The upper portion of the "B" zones consists of anhydrite and tight limestone. Porosity developes in dolomite in the interval 9262-9303. Drilling penetration averaged 2 min/ft. Samples were described as dolomite dark brown, very finely crystalline, microsucrosic, slightly argillaceous with fair intercrystalline porosity. The dolomite had dark brown oil stain, uneven dull gold fluorscence and fast streaming yellow-blue cut. It was described as a fair oil show but only 17 units of total gas was logged with $C_1NC_4$ being present (Show Report #2). The zone was not drill stem tested. Electric logs calculate high salt water saturation.

Red River "C" 9323-9410

The Red River "C" zone, because of it's thickness, is usually the best zone of production in the Bowman County area. In the 1-22 Cedar Hills well a zone of porosity was developed between 9323'-9388'. A sixty foot core was cut and analyzed (9328'-9388'). Good porosity was developed with some oil show, but low permeability and oil saturation indicate salt water (see Core Description). In addition, the interval 9321'-9388' was drill stem tested and recovered 8715 feet of salt water with no hydrocarbon show. The sample chamber contained 2300 cc of salt water. Electric logs confirm salt water production from the Red River "C" zone.

Red River "D" 9410-9500

Very little "D" zone porosity was developed in this well. A slight increase in drilling penetration was logged but no gas increase was present. The samples in this interval were interbedded dolomite and limestone, light to medium brown very finely crystalline to microcrystalline. Only poor intercrystalline porosity was developed in dolomite. There was dull gold fluorescence and very few pieces would yield a slow streaming yellow-blue cut. Low porosity and resistivity on electric logs indicates high water saturations.

CORE ANALYSIS REPORT

FOR

TOTAL PETROLEUM CORP.

NO. 1-22 CEDAR HILLS

WILDCAT

BOWMAN COUNTY, NORTH DAKOTA


CONFIDENTIAL

# CORE LABORATORIES, INC.

*Petroleum Reservoir Engineering*

DALLAS, TEXAS

CONFIDENTIAL

TOTAL PETROLEUM CORP.
NO. 1-22 CEDAR HILLS
WILDCAT
BOWMAN COUNTY, NORTH DAKOTA

DATE : 3-18-85
FORMATION : RED RIVER "C"
DRLG. FLUID: SALT GEL NO OIL
LOCATION : NE NW SEC 22 T131N R105W

FILE NO : 3805-3628
ANALYSTS : R.E.B.
ELEVATION: 2942 KB
WILLISTON, NORTH DAKOTA

## FULL DIAMETER BOYLE'S LAW ANALYSIS

| SAMPLE NUMBER | DEPTH | PERM. TO AIR (MD) MAXIMUM | 90 DEG | POR. He | FLUID SATS. OIL | WTR | GRAIN DEN | | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|
| | 9328.0-9388.0 | | CORE NO. 1 RED RIVER "C" FM. | | | | | | |
| | | | 3-18-85 CUT 60' REC. 60' | | | | | | |
| 1 | 9328.0-29.0 | 0.97 | * | 8.4 | 25.5 | 23.7 | 2.79 | | DOL V/FN XLN-SUC LIMY SCAT VUG |
| 2 | 9329.0-30.0 | 0.67 | 0.17 | 10.9 | 38.8 | 12.9 | 2.80 | | DOL V/FN XLN-SUC LIMY SCAT VUG |
| 3 | 9330.0-31.0 | 2.00 | 0.25 | 8.3 | 10.0 | 42.9 | 2.78 | VF | DOL V/FN XLN-SUC LIMY SCAT VUG |
| 4 | 9331.0-32.0 | 0.30 | 0.25 | 5.8 | 62.5 | 13.9 | 2.79 | | DOL V/FN XLN-SUC LIMY CARB STY |
| 5 | 9332.0-33.0 | 0.19 | * | 5.3 | 0.0 | 22.6 | 2.80 | | DOL V/FN XLN-SUC LIMY CAL INC |
| 6 | 9333.0-34.0 | 0.38 | 0.21 | 10.2 | 6.9 | 55.0 | 2.83 | | DOL V/FN XLN-SUC LIMY SCAT VUG |
| 7 | 9334.0-35.0 | 4.70 | 0.21 | 14.5 | 11.0 | 56.8 | 2.85 | VF | DOL V/FN XLN-SUC SCAT VUGS CAL |
| 8 | 9335.0-36.0 | 5.30 | * | 10.8 | 19.0 | 47.1 | 2.82 | | DOL V/FN XLN-SUC SCAT VUGS CAL |
| 9 | 9336.0-37.0 | 17. | * | 10.4 | 16.9 | 33.7 | 2.81 | | DOL V/FN XLN-SUC SCAT VUGS CAL |
| 10 | 9337.0-38.0 | 6.70 | 0.14 | 11.1 | 16.7 | 35.7 | 2.84 | | DOL V/FN XLN-SUC SCAT VUGS CAL |
| 11 | 9338.0-39.0 | 1.30 | 0.11 | 12.3 | 9.1 | 61.0 | 2.83 | | DOL V/FN XLN-SUC SCAT VUGS CAL |
| 12 | 9339.0-40.0 | 1.40 | 0.10 | 13.9 | 3.5 | 71.8 | 2.82 | | DOL V/FN XLN-SUC SCAT VUGS AL |
| 13 | 9340.0-41.0 | 2.20 | 0.25 | 14.4 | 1.5 | 77.1 | 2.83 | | DOL V/FN XLN-SUC SCAT VUGS CAL |
| 14 | 9341.0-42.0 | 11. | 7.40 | 12.6 | 5.1 | 68.3 | 2.81 | | DOL V/FN XLN-SUC SCAT VUGS CAL |
| 15 | 9342.0-43.0 | 7.70 | 0.19 | 15.1 | 1.7 | 70.7 | 2.82 | | DOL V/FN XLN-SUC CAL INC |
| 16 | 9343.0-44.0 | 0.65 | 0.60 | 17.0 | 3.1 | 68.2 | 2.83 | | DOL V/FN XLN-SUC CAL INC |
| 17 | 9344.0-45.0 | 23. | 0.12 | 18.8 | 3.1 | 72.2 | 2.83 | | DOL V/FN XLN-SUC CAL INC |
| 18 | 9345.0-46.0 | 26. | * | 24.7 | 1.0 | 78.5 | 2.81 | | DOL V/FN XLN-SUC CAL INC |
| 19 | 9346.0-47.0 | 30. | * | 13.7 | 0.8 | 69.9 | 2.81 | | DOL V/FN XLN-SUC CAL INC |
| 20 | 9347.0-48.0 | 3.50 | 0.73 | 14.4 | 0.8 | 82.9 | 2.85 | | DOL V/FN XLN-SUC ANHY |
| 21 | 9348.0-49.0 | 1.80 | 1.50 | 15.1 | 0.9 | 80.7 | 2.85 | | DOL V/FN XLN-SUC ANHY |
| 22 | 9349.0-50.0 | 42. | * | 15.9 | 0.6 | 81.1 | 2.82 | | DOL V/FN XLN-SUC CAL INC |
| 23 | 9350.0-51.0 | 18. | * | 13.6 | 6.4 | 65.7 | 2.81 | | DOL V/FN XLN-SUC SCAT VUGS CAL |

CORE LABORATORIES, INC.
*Petroleum Reservoir Engineering*
DALLAS, TEXAS

TOTAL PETROLEUM CORP.
NO. 1-22 CEDAR HILLS

DATE : 3-18-85
FORMATION : RED RIVER "C"

FILE NO : 3805-3628
ANALYSTS : R.E.B.

## FULL DIAMETER BOYLE'S LAW ANALYSIS

| SAMPLE NUMBER | DEPTH | PERM. TO AIR (MD) MAXIMUM | 90 DEG | POR. He | FLUID SATS. OIL | WTR | GRAIN DEN | | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|
| 24 | 9351.0-52.0 | 5.20 | 1.30 | 17.1 | 1.6 | 66.5 | 2.83 | | DOL V/FN XLN-SUC CAL INC |
| 25 | 9352.0-53.0 | 2.10 | 1.50 | 10.0 | 1.9 | 55.8 | 2.85 | | DOL V/FN XLN-SUC CAL INC |
| 26 | 9353.0-54.0 | 2.80 | 0.75 | 11.0 | 1.0 | 60.8 | 2.83 | | DOL V/FN XLN-SUC CAL INC |
| 27 | 9354.0-55.0 | 7.80 | 6.20 | 11.7 | 1.0 | 75.3 | 2.82 | | DOL V/FN XLN-SUC CAL INC |
| 28 | 9355.0-56.0 | 33. | * | 17.1 | 1.9 | 59.7 | 2.83 | | DOL V/FN XLN-SUC LIMY CAL INC |
| 29 | 9356.0-57.0 | 14. | 0.22 | 18.4 | 3.9 | 68.6 | 2.85 | | DOL V/FN XLN-SUC |
| 30 | 9357.0-58.0 | 6.50 | 3.20 | 14.9 | 4.3 | 70.4 | 2.82 | | DOL V/FN XLN-SUC LIMY CAL INC |
| 31 | 9358.0-59.0 | 2.90 | * | 11.4 | 0.9 | 78.9 | 2.79 | | DOL V/FN XLN-SUC LIMY CAL INC |
| 32 | 9359.0-60.0 | 6.70 | 5.80 | 18.3 | 1.0 | 76.6 | 2.80 | | DOL V/FN XLN-SUC LIMY CAL INC |
| 33 | 9360.0-61.0 | 4.90 | * | 10.6 | 0.9 | 71.2 | 2.81 | | DOL V/FN XLN-SUC CAL INC |
| 34 | 9361.0-62.0 | 7.90 | * | 8.2 | 1.4 | 81.7 | 2.82 | | DOL V/FN XLN-SUC |
| 35 | 9362.0-63.0 | 16. | 8.60 | 17.2 | 0.6 | 78.5 | 2.83 | | DOL V/FN XLN-SUC |
| 36 | 9363.0-64.0 | 3.40 | * | 10.2 | 0.9 | 78.4 | 2.82 | | DOL V/FN XLN-SUC SCAT VUGS CAL |
| 37 | 9364.0-65.0 | 17. | * | 14.3 | 0.7 | 78.6 | 2.82 | | DOL V/FN XLN-SUC CAL INC |
| 38 | 9365.0-66.0 | 1.70 | * | 8.9 | 1.5 | 85.6 | 2.83 | | DOL V/FN XLN CAL INC |
| 39 | 9366.0-67.0 | 8.50 | 0.31 | 16.4 | 8.4 | 57.9 | 2.85 | | DOL V/FN XLN-SUC SCAT VUGS CAL |
| 40 | 9367.0-68.0 | 5.40 | 2.00 | 14.9 | 1.8 | 81.5 | 2.86 | | DOL V/FN XLN-SUC SCAT VUGS |
| 41 | 9368.0-69.0 | 6.10 | 0.42 | 12.6 | 1.4 | 77.7 | 2.87 | | DOL V/FN XLN-SUC |
| 42 | 9369.0-70.0 | 5.10 | 0.20 | 12.7 | 1.0 | 76.3 | 2.87 | | DOL V/FN XLN-SUC |
| 43 | 9370.0-71.0 | 6.30 | 5.20 | 13.9 | 10.5 | 68.4 | 2.85 | | DOL V/FN XLN-SUC CAL INC |
| 44 | 9371.0-72.0 | 0.56 | * | 13.0 | 8.3 | 61.7 | 2.83 | | DOL V/FN XLN-SUC |
| 45 | 9372.0-73.0 | 0.30 | * | 9.7 | 1.8 | 72.8 | 2.83 | VF | DOL V/FN XLN-SUC |
| 46 | 9373.0-74.0 | 0.76 | 0.63 | 11.8 | 1.9 | 71.6 | 2.86 | VF | DOL V/FN XLN-SUC CAL INC |
| 47 | 9374.0-75.0 | 2.20 | * | 12.4 | 1.4 | 64.3 | 2.83 | VF | DOL V/FN XLN-SUC |
| 48 | 9375.0-76.0 | 3.50 | * | 15.6 | 0.8 | 63.5 | 2.83 | VF | DOL V/FN XLN-SUC CAL INC |
| 49 | 9376.0-77.0 | 2.00 | 0.95 | 9.3 | 8.5 | 54.7 | 2.86 | | DOL V/FN XLN-SUC CAL INC |
| 50 | 9377.0-78.0 | 4.20 | * | 8.1 | 6.2 | 58.7 | 2.83 | | DOL V/FN XLN-SUC CAL INC |
| 51 | 9378.0-79.0 | 5.80 | 0.34 | 14.3 | 4.2 | 65.4 | 2.83 | | DOL V/FN XLN-SUC CAL INC |
| 52 | 9379.0-80.0 | 3.90 | * | 11.5 | 6.9 | 58.2 | 2.82 | | DOL V/FN XLN-SUC CAL INC |
| 53 | 9380.0-81.0 | 0.02 | 0.02 | 2.8 | 26.0 | 62.5 | 2.81 | VF | DOL V/FN XLN-SUC LIMY CAL INC |

# CORE LABORATORIES, INC.

*Petroleum Reservoir Engineering*

DALLAS, TEXAS

TOTAL PETROLEUM CORP.
NO. 1-22 CEDAR HILLS

DATE : 3-18-85
FORMATION : RED RIVER "C"

FILE NO : 3805-3628
ANALYSTS : R.E.B.

## FULL DIAMETER BOYLE'S LAW ANALYSIS

| SAMPLE NUMBER | DEPTH | PERM. TO AIR (MD) MAXIMUM | 90 DEG | POR. He | FLUID SATS. OIL | WTR | GRAIN DEN | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|
| 54 | 9381.0-82.0 | 2.80 | * | 17.1 | 3.5 | 73.5 | 2.83 | DOL V/FN XLN-SUC CAL INC |
| 55 | 9382.0-83.0 | 1.60 | 0.85 | 10.3 | 5.0 | 73.4 | 2.86 | DOL V/FN XLN-SUC CAL INC |
| 56 | 9383.0-84.0 | 4.20 | 0.06 | 8.6 | 1.1 | 55.7 | 2.86 | DOL V/FN XLN-SUC CAL INC |
| 57 | 9384.0-85.0 | 2.80 | * | 6.4 | 2.7 | 58.6 | 2.84 | DOL V/FN XLN-SUC CAL INC |
| 58 | 9385.0-86.0 | 0.02 | * | 1.7 | 80.6 | 7.7 | 2.71 | LM V/FN XLN-SUC DOL V/CARB CAL |
| 59 | 9386.0-87.0 | 0.02 | * | 6.6 | 62.9 | 7.0 | 2.76 | LM V/FN XLN-SUC DOL V/CARB CAL |
| 60 | 9387.0-88.0 | 10. ** | * | 9.8 | 11.9 | 59.5 | 2.82 | DOL V/FN XLN-SUC LIMY CAL INC |

* SAMPLE NOT SUITABLE FOR FULL DIAMETER ANALYSIS

** INDICATES FRACTURED PERM SAMPLE

VF INDICATES VERTICAL FRACTURE

CORE LABORATORIES, INC.
*Petroleum Reservoir Engineering*
DALLAS, TEXAS

| | | | |
|---|---|---|---|
| TOTAL PETROLEUM CORP. | DATE | : 3-18-85 | FILE NO. : 3805-3628 |
| NO. 1-22 CEDAR HILLS | FORMATION | : RED RIVER "C" | ANALYSTS : R.E.B. |

*** CORE SUMMARY AVERAGES FOR 1 ZONE ***

DEPTH INTERVAL: 9328.0 TO 9388.0

FEET OF CORE ANALYZED : 60.0 FEET OF CORE INCLUDED IN AVERAGES: 60.0

-- SAMPLES FALLING WITHIN THE FOLLOWING RANGES WERE AVERAGED --

| | | | | |
|---|---|---|---|---|
| PERMEABILITY MAXIMUM RANGE (MD.) | : | 0.01 TO | 43. | (UNCORRECTED FOR SLIPPAGE) |
| HELIUM POROSITY RANGE (%) | : | 1.6 TO | 100.0 | |
| OIL SATURATION RANGE (%) | : | 0.0 TO | 100.0 | |
| WATER SATURATION RANGE (%) | : | 0.0 TO | 100.0 | |

SHALE SAMPLES EXCLUDED FROM AVERAGES.

AVERAGES FOR DEPTH INTERVAL: 9328.0 TO 9388.0

| | | | | |
|---|---|---|---|---|
| AVERAGE PERMEABILITY (MILLIDARCIES) | | | PRODUCTIVE CAPACITY (MILLIDARCY-FEET) | |
| ARITHMETIC PERMEABILITY | : 6.9 | | ARITHMETIC CAPACITY | : 415. |
| GEOMETRIC PERMEABILITY | : 2.9 | | GEOMETRIC CAPACITY | : 175. |
| HARMONIC PERMEABILITY | : 0.33 | | HARMONIC CAPACITY | : 20. |
| GEOMETRIC MAXIMUM & 90 DEG PERM. | : 0.32 | | GEOMETRIC MAXIMUM & 90 DEG CAPACITY | : 19. |
| AVERAGE POROSITY (PERCENT) | : 12.3 | | AVERAGE TOTAL WATER SATURATION (PERCENT OF PORE SPACE) | : 65.4 |
| AVERAGE RESIDUAL OIL SATURATION (PERCENT OF PORE SPACE) | : 6.0 | | | |

# CORE LABORATORIES, INC.

*Petroleum Reservoir Engineering*

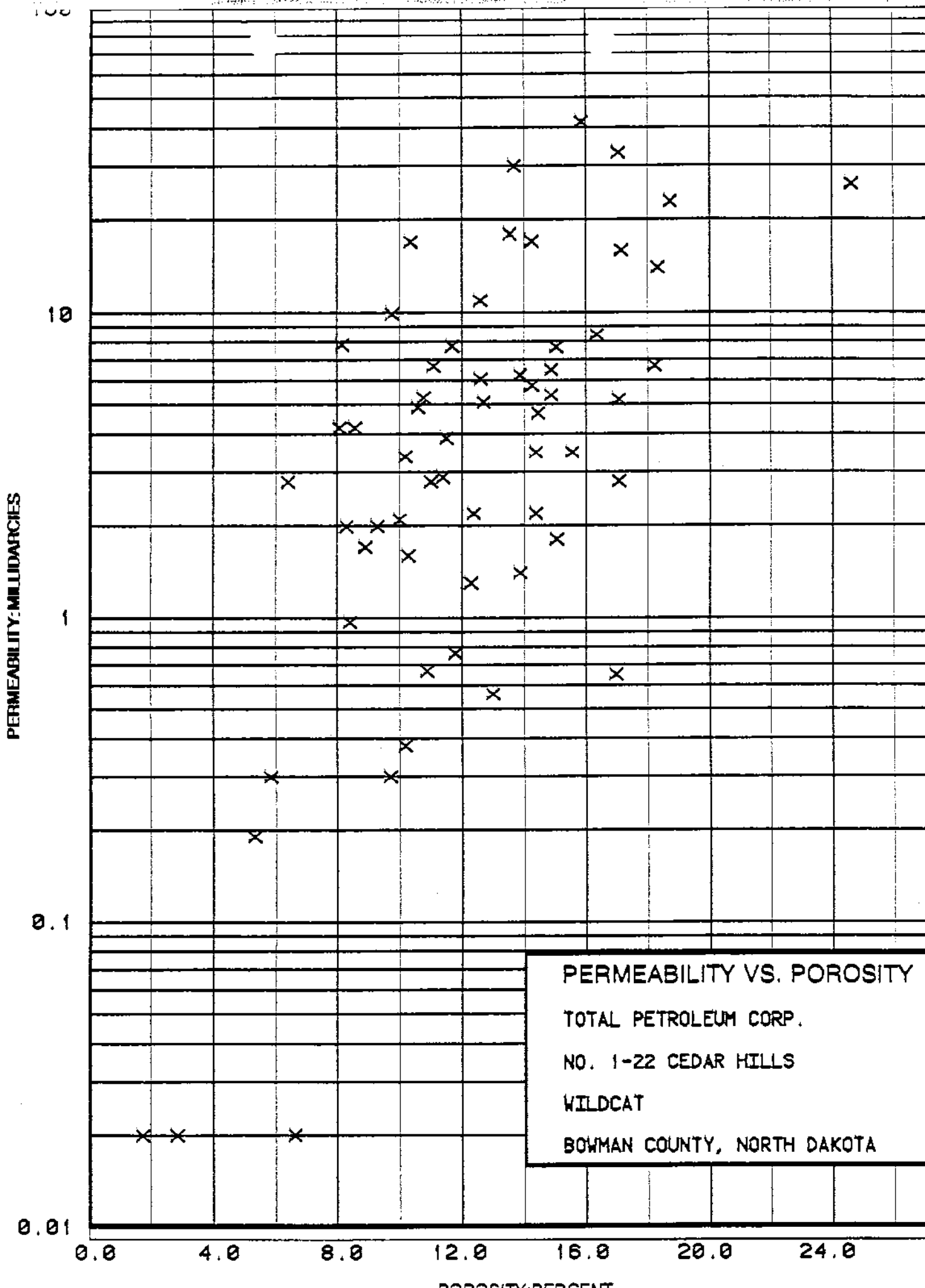
DALLAS, TEXAS

## PERMEABILITY VS POROSITY

COMPANY: TOTAL PETROLEUM CORP. WELL : NO. 1-22 CEDAR HILLS
FIELD : WILDCAT COUNTY, STATE: BOWMAN COUNTY, NORTH DAKOTA

AIR PERMEABILITY : MD - HORIZONTAL ( UNCORRECTED FOR SLIPPAGE )
POROSITY : PERCENT ( HELIUM )

| DEPTH INTERVAL | RANGE & SYMBOL | PERMEABILITY MINIMUM | PERMEABILITY MAXIMUM | POROSITY MIN. | POROSITY MAX. | POROSITY AVERAGE | PERMEABILITY AVERAGES ARITHMETIC | HARMONIC | GEOMETRIC |
|---|---|---|---|---|---|---|---|---|---|
| 9328.0 - 9388.0 | 1 (X) | 0.010 | 43.0 | 1.6 | 25.0 | 12.3 | 6.9 | 0.33 | 2.9 |




CL 1191 (7520-467)

# CORE LABORATORIES, INC.

*Petroleum Reservoir Engineering*

DALLAS, TEXAS

## STATISTICAL DATA FOR POROSITY AND PERMEABILITY HISTOGRAM

COMPANY: TOTAL PETROLEUM CORP. WELL : NO. 1-22 CEDAR HILLS
FIELD : WILDCAT COUNTY, STATE: BOWMAN COUNTY, NORTH DAKOTA

AIR PERMEABILITY : MD. ( HORIZONTAL ) RANGE USED 0.010 TO 43.
POROSITY : PERCENT ( HELIUM ) RANGE USED 1.6 TO 46.0

(PERMEABILITY UNCORRECTED FOR SLIPPAGE)

DEPTH LIMITS : 9328.0 - 9388.0 INTERVAL LENGTH : 60.0
FEET ANALYZED IN ZONE : 60.0 LITHOLOGY EXCLUDED : NONE

### DATA SUMMARY

| POROSITY AVERAGE | PERMEABILITY AVERAGES ARITHMETIC | HARMONIC | GEOMETRIC |
|---|---|---|---|
| 12.3 | 6.9 | 0.33 | 2.9 |

CORE LABORATORIES, INC.
*Petroleum Reservoir Engineering*
DALLAS, TEXAS

## STATISTICAL DATA FOR POROSITY AND PERMEABILITY HISTOGRAM

COMPANY: TOTAL PETROLEUM CORP.
FIELD : WILDCAT

WELL : NO. 1-22 CEDAR HILLS
COUNTY, STATE: BOWMAN COUNTY, NORTH DAKOTA

### GROUPING BY POROSITY RANGES

| POROSITY RANGE | FEET IN RANGE | AVERAGE POROSITY | AVERAGE PERM. (GEOM.) | AVERAGE PERM. (ARITH) | FREQUENCY (PERCENT) | CUMULATIVE FREQUENCY (%) |
|---|---|---|---|---|---|---|
| 0.0 - 2.0 | 1.0 | 1.7 | 0.020 | 0.020 | 1.7 | 1.7 |
| 2.0 - 4.0 | 1.0 | 2.8 | 0.020 | 0.020 | 1.7 | 3.3 |
| 4.0 - 6.0 | 2.0 | 5.5 | 0.239 | 0.245 | 3.3 | 6.7 |
| 6.0 - 8.0 | 2.0 | 6.5 | 0.237 | 1.4 | 3.3 | 10.0 |
| 8.0 - 10.0 | 9.0 | 8.8 | 2.4 | 3.7 | 15.0 | 25.0 |
| 10.0 - 12.0 | 14.0 | 10.8 | 2.8 | 4.3 | 23.3 | 48.3 |
| 12.0 - 14.0 | 10.0 | 13.1 | 4.4 | 8.2 | 16.7 | 65.0 |
| 14.0 - 16.0 | 11.0 | 14.9 | 5.8 | 9.1 | 18.3 | 83.3 |
| 16.0 - 18.0 | 6.0 | 17.0 | 5.9 | 11. | 10.0 | 93.3 |
| 18.0 - 20.0 | 3.0 | 18.5 | 13. | 15. | 5.0 | 98.3 |
| 24.0 - 26.0 | 1.0 | 24.7 | 26. | 26. | 1.7 | 100.0 |

TOTAL NUMBER OF FEET = 60.0

CORE LABORATORIES, INC.
*Petroleum Reservoir Engineering*
DALLAS, TEXAS

## STATISTICAL DATA FOR POROSITY AND PERMEABILITY HISTOGRAM

COMPANY: TOTAL PETROLEUM CORP. WELL : NO. 1-22 CEDAR HILLS
FIELD : WILDCAT COUNTY, STATE: BOWMAN COUNTY, NORTH DAKOTA

### GROUPING BY PERMEABILITY RANGES

| PERMEABILITY RANGE | FEET IN RANGE | AVERAGE PERM. (GEOM.) | AVERAGE PERM. (ARITH) | AVERAGE POROSITY | FREQUENCY (PERCENT) | CUMULATIVE FREQUENCY (%) |
|---|---|---|---|---|---|---|
| 0.020 - 0.039 | 3.0 | 0.020 | 0.020 | 3.7 | 5.0 | 5.0 |
| 0.156 - 0.312 | 3.0 | 0.258 | 0.263 | 6.9 | 5.0 | 10.0 |
| 0.312 - 0.625 | 2.0 | 0.461 | 0.470 | 11.6 | 3.3 | 13.3 |
| 0.625 - 1.250 | 4.0 | 0.753 | 0.762 | 12.0 | 6.7 | 20.0 |
| 1.250 - 2.500 | 10.0 | 1.8 | 1.8 | 11.5 | 16.7 | 36.7 |
| 2.500 - 5.000 | 12.0 | 3.6 | 3.6 | 11.6 | 20.0 | 56.7 |
| 5. - 10. | 14.0 | 6.4 | 6.5 | 13.7 | 23.3 | 80.0 |
| 10. - 20. | 7.0 | 14. | 15. | 13.8 | 11.7 | 91.7 |
| 20. - 40. | 4.0 | 28. | 28. | 10.6 | 6.7 | 98.3 |
| 40. - 80. | 1.0 | 42. | 42. | 15.9 | 1.7 | 100.0 |

TOTAL NUMBER OF FEET = 60.0

CORE LABORATORIES, INC.
*Petroleum Reservoir Engineering*
DALLAS, TEXAS

## STATISTICAL DATA FOR POROSITY AND PERMEABILITY HISTOGRAM

COMPANY: TOTAL PETROLEUM CORP. WELL : NO. 1-22 CEDAR HILLS
FIELD : WILDCAT COUNTY, STATE: BOWMAN COUNTY, NORTH DAKOTA

### POROSITY-FEET OF STORAGE CAPACITY LOST FOR SELECTED POROSITY CUT OFF

| POROSITY CUT OFF | FEET LOST | CAPACITY LOST (%) | FEET REMAINING | CAPACITY REMAINING (%) | ARITH MEAN | MEDIAN |
|---|---|---|---|---|---|---|
| 0.0 | 0.0 | 0.0 | 60.0 | 100.0 | 12.3 | 12.2 |
| 2.0 | 1.0 | 0.2 | 59.0 | 99.8 | 12.4 | 12.3 |
| 4.0 | 2.0 | 0.6 | 58.0 | 99.4 | 12.6 | 12.4 |
| 6.0 | 4.0 | 2.1 | 56.0 | 97.9 | 12.9 | 12.6 |
| 8.0 | 6.0 | 3.9 | 54.0 | 96.1 | 13.1 | 12.8 |
| 10.0 | 15.0 | 14.7 | 45.0 | 85.3 | 14.0 | 13.7 |
| 12.0 | 29.0 | 35.3 | 31.0 | 64.7 | 15.4 | 15.0 |
| 14.0 | 39.0 | 53.1 | 21.0 | 46.9 | 16.5 | |
| 16.0 | 50.0 | 75.3 | 10.0 | 24.7 | 18.2 | |
| 18.0 | 56.0 | 89.1 | 4.0 | 10.9 | 20.0 | |
| 20.0 | 59.0 | 96.6 | 1.0 | 3.4 | 24.7 | 25.0 |
| 22.0 | 59.0 | 96.6 | 1.0 | 3.4 | 24.7 | |
| 24.0 | 59.0 | 96.6 | 1.0 | 3.4 | 24.7 | |
| 26.0 | 60.0 | 100.0 | 0.0 | 0.0 | | |

TOTAL STORAGE CAPACITY IN POROSITY-FEET = 736.0

# CORE LABORATORIES, INC.

*Petroleum Reservoir Engineering*

DALLAS, TEXAS

## STATISTICAL DATA FOR POROSITY AND PERMEABILITY HISTOGRAM

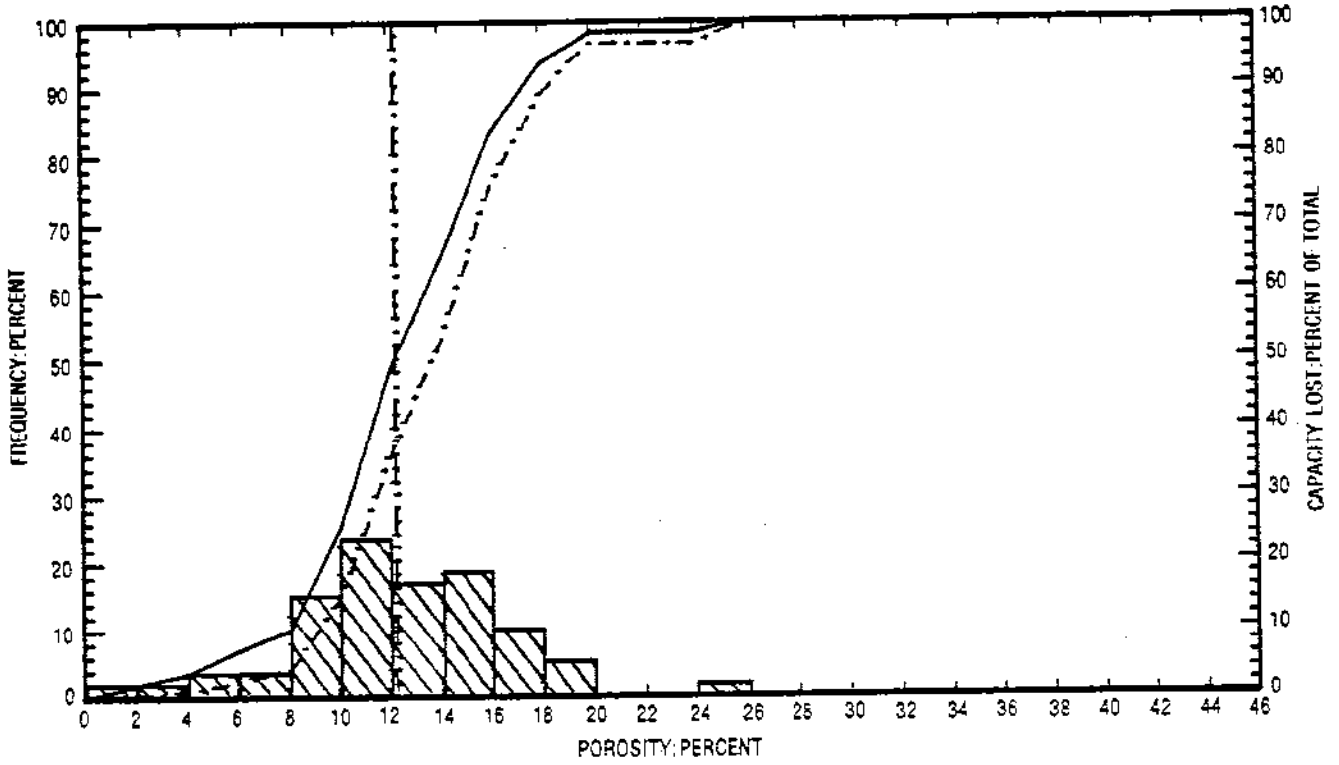
COMPANY: TOTAL PETROLEUM CORP.
FIELD : WILDCAT

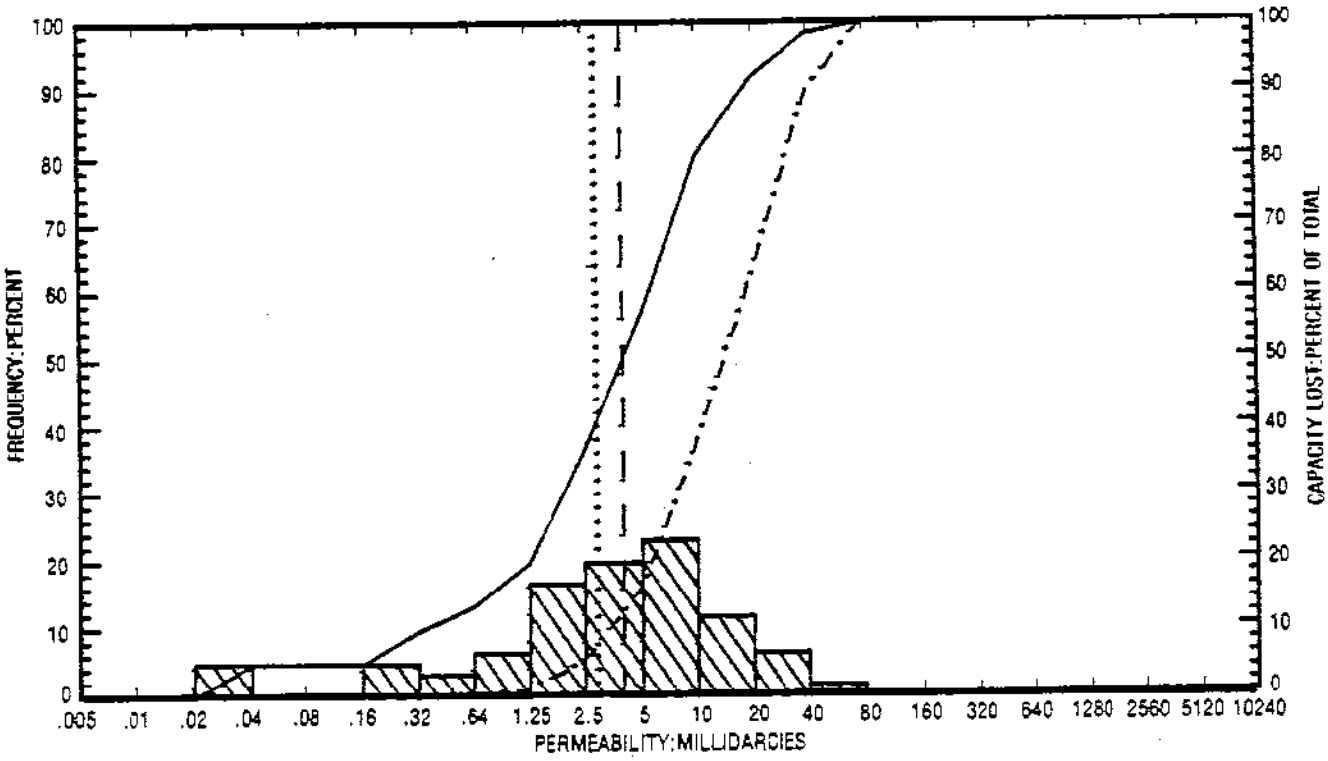
WELL : NO. 1-22 CEDAR HILLS
COUNTY, STATE: BOWMAN COUNTY, NORTH DAKOTA

### MILLIDARCY-FEET OF FLOW CAPACITY LOST FOR SELECTED PERMEABILITY CUT OFF

| PERMEABILITY CUT OFF | FEET LOST | CAPACITY LOST (%) | FEET REMAINING | CAPACITY REMAINING (%) | GEOM MEAN | MEDIAN |
|---|---|---|---|---|---|---|
| 0.005 | 0.0 | 0.0 | 60.0 | 100.0 | 2.92 | 3.97 |
| 0.010 | 0.0 | 0.0 | 60.0 | 100.0 | 3.27 | 3.97 |
| 0.020 | 0.0 | 0.0 | 60.0 | 100.0 | 2.92 | 3.97 |
| 0.039 | 3.0 | 0.0 | 57.0 | 100.0 | 3.80 | 4.33 |
| 0.078 | 3.0 | 0.0 | 57.0 | 100.0 | 3.80 | 4.33 |
| 0.156 | 3.0 | 0.0 | 57.0 | 100.0 | 3.80 | 4.33 |
| 0.312 | 6.0 | 0.2 | 54.0 | 99.8 | 4.41 | 4.72 |
| 0.625 | 8.0 | 0.4 | 52.0 | 99.6 | 4.81 | 5.00 |
| 1.250 | 12.0 | 1.2 | 48.0 | 98.8 | 5.62 | 5.52 |
| 2.500 | 22.0 | 5.6 | 38.0 | 94.4 | 7.58 | 7.07 |
| 5. | 34.0 | 16.1 | 26.0 | 83.9 | 10.74 | |
| 10. | 48.0 | 38.0 | 12.0 | 62.0 | 19.59 | |
| 20. | 55.0 | 62.9 | 5.0 | 37.1 | 30.14 | |
| 40. | 59.0 | 89.9 | 1.0 | 10.1 | 42.00 | |
| 80. | 60.0 | 100.0 | 0.0 | 0.0 | | |

TOTAL FLOW CAPACITY IN MILLIDARCY-FEET(ARITHMETIC) = 414.74




## PERMEABILITY AND POROSITY HISTOGRAMS

TOTAL PETROLEUM CORP.
NO. 1-22 CEDAR HILLS
WILDCAT
BOWMAN COUNTY, NORTH DAKOTA

**LEGEND**

ARITHMETIC MEAN POROSITY
GEOMETRIC MEAN PERMEABILITY
MEDIAN VALUE
CUMULATIVE FREQUENCY
CUMULATIVE CAPACITY LOST



CL-1093 (7520-443)

**CORE LABORATORIES, INC.** *Petroleum Reservoir Engineering*

COMPANY TOTAL PETROLEUM CORP. FILE NO. 3805-3628

WELL NO. 1-22 CEDAR HILLS DATE 3-18-85 ENGRS. R.E.B.

FIELD WILDCAT FORMATION RED RIVER "C" ELEV. 2942 KB

COUNTY BOWMAN STATE NO. DAK. DRLG. FLD. SALT GEL NO OIL CORES 1

# CoRes Log

## CORE and RESISTIVITY EVALUATION



RESISTIVITY PARAMETERS: a = 1.0 m = 2.0 n = 2.0 . Depths 9328.0 to 9368.0

a = _____ m = _____ n = _____ . Depths _____ to _____

PERMEABILITY
MILLIDARCIES

CORE ANALYSIS CALCULATED RESISTIVITY
$R_o$ = OHM-METERS AT 100% $S_w$
$R_{w_c}$ = OHM-METERS AT CRITICAL $S_w$

DEPTH FEET

1000 100 10 1.0 0.1 0.01

ONE OHM-METER REFERENCE FOR $R_w$ = 0.01

9250

9300

9350

9400

**CORE LABORATORIES, INC.** *Petroleum Reservoir Engineering*

COMPANY TOTAL PETROLEUM CORP. FILE NO. 3005-3828
WELL NO. 1-22 CEDAR HILLS DATE 3-18-85
FIELD WILDCAT FORMATION RED RIVER 'C' ELEV. 2942 KB
COUNTY BOWMAN STATE NO. DAK. DRLG. FLD. SALT GEL NO OIL CORES
LOCATION NE NW SEC 22 T131N R105W

# CORRELATION COREGRAPH





VERTICAL SCALE: 5" = 100'

**Total Water**
PERCENT PORE SPACE
100 80 60 40 20 0

**Gamma Ray**
RADIATION INCREASE

**Permeability**
MILLIDARCIES
100 10 1.0 .1

Depth Feet

**Porosity**
PERCENT
30 20 10 0

**Oil Saturation**
PERCENT PORE SPACE
0 0 20 40 60 80 100

9250
9300
9350
9400

FORM 7

Well File No. 11409

North Dakota State Industrial Commission
Oil and Gas Division
900 EAST BOULEVARD - BISMARCK, NORTH DAKOTA 58505

RECEIVED
N. D. OIL & GAS DIVISION

T16HT HOLE

# PLUGGING RECORD

NAME OF OPERATOR: Total Petroleum, Inc. ADDRESS: P.O. Box 500, Denver, CO 80201

WELL NAME AND NO.: Cedar Hills 1-22 FIELD: Wildcat COUNTY: Bowman

LOCATION OF WELL: Qtr., NE NW Sec., 22 Twp., 131N Rge., 105W

Well is 1250 feet from (N) (S) section line and 1650 feet and from (E) (W) section lin

TOTAL DEPTH: 9500' ELEV.: 2942.1 (DF, GR, KB)

DATE PLUGGED: March 21, 1985 ELECTRIC OR OTHER LOGS RUN: DLL, CDL, CNL, [illegible]

NO. OF DSTS RUN: 2 (see back)

IF WELL WAS CORED, INTERVALS CORED: 9328-9388'

IF WELL WAS FILLED WITH MUD LADEN FLUID, MUD WEIGHT: 10.4 lbs./gal.

NAME OF FIELD INSPECTOR PRESENT DURING PLUGGING: Rick Hutchins

## WELL RECORD

| CASING | | | | PLUGS | | CEMENT | |
|---|---|---|---|---|---|---|---|
| SIZE | DEPTH SET | WEIGHT NO./FT. | AMOUNT PULLED | TYPE | DEPTH | NO. SACKS | INTERVAL |
| 8-5/8" | 2018' KB | 24# | None | Class G | 9140 | 40 | Red River |
| | | | | " | 8407 | 40 | Duperow |
| | | | | " | 7370 | 40 | Mission Canyon |
| | | | | " | 6350 | 40 | Minnelusa |
| | | | | " | 4200 | 40 | Newcastle |
| | | | | " | 2018 | 50 | BASE SURF CSG |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

REMARKS: WO top plug pending rancher's request.
Will report final plug via Sundry Notice.

## GEOLOGIC MARKERS

| Name | Measured Depth of Formation | True Vertical Depth |
|---|---|---|
| Greenhorn | 3500' | - |
| Dakota | 4528' | - |
| Spearfish | 5595' | - |
| Pine Salt | 5760' | - |
| Minnelusa | 6330' | - |
| Kibbey Lime | 6930' | - |
| Charles | 7045' | - |
| Mission Canyon | 7370' | - |
| Lodgepole | 7838' | - |
| Devonian | 8410 | - |
| Interlake | 8645' | - |
| Red River | 9140 | - |

(COMPLETE FORM ON REVERSE SIDE)

## DRILL STEM TEST DATA

***SEE ATTACHED***

I hereby swear or affirm that the information herein provided is true, complete and correct as determined from all available records.

Daniel J Petri
Signature

3/29/85
Date

Sr. Petroleum Engineer
Title

State of Colorado )
)SS
County of Denver )

On this 29th day of March, 19 85, before me personally appeared Daniel J Petri to me known as the person described in and who executed the foregoing instrument and acknowledged that (s)he executed the same as his/her free act and deed.

Notary Seal

Donna L Shumaker
Notary Public
State of Colorado County of Denver
My Commission expires June 21, 1988

### INSTRUCTIONS

1. Within thirty (30) days after the plugging of any well, the owner or operator thereof must file the original and three copies of this report with the North Dakota Industrial Commission, Oil and Gas Division.

2. The owner or operator shall file with the Oil and Gas Division three copies of the following: all logs run, drill stem test reports and charts, formation water analysis and noninterpretive lithologic logs or sample descriptions if complied.

**TOTAL**
**Total Petroleum, Inc.**

ONE DENVER PLACE · SUITE 3100
999 18TH STREET
DENVER COLORADO

TELEPHONE 303 291-2000

MAILING ADDRESS
P. O. BOX 500
DENVER, COLORADO 80201

CEDAR HILLS 1-22
Sec 22-T131N-R105W
Bowman County, ND
Well File #11409


DST #1 - Red River "A" 9152-9206'

| | Time | Pressures |
|---|---|---|
| IF | 5 Min | 85-158 |
| ISI | 60 Min | 3863 |
| 2nd Flow | 180 Min | 183-360 |
| FSI | 180 Min | 3520 |
| FF | 180 Min | 415-523 |
| IH | | 4947 |
| FH | | 4847 |

Sampler: 500 cc Oil, 1600 cc Wtr., .15 cu ft Gas.
Pressure 120 psi, Rw = .049 @ 68°
Gravity 24° API, Temp = 218°F

Recovery: 410' (5.8 BBLS) HGCO
850' (4.7 BBLS) SW
1260' (10.5 BBLS) Total

DST #2 - Red River "C" 9321-9388'

| | Time | Pressures |
|---|---|---|
| IF | 5 Min | 680-1003 |
| ISI | 60 Min | 4124 |
| 2nd Flow | 180 Min | 1082-3795 |
| FSI | 180 Min | 4086 |
| FF | 180 Min | 3818-4067 |
| IHP | | 5123 |
| FHP | | 5123 |

Sampler: 2300cc Wtr

Recovery: 310' (4.4 BBLS) Amonia cut mud
8715' (117.1 BBLS) SW
9025' (121.5 BBLS) Total

Well File

FORM 4

North Dakot a State Industrial Commission
Oil and Gas Division
900 EAST BOULEVARD · BISMARCK, NORTH DAKOTA · 58505

Well File No. 1-409

RECEIVED
APR 1 1985
N. DAK. OIL & GAS DIVISION

# SUNDRY NOTICES AND REPORTS ON WELLS

1. Notice of Intention to Drill or Redrill _____
2. Notice of Intention to Change Plans _____
3. Notice of Intention to Pull Casing _____
4. Notice of Intention to Abandon Well _____
5. Report of Water Shut-Off _____
6. Report of Shooting or Acidizing _____
7. Report of Casing _____
8. Report of Redrilling or Repair _____
9. Supplementary History _____
10. Well Potential Test _____
11. Drilling Prognosis _____
12. Notice of Reclamation X

NAME OF LEASE CEDAR HILLS Date March 29, 19 85

WELL NO. 1-22 is located 12500 ft. from (N) (S) line and 1650 ft. from the (E) (W) li

of Section 22 Township 131N Range 105W in Bowman County

County, Wildcat Field _____ Pool. The elevation of the kb

is 2942.1 feet above sea level.

Name and Address of Contractor, or Company which will do work is:

(DETAILS OF WORK)

(State names of, and expected depth of objective sand; show sizes, weight, and lengths of proposed casing, indicate mud weights, cementing points, and all other details of work)

A. Disposition of Salt Water: Truck to upcoming drill site.

B. Disposition of Mud: Truck to upcoming drill site.

C. Dirt Contractor: Miller Construction, Bowman, North Dakota.

D. Approximate Date of Restoration: April - May, 1985.

E. Party Responsible for Seeding: Total Petroleum, Inc.

F. Indicate if Cropland: N/A

Company Total Petroleum, Inc.
Address P.O. Box 500, Ste 3100
Denver, CO 80201
By Daniel J. Petri
Daniel J. Petri
Title Sr. Petroleum Engineer

Do not write in this space

Approved 4-3- 19 85
By Kenneth Kallestad
Title Reclamation Supervisor

(Instructions Over)

# Precision Service, Inc.

BOX 3659 Ph. 307/237-9327
CASPER, WYOMING

BOX 1596 Ph. 701/225-6021
DICKINSON, NORTH DAKOTA



## WATER ANALYSIS REPORT

| | | | |
|---|---|---|---|
| OPERATOR | Total Petroleum | DATE | 3/21/85 LAB NO. 2549-7 |
| WELL NO. | Cedar Hills #1-22 | LOCATION | Sec. 22-131N-105W |
| FIELD | | FORMATION | Red River "C" |
| COUNTY | Bowman | INTERVAL | 9321-9388 |
| STATE | N.D. | SAMPLE FROM | DST #2 (Sample Chamber) |

REMARKS & CONCLUSIONS: Orange brown cloudy water, Light orange brown cloudy filtrate.

Nitrate, mg/l — negative
Chromate, mg/l — trace

| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium - (Calc) - | 18,647 | 811.15 | Sulfate | 1,370 | 28.50 |
| Potassium | — | — | Chloride | 30,380 | 856.72 |
| Lithium | — | — | Carbonate | 0 | — |
| Calcium | 1,443 | 72.01 | Bicarbonate | 366 | 6.00 |
| Magnesium | 98 | 8.06 | Hydroxide | | |
| Iron | — | — | Hydrogen sulfide | — | — |
| Total Cations | | 891.22 | Total Anions | | 891.22 |

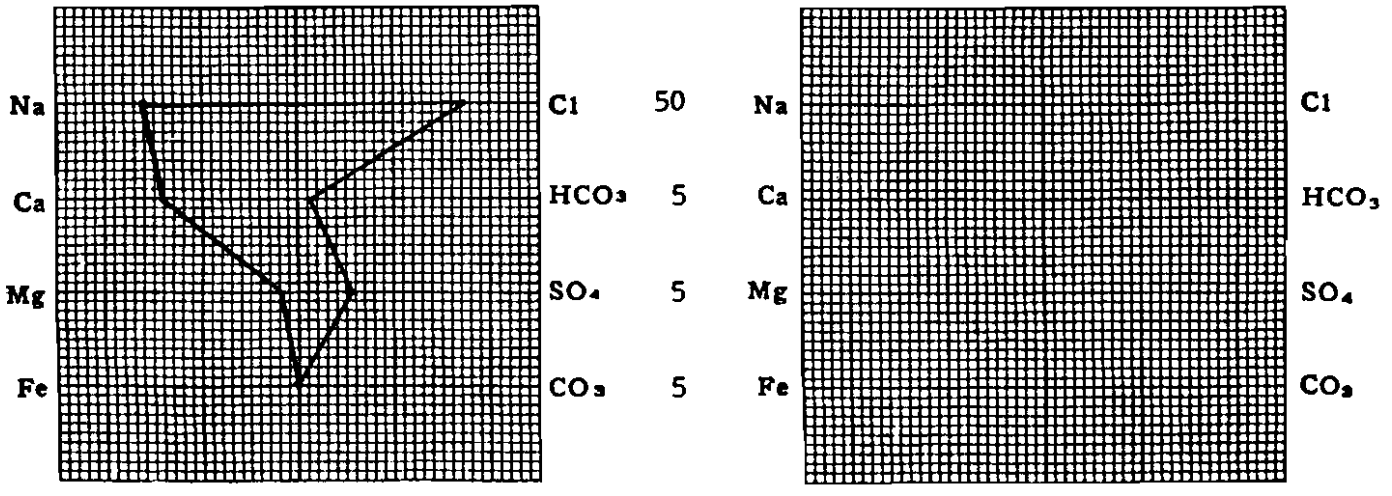
| | |
|---|---|
| Total dissolved solids, mg/l | 52,304 |
| NaCl equivalent, mg/l | 51,378 |
| Observed pH | 6.82 |

Specific resistance @ 68°F.:
Observed 0.149 ohm-meters
Calculated 0.150 ohm-meters

### WATER ANALYSIS PATTERN

Sample above described

Scale
MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent = by Dunlap & Hawthorne calculation from components

# Precision Service, Inc.

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CASPER, WYOMING

BOX 1596 Ph. 701/225-6021
DICKINSON, NORTH DAKOTA



## WATER ANALYSIS REPORT

| | | | |
|---|---|---|---|
| OPERATOR | Total Petroleum | DATE | 3/21/85 |
| WELL NO. | Cedar Hills #1-22 | LAB NO. | 2549-6 |
| FIELD | | LOCATION | Sec. 22-131N-105W |
| COUNTY | Bowman | FORMATION | Red River "C" |
| STATE | N.D. | INTERVAL | 9321-9388 |
| | | SAMPLE FROM | DST #2 (Sample #6) |

REMARKS & CONCLUSIONS: Orange brown cloudy water, Light orange brown cloudy filtrate.

Nitrate, mg/l — negative
Chromate, mg/l — negative

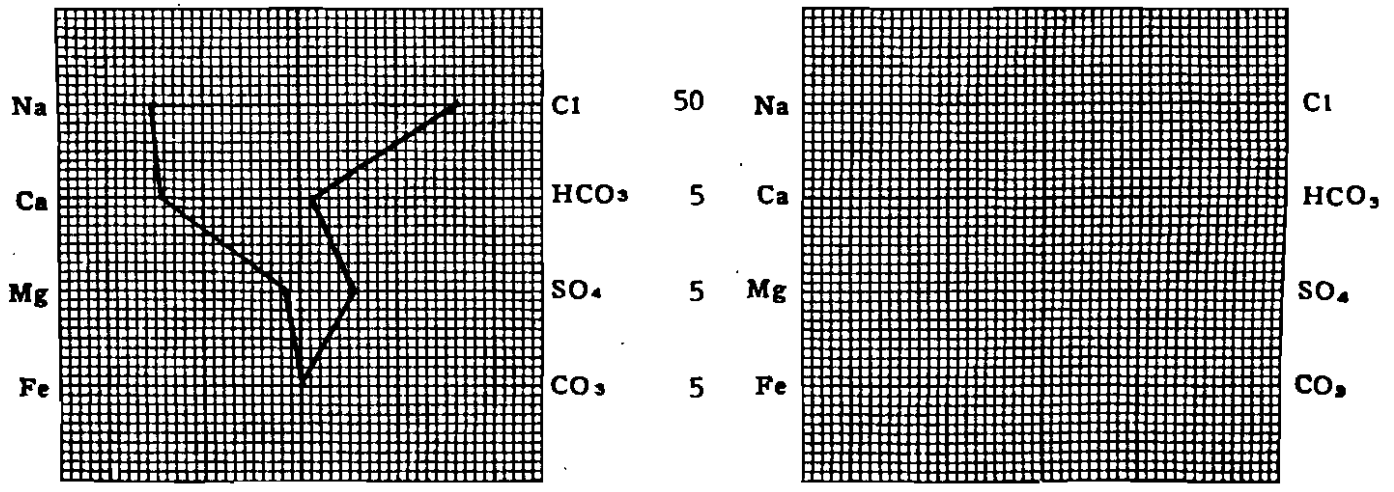
| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium - (Calc) - | 17,694 | 769.69 | Sulfate | 1,370 | 28.50 |
| Potassium | — | — | Chloride | 28,910 | 815.26 |
| Lithium | — | — | Carbonate | 0 | — |
| Calcium | 1,443 | 72.01 | Bicarbonate | 366 | 6.00 |
| Magnesium | 98 | 8.06 | Hydroxide | | |
| Iron | — | — | Hydrogen sulfide | — | — |
| Total Cations | | 849.76 | Total Anions | | 849.76 |

| | | | |
|---|---|---|---|
| Total dissolved solids, mg/l | 49,881 | Specific resistance @ 68°F.: | |
| NaCl equivalent, mg/l | 48,955 | Observed | 0.159 ohm-meters |
| Observed pH | 6.79 | Calculated | 0.154 ohm-meters |

### WATER ANALYSIS PATTERN

Sample above described

Scale MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent = by Dunlap & Hawthorne calculation from components

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## WATER ANALYSIS REPORT

OPERATOR Total Petroleum
WELL NO. Cedar Hills #1-22
FIELD
COUNTY Bowman
STATE N.D.

DATE 3/21/85 LAB NO. 2549-5
LOCATION Sec. 22-131N-105W
FORMATION Red River "C"
INTERVAL 9321-9388
SAMPLE FROM DST #2 (Sample #5)

REMARKS & CONCLUSIONS: Light brown cloudy water. Light brown cloudy filtrate.

Nitrate, mg/l — negative
Chromate, mg/l — negative

| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | 17,538 | 762.92 | Sulfate | 1,400 | 29.12 |
| Potassium | — | — | Chloride | 28,420 | 801.44 |
| Lithium | — | — | Carbonate | 0 | — |
| Calcium | 1,443 | 72.01 | Bicarbonate | 512 | 8.40 |
| Magnesium | 49 | 4.03 | Hydroxide | | |
| Iron | — | — | Hydrogen sulfide | — | — |
| Total Cations | | 838.96 | Total Anions | | 838.96 |

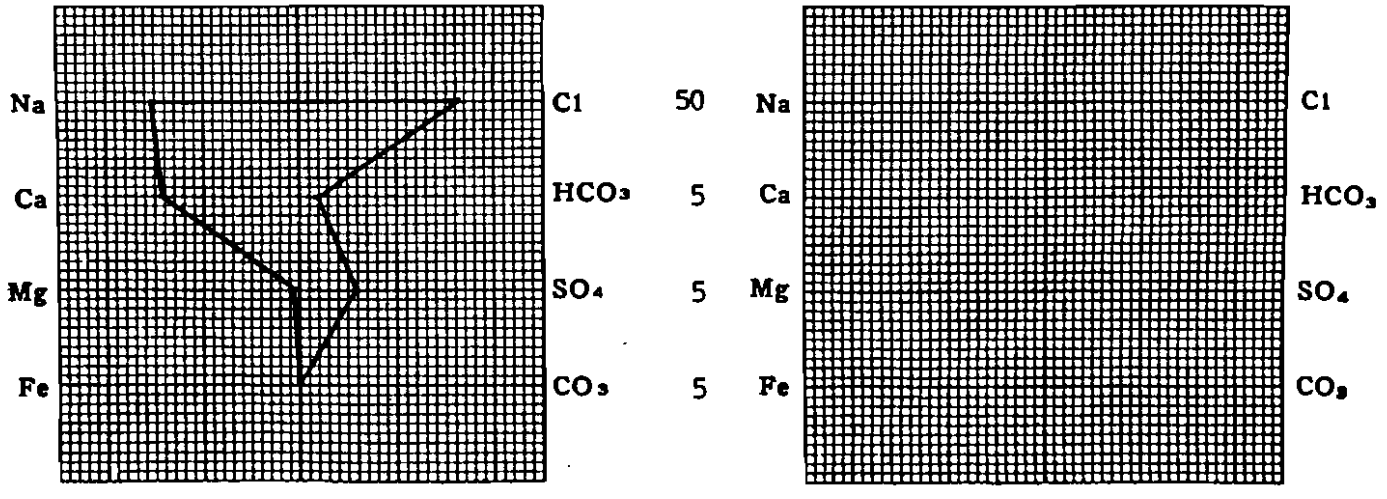
Total dissolved solids, mg/l 49,362
NaCl equivalent, mg/l 48,265
Observed pH 7.39

Specific resistance @ 68°F.:
Observed 0.159 ohm-meters
Calculated 0.156 ohm-meters

### WATER ANALYSIS PATTERN

Sample above described

Scale
MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent = by Dunlap & Hawthorne calculation from components

# Precision Service, Inc.

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## WATER ANALYSIS REPORT

OPERATOR Total Petroleum
WELL NO. Cedar Hills #1-22
FIELD
COUNTY Bowman
STATE N.D.

DATE 3/21/85 LAB NO. 2549-4
LOCATION Sec. 22-131N-105W
FORMATION Red River "C"
INTERVAL 9321-9388
SAMPLE FROM DST #2 (Sample #4)

REMARKS & CONCLUSIONS: Light brown cloudy water, Light brown cloudy filtrate.

Nitrate, mg/l --- negative
Chromate, mg/l --- negative

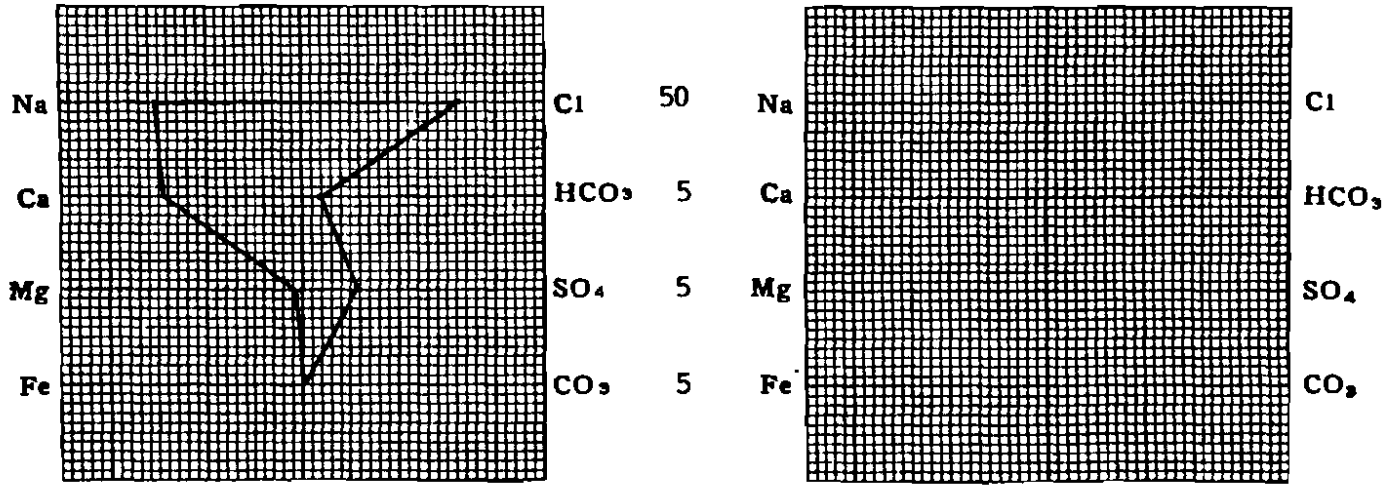
| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | 17,524 | 762.30 | Sulfate | 1,370 | 28.50 |
| Potassium | — | — | Chloride | 28,420 | 801.44 |
| Lithium | — | — | Carbonate | 0 | — |
| Calcium | 1,443 | 72.01 | Bicarbonate | 512 | 8.40 |
| Magnesium | 49 | 4.03 | Hydroxide | | |
| Iron | — | — | Hydrogen sulfide | — | — |
| Total Cations | | 838.34 | Total Anions | | 838.34 |

| | | | |
|---|---|---|---|
| Total dissolved solids, mg/l | 49,318 | Specific resistance @ 68°F.: | |
| NaCl equivalent, mg/l | 48,236 | Observed | 0.162 ohm-meters |
| Observed pH | 7.25 | Calculated | 0.156 ohm-meters |

### WATER ANALYSIS PATTERN

Sample above described

Scale MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent = by Dunlap & Hawthorne calculation from components

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## WATER ANALYSIS REPORT

OPERATOR Total Petroleum
WELL NO. Cedar Hills #1-22
FIELD
COUNTY Bowman
STATE N.D.

DATE 3/21/85 LAB NO. 2549-3
LOCATION Sec. 22-131N-105W
FORMATION Red River "C"
INTERVAL 9321-9388
SAMPLE FROM DST #2 (Sample #3)

REMARKS & CONCLUSIONS: Light brown cloudy water, Light brown cloudy filtrate.

Nitrate, mg/l --- negative
Chromate, mg/l --- trace

| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | 18,673 | 812.26 | Sulfate | 1,500 | 31.20 |
| Potassium | — | — | Chloride | 30,380 | 856.72 |
| Lithium | — | — | Carbonate | 0 | — |
| Calcium | 1,523 | 76.00 | Bicarbonate | 512 | 8.40 |
| Magnesium | 98 | 8.06 | Hydroxide | | |
| Iron | — | — | Hydrogen sulfide | — | — |
| Total Cations | | 896.32 | Total Anions | | 896.32 |

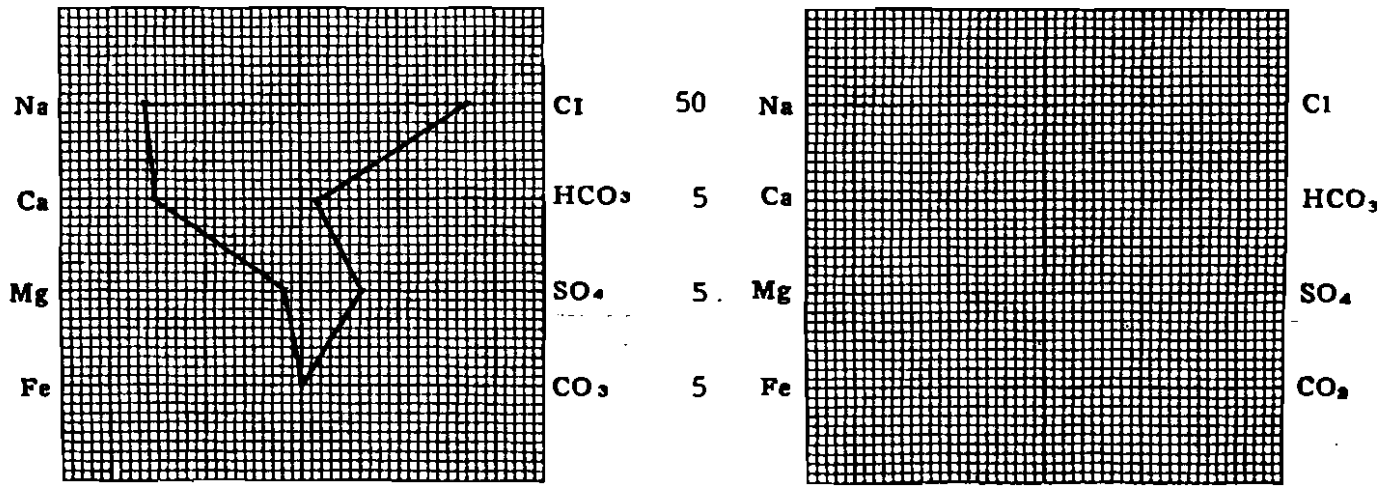
Total dissolved solids, mg/l 52,686
NaCl equivalent, mg/l 51,584
Observed pH 7.19

Specific resistance @ 68°F.:
Observed 0.149 ohm-meters
Calculated 0.150 ohm-meters

### WATER ANALYSIS PATTERN

Sample above described

Scale MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent = by Dunlap & Hawthorne calculation from components

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## WATER ANALYSIS REPORT

OPERATOR Total Petroleum
WELL NO. Cedar Hills #1-22
FIELD
COUNTY Bowman
STATE N.D.

DATE 3/21/85 LAB NO. 2549-2
LOCATION Sec. 22-131N-105W
FORMATION Red River "C"
INTERVAL 9321-9388
SAMPLE FROM DST #2 (Sample #2)

REMARKS & CONCLUSIONS: Brown cloudy water, Light brown cloudy filtrate.

Nitrate, mg/l — 60
Chromate, mg/l — 15

| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | 47,051 | 2046.70 | Sulfate | 1,860 | 38.69 |
| Potassium | — | — | Chloride | 77,420 | 2183.24 |
| Lithium | — | — | Carbonate | 0 | — |
| Calcium | 3,407 | 170.01 | Bicarbonate | 293 | 4.81 |
| Magnesium | 122 | 10.03 | Hydroxide | | |
| Iron | — | — | Hydrogen sulfide | — | — |
| Total Cations | | 2226.74 | Total Anions | | 2226.74 |

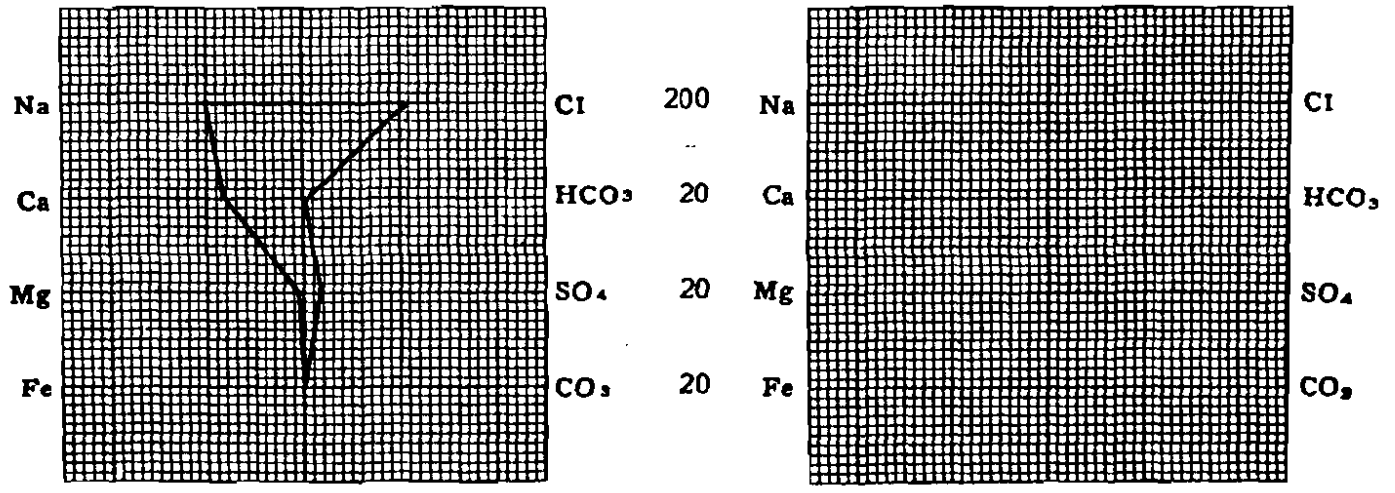
Total dissolved solids, mg/l 130,153
NaCl equivalent, mg/l 128,961
Observed pH 7.92

Specific resistance @ 68°F.:
Observed 0.073 ohm-meters
Calculated 0.074 ohm-meters

### WATER ANALYSIS PATTERN

Sample above described

Scale MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent = by Dunlap & Hawthorne calculation from components

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11409

## WATER ANALYSIS REPORT

OPERATOR Total Petroleum
WELL NO Cedar Hills #1-22
FIELD wildcat
COUNTY Bowman
STATE N.D.

DATE 3/21/85 LAB NO. 2549-1
LOCATION Sec. 22-131N-105W
FORMATION Red River "C"
INTERVAL 9321-9288
SAMPLE FROM DST #2 (Top Sample)

REMARKS & CONCLUSIONS: Mud, Chemical on top, Yellow brown cloudy filtrate.

Ammonia Present
Nitrate, mg/l — 200
Chromate, mg/l — 85

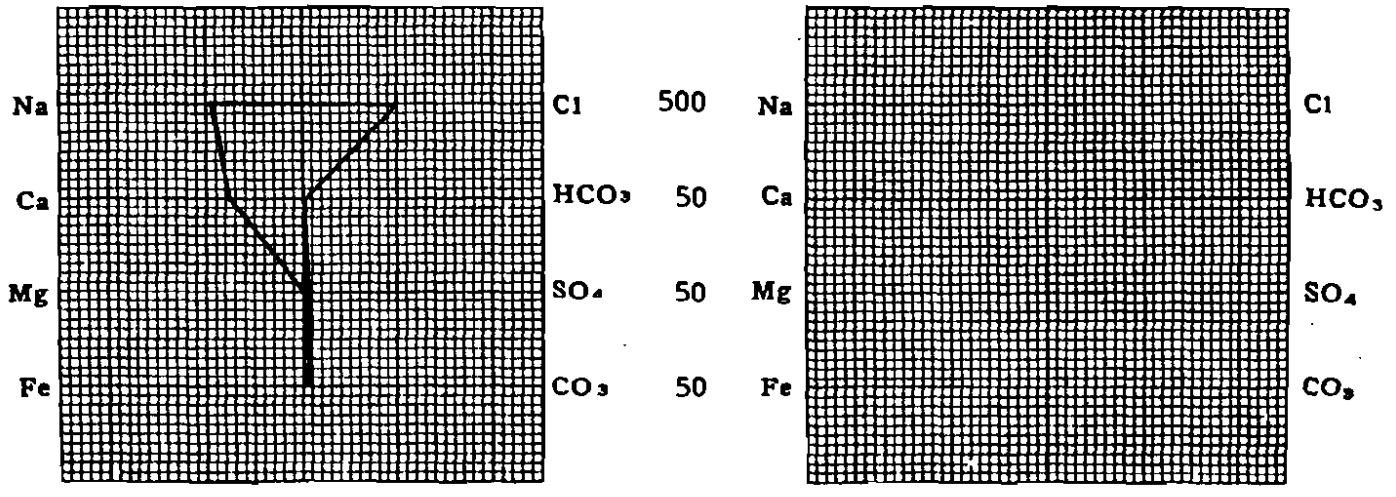
| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium - - (Calc) - | 107,183 | 4662.46 | Sulfate - - - - - - | 1,120 | 23.30 |
| Potassium - - - - - - | — | — | Chloride - - - - - - | 174,440 | 4919.21 |
| Lithium - - - - - - | — | — | Carbonate - - - - - | 1,020 | 33.97 |
| Calcium - - - - - - | 7,615 | 379.99 | Bicarbonate - - - - - | 0 | — |
| Magnesium - - - - - | 0 | — | Hydroxide - - - - - | 1,122 | 65.97 |
| Iron - - - - - - - | — | — | Hydrogen sulfide - - - | — | — |
| Total Cations - - - - | | 5042.45 | Total Anions - - - - | | 5042.45 |

| | | | |
|---|---|---|---|
| Total dissolved solids, mg/l - - - - - | 292,500 | Specific resistance @ 68°F.: | |
| NaCl equivalent, mg/l - - - - - - - | 291,824 | Observed - - - - | 0.048 ohm-meters |
| Observed pH - - - - - - - - - - | 9.48 | Calculated - - - - | 0.048 ohm-meters |

### WATER ANALYSIS PATTERN

Sample above described

Scale
MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent = by Dunlap & Hawthorne calculation from components

# Precision Service, Inc.

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## WATER ANALYSIS REPORT

| | | | |
|---|---|---|---|
| OPERATOR | Total Petroleum | DATE | 3/21/85 LAB NO. 2549-7 |
| WELL NO. | Cedar Hills #1-22 | LOCATION | Sec. 22-131N-105W |
| FIELD | | FORMATION | Red River "C" |
| COUNTY | Bowman | INTERVAL | 9321-9388 |
| STATE | N.D. | SAMPLE FROM | DST #2 (Sample Chamber) |

REMARKS & CONCLUSIONS: Orange brown cloudy water, Light orange brown cloudy filtrate.

Nitrate, mg/l — negative
Chromate, mg/l — trace

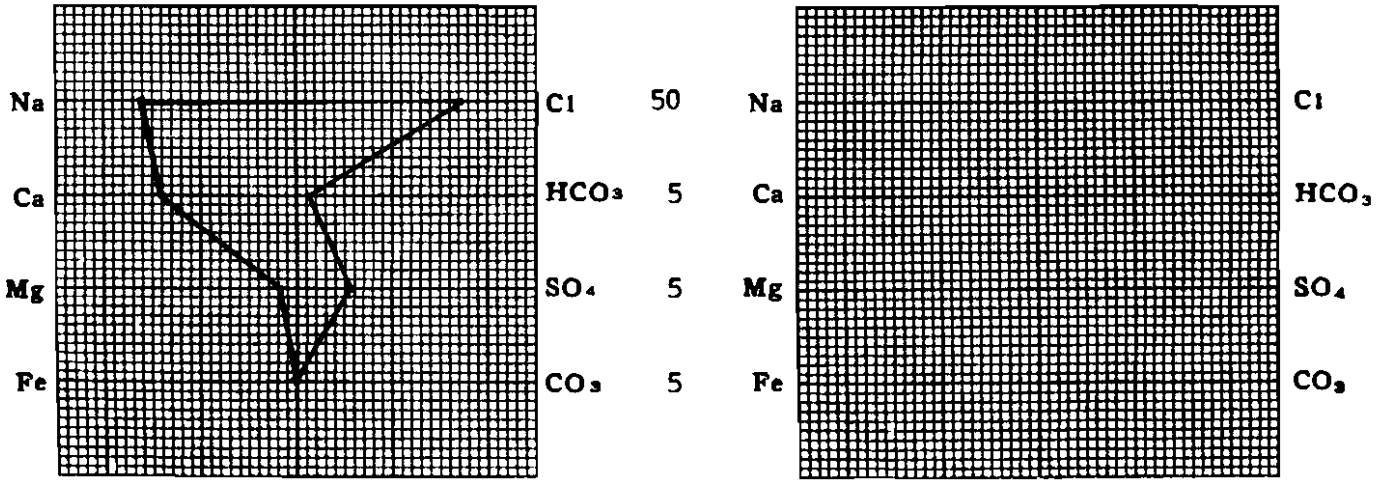
| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | 18,647 | 811.15 | Sulfate | 1,370 | 28.50 |
| Potassium | — | — | Chlorides | 30,380 | 856.72 |
| Lithium | — | — | Carbonate | 0 | — |
| Calcium | 1,443 | 72.01 | Bicarbonate | 366 | 6.00 |
| Magnesium | 98 | 8.06 | Hydroxide | | |
| Iron | — | — | Hydrogen sulfide | — | — |
| Total Cations | | 891.22 | Total Anions | | 891.22 |

| | | | |
|---|---|---|---|
| Total dissolved solids, mg/l | 52,304 | Specific resistance @ 68°F.: | |
| NaCl equivalent, mg/l | 51,378 | Observed | 0.149 ohm-meters |
| Observed pH | 6.82 | Calculated | 0.150 ohm-meters |

### WATER ANALYSIS PATTERN

Sample above described

Scale MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent = by Dunlap & Hawthorne calculation from components

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## WATER ANALYSIS REPORT

| | | | |
|---|---|---|---|
| OPERATOR | Total Petroleum | DATE | 3/21/85 LAB NO. 2549-6 |
| WELL NO. | Cedar Hills #1-22 | LOCATION | Sec. 22-131N-105W |
| FIELD | | FORMATION | Red River "C" |
| COUNTY | Bowman | INTERVAL | 9321-9388 |
| STATE | N.D. | SAMPLE FROM | DST #2 (Sample #6) |

REMARKS & CONCLUSIONS: Orange brown cloudy water, Light orange brown cloudy filtrate.

Nitrate, mg/l — negative
Chromate, mg/l — negative

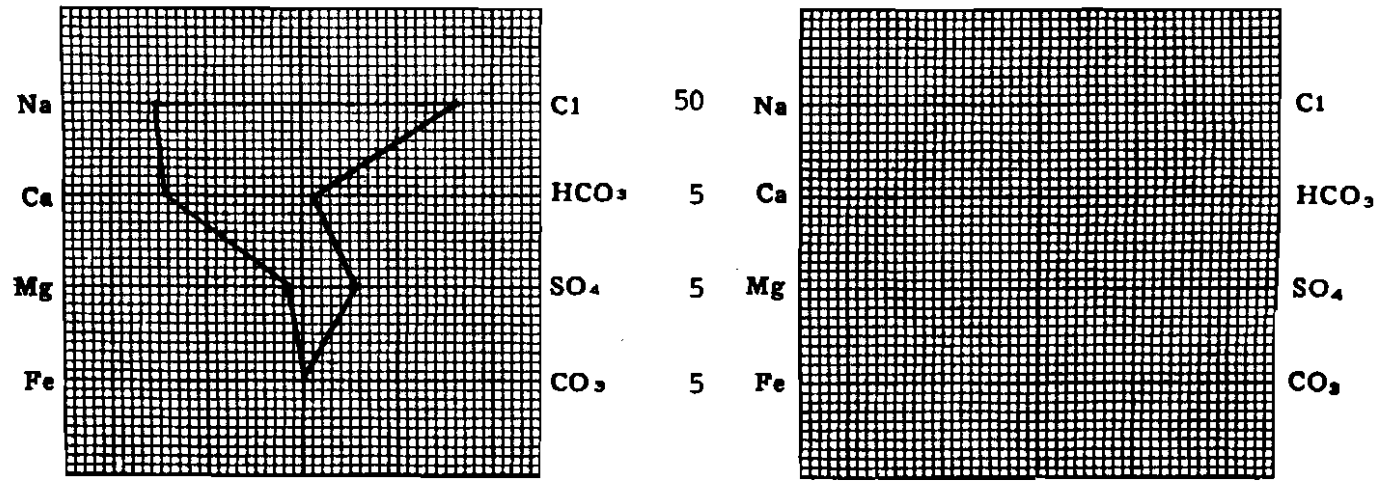
| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | 17,694 | 769.69 | Sulfate | 1,370 | 28.50 |
| Potassium | — | — | Chloride | 28,910 | 815.26 |
| Lithium | — | — | Carbonate | 0 | — |
| Calcium | 1,443 | 72.01 | Bicarbonate | 366 | 6.00 |
| Magnesium | 98 | 8.06 | Hydroxide | | |
| Iron | — | — | Hydrogen sulfide | — | — |
| Total Cations | | 849.76 | Total Anions | | 849.76 |

| | | | |
|---|---|---|---|
| Total dissolved solids, mg/l | 49,881 | Specific resistance @ 68°F.: | |
| NaCl equivalent, mg/l | 48,955 | Observed | 0.159 ohm-meters |
| Observed pH | 6.79 | Calculated | 0.154 ohm-meters |

### WATER ANALYSIS PATTERN

Sample above described

Scale MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent=by Dunlap & Hawthorne calculation from components

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## WATER ANALYSIS REPORT

OPERATOR Total Petroleum
WELL NO. Cedar Hills #1-22
FIELD
COUNTY Bowman
STATE N.D.

DATE 3/21/85 LAB NO. 2549-5
LOCATION Sec. 22-131N-105W
FORMATION Red River "C"
INTERVAL 9321-9388
SAMPLE FROM DST #2 (Sample #5)

REMARKS & CONCLUSIONS: Light brown cloudy water, Light brown cloudy filtrate.

Nitrate, mg/l — negative
Chromate, mg/l — negative

| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | 17,538 | 762.92 | Sulfate | 1,400 | 29.12 |
| Potassium | — | — | Chloride | 28,420 | 801.44 |
| Lithium | — | — | Carbonate | 0 | — |
| Calcium | 1,443 | 72.01 | Bicarbonate | 512 | 8.40 |
| Magnesium | 49 | 4.03 | Hydroxide | | |
| Iron | — | — | Hydrogen sulfide | — | — |
| Total Cations | | 838.96 | Total Anions | | 838.96 |

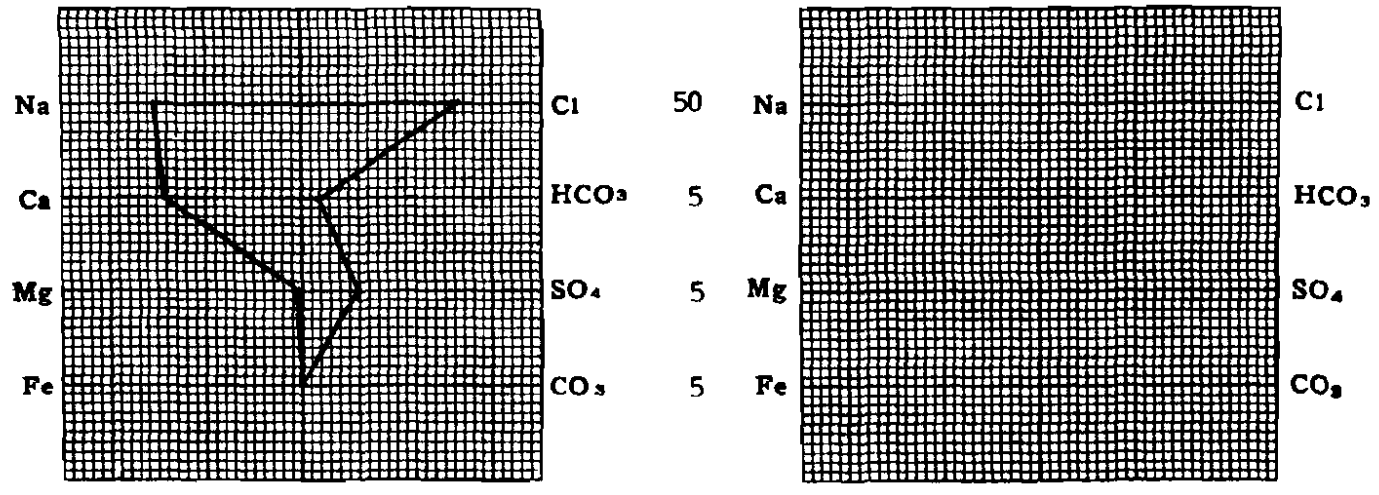
Total dissolved solids, mg/l 49,362
NaCl equivalent, mg/l 48,265
Observed pH 7.39

Specific resistance @ 68°F.:
Observed 0.159 ohm-meters
Calculated 0.156 ohm-meters

### WATER ANALYSIS PATTERN

Sample above described

Scale MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent = by Dunlap & Hawthorne calculation from components

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## WATER ANALYSIS REPORT

OPERATOR Total Petroleum
WELL NO. Cedar Hills #1-22
FIELD
COUNTY Bowman
STATE N.D.

DATE 3/21/85 LAB NO. 2549-4
LOCATION Sec. 22-131N-105W
FORMATION Red River "C"
INTERVAL 9321-9388
SAMPLE FROM DST #2 (Sample #4)

REMARKS & CONCLUSIONS: Light brown cloudy water, Light brown cloudy filtrate.

Nitrate, mg/l — negative
Chromate, mg/l — negative

| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | 17,524 | 762.30 | Sulfate | 1,370 | 28.50 |
| Potassium | — | — | Chloride | 28,420 | 801.44 |
| Lithium | — | — | Carbonate | 0 | — |
| Calcium | 1,443 | 72.01 | Bicarbonate | 512 | 8.40 |
| Magnesium | 49 | 4.03 | Hydroxide | | |
| Iron | — | — | Hydrogen sulfide | — | — |
| Total Cations | | 838.34 | Total Anions | | 838.34 |

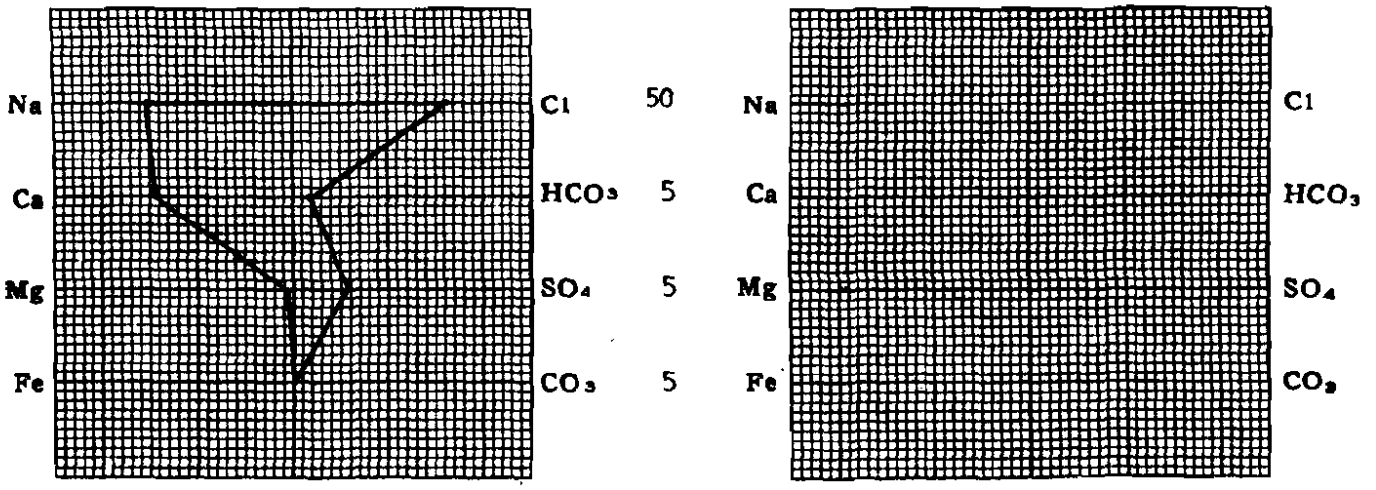
Total dissolved solids, mg/l 49,318
NaCl equivalent, mg/l 48,236
Observed pH 7.25

Specific resistance @ 68°F.:
Observed 0.162 ohm-meters
Calculated 0.156 ohm-meters

### WATER ANALYSIS PATTERN

Sample above described

Scale MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent = by Dunlap & Hawthorne calculation from components

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DICKINSON, NORTH DAKOTA

## WATER ANALYSIS REPORT

| | | | |
|---|---|---|---|
| OPERATOR | Total Petroleum | DATE | 3/21/85 |
| WELL NO. | Cedar Hills #1-22 | LAB NO. | 2549-3 |
| FIELD | | LOCATION | Sec. 22-131N-105W |
| COUNTY | Bowman | FORMATION | Red River "C" |
| STATE | N.D. | INTERVAL | 9321-9388 |
| | | SAMPLE FROM | DST #2 (Sample #3) |

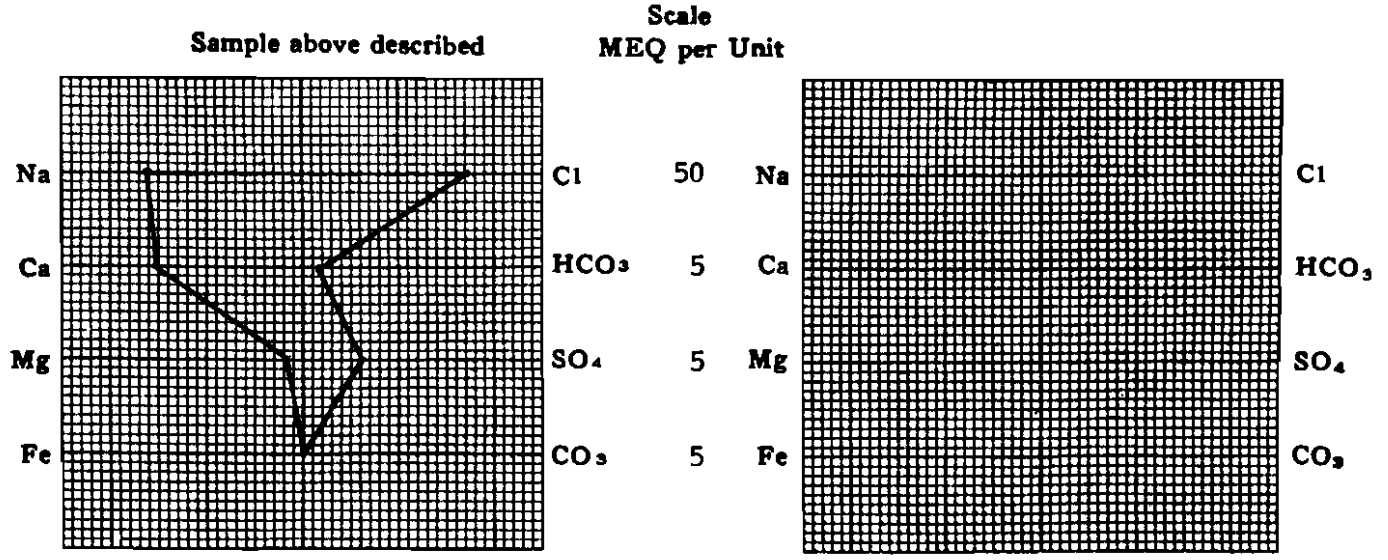
REMARKS & CONCLUSIONS: Light brown cloudy water, Light brown cloudy filtrate.

Nitrate, mg/l --- negative
Chromate, mg/l — trace

| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | 18,673 | 812.26 | Sulfate | 1,500 | 31.20 |
| Potassium | — | — | Chloride | 30,380 | 856.72 |
| Lithium | — | — | Carbonate | 0 | — |
| Calcium | 1,523 | 76.00 | Bicarbonate | 512 | 8.40 |
| Magnesium | 98 | 8.06 | Hydroxide | | |
| Iron | — | — | Hydrogen sulfide | — | — |
| Total Cations | | 896.32 | Total Anions | | 896.32 |

| | | | |
|---|---|---|---|
| Total dissolved solids, mg/l | 52,686 | Specific resistance @ 68°F.: | |
| NaCl equivalent, mg/l | 51,584 | Observed | 0.149 ohm-meters |
| Observed pH | 7.19 | Calculated | 0.150 ohm-meters |

### WATER ANALYSIS PATTERN




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l=Milligrams per liter Meq/l= Milligram equivalents per liter
Sodium chloride equivalent=by Dunlap & Hawthorne calculation from components

# Precision Service, Inc.

BOX 3659 Ph. 307/237-9327
CASPER, WYOMING

BOX 1596 Ph. 701/225-6021
DICKINSON, NORTH DAKOTA



## WATER ANALYSIS REPORT

OPERATOR Total Petroleum
WELL NO. Cedar Hills #1-22
FIELD
COUNTY Bowman
STATE N.D.

DATE 3/21/85 LAB NO. 2549-2
LOCATION Sec. 22-131N-105W
FORMATION Red River "C"
INTERVAL 9321-9388
SAMPLE FROM DST #2 (Sample #2)

REMARKS & CONCLUSIONS: Brown cloudy water, Light brown cloudy filtrate.

Nitrate, mg/l — 60
Chromate, mg/l — 15

| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium - (Calc) - | 47,051 | 2046.70 | Sulfate | 1,860 | 38.69 |
| Potassium | — | — | Chloride | 77,420 | 2183.24 |
| Lithium | — | — | Carbonate | 0 | — |
| Calcium | 3,407 | 170.01 | Bicarbonate | 293 | 4.81 |
| Magnesium | 122 | 10.03 | Hydroxide | | |
| Iron | — | — | Hydrogen sulfide | — | — |
| Total Cations | | 2226.74 | Total Anions | | 2226.74 |

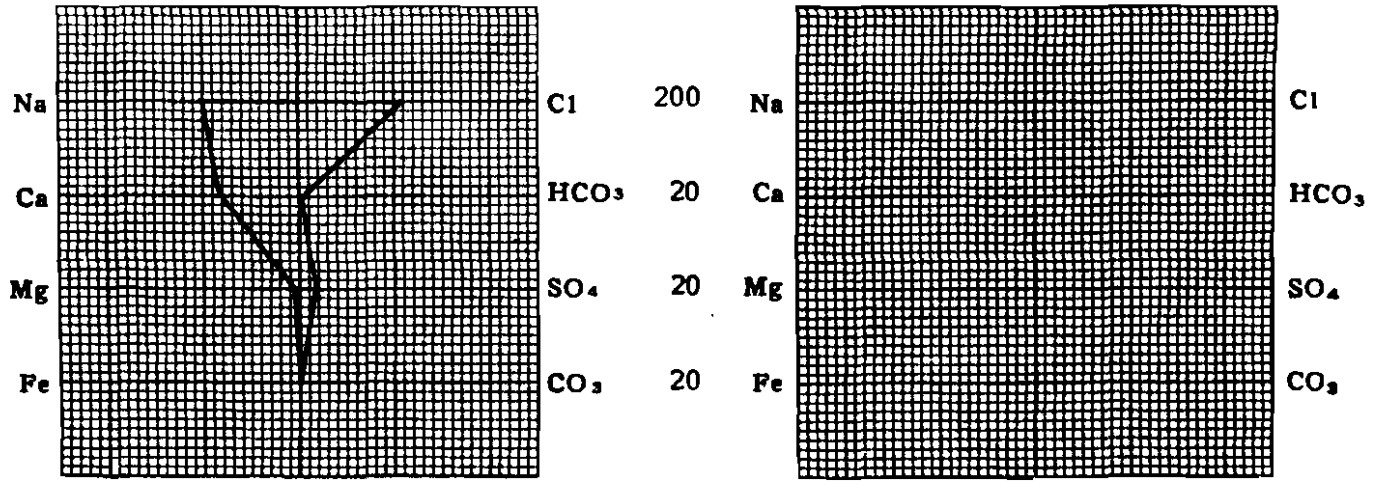
Total dissolved solids, mg/l 130,153
NaCl equivalent, mg/l 128,961
Observed pH 7.92

Specific resistance @ 68°F.:
Observed 0.073 ohm-meters
Calculated 0.074 ohm-meters

### WATER ANALYSIS PATTERN

Sample above described

Scale MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l=Milligrams per liter Meq/l= Milligram equivalents per liter
Sodium chloride equivalent=by Dunlap & Hawthorne calculation from components

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## WATER ANALYSIS REPORT

OPERATOR Total Petroleum
WELL NO. Cedar Hills #1-22
FIELD Wildcat
COUNTY Bowman
STATE N.D.

DATE 3/21/85 LAB NO. 2549-1
LOCATION Sec. 22-131N-105W NE NW
FORMATION Red River "C"
INTERVAL 9321-9288
SAMPLE FROM DST #2 (Top Sample)

REMARKS & CONCLUSIONS: Mud, Chemical on top, Yellow brown cloudy filtrate.

Ammonia Present
Nitrate, mg/l — 200
Chromate, mg/l — 85

| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | 107,183 | 4662.46 | Sulfate | 1,120 | 23.30 |
| Potassium | — | — | Chloride | 174,440 | 4919.21 |
| Lithium | — | — | Carbonate | 1,020 | 33.97 |
| Calcium | 7,615 | 379.99 | Bicarbonate | 0 | — |
| Magnesium | 0 | — | Hydroxide | 1,122 | 65.97 |
| Iron | — | — | Hydrogen sulfide | — | — |
| Total Cations | | 5042.45 | Total Anions | | 5042.45 |

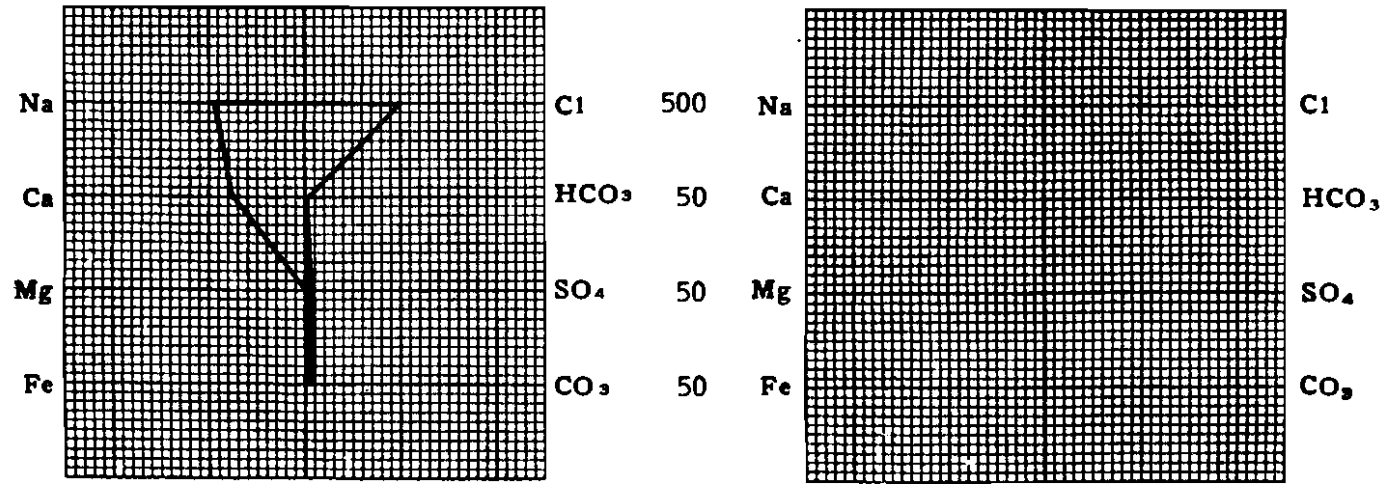
Total dissolved solids, mg/l 292,500
NaCl equivalent, mg/l 291,824
Observed pH 9.48

Specific resistance @ 68°F.:
Observed 0.048 ohm-meters
Calculated 0.048 ohm-meters

### WATER ANALYSIS PATTERN

Sample above described

Scale MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l=Milligrams per liter Meq/l= Milligram equivalents per liter
Sodium chloride equivalent=by Dunlap & Hawthorne calculation from components

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## WATER ANALYSIS REPORT

OPERATOR Total Petroleum
WELL NO Cedar Hills 1-22
FIELD
COUNTY Bowman
STATE N.D.

DATE 3/18/85 LAB NO. 2545-5
LOCATION Sec. 22-131N-105W
FORMATION Red River "A"
INTERVAL 9152-9206
SAMPLE FROM DST #1 (Sample Chamber)

REMARKS & CONCLUSIONS: Brown cloudy water, oil on top, Light brown cloudy filtrate.

Nitrate, mg/l — 30
Chromate, mg/l — 35

| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | 55,116 | 2397.56 | Sulfate | 2,570 | 53.46 |
| Potassium | — | — | Chloride | 92,120 | 2597.78 |
| Lithium | — | — | Carbonate | 0 | — |
| Calcium | 4,810 | 240.02 | Bicarbonate | 390 | 6.40 |
| Magnesium | 244 | 20.06 | Hydroxide | | |
| Iron | — | — | Hydrogen sulfide | — | — |
| Total Cations | | 2657.64 | Total Anions | | 2657.64 |

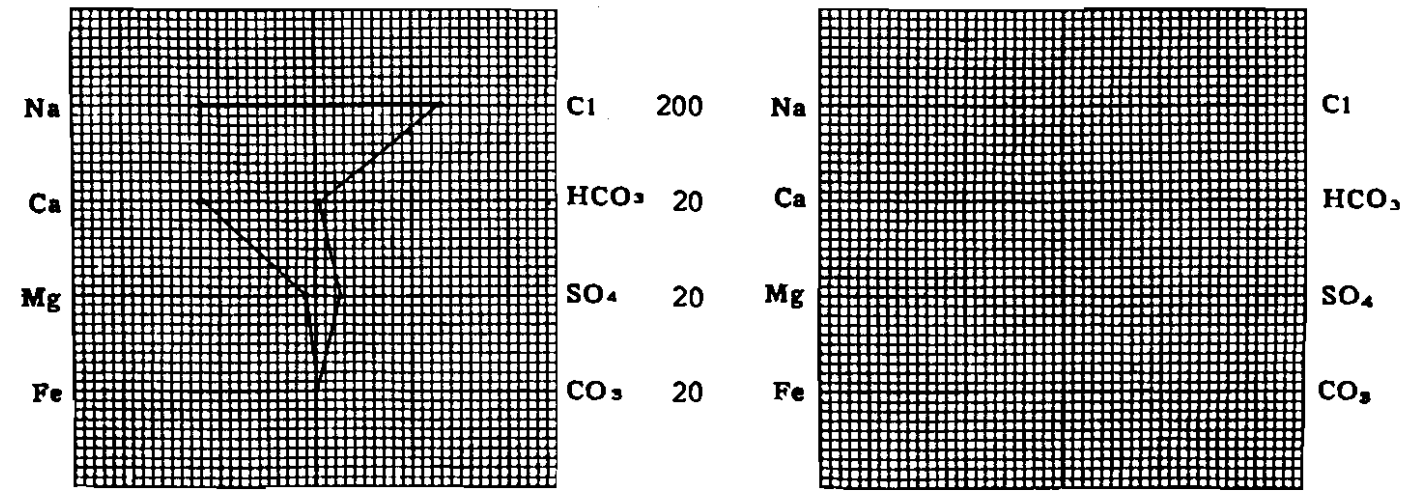
Total dissolved solids, mg/l 155,250
NaCl equivalent, mg/l 153,684
Observed pH 6.50

Specific resistance @ 68°F.:
Observed 0.067 ohm-meters
Calculated 0.066 ohm-meters

### WATER ANALYSIS PATTERN

Sample above described

Scale
MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent = by Dunlap & Hawthorne calculation from components

# Precision Service, Inc

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## WATER ANALYSIS REPORT

OPERATOR Total Petroleum
WELL NO. Cedar Hills 1-22
FIELD
COUNTY Bowman
STATE N.D.

DATE 3/18/85 LAB NO. 2545-4
LOCATION Sec. 22-131N-105W
FORMATION Red River "A"
INTERVAL 9152-9206
SAMPLE FROM DST #1 (Sample #4) Bottom Spl.

REMARKS & CONCLUSIONS: Dark brown muddy water, trace of oil, Brown cloudy filtrate.

Nitrate, mg/l — 100
Chromate, mg/l — 400

| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | 101,952 | 4434.90 | Sulfate | 1,050 | 21.84 |
| Potassium | — | — | Chloride | 172,480 | 4863.94 |
| Lithium | — | — | Carbonate | 0 | — |
| Calcium | 8,818 | 440.02 | Bicarbonate | 561 | 9.20 |
| Magnesium | 244 | 20.06 | Hydroxide | | |
| Iron | — | — | Hydrogen sulfide | — | — |
| Total Cations | | 4894.98 | Total Anions | | 4894.98 |

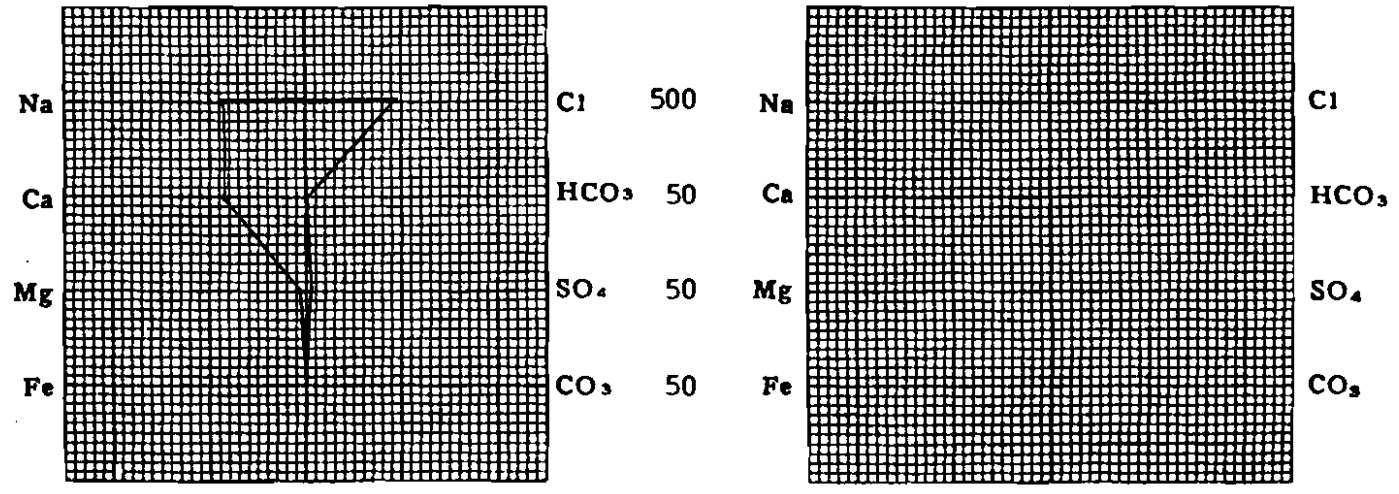
Total dissolved solids, mg/l 285,105
NaCl equivalent, mg/l 283,974
Observed pH 6.54

Specific resistance @ 68°F.:
Observed 0.049 ohm-meters
Calculated 0.048 ohm-meters

### WATER ANALYSIS PATTERN

Sample above described

Scale
MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent—by Dunlap & Hawthorne calculation from components

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## WATER ANALYSIS REPORT

OPERATOR Total Petroleum
WELL NO. Cedar Hills 1-22
FIELD
COUNTY Bowman
STATE N.D.

DATE 3/18/85 LAB NO. 2545-3
LOCATION Sec. 22-131N-105W
FORMATION Red River "A"
INTERVAL 9152-9206
SAMPLE FROM DST #1 (Sample #3)

REMARKS & CONCLUSIONS: Black muddy water, oil & oil cut mud on top, Brown cloudy filtrate.

Nitrate, mg/l --- 40
Chromate, mg/l -- 90

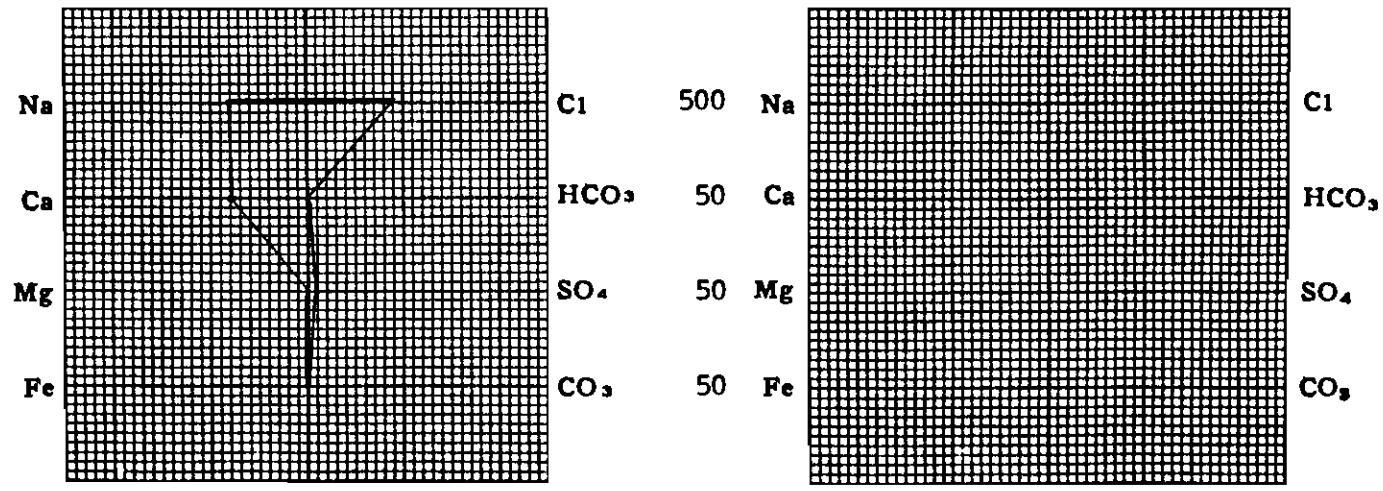
| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | 95,833 | 4168.73 | Sulfate | 1,540 | 32.03 |
| Potassium | — | — | Chloride | 160,720 | 4532.30 |
| Lithium | — | — | Carbonate | 0 | — |
| Calcium | 8,016 | 400.00 | Bicarbonate | 268 | 4.40 |
| Magnesium | trace | — | Hydroxide | | |
| Iron | — | — | Hydrogen sulfide | — | — |
| Total Cations | | 4568.73 | Total Anions | | 4568.73 |

| | | | |
|---|---|---|---|
| Total dissolved solids, mg/l | 266,377 | Specific resistance @ 68°F.: | |
| NaCl equivalent, mg/l | 265,011 | Observed | 0.051 ohm-meters |
| Observed pH | 6.25 | Calculated | 0.049 ohm-meters |

### WATER ANALYSIS PATTERN

Sample above described

Scale
MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l=Milligrams per liter Meq/l= Milligram equivalents per liter
Sodium chloride equivalent=by Dunlap & Hawthorne calculation from components

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## WATER ANALYSIS REPORT

OPERATOR Total Petroleum
WELL NO. Cedar Hills 1-22
FIELD
COUNTY Bowman
STATE N.D.

DATE 3/18/85 LAB NO. 2545-2
LOCATION Sec. 22-131N-105W
FORMATION Red River "A"
INTERVAL 9152-9206
SAMPLE FROM DST #1 (Sample #2)

REMARKS & CONCLUSIONS: Oil sample, some oil cut mud, (5% est.)

(Insufficient water for analysis)

| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | | | Sulfate | | |
| Potassium | | | Chloride | | |
| Lithium | | | Carbonate | | |
| Calcium | | | Bicarbonate | | |
| Magnesium | | | Hydroxide | | |
| Iron | | | Hydrogen sulfide | | |
| Total Cations | | | Total Anions | | |

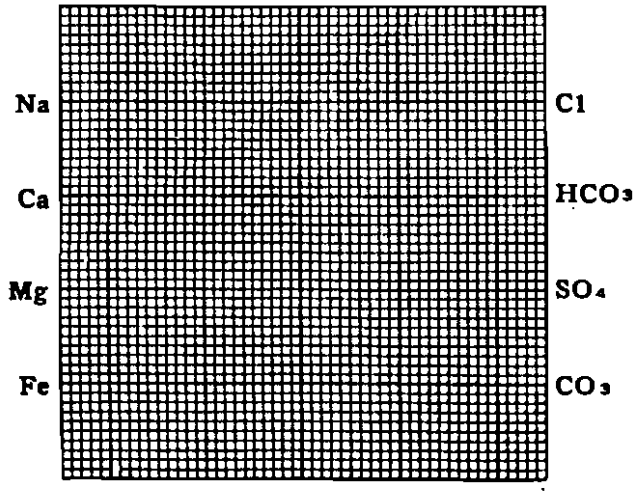
Total dissolved solids, mg/l
NaCl equivalent, mg/l
Observed pH

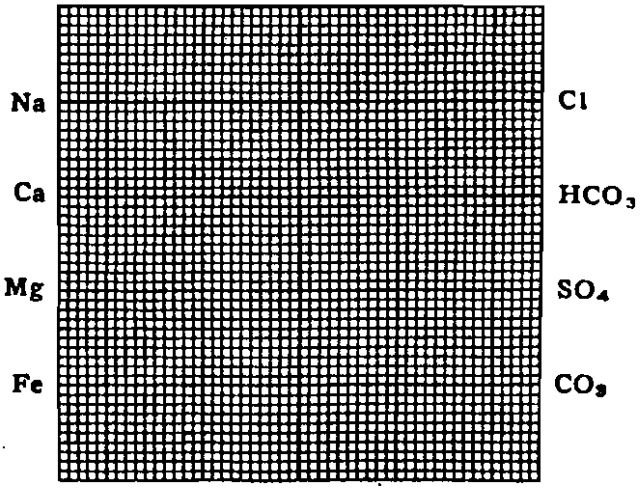
Specific resistance @ 68°F.:
Observed ohm-meters
Calculated ohm-meters

### WATER ANALYSIS PATTERN

Sample above described

Scale
MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent = by Dunlap & Hawthorne calculation from components

# Precision Service, Inc.

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DICKINSON, NORTH DAKOTA

## WATER ANALYSIS REPORT

OPERATOR Total Petroleum
WELL NO Cedar Hills 1-22
FIELD
COUNTY Bowman
STATE N.D.

DATE 3/18/85 LAB NO. 2545-1
LOCATION Sec. 22-131N-105W
FORMATION Red River "A"
INTERVAL 9152-9206
SAMPLE FROM DST #1 (Top Sample)

REMARKS & CONCLUSIONS: Oil sample, some oil cut mud, 10% est.

(Insufficient water for analysis)

| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | | | Sulfate | | |
| Potassium | | | Chloride | | |
| Lithium | | | Carbonate | | |
| Calcium | | | Bicarbonate | | |
| Magnesium | | | Hydroxide | | |
| Iron | | | Hydrogen sulfide | | |
| Total Cations | | | Total Anions | | |

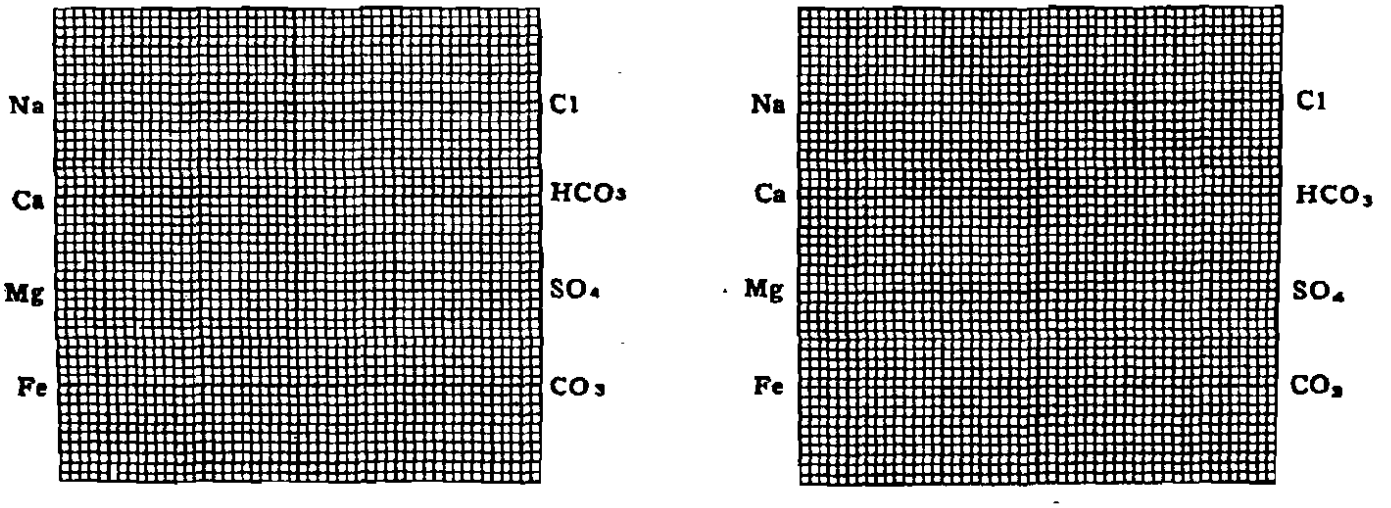
Total dissolved solids, mg/l
NaCl equivalent, mg/l
Observed pH

Specific resistance @ 68°F.:
Observed ohm-meters
Calculated ohm-meters

### WATER ANALYSIS PATTERN

Sample above described

Scale
MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent = by Dunlap & Hawthorne calculation from components

# Precision Service, Inc.

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## WATER ANALYSIS REPORT

| | | | |
|---|---|---|---|
| OPERATOR | Total Petroleum | DATE | 3/18/85 LAB NO. 2545-5 |
| WELL NO. | Cedar Hills 1-22 | LOCATION | Sec. 22-131N-105W |
| FIELD | | FORMATION | Red River "A" |
| COUNTY | Bowman | INTERVAL | 9152-9206 |
| STATE | N.D. | SAMPLE FROM | DST #1 (Sample Chamber) |

REMARKS & CONCLUSIONS: Brown cloudy water, oil on top, Light brown cloudy filtrate.

Nitrate, mg/l — 30
Chromate, mg/l — 35

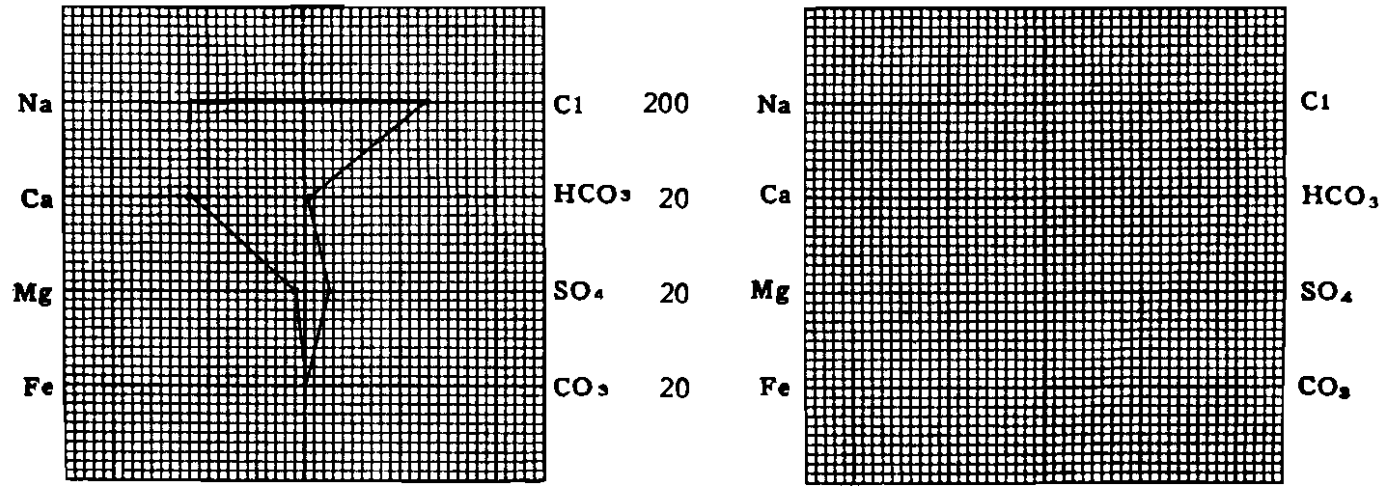
| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | 55,116 | 2397.56 | Sulfate | 2,570 | 53.46 |
| Potassium | — | — | Chloride | 92,120 | 2597.78 |
| Lithium | — | — | Carbonate | 0 | — |
| Calcium | 4,810 | 240.02 | Bicarbonate | 390 | 6.40 |
| Magnesium | 244 | 20.06 | Hydroxide | | |
| Iron | — | — | Hydrogen sulfide | — | — |
| Total Cations | | 2657.64 | Total Anions | | 2657.64 |

| | | | |
|---|---|---|---|
| Total dissolved solids, mg/l | 155,250 | Specific resistance @ 68°F.: | |
| NaCl equivalent, mg/l | 153,684 | Observed | 0.067 ohm-meters |
| Observed pH | 6.50 | Calculated | 0.066 ohm-meters |

### WATER ANALYSIS PATTERN

Sample above described

Scale
MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent = by Dunlap & Hawthorne calculation from components

# Precision Service, Inc.

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DICKINSON, NORTH DAKOTA

## WATER ANALYSIS REPORT

OPERATOR Total Petroleum
WELL NO. Cedar Hills 1-22
FIELD
COUNTY Bowman
STATE N.D.

DATE 3/18/85 LAB NO. 2545-4
LOCATION Sec. 22-131N-105W
FORMATION Red River "A"
INTERVAL 9152-9206
SAMPLE FROM DST #1 (Sample #4) Bottom Spl.

REMARKS & CONCLUSIONS: Dark brown muddy water, trace of oil, Brown cloudy filtrate.

Nitrate, mg/l --- 100
Chromate, mg/l -- 400

| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | 101,952 | 4434.90 | Sulfate | 1,050 | 21.84 |
| Potassium | — | — | Chloride | 172,480 | 4863.94 |
| Lithium | — | — | Carbonate | 0 | — |
| Calcium | 8,818 | 440.02 | Bicarbonate | 561 | 9.20 |
| Magnesium | 244 | 20.06 | Hydroxide | | |
| Iron | — | — | Hydrogen sulfide | — | — |
| Total Cations | | 4894.98 | Total Anions | | 4894.98 |

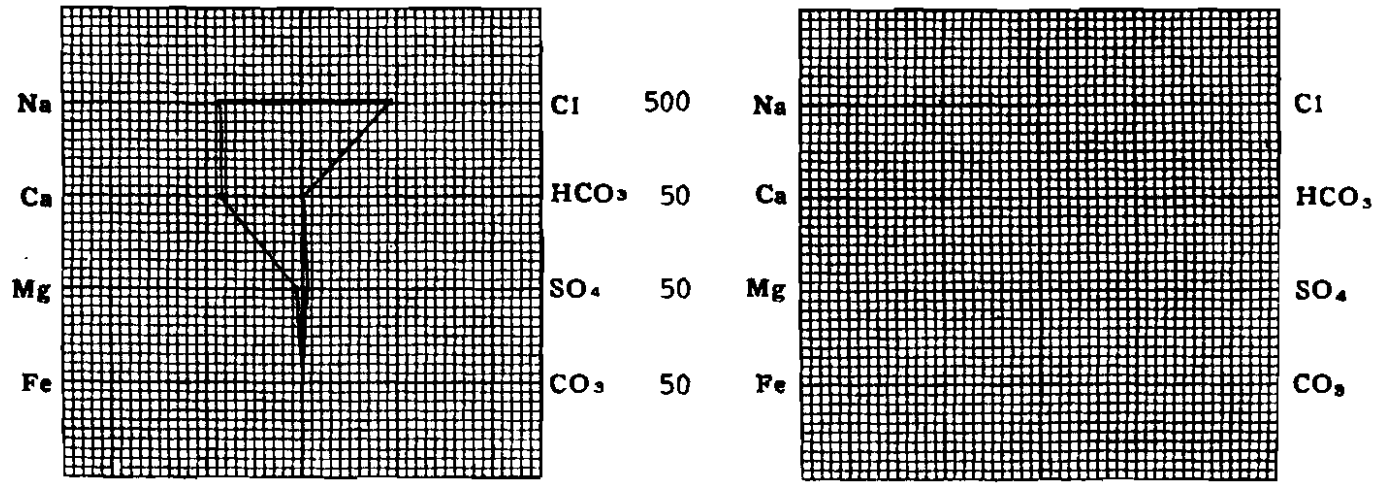
Total dissolved solids, mg/l 285,105
NaCl equivalent, mg/l 283,974
Observed pH 6.54

Specific resistance @ 68°F.:
Observed 0.049 ohm-meters
Calculated 0.048 ohm-meters

### WATER ANALYSIS PATTERN

Sample above described

Scale
MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent by Dunlap & Hawthorne calculation from components

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## WATER ANALYSIS REPORT

OPERATOR Total Petroleum
WELL NO. Cedar Hills 1-22
FIELD
COUNTY Bowman
STATE N.D.

DATE 3/18/85 LAB NO. 2545-3
LOCATION Sec. 22-131N-105W
FORMATION Red River "A"
INTERVAL 9152-9206
SAMPLE FROM DST #1 (Sample #3)

REMARKS & CONCLUSIONS: Black muddy water, oil & oil cut mud on top, Brown cloudy filtrate.

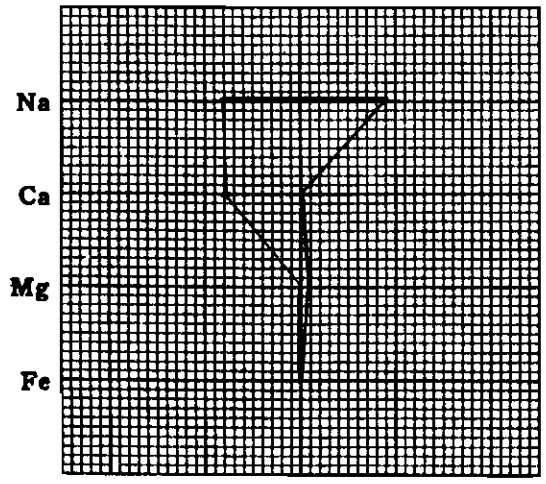
Nitrate, mg/l --- 40
Chromate, mg/l -- 90

| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | 95,833 | 4168.73 | Sulfate | 1,540 | 32.03 |
| Potassium | — | — | Chloride | 160,720 | 4532.30 |
| Lithium | — | — | Carbonate | 0 | — |
| Calcium | 8,016 | 400.00 | Bicarbonate | 268 | 4.40 |
| Magnesium | trace | — | Hydroxide | | |
| Iron | — | — | Hydrogen sulfide | — | — |
| Total Cations | | 4568.73 | Total Anions | | 4568.73 |

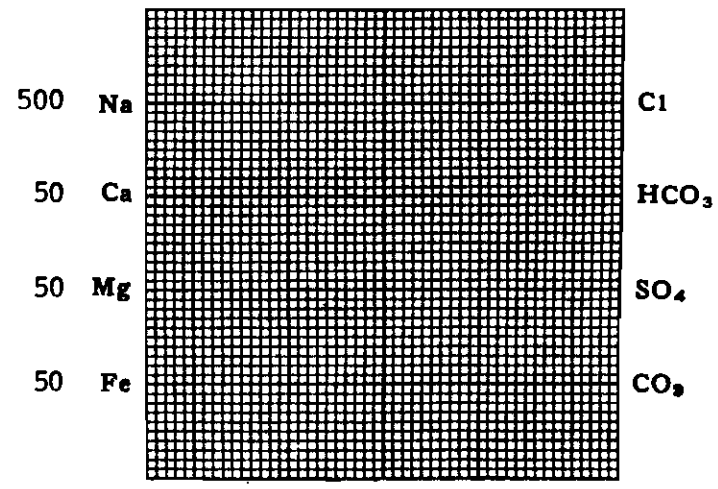
| | | | |
|---|---|---|---|
| Total dissolved solids, mg/l | 266,377 | Specific resistance @ 68°F.: | |
| NaCl equivalent, mg/l | 265,011 | Observed | 0.051 ohm-meters |
| Observed pH | 6.25 | Calculated | 0.049 ohm-meters |

### WATER ANALYSIS PATTERN

Sample above described




Scale
MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent = by Dunlap & Hawthorne calculation from components

# Precision Service, Inc.

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## WATER ANALYSIS REPORT

OPERATOR Total Petroleum
WELL NO. Cedar Hills 1-22
FIELD
COUNTY Bowman
STATE N.D.

DATE 3/18/85 LAB NO. 2545-2
LOCATION Sec. 22-131N-105W
FORMATION Red River "A"
INTERVAL 9152-9206
SAMPLE FROM DST #1 (Sample #2)

REMARKS & CONCLUSIONS: Oil sample, some oil cut mud, (5% est.)

(Insufficient water for analysis)

| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | | | Sulfate | | |
| Potassium | | | Chloride | | |
| Lithium | | | Carbonate | | |
| Calcium | | | Bicarbonate | | |
| Magnesium | | | Hydroxide | | |
| Iron | | | Hydrogen sulfide | | |
| Total Cations | | | Total Anions | | |

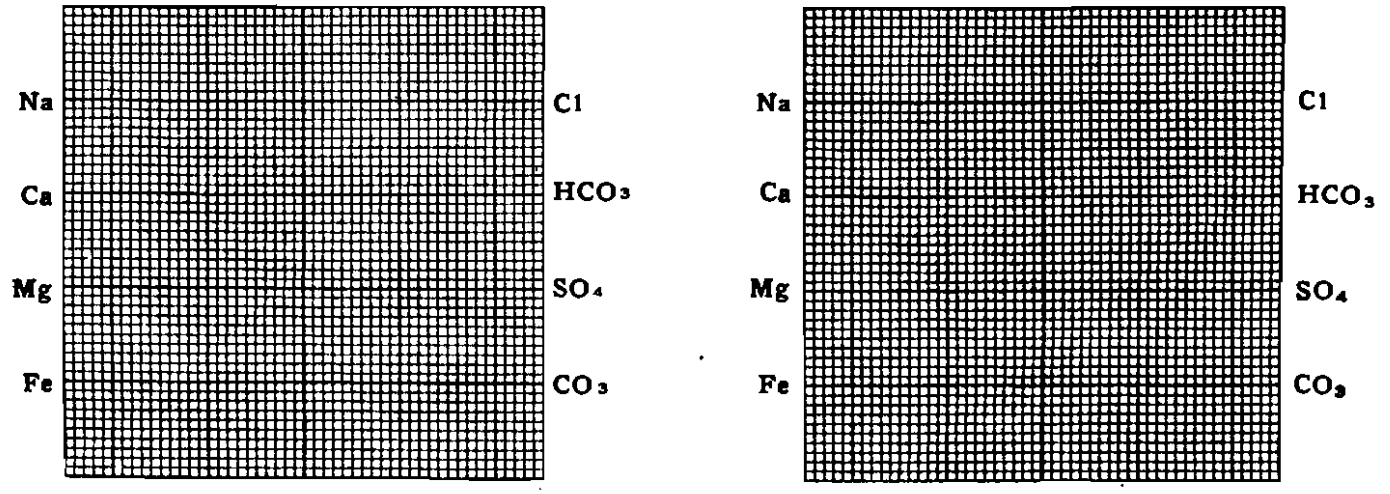
Total dissolved solids, mg/l
NaCl equivalent, mg/l
Observed pH

Specific resistance @ 68°F.:
Observed ohm-meters
Calculated ohm-meters

### WATER ANALYSIS PATTERN

Sample above described

Scale
MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent = by Dunlap & Hawthorne calculation from components

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## WATER ANALYSIS REPORT

OPERATOR Total Petroleum
WELL NO. Cedar Hills 1-22
FIELD
COUNTY Bowman
STATE N.D.

DATE 3/18/85 LAB NO. 2545-1
LOCATION Sec. 22-131N-105W
FORMATION Red River "A"
INTERVAL 9152-9206
SAMPLE FROM DST #1 (Top Sample)

REMARKS & CONCLUSIONS: Oil sample, some oil cut mud, 10% est.

(Insufficient water for analysis)

| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | | | Sulfate | | |
| Potassium | | | Chloride | | |
| Lithium | | | Carbonate | | |
| Calcium | | | Bicarbonate | | |
| Magnesium | | | Hydroxide | | |
| Iron | | | Hydrogen sulfide | | |
| Total Cations | | | Total Anions | | |

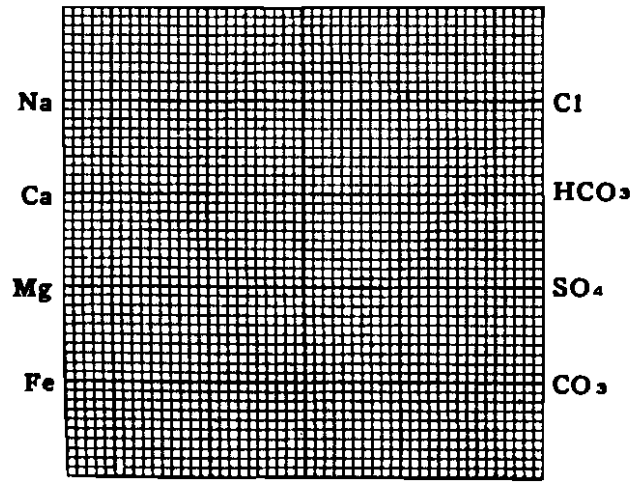
Total dissolved solids, mg/l
NaCl equivalent, mg/l
Observed pH

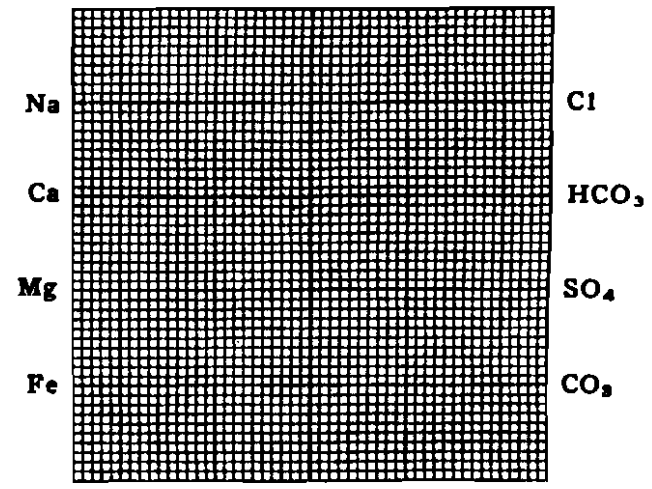
Specific resistance @ 68°F.:
Observed ohm-meters
Calculated ohm-meters

### WATER ANALYSIS PATTERN

Sample above described

Scale
MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent = by Dunlap & Hawthorne calculation from components

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COMPANY Total Petroleum DATE 3/18/85 WO # 2545
LOCATION Cedar Hills 1-22 COUNTY Bowman STATE N.D.
REMARKS Sec. 22-131N-105W NE NW

DST #1 Red River "A" 9152-9206

| | Chloride | | Nitrate | Chromate | Bs & W | Oil |
|---|---|---|---|---|---|---|
| | mg/l | | mg/l | mg/l | % by vol | % by vol. |
| | | | | | | |
| Start | | | | | 40% | 60% |
| 2 minute reverse out | | | | | 10% | 90% |
| 4 minute reverse out | | | | | 8% | 92% |
| 6 minute reverse out | | | | | 20% | 80% |
| 8 minute reverse out | | | | | 85% | 15% |
| 10 minute reverse out | 184,240 | | 100 | 500+ | 100% | 0 |
| 12 minute reverse out | 184,240 | | 100 | 500+ | 100% | 0 |
| Sample Chamber | 92,120 | | 30 | | 95% | ± 5% |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

CONCLUSIONS OIL SAMPLE

Specific Gravity @ 60°F ——— 0.9087
API Gravity @ 60°F ——— 24.2

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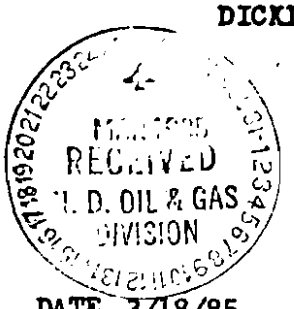


P&A'd

COMPANY Total Petroleum DATE 3/18/85 WO # 2545
LOCATION Cedar Hills 1-22 COUNTY Bowman STATE N.D.
REMARKS Sec. 22-131N-105W NE NW

DST #1 Red River "A" 9152-9206

Wildcat

| | Chloride | | Nitrate | Chromate | Bs & W | Oil |
|---|---|---|---|---|---|---|
| | mg/l | | mg/l | mg/l | % by vol | % by vol. |
| | | | | | | |
| Start | | | | | 40% | 60% |
| 2 minute reverse out | | | | | 10% | 90% |
| 4 minute reverse out | | | | | 8% | 92% |
| 6 minute reverse out | | | | | 20% | 80% |
| 8 minute reverse out | | | | | 85% | 15% |
| 10 minute reverse out | 184,240 | | 100 | 500+ | 100% | 0 |
| 12 minute reverse out | 184,240 | | 100 | 500+ | 100% | 0 |
| Sample Chamber | 92,120 | | 30 | | 95% | ± 5% |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

CONCLUSIONS OIL SAMPLE

Specific Gravity @ 60°F ——— 0.9087
API Gravity @ 60°F ——— 24.2

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COMPANY Total Petroleum DATE 3/18/85 WO # 2545
LOCATION Cedar Hills 1-22 COUNTY Bowman STATE N.D.
REMARKS Sec. 22-131N-105W NE NW

DST #1 Red River "A" 9152-9206

| | Chloride | | Nitrate | Chromate | Bs & W | Oil |
|---|---|---|---|---|---|---|
| | mg/l | | mg/l | mg/l | % by vol | % by vol. |
| | | | | | | |
| Start | | | | | 40% | 60% |
| 2 minute reverse out | | | | | 10% | 90% |
| 4 minute reverse out | | | | | 8% | 92% |
| 6 minute reverse out | | | | | 20% | 80% |
| 8 minute reverse out | | | | | 85% | 15% |
| 10 minute reverse out | 184,240 | | 100 | 500+ | 100% | 0 |
| 12 minute reverse out | 184,240 | | 100 | 500+ | 100% | 0 |
| Sample Chamber | 92,120 | | 30 | | 95% | ± 5% |
| | | | | | | |
| | | | | | | |
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CONCLUSIONS OIL SAMPLE

Specific Gravity @ 60°F ——— 0.9087
API Gravity @ 60°F ——— 24.2

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## WATER ANALYSIS REPORT

| | | | |
|---|---|---|---|
| OPERATOR | Total Petroleum | DATE | 3/18/85 LAB NO. 2545-5 |
| WELL NO. | Cedar Hills 1-22 | LOCATION | Sec. 22-131N-105W |
| FIELD | | FORMATION | Red River "A" |
| COUNTY | Bowman | INTERVAL | 9152-9206 |
| STATE | N.D. | SAMPLE FROM | DST #1 (Sample Chamber) |

REMARKS & CONCLUSIONS: Brown cloudy water, oil on top, Light brown cloudy filtrate.

Nitrate, mg/l — 30
Chromate, mg/l — 35

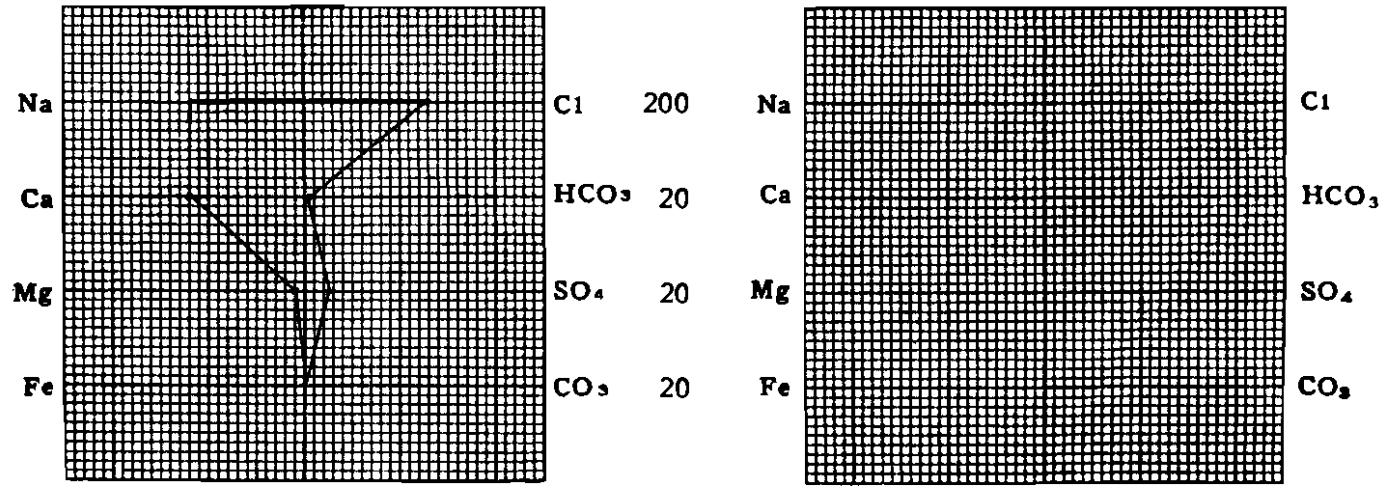
| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | 55,116 | 2397.56 | Sulfate | 2,570 | 53.46 |
| Potassium | — | — | Chloride | 92,120 | 2597.78 |
| Lithium | — | — | Carbonate | 0 | — |
| Calcium | 4,810 | 240.02 | Bicarbonate | 390 | 6.40 |
| Magnesium | 244 | 20.06 | Hydroxide | | |
| Iron | — | — | Hydrogen sulfide | — | — |
| Total Cations | | 2657.64 | Total Anions | | 2657.64 |

| | | | |
|---|---|---|---|
| Total dissolved solids, mg/l | 155,250 | Specific resistance @ 68°F.: | |
| NaCl equivalent, mg/l | 153,684 | Observed | 0.067 ohm-meters |
| Observed pH | 6.50 | Calculated | 0.066 ohm-meters |

### WATER ANALYSIS PATTERN

Sample above described

Scale
MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent = by Dunlap & Hawthorne calculation from components

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## WATER ANALYSIS REPORT

OPERATOR Total Petroleum
WELL NO. Cedar Hills 1-22
FIELD
COUNTY Bowman
STATE N.D.

DATE 3/18/85 LAB NO. 2545-4
LOCATION Sec. 22-131N-105W
FORMATION Red River "A"
INTERVAL 9152-9206
SAMPLE FROM DST #1 (Sample #4) Bottom Spl.

REMARKS & CONCLUSIONS: Dark brown muddy water, trace of oil, Brown cloudy filtrate.

Nitrate, mg/l --- 100
Chromate, mg/l -- 400

| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | 101,952 | 4434.90 | Sulfate | 1,050 | 21.84 |
| Potassium | — | — | Chloride | 172,480 | 4863.94 |
| Lithium | — | — | Carbonate | 0 | — |
| Calcium | 8,818 | 440.02 | Bicarbonate | 561 | 9.20 |
| Magnesium | 244 | 20.06 | Hydroxide | | |
| Iron | — | — | Hydrogen sulfide | — | — |
| Total Cations | | 4894.98 | Total Anions | | 4894.98 |

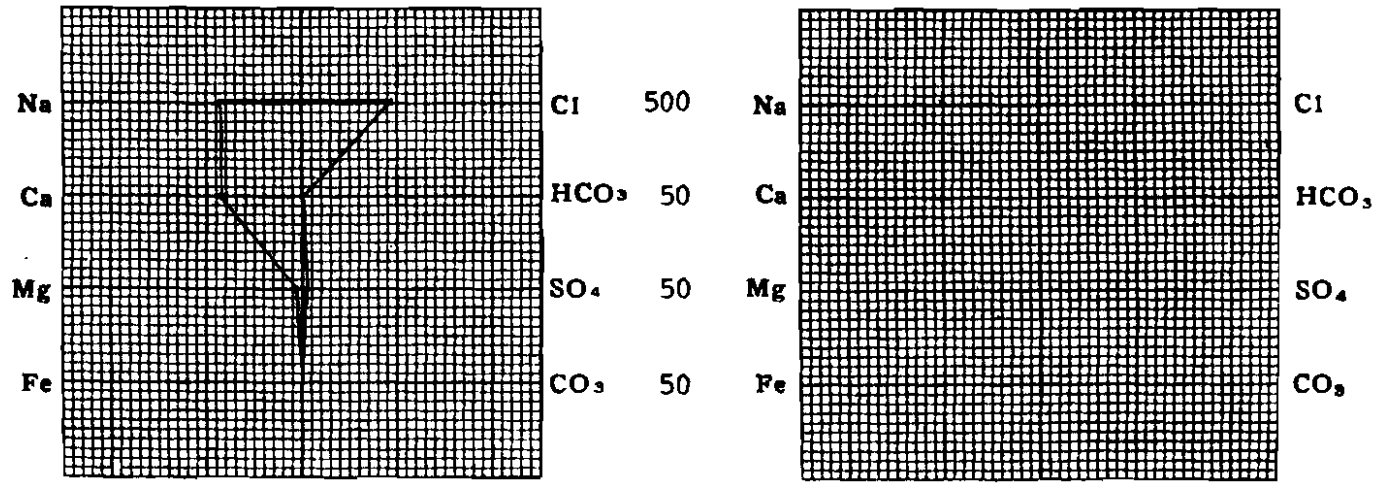
Total dissolved solids, mg/l 285,105
NaCl equivalent, mg/l 283,974
Observed pH 6.54

Specific resistance @ 68°F.:
Observed 0.049 ohm-meters
Calculated 0.048 ohm-meters

### WATER ANALYSIS PATTERN

Sample above described

Scale
MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent by Dunlap & Hawthorne calculation from components

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## WATER ANALYSIS REPORT

OPERATOR Total Petroleum
WELL NO. Cedar Hills 1-22
FIELD
COUNTY Bowman
STATE N.D.

DATE 3/18/85 LAB NO. 2545-3
LOCATION Sec. 22-131N-105W
FORMATION Red River "A"
INTERVAL 9152-9206
SAMPLE FROM DST #1 (Sample #3)

REMARKS & CONCLUSIONS: Black muddy water, oil & oil cut mud on top, Brown cloudy filtrate.

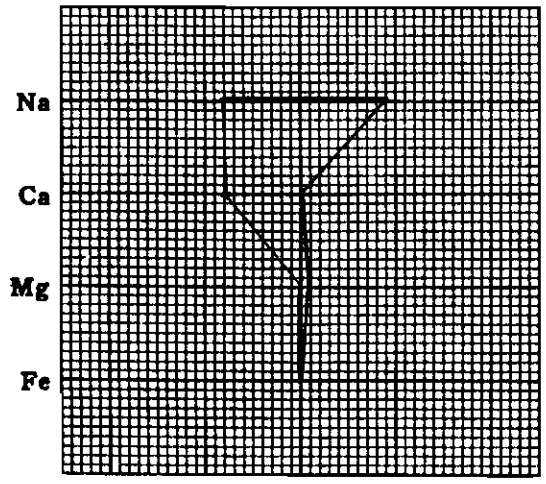
Nitrate, mg/l --- 40
Chromate, mg/l -- 90

| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | 95,833 | 4168.73 | Sulfate | 1,540 | 32.03 |
| Potassium | — | — | Chloride | 160,720 | 4532.30 |
| Lithium | — | — | Carbonate | 0 | — |
| Calcium | 8,016 | 400.00 | Bicarbonate | 268 | 4.40 |
| Magnesium | trace | — | Hydroxide | | |
| Iron | — | — | Hydrogen sulfide | — | — |
| Total Cations | | 4568.73 | Total Anions | | 4568.73 |

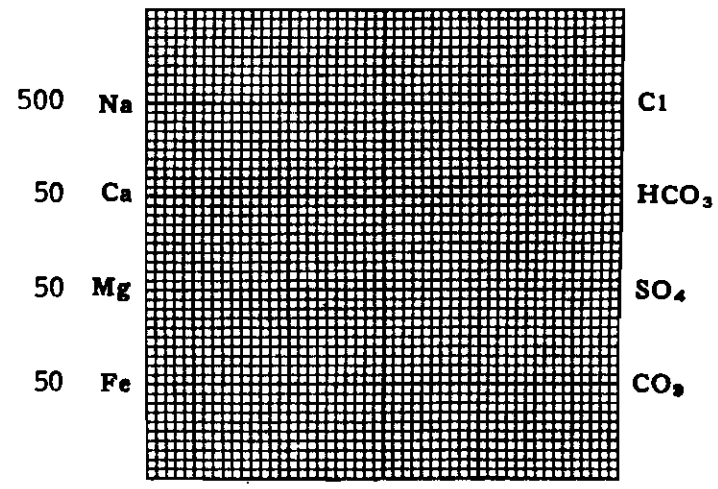
| | | | |
|---|---|---|---|
| Total dissolved solids, mg/l | 266,377 | Specific resistance @ 68°F.: | |
| NaCl equivalent, mg/l | 265,011 | Observed | 0.051 ohm-meters |
| Observed pH | 6.25 | Calculated | 0.049 ohm-meters |

### WATER ANALYSIS PATTERN

Sample above described




Scale
MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent = by Dunlap & Hawthorne calculation from components

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## WATER ANALYSIS REPORT

OPERATOR Total Petroleum
WELL NO. Cedar Hills 1-22
FIELD
COUNTY Bowman
STATE N.D.

DATE 3/18/85 LAB NO. 2545-2
LOCATION Sec. 22-131N-105W
FORMATION Red River "A"
INTERVAL 9152-9206
SAMPLE FROM DST #1 (Sample #2)

REMARKS & CONCLUSIONS: Oil sample, some oil cut mud, (5% est.)

(Insufficient water for analysis)

| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | | | Sulfate | | |
| Potassium | | | Chloride | | |
| Lithium | | | Carbonate | | |
| Calcium | | | Bicarbonate | | |
| Magnesium | | | Hydroxide | | |
| Iron | | | Hydrogen sulfide | | |
| Total Cations | | | Total Anions | | |

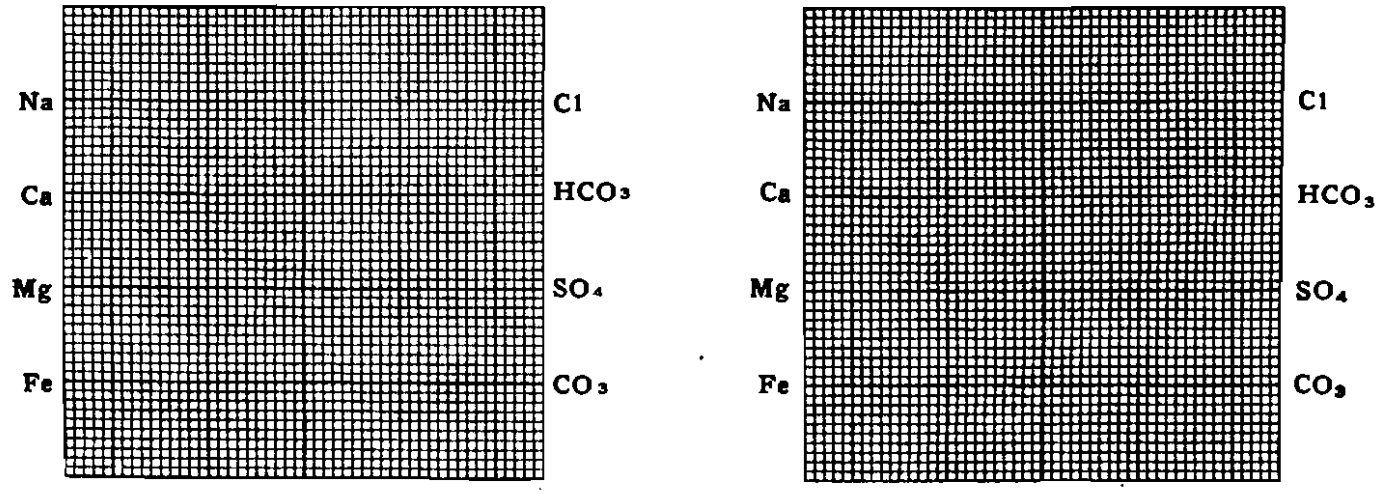
Total dissolved solids, mg/l
NaCl equivalent, mg/l
Observed pH

Specific resistance @ 68°F.:
Observed ohm-meters
Calculated ohm-meters

### WATER ANALYSIS PATTERN

Sample above described

Scale
MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent = by Dunlap & Hawthorne calculation from components

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## WATER ANALYSIS REPORT

OPERATOR Total Petroleum
WELL NO. Cedar Hills 1-22
FIELD
COUNTY Bowman
STATE N.D.

DATE 3/18/85 LAB NO. 2545-1
LOCATION Sec. 22-131N-105W
FORMATION Red River "A"
INTERVAL 9152-9206
SAMPLE FROM DST #1 (Top Sample)

REMARKS & CONCLUSIONS: Oil sample, some oil cut mud, 10% est.

(Insufficient water for analysis)

| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | | | Sulfate | | |
| Potassium | | | Chloride | | |
| Lithium | | | Carbonate | | |
| Calcium | | | Bicarbonate | | |
| Magnesium | | | Hydroxide | | |
| Iron | | | Hydrogen sulfide | | |
| Total Cations | | | Total Anions | | |

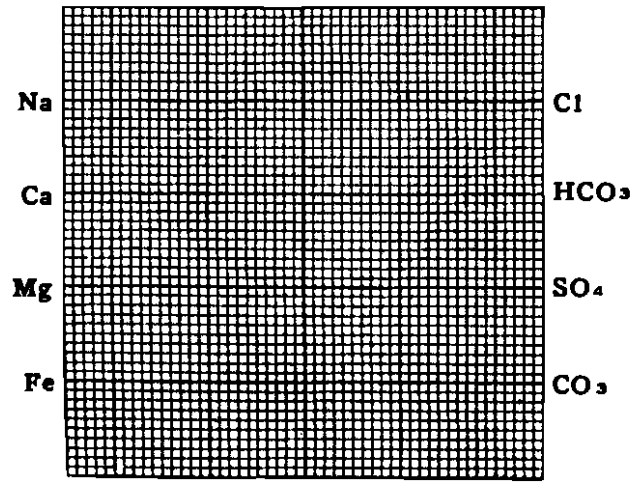
Total dissolved solids, mg/l
NaCl equivalent, mg/l
Observed pH

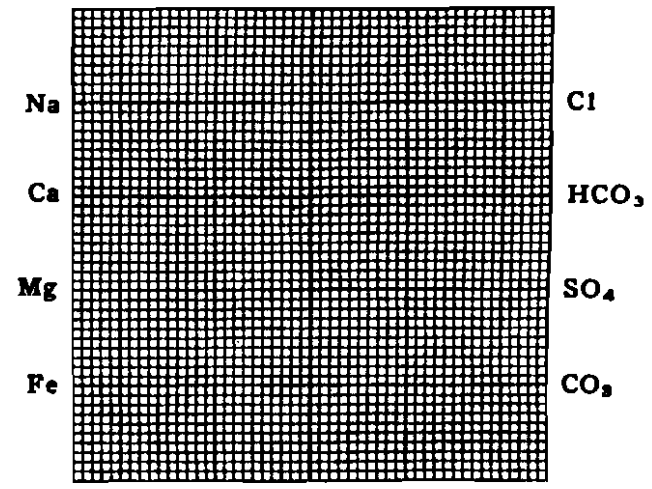
Specific resistance @ 68°F.:
Observed ohm-meters
Calculated ohm-meters

### WATER ANALYSIS PATTERN

Sample above described

Scale
MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent = by Dunlap & Hawthorne calculation from components

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## WATER ANALYSIS REPORT

| | | | |
|---|---|---|---|
| OPERATOR | Total Petroleum | DATE | 3/21/85 LAB NO. 2549-7 |
| WELL NO. | Cedar Hills #1-22 | LOCATION | Sec. 22-131N-105W |
| FIELD | | FORMATION | Red River "C" |
| COUNTY | Bowman | INTERVAL | 9321-9388 |
| STATE | N.D. | SAMPLE FROM | DST #2 (Sample Chamber) |

REMARKS & CONCLUSIONS: Orange brown cloudy water, Light orange brown cloudy filtrate.

Nitrate, mg/l — negative
Chromate, mg/l — trace

| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium - (Calc) - | 18,647 | 811.15 | Sulfate | 1,370 | 28.50 |
| Potassium | — | — | Chloride | 30,380 | 856.72 |
| Lithium | — | — | Carbonate | 0 | — |
| Calcium | 1,443 | 72.01 | Bicarbonate | 366 | 6.00 |
| Magnesium | 98 | 8.06 | Hydroxide | | |
| Iron | — | — | Hydrogen sulfide | — | — |
| Total Cations | | 891.22 | Total Anions | | 891.22 |

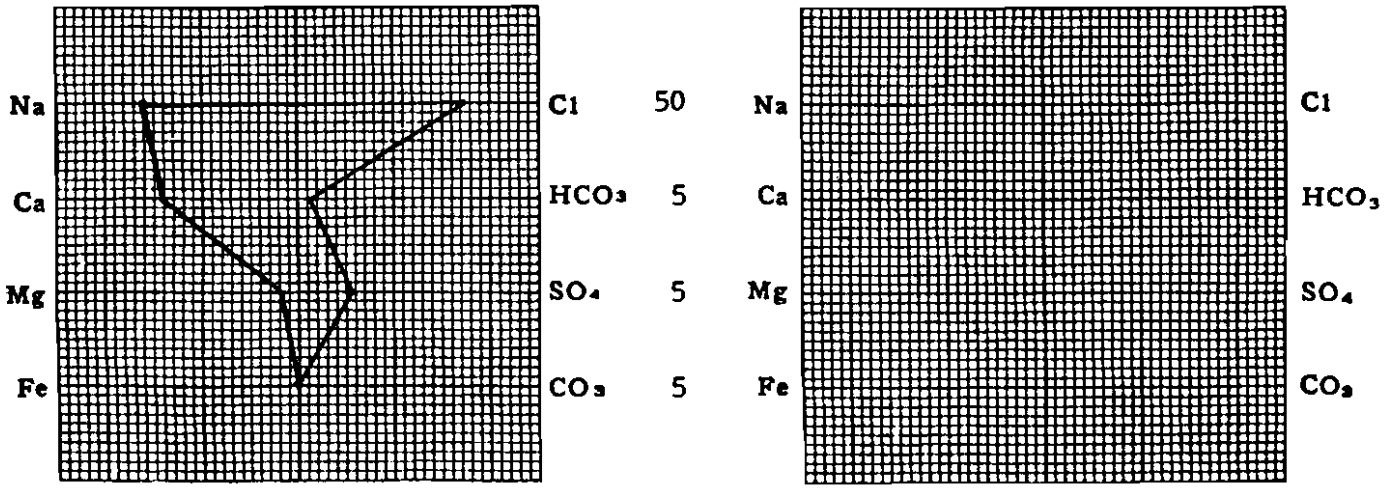
| | |
|---|---|
| Total dissolved solids, mg/l | 52,304 |
| NaCl equivalent, mg/l | 51,378 |
| Observed pH | 6.82 |

Specific resistance @ 68°F.:
Observed 0.149 ohm-meters
Calculated 0.150 ohm-meters

### WATER ANALYSIS PATTERN

Sample above described

Scale
MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent = by Dunlap & Hawthorne calculation from components

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## WATER ANALYSIS REPORT

| | | | |
|---|---|---|---|
| OPERATOR | Total Petroleum | DATE | 3/21/85 |
| WELL NO. | Cedar Hills #1-22 | LAB NO. | 2549-6 |
| FIELD | | LOCATION | Sec. 22-131N-105W |
| COUNTY | Bowman | FORMATION | Red River "C" |
| STATE | N.D. | INTERVAL | 9321-9388 |
| | | SAMPLE FROM | DST #2 (Sample #6) |

REMARKS & CONCLUSIONS: Orange brown cloudy water, Light orange brown cloudy filtrate.

Nitrate, mg/l — negative
Chromate, mg/l — negative

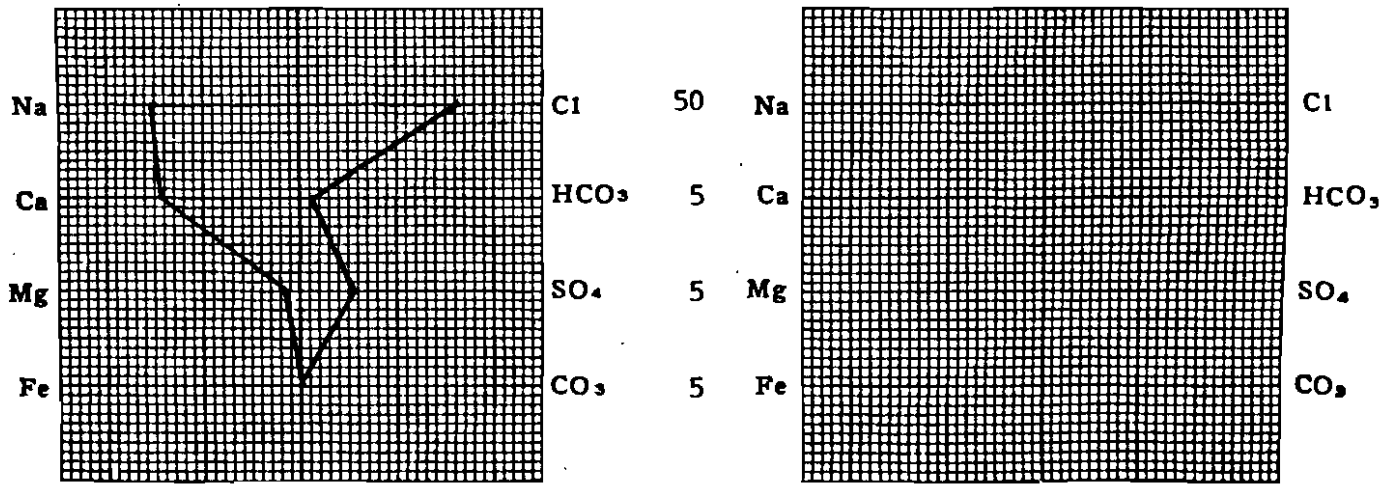
| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium - (Calc) - | 17,694 | 769.69 | Sulfate | 1,370 | 28.50 |
| Potassium | — | — | Chloride | 28,910 | 815.26 |
| Lithium | — | — | Carbonate | 0 | — |
| Calcium | 1,443 | 72.01 | Bicarbonate | 366 | 6.00 |
| Magnesium | 98 | 8.06 | Hydroxide | | |
| Iron | — | — | Hydrogen sulfide | — | — |
| Total Cations | | 849.76 | Total Anions | | 849.76 |

| | | | |
|---|---|---|---|
| Total dissolved solids, mg/l | 49,881 | Specific resistance @ 68°F.: | |
| NaCl equivalent, mg/l | 48,955 | Observed | 0.159 ohm-meters |
| Observed pH | 6.79 | Calculated | 0.154 ohm-meters |

### WATER ANALYSIS PATTERN

Sample above described

Scale MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent = by Dunlap & Hawthorne calculation from components

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## WATER ANALYSIS REPORT

OPERATOR Total Petroleum
WELL NO. Cedar Hills #1-22
FIELD
COUNTY Bowman
STATE N.D.

DATE 3/21/85 LAB NO. 2549-5
LOCATION Sec. 22-131N-105W
FORMATION Red River "C"
INTERVAL 9321-9388
SAMPLE FROM DST #2 (Sample #5)

REMARKS & CONCLUSIONS: Light brown cloudy water. Light brown cloudy filtrate.

Nitrate, mg/l — negative
Chromate, mg/l — negative

| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | 17,538 | 762.92 | Sulfate | 1,400 | 29.12 |
| Potassium | — | — | Chloride | 28,420 | 801.44 |
| Lithium | — | — | Carbonate | 0 | — |
| Calcium | 1,443 | 72.01 | Bicarbonate | 512 | 8.40 |
| Magnesium | 49 | 4.03 | Hydroxide | | |
| Iron | — | — | Hydrogen sulfide | — | — |
| Total Cations | | 838.96 | Total Anions | | 838.96 |

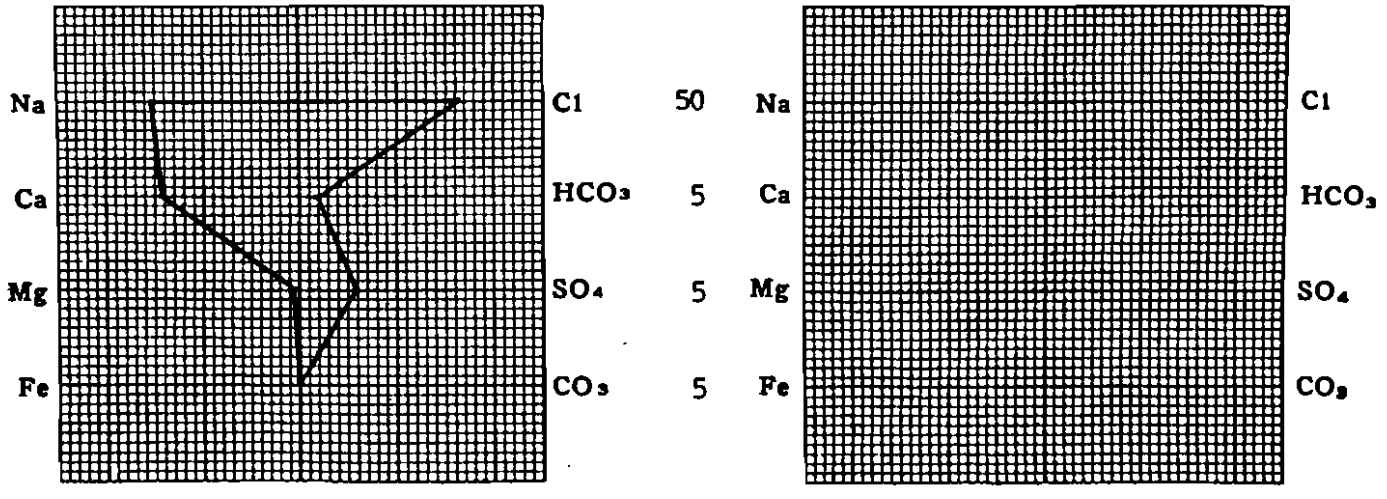
Total dissolved solids, mg/l 49,362
NaCl equivalent, mg/l 48,265
Observed pH 7.39

Specific resistance @ 68°F.:
Observed 0.159 ohm-meters
Calculated 0.156 ohm-meters

### WATER ANALYSIS PATTERN

Sample above described

Scale
MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent = by Dunlap & Hawthorne calculation from components

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## WATER ANALYSIS REPORT

OPERATOR Total Petroleum
WELL NO. Cedar Hills #1-22
FIELD
COUNTY Bowman
STATE N.D.

DATE 3/21/85 LAB NO. 2549-4
LOCATION Sec. 22-131N-105W
FORMATION Red River "C"
INTERVAL 9321-9388
SAMPLE FROM DST #2 (Sample #4)

REMARKS & CONCLUSIONS: Light brown cloudy water, Light brown cloudy filtrate.

Nitrate, mg/l --- negative
Chromate, mg/l --- negative

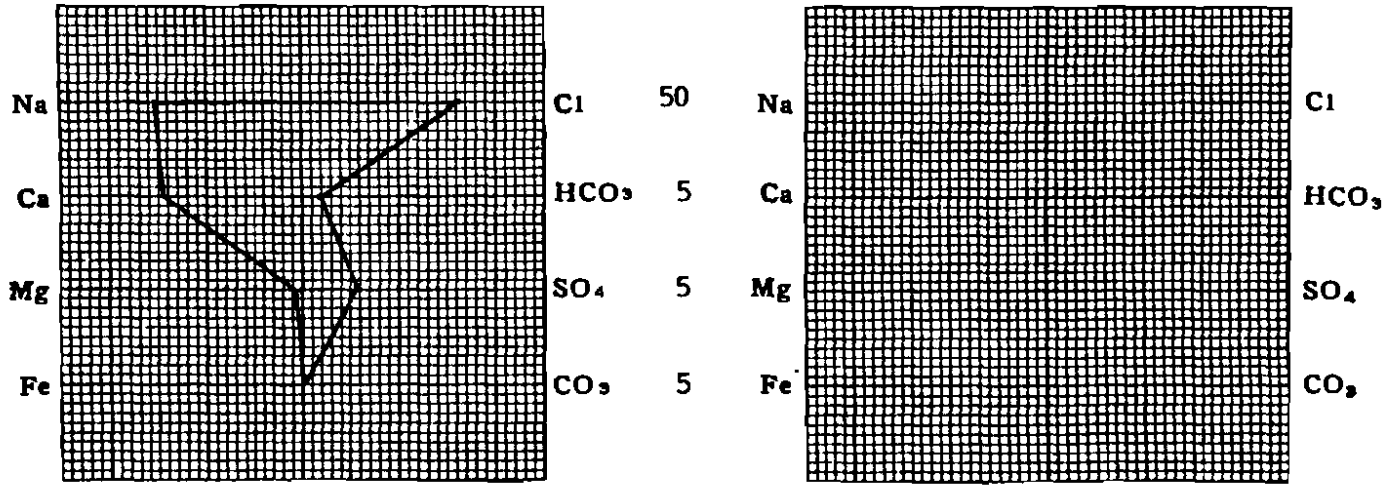
| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | 17,524 | 762.30 | Sulfate | 1,370 | 28.50 |
| Potassium | — | — | Chloride | 28,420 | 801.44 |
| Lithium | — | — | Carbonate | 0 | — |
| Calcium | 1,443 | 72.01 | Bicarbonate | 512 | 8.40 |
| Magnesium | 49 | 4.03 | Hydroxide | | |
| Iron | — | — | Hydrogen sulfide | — | — |
| Total Cations | | 838.34 | Total Anions | | 838.34 |

| | | | |
|---|---|---|---|
| Total dissolved solids, mg/l | 49,318 | Specific resistance @ 68°F.: | |
| NaCl equivalent, mg/l | 48,236 | Observed | 0.162 ohm-meters |
| Observed pH | 7.25 | Calculated | 0.156 ohm-meters |

### WATER ANALYSIS PATTERN

Sample above described

Scale MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent = by Dunlap & Hawthorne calculation from components

# Precision Service, Inc.

BOX 3659 Ph. 307/237-9327
CASPER, WYOMING

BOX 1596 Ph. 701/225-6021
DICKINSON, NORTH DAKOTA



## WATER ANALYSIS REPORT

OPERATOR Total Petroleum
WELL NO. Cedar Hills #1-22
FIELD
COUNTY Bowman
STATE N.D.

DATE 3/21/85 LAB NO. 2549-3
LOCATION Sec. 22-131N-105W
FORMATION Red River "C"
INTERVAL 9321-9388
SAMPLE FROM DST #2 (Sample #3)

REMARKS & CONCLUSIONS: Light brown cloudy water, Light brown cloudy filtrate.

Nitrate, mg/l --- negative
Chromate, mg/l --- trace

| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | 18,673 | 812.26 | Sulfate | 1,500 | 31.20 |
| Potassium | — | — | Chloride | 30,380 | 856.72 |
| Lithium | — | — | Carbonate | 0 | — |
| Calcium | 1,523 | 76.00 | Bicarbonate | 512 | 8.40 |
| Magnesium | 98 | 8.06 | Hydroxide | | |
| Iron | — | — | Hydrogen sulfide | — | — |
| Total Cations | | 896.32 | Total Anions | | 896.32 |

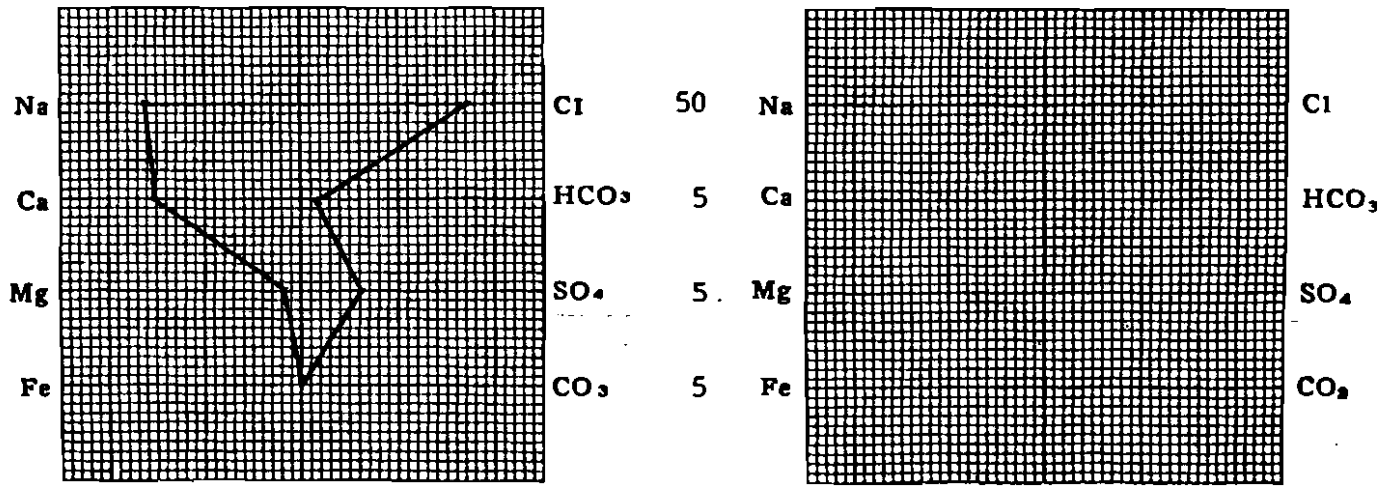
Total dissolved solids, mg/l 52,686
NaCl equivalent, mg/l 51,584
Observed pH 7.19

Specific resistance @ 68°F.:
Observed 0.149 ohm-meters
Calculated 0.150 ohm-meters

### WATER ANALYSIS PATTERN

Sample above described

Scale MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent = by Dunlap & Hawthorne calculation from components

# Precision Service, Inc.

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## WATER ANALYSIS REPORT

OPERATOR Total Petroleum
WELL NO. Cedar Hills #1-22
FIELD
COUNTY Bowman
STATE N.D.

DATE 3/21/85 LAB NO. 2549-2
LOCATION Sec. 22-131N-105W
FORMATION Red River "C"
INTERVAL 9321-9388
SAMPLE FROM DST #2 (Sample #2)

REMARKS & CONCLUSIONS: Brown cloudy water, Light brown cloudy filtrate.

Nitrate, mg/l — 60
Chromate, mg/l — 15

| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | 47,051 | 2046.70 | Sulfate | 1,860 | 38.69 |
| Potassium | — | — | Chloride | 77,420 | 2183.24 |
| Lithium | — | — | Carbonate | 0 | — |
| Calcium | 3,407 | 170.01 | Bicarbonate | 293 | 4.81 |
| Magnesium | 122 | 10.03 | Hydroxide | | |
| Iron | — | — | Hydrogen sulfide | — | — |
| Total Cations | | 2226.74 | Total Anions | | 2226.74 |

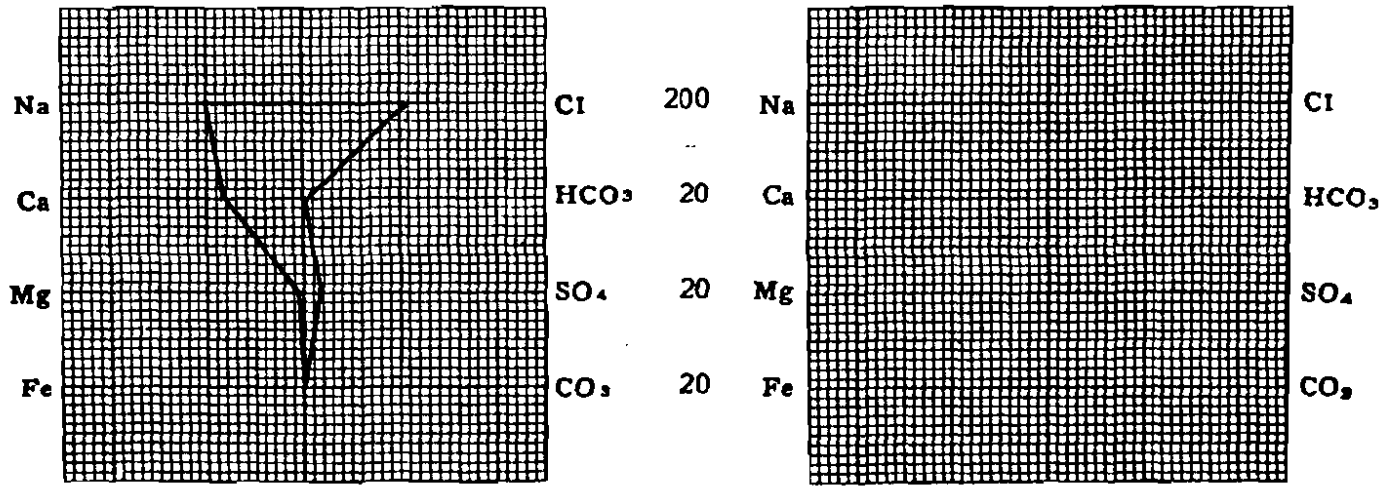
Total dissolved solids, mg/l 130,153
NaCl equivalent, mg/l 128,961
Observed pH 7.92

Specific resistance @ 68°F.:
Observed 0.073 ohm-meters
Calculated 0.074 ohm-meters

### WATER ANALYSIS PATTERN

Sample above described

Scale MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent = by Dunlap & Hawthorne calculation from components

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11409

## WATER ANALYSIS REPORT

OPERATOR Total Petroleum
WELL NO Cedar Hills #1-22
FIELD wildcat
COUNTY Bowman
STATE N.D.

DATE 3/21/85 LAB NO. 2549-1
LOCATION Sec. 22-131N-105W
FORMATION Red River "C"
INTERVAL 9321-9288
SAMPLE FROM DST #2 (Top Sample)

REMARKS & CONCLUSIONS: Mud, Chemical on top, Yellow brown cloudy filtrate.

Ammonia Present
Nitrate, mg/l — 200
Chromate, mg/l — 85

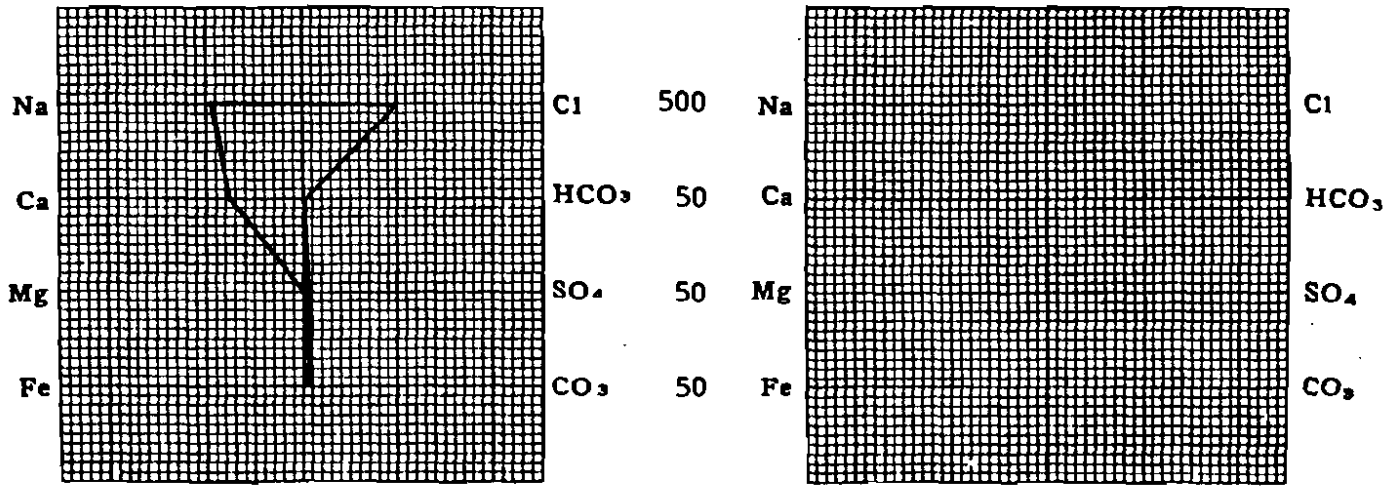
| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium - - (Calc) - | 107,183 | 4662.46 | Sulfate - - - - - - | 1,120 | 23.30 |
| Potassium - - - - - - | — | — | Chloride - - - - - - | 174,440 | 4919.21 |
| Lithium - - - - - - | — | — | Carbonate - - - - - | 1,020 | 33.97 |
| Calcium - - - - - - | 7,615 | 379.99 | Bicarbonate - - - - - | 0 | — |
| Magnesium - - - - - | 0 | — | Hydroxide - - - - - | 1,122 | 65.97 |
| Iron - - - - - - - | — | — | Hydrogen sulfide - - - | — | — |
| Total Cations - - - - | | 5042.45 | Total Anions - - - - | | 5042.45 |

| | | | |
|---|---|---|---|
| Total dissolved solids, mg/l - - - - - | 292,500 | Specific resistance @ 68°F.: | |
| NaCl equivalent, mg/l - - - - - - - | 291,824 | Observed - - - - | 0.048 ohm-meters |
| Observed pH - - - - - - - - - - | 9.48 | Calculated - - - - | 0.048 ohm-meters |

### WATER ANALYSIS PATTERN

Sample above described

Scale
MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent = by Dunlap & Hawthorne calculation from components

# Precision Service, Inc.

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## WATER ANALYSIS REPORT

| | | | |
|---|---|---|---|
| OPERATOR | Total Petroleum | DATE | 3/21/85 LAB NO. 2549-7 |
| WELL NO. | Cedar Hills #1-22 | LOCATION | Sec. 22-131N-105W |
| FIELD | | FORMATION | Red River "C" |
| COUNTY | Bowman | INTERVAL | 9321-9388 |
| STATE | N.D. | SAMPLE FROM | DST #2 (Sample Chamber) |

REMARKS & CONCLUSIONS: Orange brown cloudy water, Light orange brown cloudy filtrate.

Nitrate, mg/l — negative
Chromate, mg/l — trace

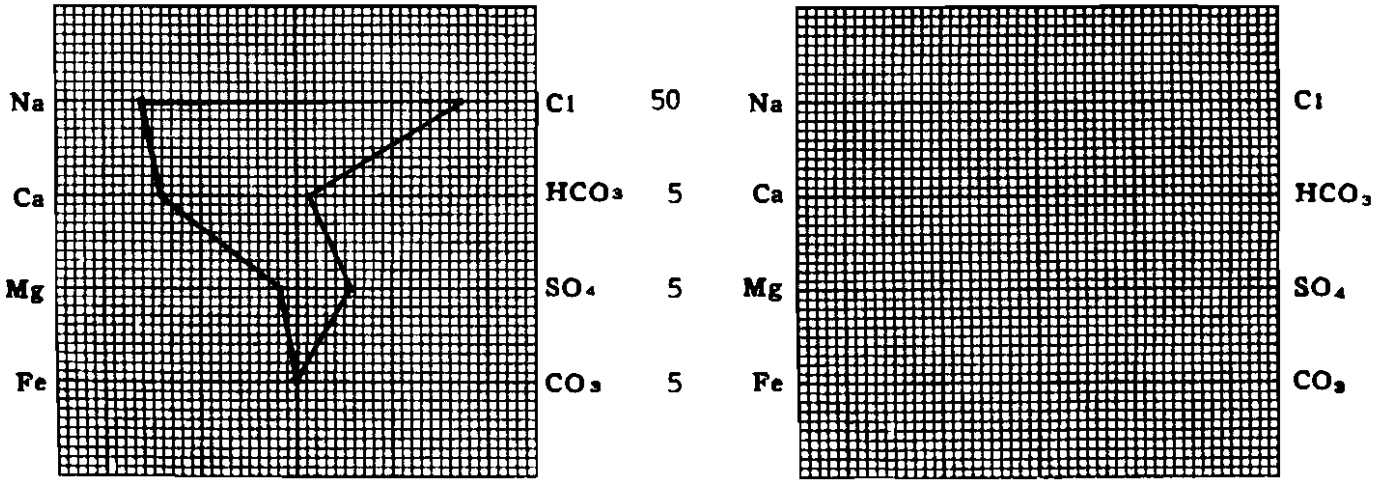
| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | 18,647 | 811.15 | Sulfate | 1,370 | 28.50 |
| Potassium | — | — | Chlorides | 30,380 | 856.72 |
| Lithium | — | — | Carbonate | 0 | — |
| Calcium | 1,443 | 72.01 | Bicarbonate | 366 | 6.00 |
| Magnesium | 98 | 8.06 | Hydroxide | | |
| Iron | — | — | Hydrogen sulfide | — | — |
| Total Cations | | 891.22 | Total Anions | | 891.22 |

| | | | |
|---|---|---|---|
| Total dissolved solids, mg/l | 52,304 | Specific resistance @ 68°F.: | |
| NaCl equivalent, mg/l | 51,378 | Observed | 0.149 ohm-meters |
| Observed pH | 6.82 | Calculated | 0.150 ohm-meters |

### WATER ANALYSIS PATTERN

Sample above described

Scale MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent = by Dunlap & Hawthorne calculation from components

# Precision Service, Inc.

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## WATER ANALYSIS REPORT

| | | | |
|---|---|---|---|
| OPERATOR | Total Petroleum | DATE | 3/21/85 LAB NO. 2549-6 |
| WELL NO. | Cedar Hills #1-22 | LOCATION | Sec. 22-131N-105W |
| FIELD | | FORMATION | Red River "C" |
| COUNTY | Bowman | INTERVAL | 9321-9388 |
| STATE | N.D. | SAMPLE FROM | DST #2 (Sample #6) |

REMARKS & CONCLUSIONS: Orange brown cloudy water, Light orange brown cloudy filtrate.

Nitrate, mg/l — negative
Chromate, mg/l — negative

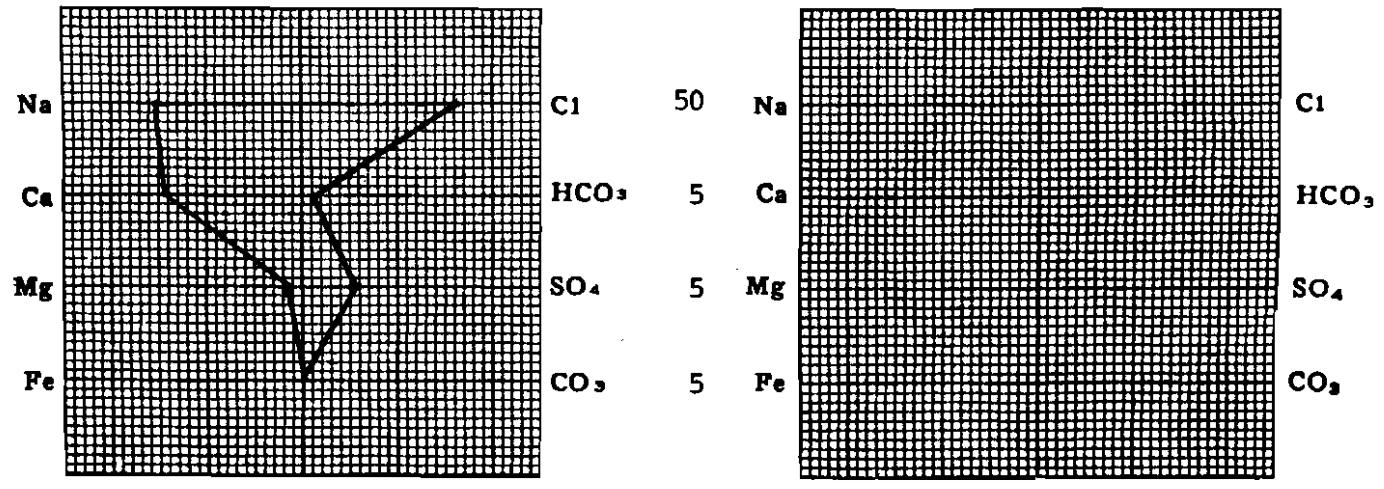
| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | 17,694 | 769.69 | Sulfate | 1,370 | 28.50 |
| Potassium | — | — | Chloride | 28,910 | 815.26 |
| Lithium | — | — | Carbonate | 0 | — |
| Calcium | 1,443 | 72.01 | Bicarbonate | 366 | 6.00 |
| Magnesium | 98 | 8.06 | Hydroxide | | |
| Iron | — | — | Hydrogen sulfide | — | — |
| Total Cations | | 849.76 | Total Anions | | 849.76 |

| | | | |
|---|---|---|---|
| Total dissolved solids, mg/l | 49,881 | Specific resistance @ 68°F.: | |
| NaCl equivalent, mg/l | 48,955 | Observed | 0.159 ohm-meters |
| Observed pH | 6.79 | Calculated | 0.154 ohm-meters |

### WATER ANALYSIS PATTERN

Sample above described

Scale MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent=by Dunlap & Hawthorne calculation from components

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## WATER ANALYSIS REPORT

OPERATOR Total Petroleum
WELL NO. Cedar Hills #1-22
FIELD
COUNTY Bowman
STATE N.D.

DATE 3/21/85 LAB NO. 2549-5
LOCATION Sec. 22-131N-105W
FORMATION Red River "C"
INTERVAL 9321-9388
SAMPLE FROM DST #2 (Sample #5)

REMARKS & CONCLUSIONS: Light brown cloudy water, Light brown cloudy filtrate.

Nitrate, mg/l — negative
Chromate, mg/l — negative

| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | 17,538 | 762.92 | Sulfate | 1,400 | 29.12 |
| Potassium | — | — | Chloride | 28,420 | 801.44 |
| Lithium | — | — | Carbonate | 0 | — |
| Calcium | 1,443 | 72.01 | Bicarbonate | 512 | 8.40 |
| Magnesium | 49 | 4.03 | Hydroxide | | |
| Iron | — | — | Hydrogen sulfide | — | — |
| Total Cations | | 838.96 | Total Anions | | 838.96 |

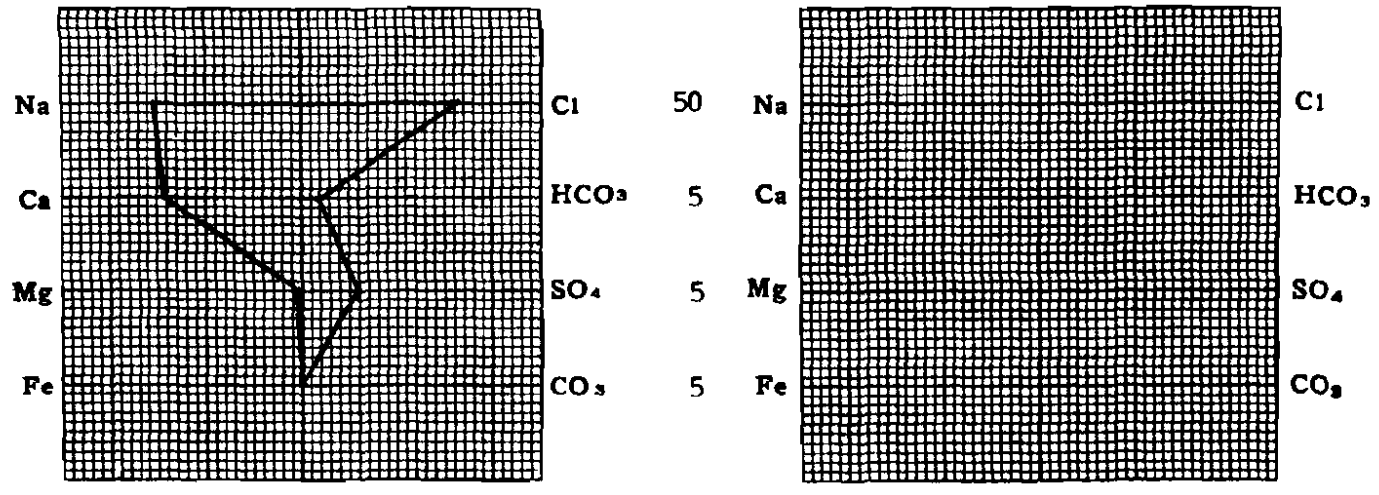
Total dissolved solids, mg/l 49,362
NaCl equivalent, mg/l 48,265
Observed pH 7.39

Specific resistance @ 68°F.:
Observed 0.159 ohm-meters
Calculated 0.156 ohm-meters

### WATER ANALYSIS PATTERN

Sample above described

Scale MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent = by Dunlap & Hawthorne calculation from components

# Precision Service, Inc.

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## WATER ANALYSIS REPORT

OPERATOR Total Petroleum
WELL NO. Cedar Hills #1-22
FIELD
COUNTY Bowman
STATE N.D.

DATE 3/21/85 LAB NO. 2549-4
LOCATION Sec. 22-131N-105W
FORMATION Red River "C"
INTERVAL 9321-9388
SAMPLE FROM DST #2 (Sample #4)

REMARKS & CONCLUSIONS: Light brown cloudy water, Light brown cloudy filtrate.

Nitrate, mg/l — negative
Chromate, mg/l — negative

| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | 17,524 | 762.30 | Sulfate | 1,370 | 28.50 |
| Potassium | — | — | Chloride | 28,420 | 801.44 |
| Lithium | — | — | Carbonate | 0 | — |
| Calcium | 1,443 | 72.01 | Bicarbonate | 512 | 8.40 |
| Magnesium | 49 | 4.03 | Hydroxide | | |
| Iron | — | — | Hydrogen sulfide | — | — |
| Total Cations | | 838.34 | Total Anions | | 838.34 |

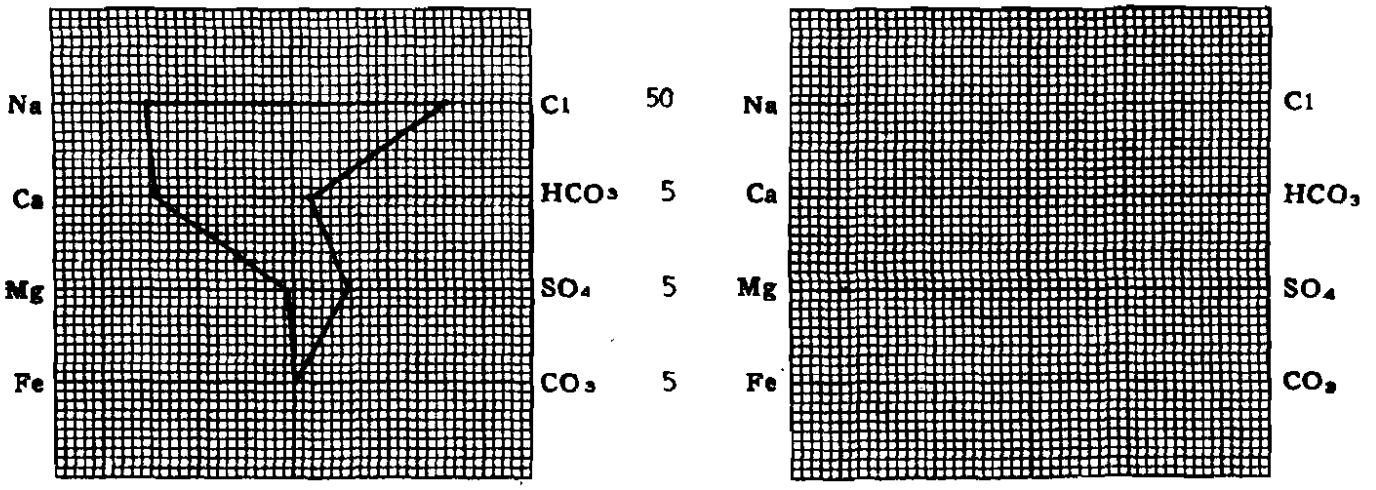
Total dissolved solids, mg/l 49,318
NaCl equivalent, mg/l 48,236
Observed pH 7.25

Specific resistance @ 68°F.:
Observed 0.162 ohm-meters
Calculated 0.156 ohm-meters

### WATER ANALYSIS PATTERN

Sample above described

Scale MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent = by Dunlap & Hawthorne calculation from components

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DICKINSON, NORTH DAKOTA

## WATER ANALYSIS REPORT

| | | | |
|---|---|---|---|
| OPERATOR | Total Petroleum | DATE | 3/21/85 |
| WELL NO. | Cedar Hills #1-22 | LAB NO. | 2549-3 |
| FIELD | | LOCATION | Sec. 22-131N-105W |
| COUNTY | Bowman | FORMATION | Red River "C" |
| STATE | N.D. | INTERVAL | 9321-9388 |
| | | SAMPLE FROM | DST #2 (Sample #3) |

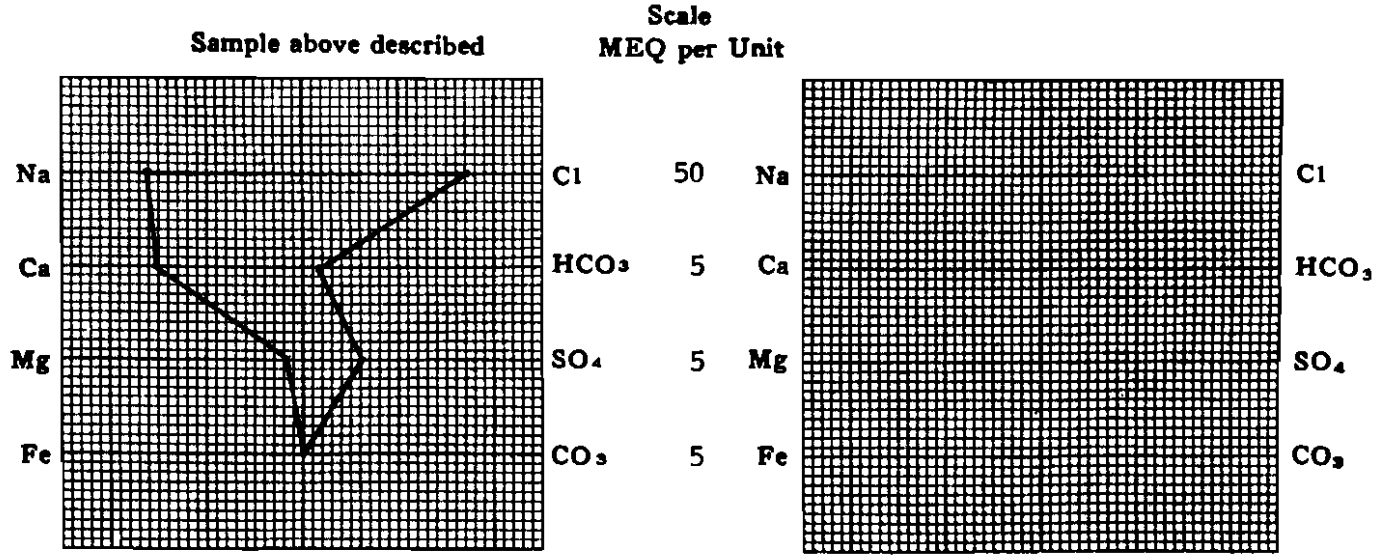
REMARKS & CONCLUSIONS: Light brown cloudy water, Light brown cloudy filtrate.

Nitrate, mg/l --- negative
Chromate, mg/l — trace

| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | 18,673 | 812.26 | Sulfate | 1,500 | 31.20 |
| Potassium | — | — | Chloride | 30,380 | 856.72 |
| Lithium | — | — | Carbonate | 0 | — |
| Calcium | 1,523 | 76.00 | Bicarbonate | 512 | 8.40 |
| Magnesium | 98 | 8.06 | Hydroxide | | |
| Iron | — | — | Hydrogen sulfide | — | — |
| Total Cations | | 896.32 | Total Anions | | 896.32 |

| | | | |
|---|---|---|---|
| Total dissolved solids, mg/l | 52,686 | Specific resistance @ 68°F.: | |
| NaCl equivalent, mg/l | 51,584 | Observed | 0.149 ohm-meters |
| Observed pH | 7.19 | Calculated | 0.150 ohm-meters |

### WATER ANALYSIS PATTERN




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l=Milligrams per liter Meq/l= Milligram equivalents per liter
Sodium chloride equivalent=by Dunlap & Hawthorne calculation from components

# Precision Service, Inc.

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## WATER ANALYSIS REPORT

OPERATOR Total Petroleum
WELL NO. Cedar Hills #1-22
FIELD
COUNTY Bowman
STATE N.D.

DATE 3/21/85 LAB NO. 2549-2
LOCATION Sec. 22-131N-105W
FORMATION Red River "C"
INTERVAL 9321-9388
SAMPLE FROM DST #2 (Sample #2)

REMARKS & CONCLUSIONS: Brown cloudy water, Light brown cloudy filtrate.

Nitrate, mg/l — 60
Chromate, mg/l — 15

| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium - (Calc) - | 47,051 | 2046.70 | Sulfate | 1,860 | 38.69 |
| Potassium | — | — | Chloride | 77,420 | 2183.24 |
| Lithium | — | — | Carbonate | 0 | — |
| Calcium | 3,407 | 170.01 | Bicarbonate | 293 | 4.81 |
| Magnesium | 122 | 10.03 | Hydroxide | | |
| Iron | — | — | Hydrogen sulfide | — | — |
| Total Cations | | 2226.74 | Total Anions | | 2226.74 |

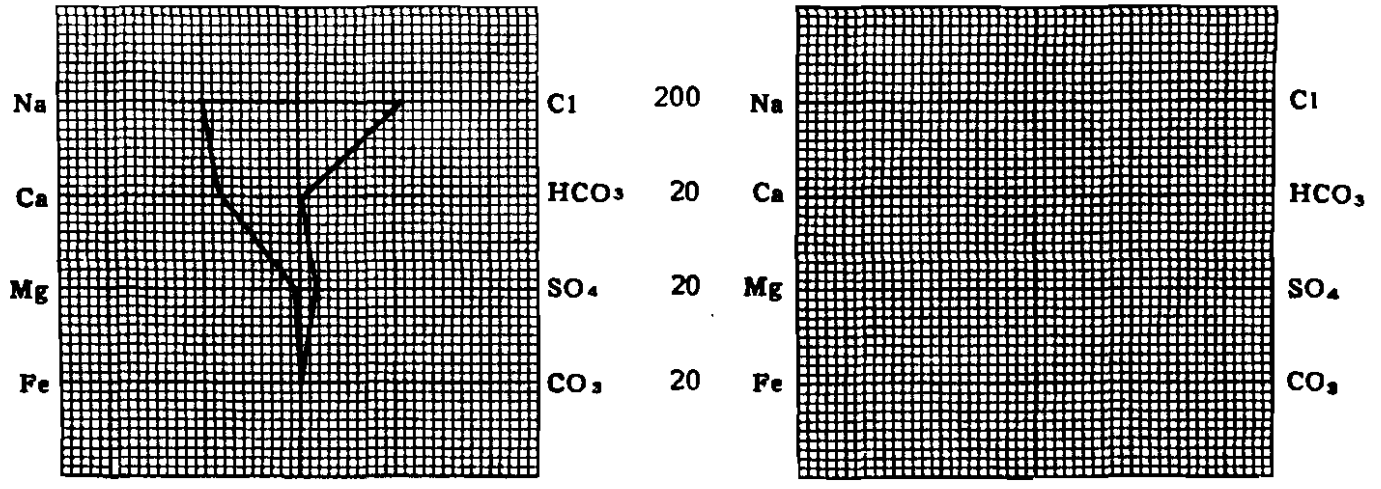
Total dissolved solids, mg/l 130,153
NaCl equivalent, mg/l 128,961
Observed pH 7.92

Specific resistance @ 68°F.:
Observed 0.073 ohm-meters
Calculated 0.074 ohm-meters

### WATER ANALYSIS PATTERN

Sample above described

Scale MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l=Milligrams per liter Meq/l= Milligram equivalents per liter
Sodium chloride equivalent=by Dunlap & Hawthorne calculation from components

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## WATER ANALYSIS REPORT

OPERATOR Total Petroleum
WELL NO. Cedar Hills #1-22
FIELD Wildcat
COUNTY Bowman
STATE N.D.

DATE 3/21/85 LAB NO. 2549-1
LOCATION Sec. 22-131N-105W NE NW
FORMATION Red River "C"
INTERVAL 9321-9288
SAMPLE FROM DST #2 (Top Sample)

REMARKS & CONCLUSIONS: Mud, Chemical on top, Yellow brown cloudy filtrate.

Ammonia Present
Nitrate, mg/l — 200
Chromate, mg/l — 85

| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | 107,183 | 4662.46 | Sulfate | 1,120 | 23.30 |
| Potassium | — | — | Chloride | 174,440 | 4919.21 |
| Lithium | — | — | Carbonate | 1,020 | 33.97 |
| Calcium | 7,615 | 379.99 | Bicarbonate | 0 | — |
| Magnesium | 0 | — | Hydroxide | 1,122 | 65.97 |
| Iron | — | — | Hydrogen sulfide | — | — |
| Total Cations | | 5042.45 | Total Anions | | 5042.45 |

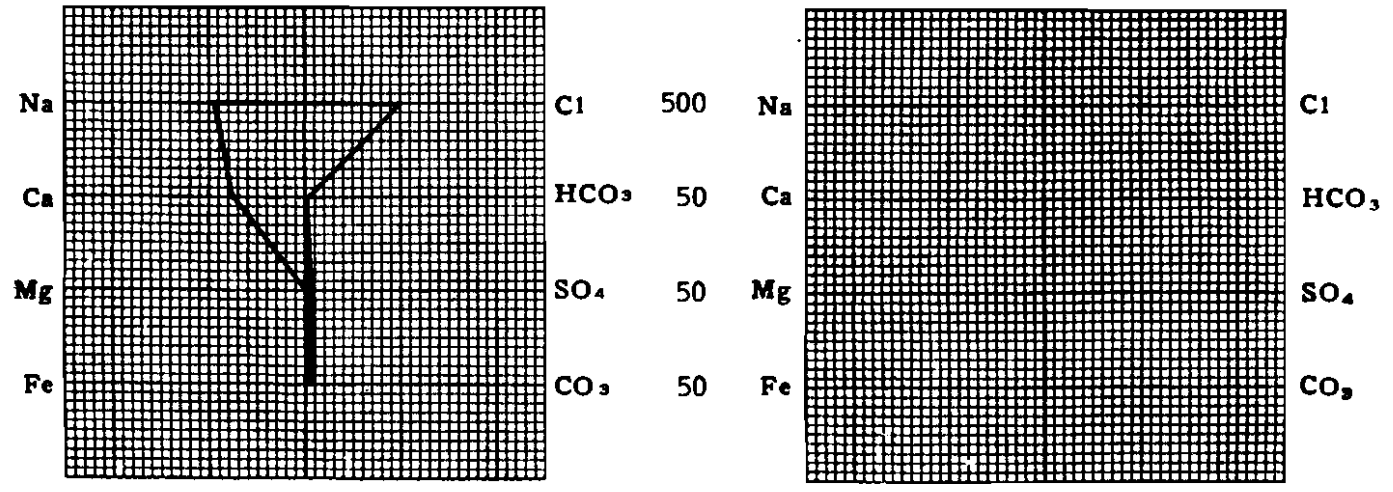
Total dissolved solids, mg/l 292,500
NaCl equivalent, mg/l 291,824
Observed pH 9.48

Specific resistance @ 68°F.:
Observed 0.048 ohm-meters
Calculated 0.048 ohm-meters

### WATER ANALYSIS PATTERN

Sample above described

Scale MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l=Milligrams per liter Meq/l= Milligram equivalents per liter
Sodium chloride equivalent=by Dunlap & Hawthorne calculation from components

# Precision Service, Inc.

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## WATER ANALYSIS REPORT

OPERATOR Total Petroleum
WELL NO. Cedar Hills #1-22
FIELD
COUNTY Bowman
STATE N.D.

DATE 3/21/85 LAB NO. 2549-1
LOCATION Sec. 22-131N-105W
FORMATION Red River "C"
INTERVAL 9321-9288
SAMPLE FROM DST #2 (Top Sample)

REMARKS & CONCLUSIONS: Mud, Chemical on top, Yellow brown cloudy filtrate.

Ammonia Present

Nitrate, mg/l — 200
Chromate, mg/l — 85

| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | 107,183 | 4662.46 | Sulfate | 1,120 | 23.30 |
| Potassium | — | — | Chloride | 174,440 | 4919.21 |
| Lithium | — | — | Carbonate | 1,020 | 33.97 |
| Calcium | 7,615 | 379.99 | Bicarbonate | 0 | — |
| Magnesium | 0 | — | Hydroxide | 1,122 | 65.97 |
| Iron | — | — | Hydrogen sulfide | — | — |
| Total Cations | | 5042.45 | Total Anions | | 5042.45 |

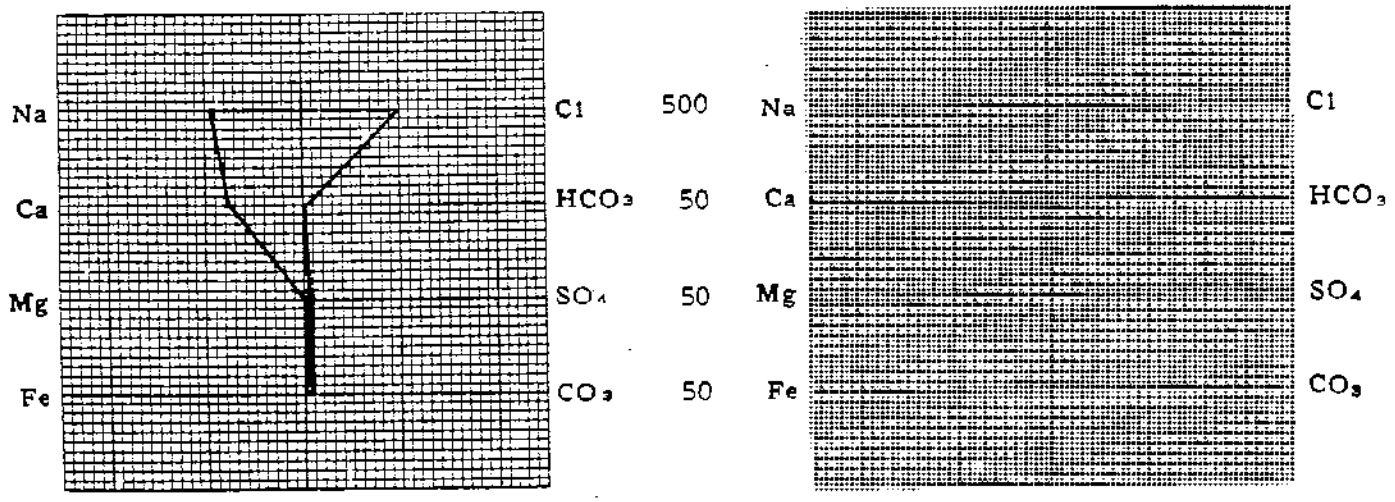
Total dissolved solids, mg/l 292,500
NaCl equivalent, mg/l 291,824
Observed pH 9.48

Specific resistance @ 68°F.:
Observed 0.048 ohm-meters
Calculated 0.048 ohm-meters

### WATER ANALYSIS PATTERN

Sample above described

Scale MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent = by Dunlap & Hawthorne calculation from components

# Precision Service, Inc.

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## WATER ANALYSIS REPORT

OPERATOR Total Petroleum
WELL NO. Cedar Hills #1-22
FIELD
COUNTY Bowman
STATE N.D.

DATE 3/21/85 LAB NO. 2549-2
LOCATION Sec. 22-131N-105W
FORMATION Red River "C"
INTERVAL 9321-9388
SAMPLE FROM DST #2 (Sample #2)

REMARKS & CONCLUSIONS: Brown cloudy water, Light brown cloudy filtrate.

Nitrate, mg/l — 60
Chromate, mg/l — 15

| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | 47,051 | 2046.70 | Sulfate | 1,860 | 38.69 |
| Potassium | — | — | Chloride | 77,420 | 2183.24 |
| Lithium | — | — | Carbonate | 0 | — |
| Calcium | 3,407 | 170.01 | Bicarbonate | 293 | 4.81 |
| Magnesium | 122 | 10.03 | Hydroxide | | |
| Iron | — | — | Hydrogen sulfide | — | — |
| Total Cations | | 2226.74 | Total Anions | | 2226.74 |

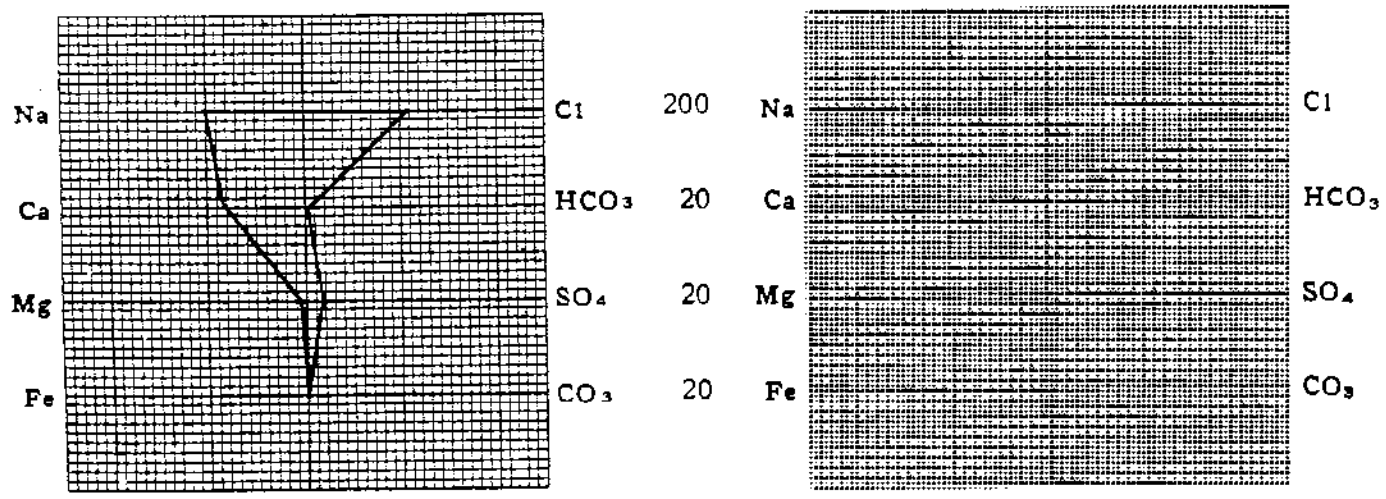
Total dissolved solids, mg/l — 130,153
NaCl equivalent, mg/l — 128,961
Observed pH — 7.92

Specific resistance @ 68°F.:
Observed — 0.073 ohm-meters
Calculated — 0.074 ohm-meters

### WATER ANALYSIS PATTERN

Sample above described

Scale MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent = by Dunlap & Hawthorne calculation from components

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DICKINSON, NORTH DAKOTA



## WATER ANALYSIS REPORT

OPERATOR Total Petroleum
WELL NO. Cedar Hills #1-22
FIELD
COUNTY Bowman
STATE N.D.

DATE 3/21/85 LAB NO. 2549-3
LOCATION Sec. 22-131N-105W
FORMATION Red River "C"
INTERVAL 9321-9388
SAMPLE FROM DST #2 (Sample #3)

REMARKS & CONCLUSIONS: Light brown cloudy water, Light brown cloudy filtrate.

Nitrate, mg/l — negative
Chromate, mg/l — trace

| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | 18,673 | 812.26 | Sulfate | 1,500 | 31.20 |
| Potassium | — | — | Chloride | 30,380 | 856.72 |
| Lithium | — | — | Carbonate | 0 | — |
| Calcium | 1,523 | 76.00 | Bicarbonate | 512 | 8.40 |
| Magnesium | 98 | 8.06 | Hydroxide | | |
| Iron | — | — | Hydrogen sulfide | — | — |
| Total Cations | | 896.32 | Total Anions | | 896.32 |

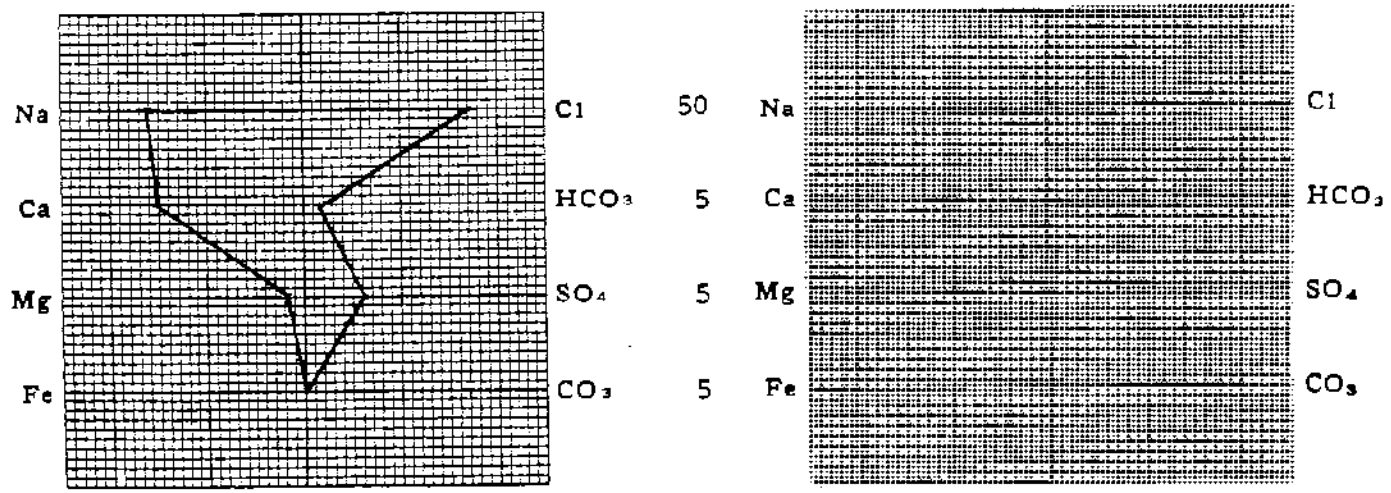
Total dissolved solids, mg/l 52,686
NaCl equivalent, mg/l 51,584
Observed pH 7.19

Specific resistance @ 68°F.:
Observed 0.149 ohm-meters
Calculated 0.150 ohm-meters

## WATER ANALYSIS PATTERN

Sample above described

Scale
MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent = by Dunlap & Hawthorne calculation from components

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## WATER ANALYSIS REPORT

OPERATOR Total Petroleum
WELL NO. Cedar Hills #1-22
FIELD
COUNTY Bowman
STATE N.D.

DATE 3/21/85 LAB NO. 2549-4
LOCATION Sec. 22-131N-105W
FORMATION Red River "C"
INTERVAL 9321-9388
SAMPLE FROM DST #2 (Sample #4)

REMARKS & CONCLUSIONS: Light brown cloudy water, Light brown cloudy filtrate.

Nitrate, mg/l — negative
Chromate, mg/l — negative

| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | 17,524 | 762.30 | Sulfate | 1,370 | 28.50 |
| Potassium | — | — | Chloride | 28,420 | 801.44 |
| Lithium | — | — | Carbonate | 0 | — |
| Calcium | 1,443 | 72.01 | Bicarbonate | 512 | 8.40 |
| Magnesium | 49 | 4.03 | Hydroxide | | |
| Iron | — | — | Hydrogen sulfide | — | — |
| Total Cations | | 838.34 | Total Anions | | 838.34 |

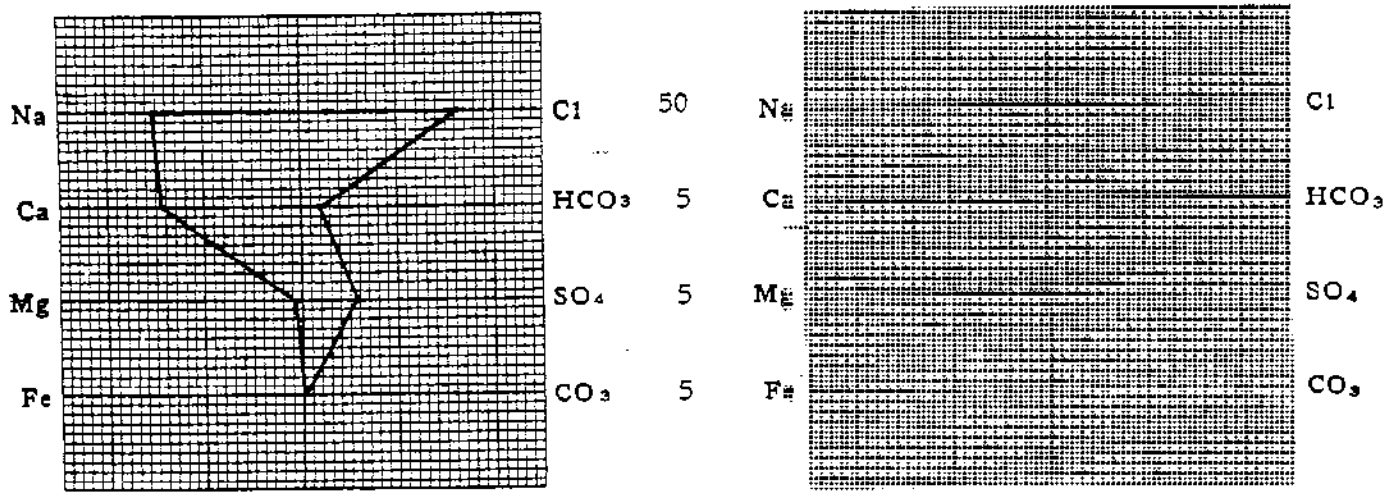
Total dissolved solids, mg/l 49,318
NaCl equivalent, mg/l 48,236
Observed pH 7.25

Specific resistance @ 68°F.:
Observed 0.162 ohm-meters
Calculated 0.156 ohm-meters

### WATER ANALYSIS PATTERN

Sample above described

Scale
MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent = by Dunlap & Hawthorne calculation from components

# Precision Service, Inc.

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## WATER ANALYSIS REPORT

OPERATOR Total Petroleum
WELL NO. Cedar Hills #1-22
FIELD
COUNTY Bowman
STATE N.D.

DATE 3/21/85 LAB NO. 2549-5
LOCATION Sec. 22-131N-105W
FORMATION Red River "C"
INTERVAL 9321-9388
SAMPLE FROM DST #2 (Sample #5)

REMARKS & CONCLUSIONS: Light brown cloudy water, Light brown cloudy filtrate.

Nitrate, mg/l — negative
Chromate, mg/l — negative

| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | 17,538 | 762.92 | Sulfate | 1,400 | 29.12 |
| Potassium | — | — | Chloride | 28,420 | 801.44 |
| Lithium | — | — | Carbonate | 0 | — |
| Calcium | 1,443 | 72.01 | Bicarbonate | 512 | 8.40 |
| Magnesium | 49 | 4.03 | Hydroxide | | |
| Iron | — | — | Hydrogen sulfide | — | — |
| Total Cations | | 838.96 | Total Anions | | 838.96 |

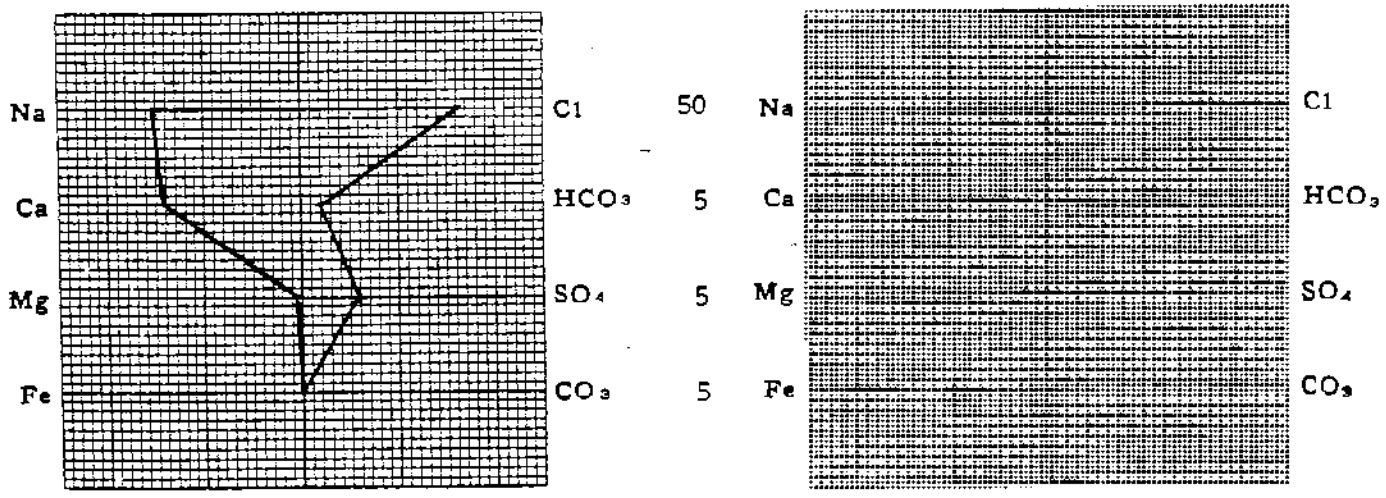
Total dissolved solids, mg/l 49,362
NaCl equivalent, mg/l 48,265
Observed pH 7.39

Specific resistance @ 68°F.:
Observed 0.159 ohm-meters
Calculated 0.156 ohm-meters

### WATER ANALYSIS PATTERN

Sample above described

Scale
MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent = by Dunlap & Hawthorne calculation from components

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## WATER ANALYSIS REPORT

OPERATOR Total Petroleum
WELL NO. Cedar Hills #1-22
FIELD
COUNTY Bowman
STATE N.D.

DATE 3/21/85 LAB NO. 2549-6
LOCATION Sec. 22-131N-105W
FORMATION Red River "C"
INTERVAL 9321-9388
SAMPLE FROM DST #2 (Sample #6)

REMARKS & CONCLUSIONS: Orange brown cloudy water, Light orange brown cloudy filtrate.

Nitrate, mg/l --- negative
Chromate, mg/l -- negative

| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | 17,694 | 769.69 | Sulfate | 1,370 | 28.50 |
| Potassium | -- | -- | Chloride | 28,910 | 815.26 |
| Lithium | -- | -- | Carbonate | 0 | -- |
| Calcium | 1,443 | 72.01 | Bicarbonate | 366 | 6.00 |
| Magnesium | 98 | 8.06 | Hydroxide | | |
| Iron | -- | -- | Hydrogen sulfide | -- | -- |
| Total Cations | | 849.76 | Total Anions | | 849.76 |

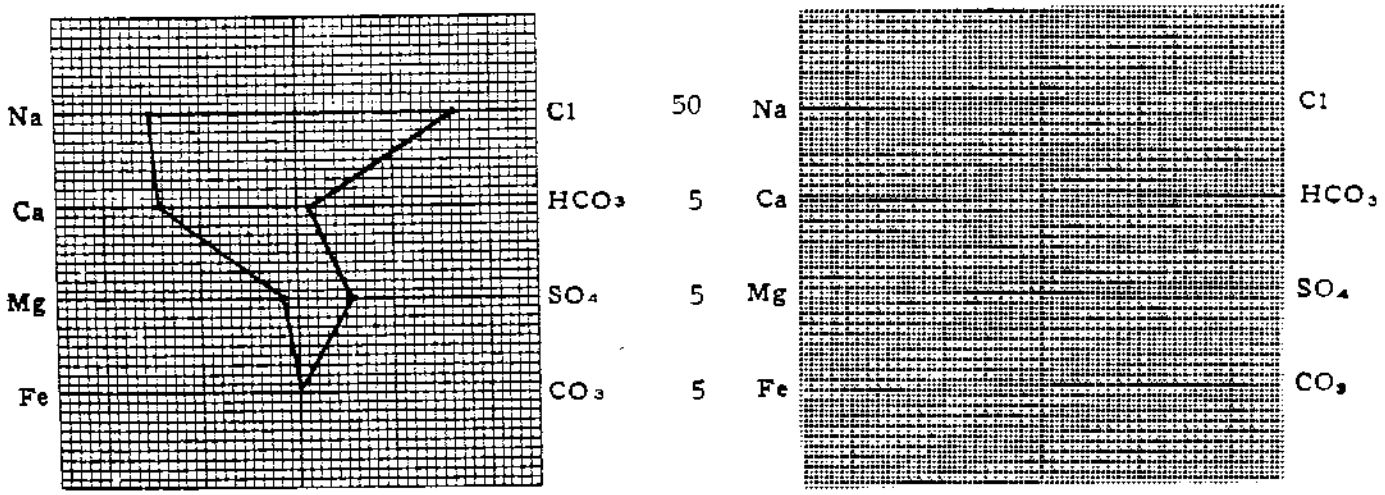
Total dissolved solids, mg/l 49,881
NaCl equivalent, mg/l 48,955
Observed pH 6.79

Specific resistance @ 68°F.:
Observed 0.159 ohm-meters
Calculated 0.154 ohm-meters

### WATER ANALYSIS PATTERN

Sample above described

Scale
MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l=Milligrams per liter Meq/l= Milligram equivalents per liter
Sodium chloride equivalent=by Dunlap & Hawthorne calculation from components

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## WATER ANALYSIS REPORT

OPERATOR Total Petroleum
WELL NO. Cedar Hills #1-22
FIELD
COUNTY Bowman
STATE N.D.

DATE 3/21/85 LAB NO. 2549-7
LOCATION Sec. 22-131N-105W
FORMATION Red River "C"
INTERVAL 9321-9388
SAMPLE FROM DST #2 (Sample Chamber)

REMARKS & CONCLUSIONS: Orange brown cloudy water, Light orange brown cloudy filtrate.

Nitrate, mg/l — negative
Chromate, mg/l — trace

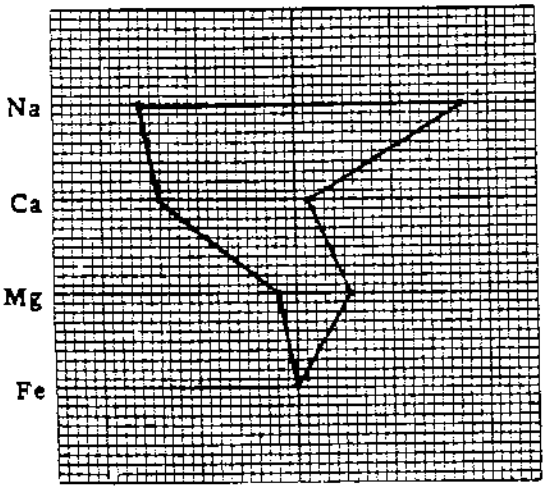
| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | 18,647 | 811.15 | Sulfate | 1,370 | 28.50 |
| Potassium | — | — | Chloride | 30,380 | 856.72 |
| Lithium | — | — | Carbonate | 0 | — |
| Calcium | 1,443 | 72.01 | Bicarbonate | 366 | 6.00 |
| Magnesium | 98 | 8.06 | Hydroxide | | |
| Iron | — | — | Hydrogen sulfide | — | — |
| Total Cations | | 891.22 | Total Anions | | 891.22 |

Total dissolved solids, mg/l 52,304
NaCl equivalent, mg/l 51,378
Observed pH 6.82

Specific resistance @ 68°F.:
Observed 0.149 ohm-meters
Calculated 0.150 ohm-meters

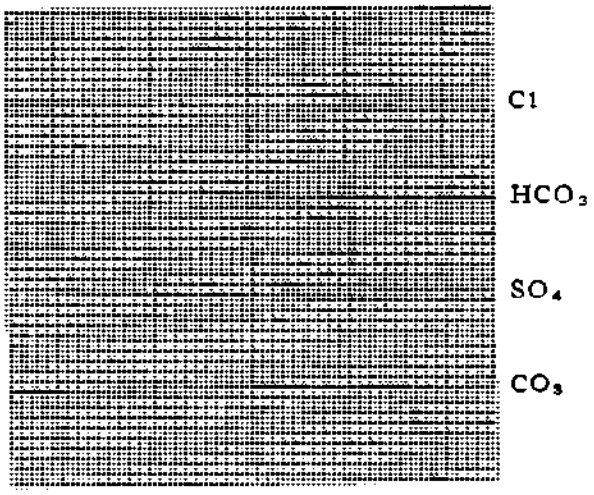
### WATER ANALYSIS PATTERN

Sample above described




Scale
MEQ per Unit

50
5
5
5




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent by Dunlap & Hawthorne calculation from components

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COMPANY Total Petroleum DATE 3/18/85 WO # 2545
LOCATION Cedar Hills 1-22 COUNTY Bowman STATE N.D.
REMARKS Sec. 22-131N-105W NENW

DST #1 Red River "A" 9152-9206

wildcat

| | Chloride | | Nitrate | Chromate | Bs & W | Oil |
|---|---|---|---|---|---|---|
| | mg/l | | mg/l | mg/l | % by vol | % by vol. |
| | | | | | | |
| Start | | | | | 40% | 60% |
| 2 minute reverse out | | | | | 10% | 90% |
| 4 minute reverse out | | | | | 8% | 92% |
| 6 minute reverse out | | | | | 20% | 80% |
| 8 minute reverse out | | | | | 85% | 15% |
| 10 minute reverse out | 184,240 | | 100 | 500+ | 100% | 0 |
| 12 minute reverse out | 184,240 | | 100 | 500+ | 100% | 0 |
| Sample Chamber | 92,120 | | 30 | | 95% | ± 5% |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

CONCLUSIONS OIL SAMPLE

Specific Gravity @ 60°F ——— 0.9087
API Gravity @ 60°F ——— 24.2

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## WATER ANALYSIS REPORT

OPERATOR Total Petroleum
WELL NO. Cedar Hills 1-22
FIELD
COUNTY Bowman
STATE N.D.

DATE 3/18/85 LAB NO. 2545-1
LOCATION Sec. 22-131N-105W
FORMATION Red River "A"
INTERVAL 9152-9206
SAMPLE FROM DST #1 (Top Sample)

REMARKS & CONCLUSIONS: Oil sample, some oil cut mud, 10% est.

(Insufficient water for analysis)

| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc.) | | | Sulfate | | |
| Potassium | | | Chloride | | |
| Lithium | | | Carbonate | | |
| Calcium | | | Bicarbonate | | |
| Magnesium | | | Hydroxide | | |
| Iron | | | Hydrogen sulfide | | |
| Total Cations | | | Total Anions | | |

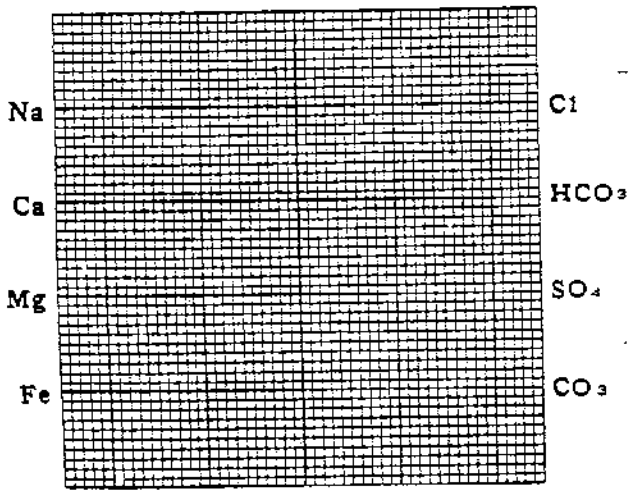
Total dissolved solids, mg/l
NaCl equivalent, mg/l
Observed pH

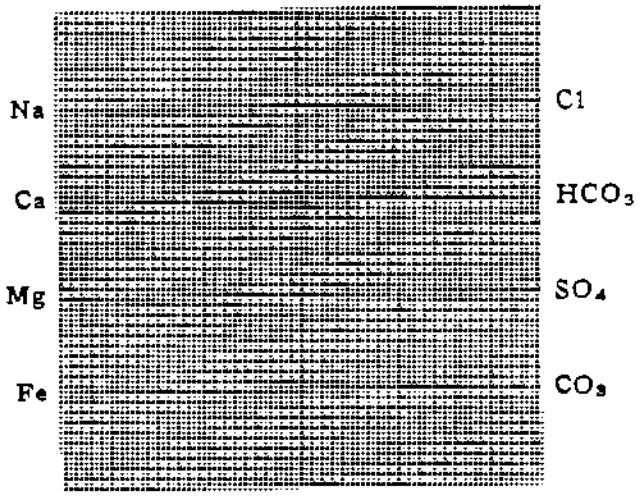
Specific resistance @ 68°F.:
Observed ohm-meters
Calculated ohm-meters

### WATER ANALYSIS PATTERN

Sample above described

Scale
MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l=Milligrams per liter Meq/l= Milligram equivalents per liter
Sodium chloride equivalent=by Dunlap & Hawthorne calculation from components

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## WATER ANALYSIS REPORT

OPERATOR Total Petroleum
WELL NO. Cedar Hills 1-22
FIELD
COUNTY Bowman
STATE N.D.

DATE 3/18/85 LAB NO. 2545-2
LOCATION Sec. 22-131N-105W
FORMATION Red River "A"
INTERVAL 9152-9206
SAMPLE FROM DST #1 (Sample #2)

REMARKS & CONCLUSIONS: Oil sample, some oil cut mud, (5% est.)
(Insufficient water for analysis)

| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | | | Sulfate | | |
| Potassium | | | Chloride | | |
| Lithium | | | Carbonate | | |
| Calcium | | | Bicarbonate | | |
| Magnesium | | | Hydroxide | | |
| Iron | | | Hydrogen sulfide | | |
| Total Cations | | | Total Anions | | |

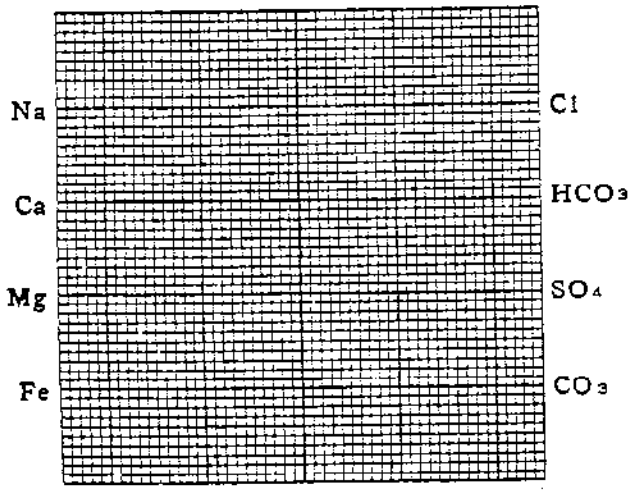
Total dissolved solids, mg/l
NaCl equivalent, mg/l
Observed pH

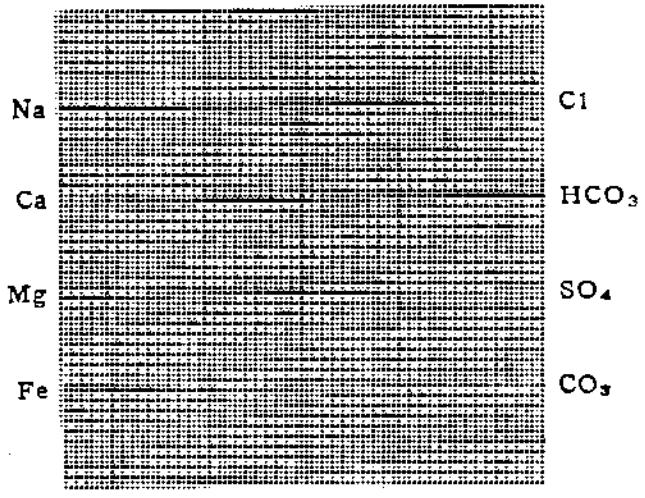
Specific resistance @ 68°F.:
Observed ohm-meters
Calculated ohm-meters

### WATER ANALYSIS PATTERN

Sample above described

Scale
MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent = by Dunlap & Hawtherne calculation from components

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## WATER ANALYSIS REPORT

OPERATOR Total Petroleum
WELL NO. Cedar Hills 1-22
FIELD
COUNTY Bowman
STATE N.D.

DATE 3/18/85 LAB NO. 2545-3
LOCATION Sec. 22-131N-105W
FORMATION Red River "A"
INTERVAL 9152-9206
SAMPLE FROM DST #1 (Sample #3)

REMARKS & CONCLUSIONS: Black muddy water, oil & oil cut mud on top, Brown cloudy filtrate.

Nitrate, mg/l — 40
Chromate, mg/l — 90

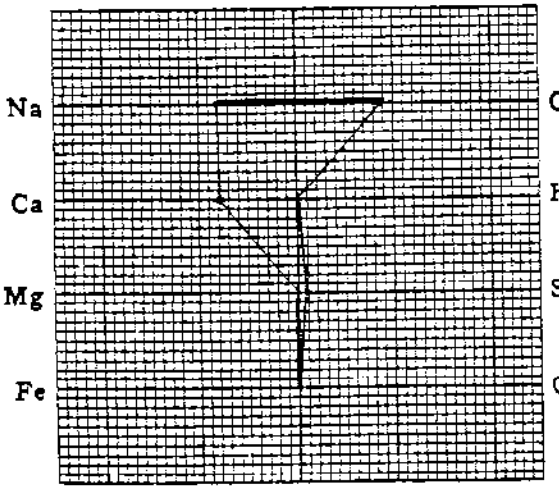
| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium (Calc) | 95,833 | 4168.73 | Sulfate | 1,540 | 32.03 |
| Potassium | — | — | Chloride | 160,720 | 4532.30 |
| Lithium | — | — | Carbonate | 0 | — |
| Calcium | 8,016 | 400.00 | Bicarbonate | 268 | 4.40 |
| Magnesium | trace | — | Hydroxide | — | — |
| Iron | — | — | Hydrogen sulfide | | |
| Total Cations | | 4568.73 | Total Anions | | 4568.73 |

| | |
|---|---|
| Total dissolved solids, mg/l | 266,377 |
| NaCl equivalent, mg/l | 265,011 |
| Observed pH | 6.25 |

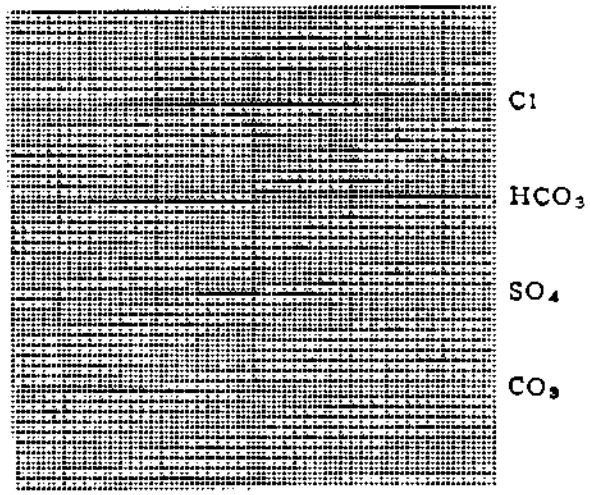
Specific resistance @ 68°F.:
Observed 0.051 ohm-meters
Calculated 0.049 ohm-meters

### WATER ANALYSIS PATTERN

Sample above described




Scale
MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent = by Dunlap & Hawthorne calculation from components

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## WATER ANALYSIS REPORT

OPERATOR: Total Petroleum
WELL NO.: Cedar Hills 1-22
FIELD:
COUNTY: Bowman
STATE: N.D.

DATE: 3/18/85 LAB NO.: 2545-4
LOCATION: Sec. 22-131N-105W
FORMATION: Red River "A"
INTERVAL: 9152-9206
SAMPLE FROM: DST #1 (Sample #4) Bottom Spl.

REMARKS & CONCLUSIONS: Dark brown muddy water, trace of oil, Brown cloudy filtrate.

Nitrate, mg/l — 100
Chromate, mg/l — 400

| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium - - (Calc) - | 101,952 | 4434.90 | Sulfate - - - - - - | 1,050 | 21.84 |
| Potassium - - - - - | — | — | Chloride - - - - - - | 172,480 | 4863.94 |
| Lithium - - - - - - | — | — | Carbonate - - - - - | 0 | — |
| Calcium - - - - - - | 8,818 | 440.02 | Bicarbonate - - - - | 561 | 9.20 |
| Magnesium - - - - - | 244 | 20.06 | Hydroxide - - - - - | — | — |
| Iron - - - - - - - | — | — | Hydrogen sulfide - - - | — | — |
| Total Cations - - - - | | 4894.98 | Total Anions - - - - | | 4894.98 |

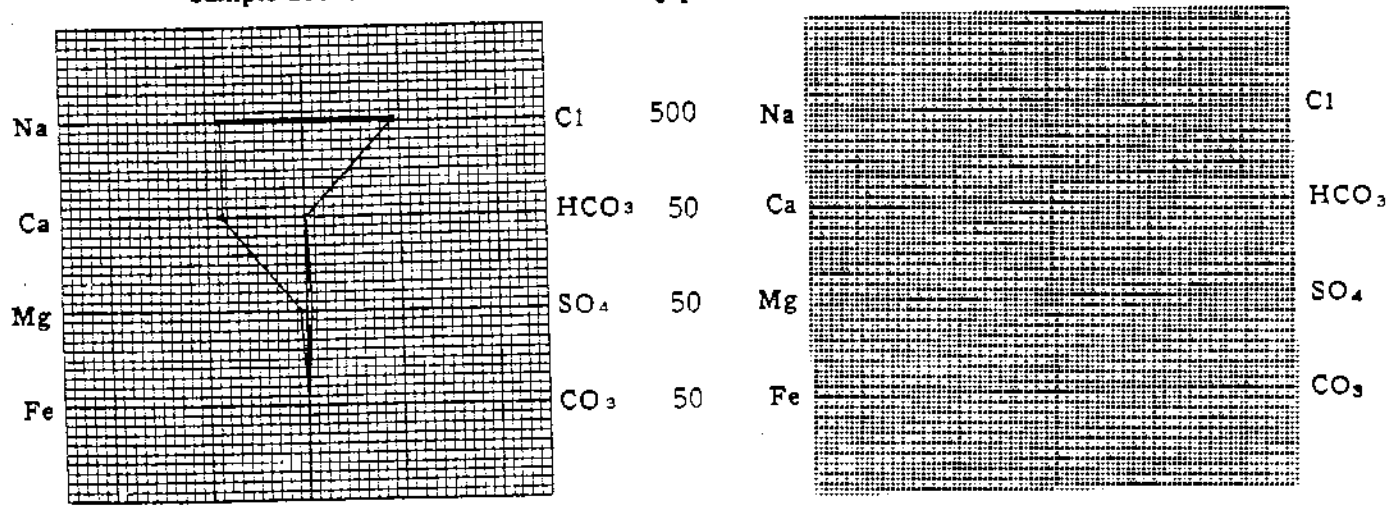
Total dissolved solids, mg/l - - - - - - 285,105
NaCl equivalent, mg/l - - - - - - - - 283,974
Observed pH - - - - - - - - - - - - 6.54

Specific resistance @ 68°F.:
Observed - - - - 0.049 ohm-meters
Calculated - - - - 0.048 ohm-meters

### WATER ANALYSIS PATTERN

Sample above described

Scale
MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent by Dunlap & Hawthorne calculation from components

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## WATER ANALYSIS REPORT

OPERATOR Total Petroleum
WELL NO. Cedar Hills 1-22
FIELD
COUNTY Bowman
STATE N.D.

DATE 3/18/85 LAB NO. 2545-5
LOCATION Sec. 22-131N-105W
FORMATION Red River "A"
INTERVAL 9152-9206
SAMPLE FROM DST #1 (Sample Chamber)

REMARKS & CONCLUSIONS: Brown cloudy water, oil on top, Light brown cloudy filtrate.

Nitrate, mg/l --- 30
Chromate, mg/l — 35

| Cations | mg/l | meq/l | Anions | mg/l | meq/l |
|---|---|---|---|---|---|
| Sodium - - (Calc) - | 55,116 | 2397.56 | Sulfate - - - - - - - | 2,570 | 53.46 |
| Potassium - - - - - | — | — | Chloride - - - - - - - | 92,120 | 2597.78 |
| Lithium - - - - - - | — | — | Carbonate - - - - - - | 0 | — |
| Calcium - - - - - - | 4,810 | 240.02 | Bicarbonate - - - - - | 390 | 6.40 |
| Magnesium - - - - - | 244 | 20.06 | Hydroxide - - - - - | — | — |
| Iron - - - - - - - | — | — | Hydrogen sulfide - - - | — | — |
| Total Cations - - - - | | 2657.64 | Total Anions - - - - | | 2657.64 |

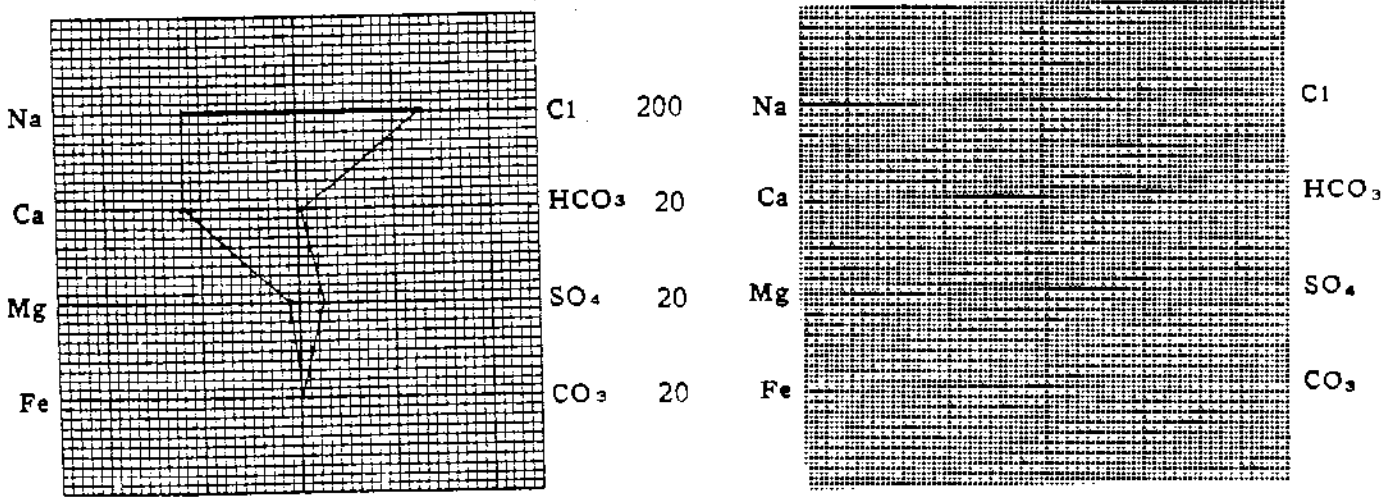
| | | |
|---|---|---|
| Total dissolved solids, mg/l - - - - - - | 155,250 | |
| NaCl equivalent, mg/l - - - - - - - - | 153,684 | |
| Observed pH - - - - - - - - - - - | 6.50 | |

Specific resistance @ 68°F.:
Observed - - - - 0.067 ohm-meters
Calculated - - - - 0.066 ohm-meters

### WATER ANALYSIS PATTERN

Sample above described

Scale
MEQ per Unit




(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent = by Dunlap & Hawthorne calculation from components

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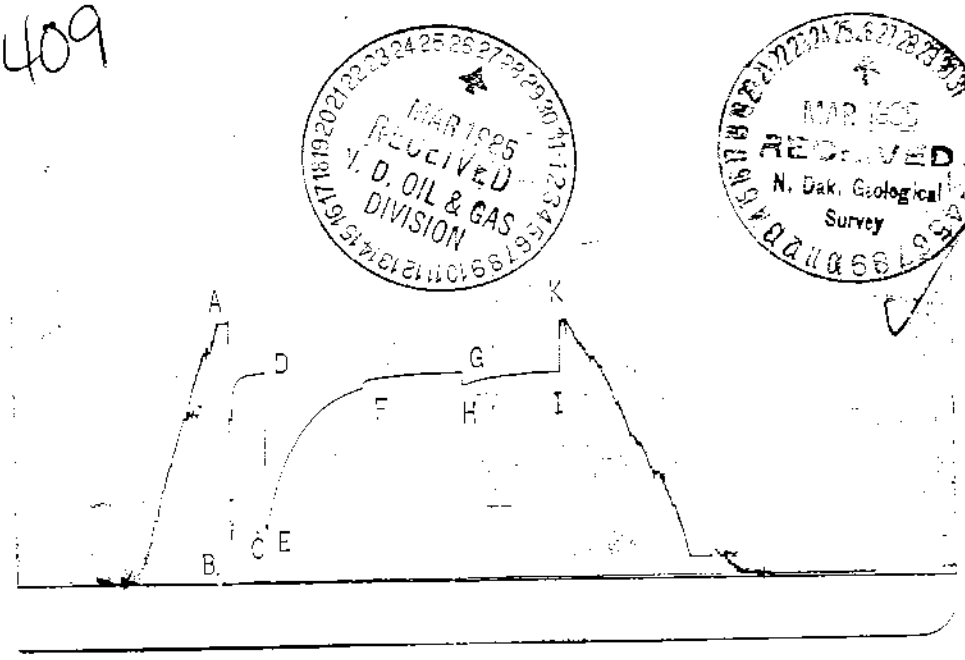
| | | | |
|---|---|---|---|
| Contractor | Noble | Top Choke | ½" |
| Rig No. | N-57 | Bottom Choke | 3/4" |
| Spot | -- | Size Hole | 7 7/8" |
| Sec. | 22 | Size Rat Hole | -- |
| Twp. | 131N | Size & Wt. D. P. | 4½" XH 16.60# |
| Rng. | 105W | Size Wt. Pipe | -- |
| Field | Wildcat | I. D. of D. C. | 2½" 4½" H-90 |
| County | Bowman | Length of D. C. | 735 ft. |
| State | North Dakota | Total Depth | 9388 ft. |
| Elevation | 2942 ft. | Interval Tested | 9321-9388 ft. |
| Formation | Red River "C" | Type of Test | Bottom Hole Conventional |

| | |
|---|---|
| Flow No. 1 | 4 Min. |
| Shut-in No. 1 | 60 Min. |
| Flow No. 2 | 179 Min. |
| Shut-in No. 2 | 180 Min. |
| Flow No. 3 | 179 Min. |
| Shut-in No. 3 | -- Min. |
| Bottom Hole Temp. | 226.6°F |
| Mud Weight | 10.4# |
| Gravity | -- |
| Viscosity | 38 |
| Tool opened @ | 6:23 p.m. |

11409








Inside Recorder

PRD Make Kuster K-3
No 24743 Cap. 9100 @ 9341'

| | | Press | Corrected |
|---|---|---|---|
| Initial Hydrostatic | A | | 5165 |
| Final Hydrostatic | K | | 5135 |
| Initial Flow | B | | 632 |
| Final Initial Flow | C | | 1045 |
| Initial Shut-in | D | | 4148 |
| Second Initial Flow | E | | 1053 |
| Second Final Flow | F | | 3818 |
| Second Shut-in | G | | 4098 |
| Third Initial Flow | H | | 3849 |
| Third Final Flow | I | | 4075 |
| Third Shut-in | J | | -- |

Lynes Dist. Dickinson, ND
Our Tester Darren Buchholz
Witnessed By: L.F. Scott

Did Well Flow – Gas No Oil No Water No

Ran 5 gallons ammonia and 5 gallons inhibitor.

RECOVERY IN PIPE:

| | |
|---|---|
| 9025 ft. Total Recovery | = 121.31 Bbls |
| 310 ft. Ammonia & inhibitor-cut mud | = 4.40 Bbls |
| 8715 ft. Water | = 116.91 Bbls |

Blow Description:

1st Flow: Tool opened with a surface blow, increasing to an 18" blow at the end of the flow.

2nd Flow: Tool opened with a ½" blow, increasing to a 21" blow in 20 minutes, then decreasing steadily to an 1/8" blow in 170 minutes, and a surface blow at the end of the flow.

Comments: The test results indicate a mechanically successful test. The flow and shut-in curves suggest excellent permeability within the zone tested. Lost approximately 2 bbls of mud in annulus while testing.

Form 1

LY-230

Address 999 18th St., Suite 2201 Denver, CO 80201 Ticket No. 20794 Date 3-18-85 No. Final Copies 9

TOTAL PETROLEUM INC.
DST#: 2
CEDAR HILLS #1-22
9321 - 9388ft.

Location: SEC. 22 T131N R105W
Test Type: BOTTOM HOLE CONVENTIONAL
Formation: RED RIVER "C"

Recorder Number: 1738
Recorder Depth: 9299 ft.

## TIME-PRESSURE LISTING

| CHART LABEL | COMMENTS | TIME MIN. | DELTA P psi | PRESSURE psi | (T+dt)/dt ABSCISSA | PRESSURE SQUARED psi^2/10^6 |
|---|---|---|---|---|---|---|
| A | INITIAL HYDROSTATIC | 0.00 | | 5120.0 | | |
| B | START OF 1st FLOW | 0.00 | | 715.0 | | |
| | 1st FLOW PERIOD | 1.00 | 85.0 | 800.0 | | |
| | | 2.00 | 153.0 | 868.0 | | |
| | | 3.00 | 188.0 | 903.0 | | |
| C | END OF 1st FLOW | 4.00 | 265.0 | 980.0 | | |
| | 1st SHUTIN PERIOD | 0.00 | 0.0 | 980.0 | 0.0000 | |
| | | 1.00 | 2180.0 | 3160.0 | 5.0000 | |
| | | 3.00 | 2723.0 | 3703.0 | 2.3333 | |
| | | 4.00 | 2803.0 | 3783.0 | 2.0000 | |
| | | 5.00 | 2858.0 | 3838.0 | 1.8000 | |
| | | 6.00 | 2895.0 | 3875.0 | 1.6667 | |
| | | 7.00 | 2928.0 | 3908.0 | 1.5714 | |
| | | 8.00 | 2950.0 | 3930.0 | 1.5000 | |
| | | 9.00 | 2970.0 | 3950.0 | 1.4444 | |
| | | 12.00 | 3010.0 | 3990.0 | 1.3333 | |
| | | 14.00 | 3028.0 | 4008.0 | 1.2857 | |
| | | 16.00 | 3043.0 | 4023.0 | 1.2500 | |
| | | 20.00 | 3063.0 | 4043.0 | 1.2000 | |
| | | 22.00 | 3068.0 | 4048.0 | 1.1818 | |
| | | 24.00 | 3075.0 | 4055.0 | 1.1667 | |
| | | 28.00 | 3085.0 | 4065.0 | 1.1429 | |
| | | 30.00 | 3090.0 | 4070.0 | 1.1333 | |
| | | 35.00 | 3098.0 | 4078.0 | 1.1143 | |
| | | 40.00 | 3103.0 | 4083.0 | 1.1000 | |
| | | 45.00 | 3108.0 | 4088.0 | 1.0889 | |
| | | 49.00 | 3110.0 | 4090.0 | 1.0816 | |
| | | 55.00 | 3115.0 | 4095.0 | 1.0727 | |
| D | END OF 1st SHUTIN | 60.00 | 3118.0 | 4098.0 | 1.0667 | |
| E | START OF 2nd FLOW | 0.00 | | 983.0 | | |
| | 2nd FLOW PERIOD | 10.00 | 410.0 | 1393.0 | | |
| | | 20.00 | 815.0 | 1798.0 | | |
| | | 30.00 | 1150.0 | 2133.0 | | |
| | | 40.00 | 1425.0 | 2408.0 | | |

TOTAL PETROLEUM INC.
DST#: 2
CEDAR HILLS #1-22
9321 - 9388ft.

Location: SEC. 22 T131N R105W
Test Type: BOTTOM HOLE CONVENTIONAL
Formation: RED RIVER "C"

Recorder Number: 1738
Recorder Depth: 9299 ft.

## TIME-PRESSURE LISTING

| CHART LABEL | COMMENTS | TIME MIN. | DELTA P psi | PRESSURE psi | (T+dt)/dt ABSCISSA | PRESSURE SQUARED psi^2/10^6 |
|---|---|---|---|---|---|---|
| | | 50.00 | 1655.0 | 2638.0 | | |
| | | 60.00 | 1850.0 | 2833.0 | | |
| | | 70.00 | 2012.0 | 2995.0 | | |
| | | 80.00 | 2150.0 | 3133.0 | | |
| | | 90.00 | 2270.0 | 3253.0 | | |
| | | 100.00 | 2372.0 | 3355.0 | | |
| | | 110.00 | 2457.0 | 3440.0 | | |
| | | 120.00 | 2532.0 | 3515.0 | | |
| | | 130.00 | 2595.0 | 3578.0 | | |
| | | 140.00 | 2650.0 | 3633.0 | | |
| | | 150.00 | 2695.0 | 3678.0 | | |
| | | 160.00 | 2735.0 | 3718.0 | | |
| | | 170.00 | 2772.0 | 3755.0 | | |
| F | END OF 2nd FLOW | 179.00 | 2802.0 | 3785.0 | | |
| | 2nd SHUTIN PERIOD | 0.00 | 0.0 | 3785.0 | 0.0000 | |
| | | 1.00 | 90.0 | 3875.0 | 184.0000 | |
| | | 3.00 | 125.0 | 3910.0 | 62.0000 | |
| | | 4.00 | 135.0 | 3920.0 | 46.7500 | |
| | | 5.00 | 138.0 | 3923.0 | 37.6000 | |
| | | 6.00 | 143.0 | 3928.0 | 31.5000 | |
| | | 7.00 | 148.0 | 3933.0 | 27.1429 | |
| | | 8.00 | 150.0 | 3935.0 | 23.8750 | |
| | | 9.00 | 155.0 | 3940.0 | 21.3333 | |
| | | 12.00 | 163.0 | 3948.0 | 16.2500 | |
| | | 14.00 | 165.0 | 3950.0 | 14.0714 | |
| | | 16.00 | 170.0 | 3955.0 | 12.4375 | |
| | | 20.00 | 178.0 | 3963.0 | 10.1500 | |
| | | 22.00 | 180.0 | 3965.0 | 9.3182 | |
| | | 24.00 | 183.0 | 3968.0 | 8.6250 | |
| | | 28.00 | 188.0 | 3973.0 | 7.5357 | |
| | | 30.00 | 190.0 | 3975.0 | 7.1000 | |
| | | 35.00 | 195.0 | 3980.0 | 6.2286 | |
| | | 40.00 | 200.0 | 3985.0 | 5.5750 | |
| | | 45.00 | 203.0 | 3988.0 | 5.0667 | |
| | | 49.00 | 208.0 | 3993.0 | 4.7347 | |
| | | 55.00 | 213.0 | 3998.0 | 4.3273 | |
| | | 60.00 | 215.0 | 4000.0 | 4.0500 | |
| | | 70.00 | 220.0 | 4005.0 | 3.6143 | |

NTAL PETROLEUM INC.
ST#. 2
CEDAR HILLS #1-22
9321 - 9388ft.

Location: SEC. 22 T131N R105W
Test Type: BOTTOM HOLE CONVENTIONAL
Formation: RED RIVER "C"

Recorder Number: 1738
Recorder Depth: 9299 ft.

## TIME-PRESSURE LISTING

| CHART LABEL | COMMENTS | TIME MIN. | DELTA P psi | PRESSURE psi | (T+dt)/dt ABSCISSA | PRESSURE SQUARED psi^2/10^6 |
|---|---|---|---|---|---|---|
| | | 80.00 | 228.0 | 4013.0 | 3.2075 | |
| | | 89.00 | 230.0 | 4015.0 | 3.0562 | |
| | | 100.00 | 238.0 | 4023.0 | 2.8300* | |
| | | 110.00 | 240.0 | 4025.0 | 2.6636* | |
| | | 120.00 | 245.0 | 4030.0 | 2.5250* | |
| | | 129.00 | 245.0 | 4030.0 | 2.4186* | |
| | | 140.00 | 250.0 | 4035.0 | 2.3071* | |
| | | 150.00 | 253.0 | 4038.0 | 2.2200* | |
| | | 160.00 | 255.0 | 4040.0 | 2.1430* | |
| | | 169.00 | 258.0 | 4043.0 | 2.0828* | |
| G | END OF 2nd SHUTIN | 180.00 | 260.0 | 4045.0 | 2.0167* | |
| H | START OF 3rd FLOW | 0.00 | | 3793.0 | | |
| | 3rd FLOW PERIOD | 10.00 | 47.0 | 3840.0 | | |
| | | 20.00 | 82.0 | 3875.0 | | |
| | | 30.00 | 110.0 | 3903.0 | | |
| | | 40.00 | 132.0 | 3925.0 | | |
| | | 50.00 | 150.0 | 3943.0 | | |
| | | 60.00 | 167.0 | 3960.0 | | |
| | | 70.00 | 180.0 | 3973.0 | | |
| | | 80.00 | 190.0 | 3983.0 | | |
| | | 90.00 | 202.0 | 3995.0 | | |
| | | 100.00 | 210.0 | 4003.0 | | |
| | | 110.00 | 217.0 | 4010.0 | | |
| | | 120.00 | 222.0 | 4015.0 | | |
| | | 130.00 | 230.0 | 4023.0 | | |
| | | 140.00 | 232.0 | 4025.0 | | |
| | | 150.00 | 237.0 | 4030.0 | | |
| | | 160.00 | 242.0 | 4035.0 | | |
| | | 170.00 | 247.0 | 4040.0 | | |
| I | END OF 3rd FLOW | 179.00 | 250.0 | 4043.0 | | |
| J | END OF 3rd SHUTIN | -1.00 | | -1.0 | | |
| Q | FINAL HYDROSTATIC | 0.00 | | 5113.0 | | |

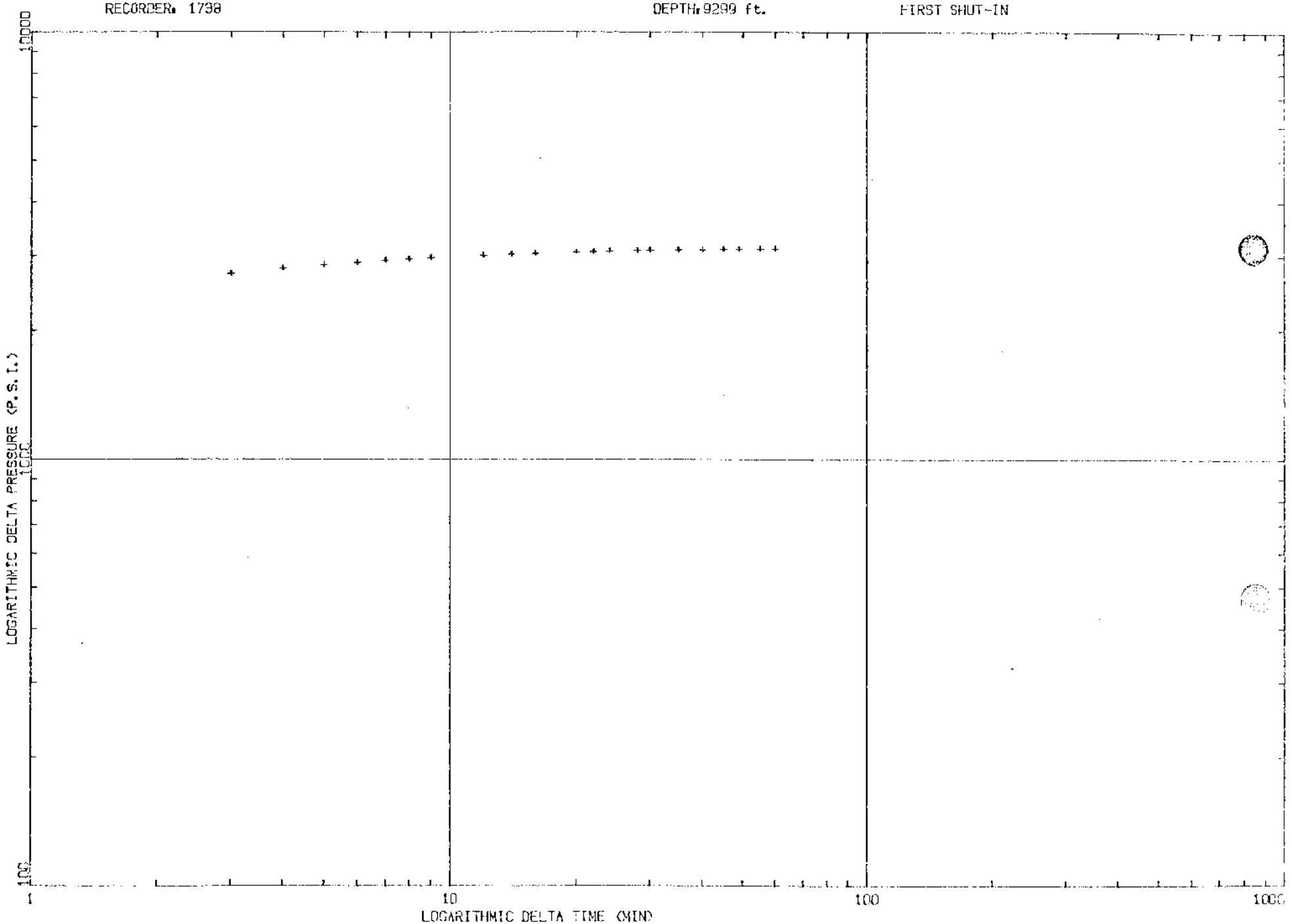
* VALUES USED FOR EXTRAPOLATIONS

2nd SHUT-IN
HORNER EXTRAPOLATION 4092.60 PSI
HORNER SLOPE 157.61 psi/cycle

OPERATOR: TOTAL PETROLEUM INC.
LOCATION: SEC. 22 T131N R105W
RECORDER: 1738

WELL NAME: CEDAR HILLS #1-22
DST #: 2
DEPTH: 9299 ft.

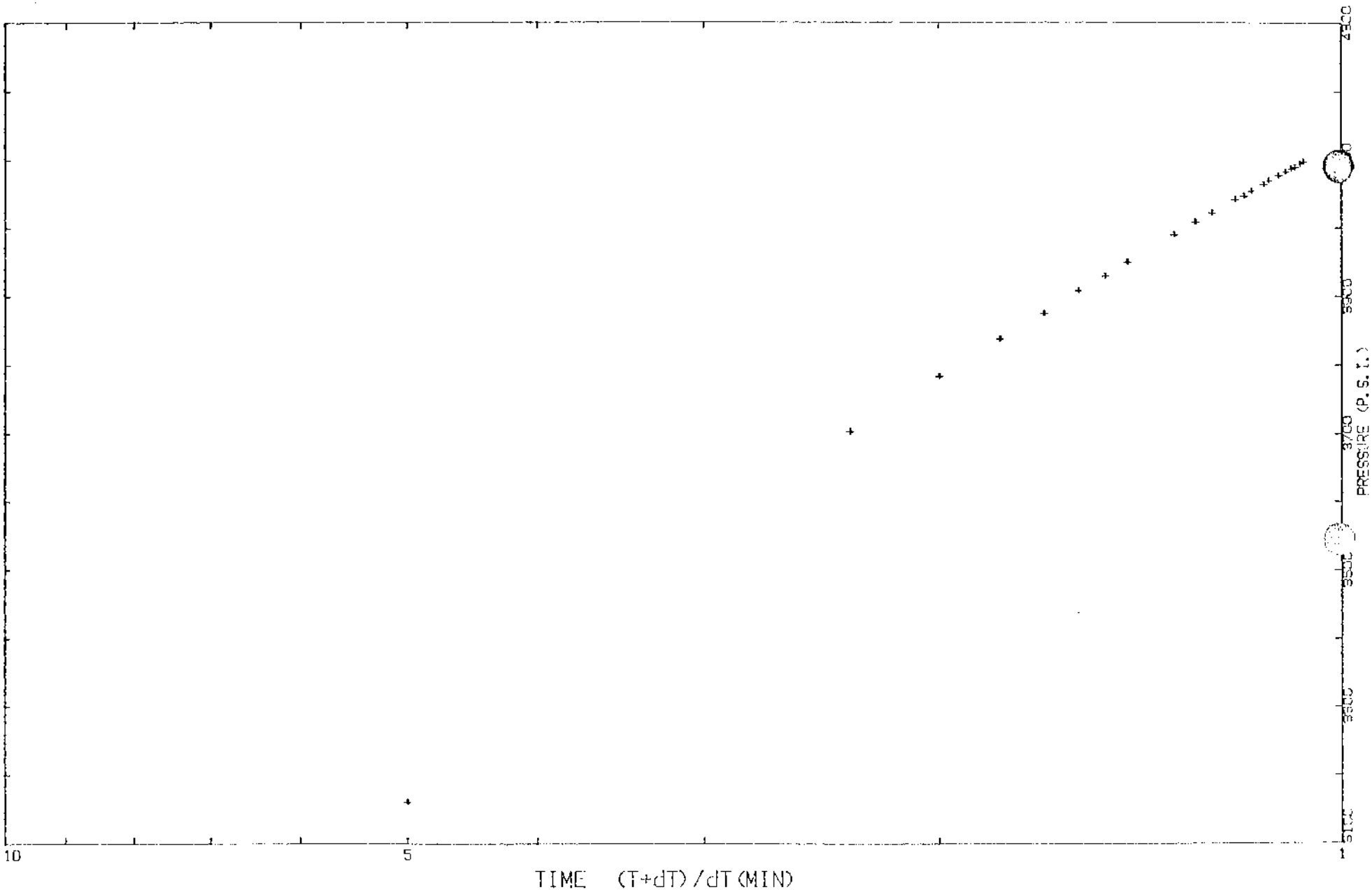
FIRST SHUT-IN



OPERATOR: TOTAL PETROLEUM INC.
WELL NAME: CEDAR HILLS #1-22
LOCATION: SEC. 22 T131N R105W
FIRST SHUT-IN
RECORDER: 1738

DST #: 2

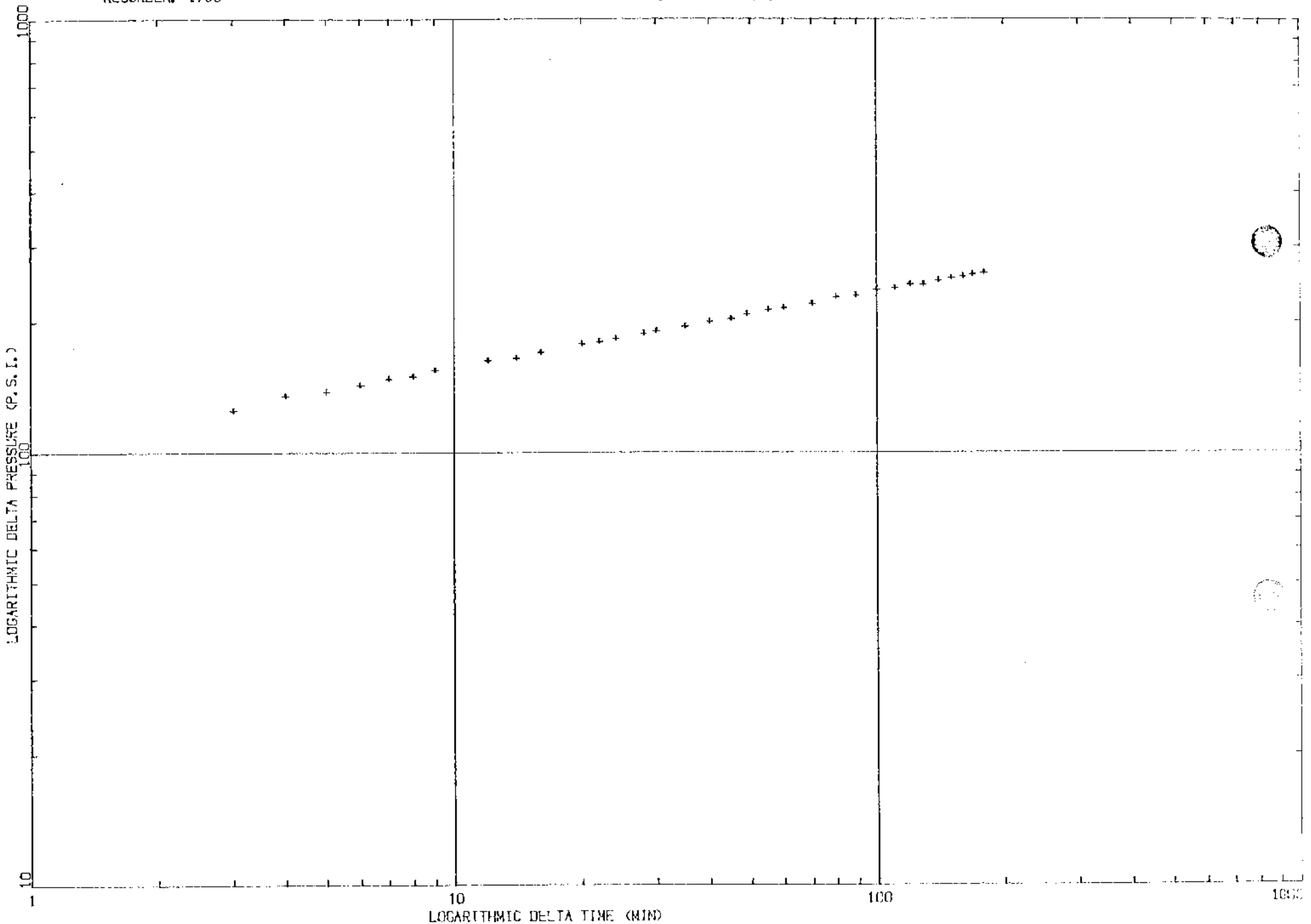
DEPTH: 9299 ft.



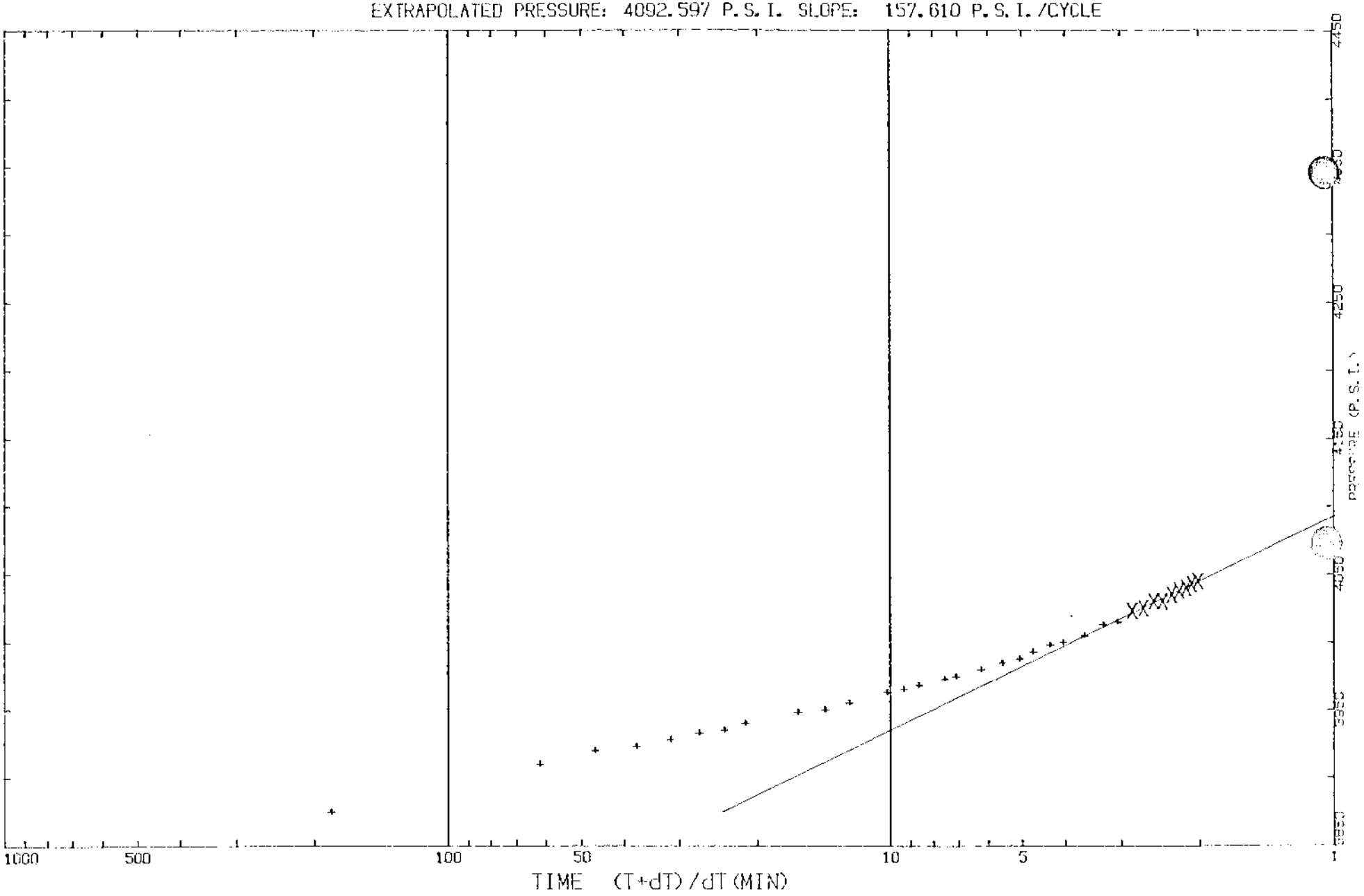
OPERATOR: TOTAL PETROLEUM INC.
LOCATION: SEC. 22 T131N R105W
RECORDER: 1730

WELL NAME: CEDAR HILLS #1-22
DST #: 2
DEPTH: 9299 Ft.

SECOND SHUT-IN



OPERATOR: TOTAL PETROLEUM INC.
WELL NAME: CEDAR HILLS #1-22
LOCATION: SEC. 22 T131N R105W DST #: 2
SECOND SHUT-IN
RECORDER: 1738 DEPTH: 9299 ft.
EXTRAPOLATED PRESSURE: 4092.597 P.S.I. SLOPE: 157.610 P.S.I./CYCLE



TOTAL PETROLEUM INC.
DST#: 2
CEDAR HILLS #1-22
9321 - 9388ft.

Location: SEC. 22 T131N R105W
Test Type: BOTTOM HOLE CONVENTIONAL
Formation: RED RIVER "C"

Recorder Number: 1738
Recorder Depth: 9299

SAMPLE DATA
**********

SAMPLE CHAMBER:
**********

| | | |
|---|---|---|
| Capacity of sample chamber | 2300 | cc |
| Volume of sample..... | 2300 | cc |
| Pressure in sampler..... | 70 | psig |
| Where sampler was drained... | on location | |

Sampler contained:
Water 2300 cc

RESISTIVITY DATA:
**********

| | |
|---|---|
| Top.....: | 164 000 PPM NACL |
| Middle.....: | 25 000 PPM NACL |
| Bottom.....: | 20 000 PPM NACL |
| Sampler.....: | 25 000 PPM NACL |
| Mud pit.....: | 190 000 PPM NACL |
| Make-up Water..: | |

# LYNES INC.

DMR—312 DIGITAL MEMORY RECORDER NO. 1738 CAP 10000 AT 9239 ft.

OPERATOR Total Petroleum Inc. WELL NAME Cedar Hills #1-22 TICKET NO. 20794 DST. NO 2

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 18:13:30 | T | 202.437 | 19:25:30 | T | 218.437 | 20:37:30 | T | 226.625 | 21:49:30 | T | 226.375 | 23:01:30 | T | 223.500 |
| Initial Hydro. | | 5120.00 | | | 4097.50 | | | 2995.00 | | | 3640.00 | | | 3990.00 |
| | | 5120.00 | End 1st Shutin | | 4097.50 | | | 3010.00 | | | 3645.00 | | | 3990.00 |
| | | 5125.00 | Start 2nd Flow | | 982.500 | | | 3025.00 | | | 3650.00 | | | 3990.00 |
| | | 5120.00 | | | 977.500 | | | 3040.00 | | | 3657.50 | | | 3987.50 |
| | | 5120.00 | | | 1017.50 | | | 3052.50 | | | 3660.00 | | | 3985.00 |
| | | 5117.50 | | | 1062.50 | | | 3067.50 | | | 3665.00 | | | 3985.00 |
| | | 5117.50 | | | 1112.50 | | | 3080.00 | | | 3670.00 | | | 3985.00 |
| 18:21:30 | T | 208.750 | 19:33:30 | T | 216.937 | 20:45:30 | T | 226.687 | 21:57:30 | T | 226.312 | 23:09:30 | T | 222.937 |
| | | 5190.00 | | | 1207.50 | | | 3107.50 | | | 3677.50 | | | 3987.50 |
| Start 1st Flow | | 715.000 | | | 1255.00 | | | 3120.00 | | | 3682.50 | | | 3987.50 |
| | | 800.000 | | | 1302.50 | | | 3132.50 | | | 3685.00 | | | 3987.50 |
| | | 867.500 | | | 1347.50 | | | 3147.50 | | | 3690.00 | | | 3990.00 |
| | | 902.500 | | | 1392.50 | | | 3160.00 | | | 3695.00 | | | 3992.50 |
| End 1st Flow | | 980.000 | | | 1437.50 | | | 3172.50 | | | 3700.00 | | | 3992.50 |
| | | 3160.00 | | | 1480.00 | | | 3185.00 | | | 3705.00 | | | 3992.50 |
| 18:29:30 | T | 210.562 | 19:41:30 | T | 222.625 | 20:53:30 | T | 226.637 | 22:05:30 | T | 226.250 | 23:17:30 | T | 222.375 |
| | | 3702.50 | | | 1565.00 | | | 3207.50 | | | 3710.00 | | | 3995.00 |
| | | 3722.50 | | | 1605.00 | | | 3217.50 | | | 3715.00 | | | 3995.00 |
| | | 3827.50 | | | 1645.00 | | | 3230.00 | | | 3717.50 | | | 3995.00 |
| | | 3875.00 | | | 1682.50 | | | 3242.50 | | | 3722.50 | | | 3997.50 |
| | | 3907.50 | | | 1725.00 | | | 3252.50 | | | 3727.50 | | | 3997.50 |
| | | 3930.00 | | | 1762.00 | | | 3262.50 | | | 3732.00 | | | 3997.50 |
| | | 3950.00 | | | 1797.50 | | | 3275.00 | | | 3735.00 | | | 3997.50 |
| 18:37:30 | T | 215.937 | 19:49:30 | T | 224.750 | 21:01:30 | T | 226.625 | 22:13:30 | T | 226.125 | 23:25:30 | T | 221.937 |
| | | 3980.00 | | | 1870.00 | | | 3295.00 | | | 3742.50 | | | 4000.00 |
| | | 3990.00 | | | 1905.00 | | | 3305.00 | | | 3745.00 | | | 4000.00 |
| | | 4000.00 | | | 1937.50 | | | 3317.50 | | | 3747.50 | | | 4000.00 |
| | | 4007.50 | | | 1972.50 | | | 3325.00 | | | 3750.00 | | | 4002.50 |
| | | 4015.00 | | | 2205.00 | | | 3335.00 | | | 3755.00 | | | 4002.50 |
| | | 4022.50 | | | 2037.50 | | | 3345.00 | | | 3757.50 | | | 4002.50 |
| | | 4027.50 | | | 2067.50 | | | 3355.00 | | | 3760.00 | | | 4002.50 |
| 18:45:30 | T | 215.687 | 19:57:30 | T | 225.687 | 21:09:30 | T | 226.625 | 22:21:30 | T | 226.062 | 23:33:30 | T | 221.500 |
| | | 4037.50 | | | 2132.50 | | | 3372.50 | | | 3767.50 | | | 4005.00 |
| | | 4042.50 | | | 2162.50 | | | 3380.00 | | | 3770.00 | | | 4005.00 |
| | | 4045.00 | | | 2192.50 | | | 3387.50 | | | 3775.00 | | | 4005.00 |
| | | 4047.50 | | | 2223.00 | | | 3400.00 | | | 3777.50 | | | 4005.00 |
| | | 4052.50 | | | 2247.50 | | | 3405.00 | | | 3780.00 | | | 4005.00 |
| | | 4055.00 | | | 2275.00 | | | 3415.00 | End 2nd Flow | | -3785.00 | | | 4007.50 |
| | | 4057.50 | | | 2302.50 | | | 3422.50 | | | 3875.00 | | | 4007.50 |
| 18:53:30 | T | 214.812 | 20:05:30 | T | 226.125 | 21:17:30 | T | 226.562 | 22:29:30 | T | 226.000 | 23:41:30 | T | 221.062 |
| | | 4062.50 | | | 2357.50 | | | 3440.00 | | | 3910.00 | | | 4007.50 |
| | | 4065.00 | | | 2382.50 | | | 3447.50 | | | 3920.00 | | | 4010.00 |
| | | 4067.50 | | | 2407.50 | | | 3455.00 | | | 3922.50 | | | 4010.00 |
| | | 4070.00 | | | 2432.50 | | | 3462.50 | | | 3927.50 | | | 4010.00 |
| | | 4072.50 | | | 2457.50 | | | 3470.00 | | | 3932.50 | | | 4010.00 |
| | | 4072.50 | | | 2482.50 | | | 3477.50 | | | 3935.00 | | | 4012.50 |
| | | 4075.00 | | | 2505.00 | | | 3485.00 | | | 3940.00 | | | 4012.50 |
| 19:01:30 | T | 213.937 | 20:13:30 | T | 226.375 | 21:25:30 | T | 226.562 | 22:37:30 | T | 225.625 | 23:49:30 | T | 220.687 |
| | | 4077.50 | | | 2550.00 | | | 3500.00 | | | 3945.20 | | | 4012.50 |
| | | 4077.50 | | | 2572.50 | | | 3507.50 | | | 3947.50 | | | 4012.50 |
| | | 4080.00 | | | 2595.00 | | | 3515.00 | | | 3950.00 | | | 4015.00 |
| | | 4082.50 | | | 2615.00 | | | 3520.00 | | | 3950.00 | | | 4015.00 |
| | | 4082.50 | | | 2637.50 | | | 3525.00 | | | 3952.50 | | | 4015.00 |
| | | 4082.50 | | | 2657.50 | | | 3532.50 | | | 3955.00 | | | 4015.00 |
| | | 4085.00 | | | 2680.00 | | | 3537.50 | | | 3957.50 | | | 4015.00 |
| 19:09:30 | T | 213.312 | 20:21:30 | T | 226.500 | 21:33:30 | T | 226.500 | 22:45:30 | T | 224.937 | 23:57:30 | T | 220.375 |
| | | 4087.50 | | | 2720.00 | | | 3550.00 | | | 3960.00 | | | 4017.50 |
| | | 4087.50 | | | 2740.00 | | | 3557.50 | | | 3962.50 | | | 4017.50 |
| | | 4087.50 | | | 2757.50 | | | 3565.00 | | | 3962.50 | | | 4017.50 |
| | | 4087.50 | | | 2777.50 | | | 3570.00 | | | 3965.00 | | | 4017.50 |
| | | 4087.50 | | | 2795.00 | | | 3577.50 | | | 3965.00 | | | 4017.50 |
| | | 4090.00 | | | 2815.00 | | | 3582.50 | | | 3967.50 | | | 4020.00 |
| | | 4090.00 | | | 2832.50 | | | 3587.50 | | | 3967.50 | | | 4020.00 |
| 19:17:30 | T | 212.875 | 20:29:30 | T | 226.562 | 21:41:30 | T | 226.437 | 22:53:30 | T | 224.187 | 00:05:30 | T | 220.062 |
| | | 4092.50 | | | 2865.00 | | | 3600.00 | | | 3972.50 | | | 4020.00 |
| | | 4095.00 | | | 2885.00 | | | 3605.00 | | | 3972.50 | | | 4022.50 |
| | | 4092.50 | | | 2900.00 | | | 3610.00 | | | 3972.50 | | | 4022.50 |
| | | 4095.00 | | | 2917.50 | | | 3617.50 | | | 3975.00 | | | 4020.00 |
| | | 4095.00 | | | 2935.00 | | | 3620.00 | | | 3975.00 | | | 4022.50 |
| | | 4095.00 | | | 2950.00 | | | 3627.50 | | | 3977.50 | | | 4022.50 |
| | | 4097.50 | | | 2965.00 | | | 3632.50 | | | 3977.50 | | | 4022.50 |

# LYNES INC.

DMR—3i2 DIGITAL MEMORY RECORDER NO. 1738 CAP 10000 AT 9299 ft.

OPERATOR Total Petroleum Inc. WELL NAME Cedar Hills #1-22 TICKET NO. 20794 DST. NO. 2

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 00:13:30 T | 219.875 | 01:25:30 T | 218.062 | 02:37:30 T | 225.062 | 03:49:30 T | 224.187 |
| | 4022.50 | | 4045.00 | | 3972.50 | | 4027.50 |
| | 4025.00 | End 2nd Shutin | 4045.00 | | 3975.00 | | 4027.50 |
| | 4022.50 | Start 3rd Flow | 3792.50 | | 3975.00 | | 4027.50 |
| | 4025.00 | | 3800.00 | | 3977.50 | | 4027.50 |
| | 4025.00 | | 3805.30 | | 3977.50 | | 4030.00 |
| | 4025.00 | | 3812.00 | | 3980.00 | | 4027.50 |
| | 4027.50 | | 3815.00 | | 3982.50 | | 4030.00 |
| 00:21:30 T | 219.562 | 01:33:30 T | 220.625 | 02:45:30 T | 225.000 | 03:57:30 T | 224.062 |
| | 4027.50 | | 3825.00 | | 3982.50 | | 4030.00 |
| | 4027.50 | | 3827.50 | | 3982.50 | | 4030.00 |
| | 4027.50 | | 3832.50 | | 3982.50 | | 4030.00 |
| | 4027.50 | | 3837.50 | | 3985.00 | | 4032.50 |
| | 4027.50 | | 3840.00 | | 3987.50 | | 4032.50 |
| | 4030.00 | | 3842.50 | | 3987.50 | | 4032.50 |
| | 4027.50 | | 3847.50 | | 3987.50 | | 4032.50 |
| 00:29:30 T | 219.375 | 01:41:30 T | 223.312 | 02:53:30 T | 224.937 | 04:05:30 T | 223.875 |
| | 4030.00 | | 3855.00 | | 3990.00 | | 4035.00 |
| | 4030.00 | | 3857.50 | | 3992.50 | | 4035.00 |
| | 4030.00 | | 3862.50 | | 3992.50 | | 4035.00 |
| | 4030.00 | | 3865.00 | | 3995.00 | | 4035.00 |
| | 4030.00 | | 3870.00 | | 3995.00 | | 4035.00 |
| | 4030.00 | | 3872.50 | | 3997.50 | | 4035.00 |
| | 4030.00 | | 3875.00 | | 3997.50 | | 4035.00 |
| 00:37:30 T | 219.125 | 01:49:30 T | 224.312 | 03:01:30 T | 224.812 | 04:13:30 T | 223.750 |
| | 4032.50 | | 3882.50 | | 3997.50 | | 4037.50 |
| | 4032.50 | | 3885.00 | | 3997.50 | | 4037.50 |
| | 4032.50 | | 3887.50 | | 4000.00 | | 4037.50 |
| | 4035.00 | | 3890.00 | | 4000.00 | | 4037.50 |
| | 4032.50 | | 3892.50 | | 4000.00 | | 4040.00 |
| | 4035.00 | | 3897.50 | | 4002.50 | | 4037.50 |
| | 4035.00 | | 3897.50 | | 4002.50 | | 4040.00 |
| 00:45:30 T | 219.937 | 01:57:30 T | 224.687 | 03:09:30 T | 224.750 | 04:21:30 T | 223.625 |
| | 4035.00 | | 3900.50 | | 4002.50 | | 4040.00 |
| | 4035.00 | | 3905.00 | | 4005.00 | | 4040.00 |
| | 4035.00 | | 3907.50 | | 4005.00 | | 4040.00 |
| | 4035.00 | | 3910.00 | | 4005.00 | | 4040.00 |
| | 4035.00 | | 3912.50 | | 4005.00 | | 4040.00 |
| | 4037.50 | | 3915.00 | | 4007.50 | End 3rd Flow | 4042.50 |
| | 4035.00 | | 3917.50 | | 4007.50 | | 5075.00 |
| 00:53:30 T | 218.750 | 02:05:30 T | 224.937 | 03:17:30 T | 224.625 | 04:29:30 T | 223.437 |
| | 4037.50 | | 3922.50 | | 4010.00 | | 5085.00 |
| | 4037.50 | | 3925.00 | | 4007.50 | | 5107.50 |
| | 4037.50 | | 3925.00 | | 4010.00 | | 5120.00 |
| | 4037.50 | | 3927.50 | | 4010.00 | | 5087.50 |
| | 4037.50 | | 3930.00 | | 4012.50 | | 5065.00 |
| | 4040.00 | | 3930.00 | | 4012.50 | | 5112.50 |
| | 4040.00 | | 3935.00 | | 4012.50 | Final Hydro. | 5112.50 |
| 01:01:30 T | 218.562 | 02:13:30 T | 225.062 | 03:25:30 T | 224.500 | 04:37:30 T | 219.625 |
| | 4040.00 | | 3937.50 | | 4012.50 | | 4980.00 |
| | 4040.00 | | 3937.50 | | 4012.50 | | 5092.50 |
| | 4040.00 | | 3942.50 | | 4015.00 | | 5050.00 |
| | 4040.00 | | 3942.50 | | 4017.50 | | 5007.50 |
| | 4040.00 | | 3942.50 | | 4017.50 | | 5037.50 |
| | 4040.00 | | 3945.00 | | 4017.50 | | 5015.00 |
| | 4042.50 | | 3947.50 | | 4017.50 | | 4977.50 |
| 01:09:30 T | 218.437 | 02:21:30 T | 225.125 | 03:33:30 T | 224.437 | 04:45:30 T | 217.812 |
| | 4042.50 | | 3952.50 | | 4017.50 | | 4970.00 |
| | 4042.50 | | 3952.50 | | 4020.00 | | 4985.00 |
| | 4042.50 | | 3952.50 | | 4020.00 | | 4987.50 |
| | 4042.50 | | 3955.00 | | 4020.00 | | 4982.50 |
| | 4042.50 | | 3957.50 | | 4022.50 | | 4985.00 |
| | 4042.50 | | 3962.00 | | 4020.00 | | |
| | 4042.50 | | 3960.00 | | 4022.50 | | |
| 01:17:30 T | 218.250 | 02:29:30 T | 225.062 | 03:41:30 T | 224.312 | | |
| | 4045.00 | | 3962.50 | | 4025.00 | | |
| | 4045.00 | | 3965.00 | | 4022.50 | | |
| | 4045.00 | | 3965.00 | | 4025.00 | | |
| | 4045.00 | | 3967.50 | | 4025.00 | | |
| | 4045.00 | | 3967.50 | | 4025.00 | | |
| | 4045.00 | | 3970.00 | | 4025.00 | | |
| | 4047.50 | | 3970.00 | | 4025.00 | | |

DST#: 2
CEDAR HILLS #1-22
9321 - 9388ft.

PRESSURE RECORDER NUMBER : 1738

DEPTH : 9299.00ft. LOCATION : INSIDE
TYPE : DMR CAPACITY : 10000.00psi

| | PRESSURE psi |
|---|---|
| A)Initial Hydro : | 5120.0 |
| B)1st Flow Start: | 715.0 |
| C)1st Flow End : | 980.0 |
| D)END 1st Shutin: | 4098.0 |
| E)2nd Flow Start: | 983.0 |
| F)2nd Flow End : | 3785.0 |
| G)END 2nd Shutin: | 4045.0 |
| H)3rd Flow Start: | 3793.0 |
| I)3rd Flow End : | 4043.0 |
| Q)Final Hydro. : | 5113.0 |

| TEST TIMES(MIN) | |
|---|---|
| 1st FLOW : | 4 |
| SHUTIN: | 60 |
| 2nd FLOW : | 179 |
| SHUTIN: | 180 |
| 3rd FLOW : | 179 |

TECHNICAL SERVICES, Security Life Bldg. • Suite 1350 • 1616 Glenarm • Denver, Colorado 80202 • Phone: (303) 573-8027

Q409

| | | | |
|---|---|---|---|
| Contractor | Noble | Top Choke | ½" |
| Rig No. | N-57 | Bottom Choke | 3/4" |
| Spot | -- | Size Hole | 7 7/8" |
| Sec. | 22 | Size Rat Hole | -- |
| Twp. | 131N | Size & Wt. D. P. | 4½" XH 16.60# |
| Rng. | 105W | Size Wt. Pipe | -- |
| Field | Wildcat | I. D. of D. C. | 2¼" 4½" H-90 |
| County | Bowman | Length of D. C. | 795 ft. |
| State | North Dakota | Total Depth | 9206 ft. |
| Elevation | 2942 ft. | Interval Tested | 9152-9206 ft. |
| Formation | Red River "A" | Type of Test | Bottom Hole Conventional |

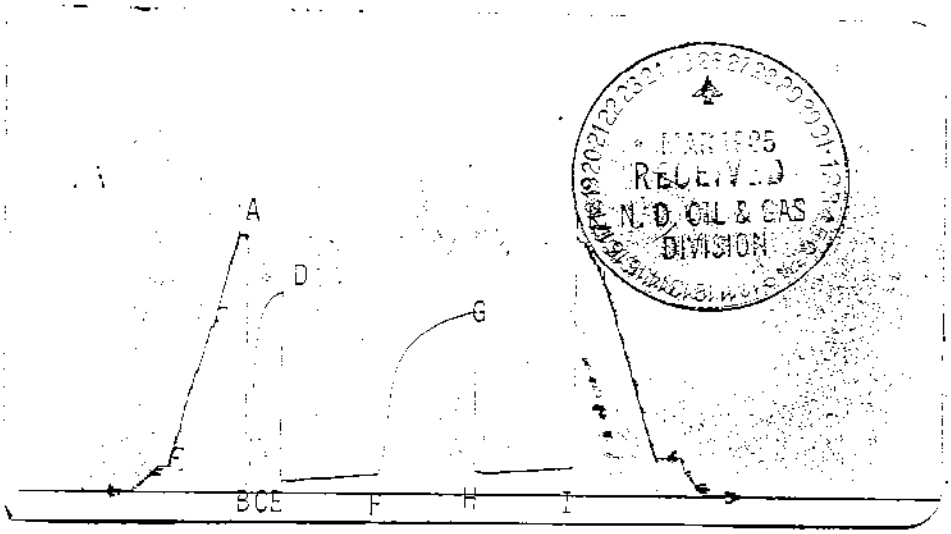
| | |
|---|---|
| Flow No. 1 | 4 |
| Shut-in No. 1 | 59 |
| Flow No. 2 | 178 |
| Shut-in No. 2 | 180 |
| Flow No. 3 | 180 |
| Shut-in No. 3 | -- |
| Bottom Hole Temp. | 218° F |
| Mud Weight | 10.3# |
| Gravity | -- |
| Viscosity | 35 |

Tool opened @ 10:42 p.m.

Outsice Recorder

PRD Make Kuster K-3
No 20791 Cap. 8650 @ 9162'

| | | Press Corrected |
|---|---|---|
| Initial Hydrostatic | A | 4935 |
| Final Hydrostatic | K | 4888 |
| Initial Flow | B | 127 |
| Final Initial Flow | C | 164 |
| Initial Shut-in | D | 3843 |
| Second Initial Flow | E | 238 |
| Second Final Flow | F | 357 |
| Second Shut-in | G | 3496 |
| Third Initial Flow | H | 450 |
| Third Final Flow | I | 521 |
| Third Shut-in | J | -- |






Lynes Dist. Dickinson, ND
Our Tester Rodger Burckhard
Witnessed By L.F. Scott

Test was reverse circulated to a tank. Ran 5 gal. ammonia and 5 gal. inhibitor

Did Well Flow – Gas Yes Oil No Water No
RECOVERY IN PIPE.

| | |
|---|---|
| 1260 ft. Total Recovery | = 10.50 Bbls |
| 410 ft. Highly gas-cut oil | = 5.82 Bbls |
| 850 ft. Salt water | = 4.68 Bbls |

Blow Description:

1st Flow: Tool opened with a ½" underwater blow increasing to 2" in one minute and remaining throughout the flow.

2nd Flow: Tool opened with a ½" underwater blow increasing to 3 psi in 10 minutes and remaining throughout the flow. (gas to surface 55 minutes into the final shut-in.)

3rd Flow: Tool opened with gas to surface immediately, increasing to 1 psi (12.5 MCF/D) in 30 minutes, decreasing to a 7" blow in 170 minutes and remaining throughout the flow.

Comments: The test results indicate a mechanically successful test. The flow and shut-in curves suggest low permeability within the zone tested. The initial and final shut-in curves were incremented and plotted, but no accurate extrapolations could be performed due to insufficient curve de-

LY-230

Operator Total Petroleum
999 18th St.
Denver, CO 80202

Well Name and No. Cedar Hills #1-22

Ticket No. 20792

Date 3-15-85

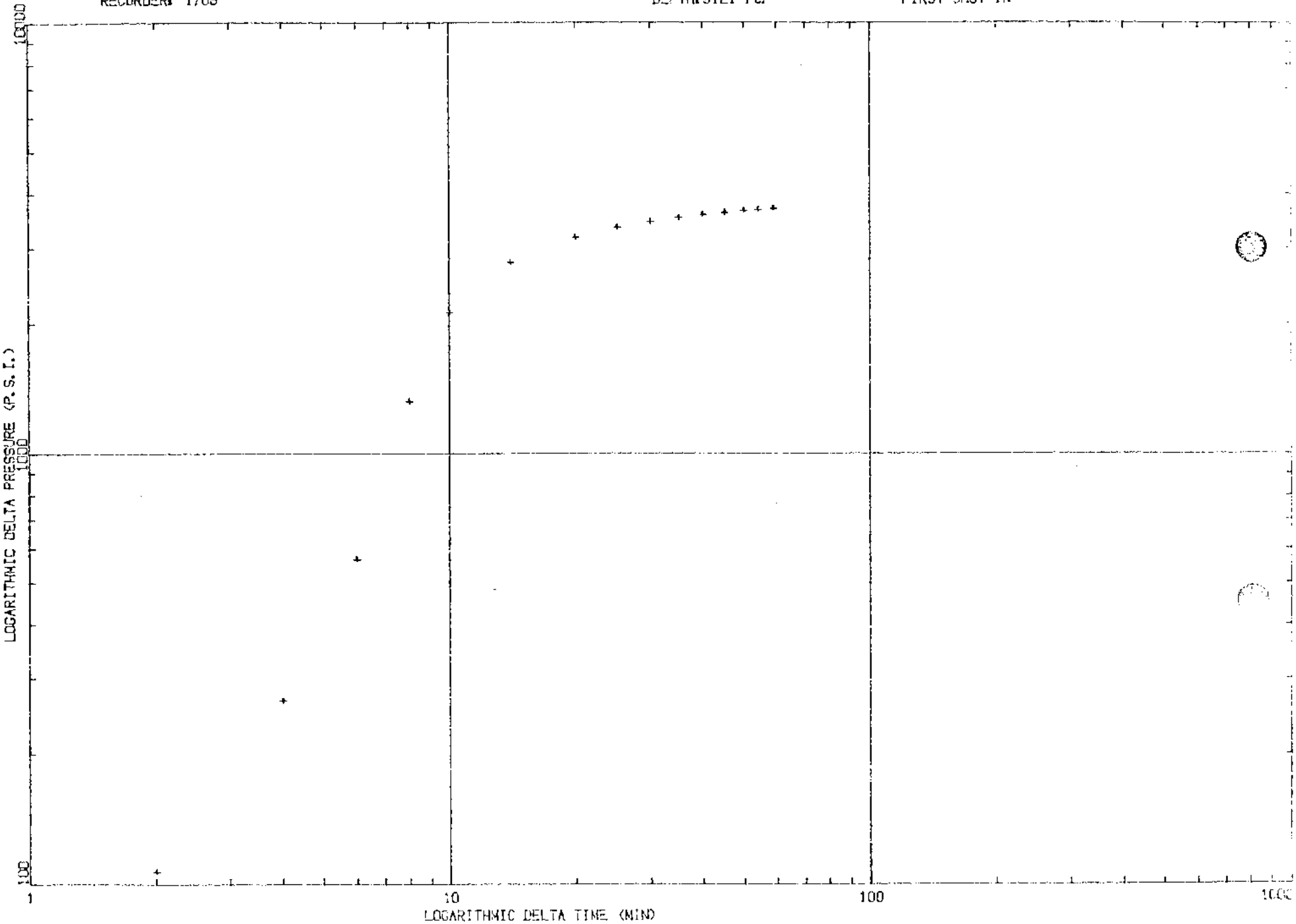
DST No. 1

No. Final Copies 9

OPERATOR: TOTAL PETROLEUM
LOCATION: 22-131N-105W
RECORDER: 1768

WELL NAME: CEDAR HILLS #1-22
DST #: 1
DEPTH: 9121 Ft.

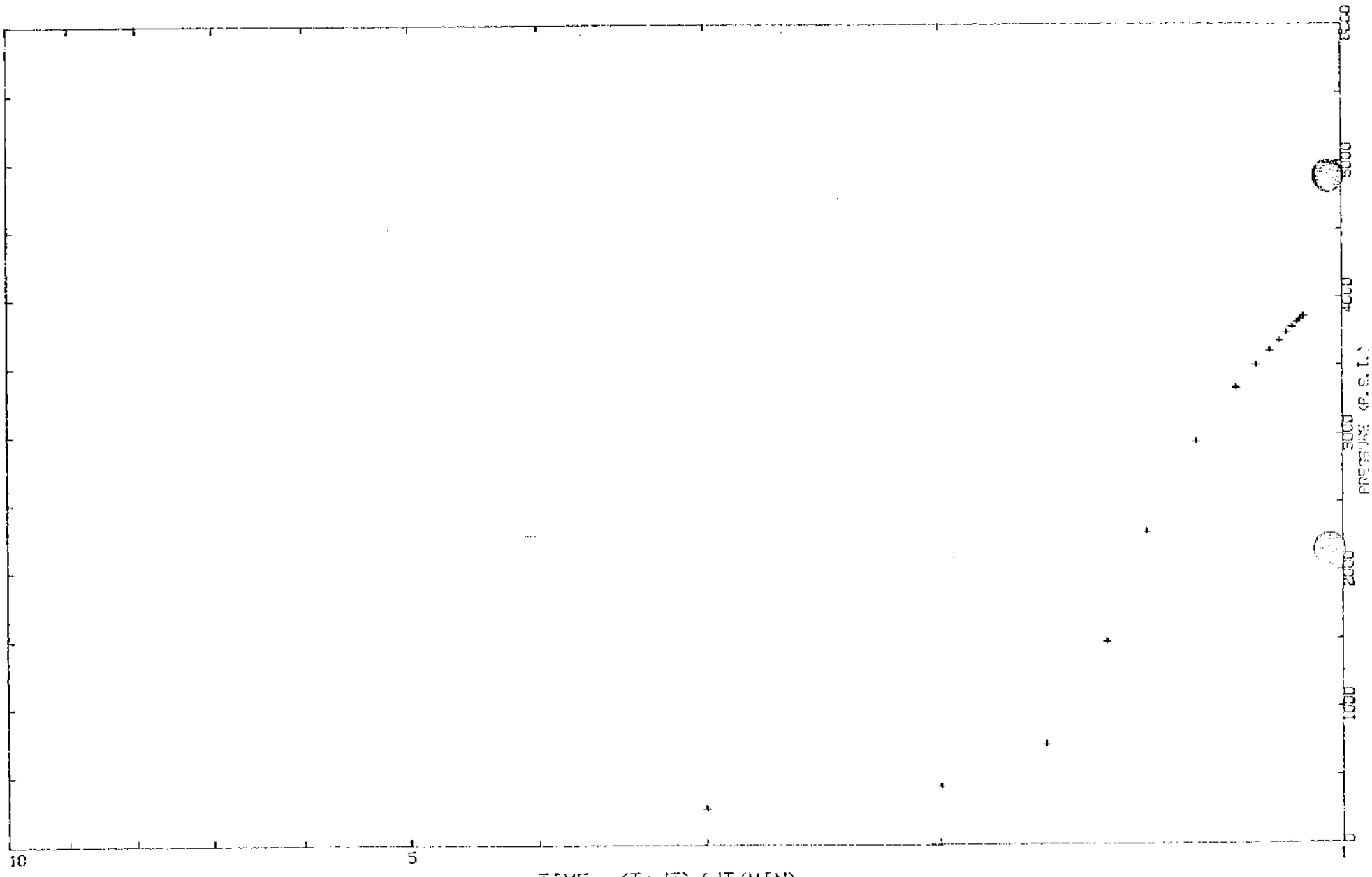
FIRST SHUT-IN



OPERATOR: TOTAL PETROLEUM
WELL NAME: CEDAR HILLS #1-22
LOCATION: 22-131N-105W
FIRST SHUT-IN
RECORDER: 1768

DST #: 1

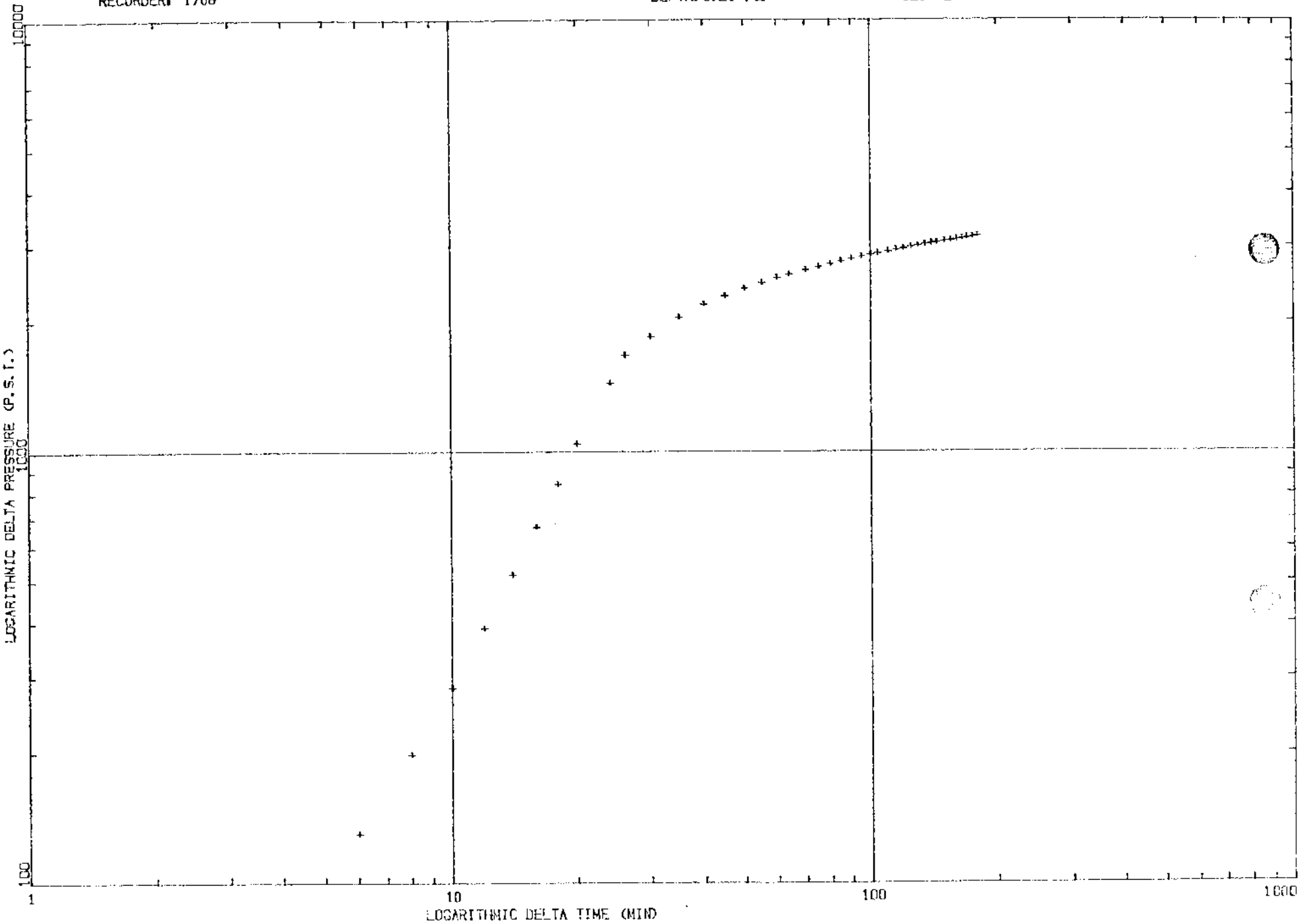
DEPTH: 9121 ft.



OPERATOR: TOTAL PETROLEUM
LOCATION: 22-131N-105W
RECORDER: 1788

WELL NAME: CEDAR HILLS #1-22
DST #: 1
DEPTH: 8121 ft.

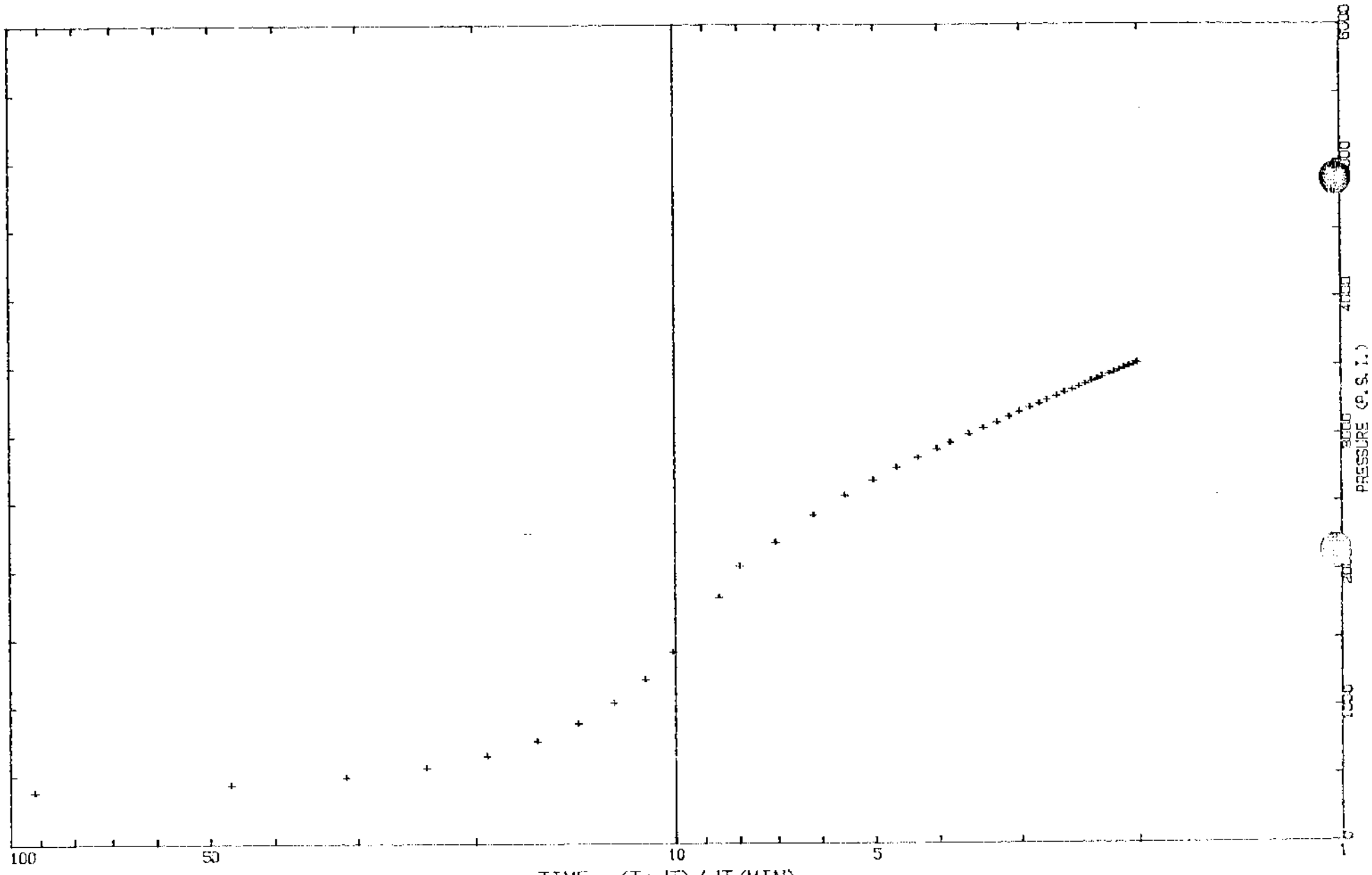
SECOND SHUT-IN



OPERATOR: TOTAL PETROLEUM
WELL NAME: CEDAR HILLS #1-22
LOCATION: 22-131N-105W
SECOND SHUT-IN
RECORDER: 1768

DST #: 1

DEPTH: 9121 ft.



[illegible] PETROLEUM
[illegible]T#: 1
[illegible]DAR HILLS #1-22
9152 - 9206ft.

Location: 22-131N-105W
Test Type: BOTTOM HOLE CONVENTIONAL
Formation: RED RIVER A

Recorder Number: 1768
Recorder Depth: 9121 ft.

## TIME-PRESSURE LISTING

| CHART LABEL | COMMENTS | TIME MIN. | DELTA P psi | PRESSURE psi | (T+dt)/dt ABSCISSA | PRESSURE SQUARED psi^2/10^6 |
|---|---|---|---|---|---|---|
| A | INITIAL HYDROSTATIC | 0.00 | | 4925.0 | | |
| B | START OF 1st FLOW | 0.00 | | 85.0 | | |
| | 1st FLOW PERIOD | 1.00 | 30.0 | 115.0 | | |
| | | 2.00 | 53.0 | 138.0 | | |
| C | END OF 1st FLOW | 4.00 | 73.0 | 158.0 | | |
| | 1st SHUTIN PERIOD | 0.00 | 0.0 | 158.0 | 0.0000 | |
| | | 2.00 | 107.0 | 265.0 | 3.0000 | |
| | | 4.00 | 267.0 | 425.0 | 2.0000 | |
| | | 6.00 | 567.0 | 725.0 | 1.6667 | |
| | | 8.00 | 1322.0 | 1480.0 | 1.5000 | |
| | | 10.00 | 2122.0 | 2280.0 | 1.4000 | |
| | | 14.00 | 2787.0 | 2945.0 | 1.2857 | |
| | | 20.00 | 3180.0 | 3338.0 | 1.2000 | |
| | | 25.00 | 3345.0 | 3503.0 | 1.1600 | |
| | | 30.00 | 3450.0 | 3608.0 | 1.1333 | |
| | | 35.00 | 3525.0 | 3683.0 | 1.1143 | |
| | | 40.00 | 3580.0 | 3738.0 | 1.1000 | |
| | | 45.00 | 3622.0 | 3780.0 | 1.0889 | |
| | | 50.00 | 3657.0 | 3815.0 | 1.0800 | |
| | | 54.00 | 3680.0 | 3838.0 | 1.0741 | |
| D | END OF 1st SHUTIN | 59.00 | 3705.0 | 3863.0 | 1.0678 | |
| E | START OF 2nd FLOW | 0.00 | | 218.0 | | |
| | 2nd FLOW PERIOD | 10.00 | 20.0 | 198.0 | | |
| | | 20.00 | 5.0 | 213.0 | | |
| | | 30.00 | 7.0 | 225.0 | | |
| | | 40.00 | 27.0 | 245.0 | | |
| | | 50.00 | 25.0 | 243.0 | | |
| | | 60.00 | 45.0 | 263.0 | | |
| | | 70.00 | 45.0 | 263.0 | | |
| | | 80.00 | 45.0 | 263.0 | | |
| | | 90.00 | 50.0 | 268.0 | | |
| | | 100.00 | 80.0 | 298.0 | | |
| | | 110.00 | 85.0 | 303.0 | | |
| | | 120.00 | 90.0 | 308.0 | | |

TOTAL PETROLEUM
DST#: 1
CEDAR HILLS #1-22
9152 - 9206ft.

Location: 22-131N--105W
Test Type: BOTTOM HOLE CONVENTIONAL
Formation: RED RIVER A

Recorder Number: 1768
Recorder Depth: 9121 ft.

## TIME-PRESSURE LISTING

| CHART LABEL | COMMENTS | TIME MIN. | DELTA P psi | PRESSURE psi | (T+dt)/dt ABSCISSA | PRESSURE SQUARED psi^2/10^6 |
|---|---|---|---|---|---|---|
| | | 130.00 | 100.0 | 318.0 | | |
| | | 140.00 | 112.0 | 330.0 | | |
| | | 150.00 | 125.0 | 343.0 | | |
| | | 160.00 | 130.0 | 348.0 | | |
| | | 170.00 | 135.0 | 353.0 | | |
| F | END OF 2nd FLOW | 178.00 | 142.0 | 360.0 | | |
| | 2nd SHUTIN PERIOD | 0.00 | 0.0 | 360.0 | 0.0000 | |
| | | 2.00 | 23.0 | 383.0 | 92.0000 | |
| | | 4.00 | 73.0 | 433.0 | 46.5000 | |
| | | 6.00 | 130.0 | 490.0 | 31.3333 | |
| | | 8.00 | 198.0 | 558.0 | 23.7500 | |
| | | 10.00 | 283.0 | 643.0 | 19.2000 | |
| | | 12.00 | 390.0 | 750.0 | 16.1667 | |
| | | 14.00 | 518.0 | 878.0 | 14.0000 | |
| | | 16.00 | 668.0 | 1028.0 | 12.3750 | |
| | | 18.00 | 843.0 | 1203.0 | 11.1111 | |
| | | 20.00 | 1043.0 | 1403.0 | 10.1000 | |
| | | 24.00 | 1440.0 | 1800.0 | 8.5833 | |
| | | 26.00 | 1670.0 | 2030.0 | 8.0000 | |
| | | 30.00 | 1843.0 | 2203.0 | 7.0667 | |
| | | 35.00 | 2043.0 | 2403.0 | 6.2000 | |
| | | 40.00 | 2188.0 | 2548.0 | 5.5500 | |
| | | 45.00 | 2298.0 | 2658.0 | 5.0444 | |
| | | 50.00 | 2390.0 | 2750.0 | 4.6400 | |
| | | 55.00 | 2465.0 | 2825.0 | 4.3091 | |
| | | 60.00 | 2530.0 | 2890.0 | 4.0333 | |
| | | 64.00 | 2578.0 | 2938.0 | 3.8438 | |
| | | 70.00 | 2640.0 | 3000.0 | 3.6000 | |
| | | 75.00 | 2685.0 | 3045.0 | 3.4267 | |
| | | 80.00 | 2725.0 | 3085.0 | 3.2750 | |
| | | 85.00 | 2765.0 | 3125.0 | 3.1412 | |
| | | 90.00 | 2800.0 | 3160.0 | 3.0222 | |
| | | 95.00 | 2833.0 | 3193.0 | 2.9158 | |
| | | 100.00 | 2860.0 | 3220.0 | 2.8200 | |
| | | 104.00 | 2885.0 | 3245.0 | 2.7500 | |
| | | 110.00 | 2915.0 | 3275.0 | 2.6545 | |
| | | 115.00 | 2940.0 | 3300.0 | 2.5826 | |
| | | 120.00 | 2963.0 | 3323.0 | 2.5167 | |

TOTAL PETROLEUM
DST#: 1
CEDAR HILLS #1-22
9152 - 9206ft.

Location: 22-131N-105W
Test Type: BOTTOM HOLE CONVENTIONAL
Formation: RED RIVER A

Recorder Number: 1768
Recorder Depth: 9121 ft.

## TIME-PRESSURE LISTING

| CHART LABEL | COMMENTS | TIME MIN. | DELTA P psi | PRESSURE psi | (T+dt)/dt ABSCISSA | PRESSURE SQUARED psi^2/10^6 |
|---|---|---|---|---|---|---|
| | | 125.00 | 2983.0 | 3343.0 | 2.4560 | |
| | | 130.00 | 3003.0 | 3363.0 | 2.4000 | |
| | | 135.00 | 3023.0 | 3383.0 | 2.3481 | |
| | | 140.00 | 3040.0 | 3400.0 | 2.3000 | |
| | | 144.00 | 3055.0 | 3415.0 | 2.2639 | |
| | | 150.00 | 3075.0 | 3435.0 | 2.2133 | |
| | | 155.00 | 3088.0 | 3448.0 | 2.1742 | |
| | | 160.00 | 3105.0 | 3465.0 | 2.1375 | |
| | | 165.00 | 3120.0 | 3480.0 | 2.1030 | |
| | | 170.00 | 3133.0 | 3493.0 | 2.0706 | |
| | | 175.00 | 3145.0 | 3505.0 | 2.0400 | |
| G | END OF 2nd SHUTIN | 180.00 | 3160.0 | 3520.0 | 2.0111 | |
| H | START OF 3rd FLOW | 0.00 | | 488.0 | | |
| | 3rd FLOW PERIOD | 11.00 | 98.0 | 390.0 | | |
| | | 20.00 | 100.0 | 388.0 | | |
| | | 30.00 | 80.0 | 408.0 | | |
| | | 40.00 | 68.0 | 420.0 | | |
| | | 51.00 | 53.0 | 435.0 | | |
| | | 60.00 | 45.0 | 443.0 | | |
| | | 70.00 | 38.0 | 450.0 | | |
| | | 80.00 | 33.0 | 455.0 | | |
| | | 91.00 | 28.0 | 460.0 | | |
| | | 100.00 | 20.0 | 468.0 | | |
| | | 110.00 | 10.0 | 478.0 | | |
| | | 120.00 | 0.0 | 488.0 | | |
| | | 131.00 | 5.0 | 493.0 | | |
| | | 140.00 | 10.0 | 498.0 | | |
| | | 150.00 | 12.0 | 500.0 | | |
| | | 160.00 | 22.0 | 510.0 | | |
| | | 171.00 | 27.0 | 515.0 | | |
| I | END OF 3rd FLOW | 180.00 | 35.0 | 523.0 | | |
| J | END OF 3rd SHUTIN | -1.00 | | -1.0 | | |
| Q | FINAL HYDROSTATIC | 0.00 | | 4915.0 | | |

* VALUES USED FOR EXTRAPOLATIONS

TOTAL PETROLEUM
DST: 1
CEDAR HILLS #1-22
9152 - 9206ft.

Location: SEC. 22 T131N R105W
Test Type: BOTTOM HOLE CONVENTIONAL
Formation: RED RIVER "A"

Recorder Number: 1760
Recorder Depth: 9121

## SAMPLE DATA

### SAMPLE CHAMBER:

| | | |
|---|---|---|
| Capacity of sample chamber | 2500 | cc |
| Volume of sample..... | 2100 | cc |
| Pressure in sampler..... | 120 | psig |
| Where sampler was drained... | on location | |

Sampler contained:

| | | | |
|---|---|---|---|
| Oil | 500 | cc | 41 @ 60 Degrees F |
| Water | 1600 | cc | |
| Gas | .15 | cu-ft | |
| GOR | 48 | | |

### RESISTIVITY DATA:

| | |
|---|---|
| Top.....: | 41 API @ 62 F |
| Middle.....: | |
| Bottom.....: | 30 000 PPM NACL |
| Sampler.....: | 55 000 PPM NACL |
| Mud pit.....: | 200 000 PPM NACL |
| Make-up Water..: | |

# LYNES INC.

DMR—312 DIGITAL MEMORY RECORDER NO. 1768 CAP 10000 AT 9121 ft.

OPERATOR Total Petroleum WELL NAME Cedar Hills #1-22 TICKET NO. 20792 DST NO. 1

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 22:29:00 T | 195.000 | 23:41:00 T | 203.62 | 00:53:00 T | 207.375 | 02:05:00 T | 210.187 |
| | 4925.00 | | 3847.50 | | 267.500 | | 330.000 |
| | 4925.00 | | 3858.50 | | 260.000 | | 320.000 |
| | 4925.00 | | 3857.50 | | 262.500 | | 332.500 |
| | 4925.00 | End 1st Shutin | 3862.50 | | 267.500 | | 332.500 |
| | 4925.00 | Start 2nd Flow | 217.500 | | 267.500 | | 335.000 |
| | 4925.00 | | 182.500 | | 260.000 | | 337.500 |
| Initial Hydro. | 4925.00 | | 187.500 | | 262.500 | | 337.500 |
| 22:37:00 T | 198.812 | 23:49:00 T | 201.687 | 01:01:00 T | 208.125 | 02:13:00 T | 210.437 |
| | 4945.00 | | 225.000 | | 260.000 | | 340.000 |
| | 4957.50 | | 217.500 | | 262.500 | | 340.000 |
| | 4967.50 | | 217.500 | | 262.500 | | 342.500 |
| | 4915.00 | | 242.500 | | 262.500 | | 342.500 |
| Start 1st Flow | 65.0000 | | 242.500 | | 262.500 | | 345.000 |
| | 115.000 | | 267.500 | | 265.000 | | 345.000 |
| | 137.500 | | 197.500 | | 262.500 | | 347.500 |
| 22:45:00 T | 196.875 | 23:57:00 T | 204.437 | 01:09:00 T | 208.375 | 02:21:00 T | 210.687 |
| End 1st Flow | 157.500 | | 197.500 | | 262.500 | | 347.500 |
| | 207.500 | | 205.000 | | 262.500 | | 347.500 |
| | 265.000 | | 202.500 | | 262.500 | | 347.500 |
| | 305.000 | | 232.500 | | 270.000 | | 347.500 |
| | 425.000 | | 235.000 | | 267.500 | | 347.500 |
| | 545.000 | | 207.500 | | 270.000 | | 347.500 |
| | 725.000 | | 207.500 | | 267.500 | | 347.500 |
| 22:53:00 T | 201.437 | 00:05:00 T | 205.062 | 01:17:00 T | 208.625 | 02:29:00 T | 210.937 |
| | 1480.00 | | 212.500 | | 267.500 | | 350.000 |
| | 1940.00 | | 217.500 | | 270.000 | | 350.000 |
| | 2280.00 | | 217.500 | | 267.500 | | 350.000 |
| | 2520.00 | | 217.500 | | 262.500 | | 352.500 |
| | 2695.00 | | 260.000 | | 262.500 | | 350.000 |
| | 2832.50 | | 220.000 | | 262.500 | | 352.500 |
| | 2945.00 | | 227.500 | | 260.000 | | 352.500 |
| 23:01:00 T | 202.625 | 00:13:00 T | 205.625 | 01:25:00 T | 208.875 | 02:37:00 T | 211.187 |
| | 3115.00 | | 227.500 | | 267.500 | | 352.500 |
| | 3182.50 | | 230.000 | | 270.000 | | 352.500 |
| | 3240.00 | | 225.000 | | 265.000 | | 355.000 |
| | 3290.00 | | 232.500 | | 267.500 | | 357.500 |
| | 3317.50 | | 235.000 | | 300.000 | | 357.500 |
| | 3275.00 | | 236.500 | | 297.500 | | 357.500 |
| | 3418.50 | | 235.000 | | 302.500 | End 2nd Flow | 360.000 |
| 23:09:00 T | 204.187 | 00:21:00 T | 206.125 | 01:33:00 T | 209.187 | 02:45:00 T | 211.312 |
| | 3475.00 | | 242.500 | | 302.500 | | 362.500 |
| | 3532.50 | | 238.500 | | 305.000 | | 407.500 |
| | 3525.00 | | 230.000 | | 302.500 | | 432.500 |
| | 3550.00 | | 240.000 | | 305.000 | | 462.500 |
| | 3570.00 | | 245.000 | | 305.000 | | 490.000 |
| | 3590.00 | | 245.000 | | 305.000 | | 522.500 |
| | 3607.50 | | 250.000 | | 305.000 | | 557.500 |
| 23:17:00 T | 205.375 | 00:29:00 T | 206.625 | 01:41:00 T | 209.500 | 02:53:00 T | 211.250 |
| | 3640.00 | | 255.000 | | 305.000 | | 642.500 |
| | 3655.00 | | 250.000 | | 307.500 | | 692.500 |
| | 3670.00 | | 260.000 | | 307.500 | | 750.000 |
| | 3682.50 | | 260.000 | | 305.000 | | 810.000 |
| | 3695.00 | | 257.500 | | 307.500 | | 877.500 |
| | 3707.50 | | 245.000 | | 310.000 | | 952.500 |
| | 3717.50 | | 242.500 | | 312.500 | | 1027.50 |
| 23:25:00 T | 206.562 | 00:37:00 T | 207.062 | 01:49:00 T | 209.750 | 03:01:00 T | 211.125 |
| | 3737.50 | | 257.500 | | 312.500 | | 1202.50 |
| | 3747.50 | | 267.500 | | 312.500 | | 1300.00 |
| | 3757.50 | | 265.000 | | 312.500 | | 1402.50 |
| | 3765.00 | | 260.000 | | 315.000 | | 1537.50 |
| | 3775.00 | | 265.000 | | 315.000 | | 1610.00 |
| | 3780.00 | | 275.000 | | 317.500 | | 1707.50 |
| | 3737.50 | | 277.500 | | 317.500 | | 1800.00 |
| 23:33:00 T | 206.687 | 00:45:30 T | 207.437 | 01:57:00 T | 210.000 | 03:09:00 T | 211.375 |
| | 3802.50 | | 262.500 | | 322.500 | | 1962.50 |
| | 3810.00 | | 260.000 | | 320.000 | | 2030.00 |
| | 3815.00 | | 262.500 | | 322.500 | | 2095.00 |
| | 3822.50 | | 267.500 | | 322.500 | | 2150.00 |
| | 3827.50 | | 262.500 | | 325.000 | | 2202.50 |
| | 3832.50 | | 262.500 | | 325.000 | | 2247.50 |
| | 3837.50 | | 267.500 | | 327.500 | | 2290.00 |

# LYNES INC.

DMR—312 DIGITAL MEMORY RECORDER NO 1768 CAP 10000 AT 9121 ft.

OPERATOR Total Petroleum WELL NAME Cedar Hills #1-22 TICKET NO. 20792 DST. NO 1

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 03:17:00 T | 211.562 | 04:29:00 T | 211.300 | 05:41:00 T | 210.937 | 06:53:00 T | 214.375 | 08:05:00 T | 215.625 | | |
| | 2370.00 | | 3858.50 | | 3516.50 | | 447.500 | | 495.000 | | |
| | 2403.50 | | 3857.50 | | 3515.00 | | 447.500 | | 497.500 | | |
| | 2435.00 | | 3865.00 | | 3517.50 | | 447.500 | | 497.500 | | |
| | 2465.00 | | 3870.00 | End 2nd Shutin | 3520.00 | | 450.000 | | 497.500 | | |
| | 2495.00 | | 3875.00 | Start 3rd Flow | 487.500 | | 452.500 | | 497.500 | | |
| | 2533.50 | | 3880.00 | | 415.000 | | 452.500 | | 497.500 | | |
| | 2547.50 | | 3882.50 | | 412.500 | | 452.500 | | 497.500 | | |
| 03:25:00 T | 211.625 | 04:37:00 T | 210.687 | 05:49:00 T | 210.687 | 07:01:00 T | 214.625 | 08:13:00 T | 215.687 | | |
| | 2595.00 | | 3885.00 | | 407.500 | | 452.500 | | 497.500 | | |
| | 2617.50 | | 3900.00 | | 407.500 | | 455.000 | | 500.000 | | |
| | 2637.50 | | 3902.50 | | 405.000 | | 455.000 | | 500.000 | | |
| | 2657.50 | | 3907.50 | | 405.000 | | 455.000 | | 500.000 | | |
| | 2677.50 | | 3912.50 | | 402.500 | | 455.000 | | 502.500 | | |
| | 2697.50 | | 3917.50 | | 402.500 | | 455.000 | | 502.500 | | |
| | 2715.00 | | 3922.00 | | 400.000 | | 455.000 | | 502.500 | | |
| 03:33:00 T | 211.562 | 04:45:00 T | 210.937 | 05:57:00 T | 211.437 | 07:09:00 T | 214.812 | 08:21:00 T | 215.812 | | |
| | 2750.00 | | 3930.00 | | 390.000 | | 457.500 | | 502.500 | | |
| | 2765.00 | | 3935.00 | | 387.500 | | 455.000 | | 505.000 | | |
| | 2782.50 | | 3937.50 | | 385.000 | | 457.500 | | 507.500 | | |
| | 2797.50 | | 3942.50 | | 385.000 | | 457.500 | | 507.500 | | |
| | 2810.00 | | 3947.50 | | 385.000 | | 457.500 | | 507.500 | | |
| | 2825.00 | | 3952.50 | | 385.000 | | 460.000 | | 510.000 | | |
| | 2840.00 | | 3955.00 | | 382.500 | | 460.000 | | 510.000 | | |
| 03:41:00 T | 211.437 | 04:53:00 T | 210.937 | 06:05:00 T | 212.312 | | 460.000 | 08:29:00 T | 215.875 | | |
| | 2867.50 | | 3968.50 | | 385.000 | 07:17:00 T | 462.500 | | 510.000 | | |
| | 2880.00 | | 3965.00 | | 387.500 | | 462.500 | | 512.500 | | |
| | 2890.00 | | 3970.00 | | 390.000 | | 465.000 | | 515.000 | | |
| | 2902.50 | | 3975.00 | | 392.500 | | 462.500 | | 515.000 | | |
| | 2915.00 | | 3977.50 | | 395.000 | | 465.000 | | 515.000 | | |
| | 2925.00 | | 3982.50 | | 397.500 | | 467.500 | | 515.000 | | |
| | 2937.50 | | 3985.00 | | 400.000 | | 467.500 | End 3rd Flow | 522.500 | | |
| 03:49:00 T | 211.375 | 05:01:00 T | 210.937 | 06:13:00 T | 212.875 | 07:25:00 T | 215.062 | 08:37:00 T | 215.937 | | |
| | 2960.00 | | 3992.50 | | 402.500 | | 467.500 | | 515.000 | | |
| | 2970.00 | | 3995.00 | | 405.000 | | 467.500 | | 520.000 | | |
| | 2980.00 | | 3400.00 | | 405.000 | | 467.500 | | 520.000 | | |
| | 2990.00 | | 3402.50 | | 407.500 | | 467.500 | End 3rd Flow | 522.500 | | |
| | 3000.00 | | 3407.50 | | 407.500 | | 470.000 | | 520.000 | | |
| | 3010.00 | | 3412.50 | | 410.000 | | 472.500 | | 520.000 | | |
| | 3017.50 | | 3415.00 | | 410.000 | | 475.000 | | 522.500 | | |
| 03:57:00 T | 211.187 | 05:09:00 T | 210.937 | 06:21:00 T | 213.187 | 07:33:00 T | 215.187 | 08:45:00 T | 215.937 | | |
| | 3035.00 | | 3420.00 | | 412.500 | | 475.000 | | 522.500 | | |
| | 3045.00 | | 3425.00 | | 415.000 | | 477.500 | | 522.500 | | |
| | 3055.00 | | 3427.50 | | 417.500 | | 477.500 | | 547.500 | | |
| | 3062.50 | | 3427.50 | | 417.500 | | 477.500 | | 4935.00 | | |
| | 3070.00 | | 3435.00 | | 417.500 | | 480.000 | | 4945.00 | | |
| | 3077.50 | | 3437.50 | | 420.000 | | 480.000 | | 4945.00 | | |
| | 3085.00 | | 3440.00 | | 420.000 | | 480.000 | | 4945.00 | | |
| 04:05:00 T | 211.125 | 05:17:00 T | 210.937 | 06:29:00 T | 213.500 | 07:41:00 T | 215.250 | 08:53:00 T | 215.875 | | |
| | 3102.50 | | 3445.00 | | 425.000 | | 482.500 | Final Hydro. | 4915.00 | | |
| | 3110.00 | | 3447.50 | | 427.500 | | 482.500 | | 4950.00 | | |
| | 3117.50 | | 3452.50 | | 427.500 | | 482.500 | | 4875.00 | | |
| | 3125.00 | | 3455.00 | | 427.500 | | 485.000 | | 4885.00 | | |
| | 3130.00 | | 3460.00 | | 430.000 | | 485.000 | | 4867.50 | | |
| | 3137.50 | | 3462.50 | | 432.500 | | 487.500 | | 4842.50 | | |
| | 3145.00 | | 3465.00 | | 435.000 | | 487.500 | | 4847.50 | | |
| 04:13:00 T | 211.062 | 05:25:00 T | 210.937 | 06:37:00 T | 213.750 | 07:49:00 T | 215.437 | 09:01:00 T | 212.562 | | |
| | 3160.00 | | 3470.00 | | 435.000 | | 487.500 | | 4847.50 | | |
| | 3165.00 | | 3472.50 | | 435.000 | | 487.500 | | 4847.50 | | |
| | 3172.50 | | 3477.50 | | 435.000 | | 490.000 | | 4835.00 | | |
| | 3177.50 | | 3480.00 | | 437.500 | | 490.000 | | 4775.00 | | |
| | 3185.00 | | 3480.00 | | 440.000 | | 490.000 | | 4796.00 | | |
| | 3192.50 | | 3482.50 | | 440.000 | | 490.000 | | 4775.00 | | |
| | 3200.00 | | 3487.50 | | 440.000 | | 492.500 | | 4777.50 | | |
| 04:21:00 T | 211.062 | 05:33:00 T | 210.937 | 06:45:00 T | 214.062 | 07:57:00 T | 215.562 | 09:09:00 T | 209.312 | | |
| | 3210.00 | | 3492.50 | | 442.500 | | 498.500 | | 4750.00 | | |
| | 3215.00 | | 3495.00 | | 442.500 | | 495.000 | | 4690.00 | | |
| | 3220.00 | | 3497.50 | | 445.000 | | 495.000 | | 4632.50 | | |
| | 3227.50 | | 3500.00 | | 445.000 | | 495.000 | | 4657.50 | | |
| | 3230.00 | | 3502.50 | | 445.000 | | 495.000 | | 4637.50 | | |
| | 3237.50 | | 3505.00 | | 447.500 | | 497.500 | | 4647.50 | | |
| | 3245.00 | | 3507.50 | | 447.500 | | 497.500 | | 4617.50 | | |

TOTAL PETROLEUM
DST#: 1
CEDAR HILLS #1-22
9152 - 9206ft.

PRESSURE RECORDER NUMBER : 1768

DEPTH : 9121.00ft. LOCATION : INSIDE
TYPE : DMR CAPACITY : 10000.00psi

| | PRESSURE psi |
|---|---|
| A)Initial Hydro : | 4925.0 |
| B)1st Flow Start: | 85.0 |
| C)1st Flow End : | 158.0 |
| D)END 1st Shutin: | 3863.0 |
| E)2nd Flow Start: | 218.0 |
| F)2nd Flow End : | 360.0 |
| G)END 2nd Shutin: | 3520.0 |
| H)3rd Flow Start: | 488.0 |
| I)3rd Flow End : | 523.0 |
| Q)Final Hydro. : | 4915.0 |

TEST TIMES(MIN)

| | |
|---|---|
| 1st FLOW : | 4 |
| SHUTIN: | 59 |
| 2nd FLOW : | 178 |
| SHUTIN: | 180 |
| 3rd FLOW : | 180 |

PRESSURE RECORDER NUMBER : 24748

DEPTH : 9200.00ft. LOCATION : OUTSIDE
TYPE : K-3 CAPACITY : 9100.00psi

| | PRESSURE psi |
|---|---|
| A)Initial Hydro : | 5010.0 |
| B)1st Flow Start: | 680.0 |
| C)1st Flow End : | 141.0 |
| D)END 1st Shutin: | 3873.0 |
| E)2nd Flow Start: | 239.0 |
| F)2nd Flow End : | 346.0 |
| G)END 2nd Shutin: | 3530.0 |
| H)3rd Flow Start: | 467.0 |
| I)3rd Flow End : | 509.0 |
| Q)Final Hydro. : | 4933.0 |

FORM 4

Well File No. 1404

North Dakota State Industrial Commission
Oil and Gas Division
900 EAST BOULEVARD - BISMARCK, NORTH DAKOTA 58505

RECEIVED
MAR 1985
N. D. OIL & GAS DIVISION

# SUNDRY NOTICES AND REPORTS ON WELLS

1. Notice of Intention to Drill or Redrill
2. Notice of Intention to Change Plans
3. Notice of Intention to Pull Casing
4. Notice of Intention to Abandon Well
5. Report of Water Shut-Off
6. Report of Shooting or Acidizing
7. Report of Casing
8. Report of Redrilling or Repair
9. Supplementary History
10. Well Potential Test
11. Drilling Prognosis
12.

NAME OF LEASE CEDAR HILLS Date March 7, 1985

WELL NO. 1-22 is located 1250' ft. from (N) ~~(S)~~ line and 1650' ft. from the (E) ~~(W)~~ li

of Section 22 Township 131N Range 105W in Bowman

County, Wildcat Field Red River Pool. The elevation of the GL

is 2929.8 feet above sea level.

Name and Address of Contractor, or Company which will do work is:

Noble Drilling Corporation, 1416 Lincoln Center Building, Denver, Colorado 80264

(DETAILS OF WORK)

(State names of, and expected depth of objective sand; show sizes, weight, and lengths of proposed casing, indicate mud weights, cementing points, and all other details of work)

3/1/85: Spudded well at 9:00 p.m. 2/28/85

3/2/85: Ran 48 jts. 8-5/8" 24#, J-55. Set csg. at 2018' K.B. Good returns. Bumped plug at 5:30 a.m.
Cement: Lead off with 660 sx HALCO Lightweight w/2% CaCL + ¼#/sk flocele (1.84 $ft^3$/sk, 12.9 PPG).
Tailed in w/200 sx CL "G" w/2% CaCL + ¼#/sk flocele (1.15 $ft^3$/sk, 15.8 PPG).

Company Total Petroleum, Inc.
Address PO Box 500, Denver, CO 80201
By Daniel J. Petri
Title Senior Petroleum Engineer

Do not write in this space
Approved MAR 12 1985 19
By F. E. Williams
Title

(Instructions Over)

NORTH DAKOTA INDUSTRIAL COMMISSION

# OIL AND GAS DIVISION



March 11, 1985

Laurna Miller
Total Petroleum, Inc.
P.O. Box 500
Denver, CO 80201

RE: Confidential Well Status
Cedar Hills 1-22
NE NW Sec.22-131N-105W, Bowman Co
Permit No. 11409

Dear Mr. Miller:

Your request for confidential status of all information furnished to the Enforcement Officer, or his representatives, is hereby granted. Such information shall remain confidential for six months commencing on the date such information, except production data, is required by statute and rule to be filed.

Confidential status notwithstanding, the Enforcement Officer and his representatives shall have access to all well records wherever located. Your company personnel, or any person performing work for your company, shall permit the Enforcement Officer and his representatives to come upon any lease, property, well, or drilling rig operated or controlled by them, complying with all safety rules, and to inspect the records and operation of such wells, and to have access at all times to any and all records of wells.

The Commission's field personnel periodically inspect producing and drilling wells. Any information regarding such wells shall be made available to them at any time upon request. The information so obtained by the field personnel shall be maintained in strict confidence, and shall be available only to the Commission, and its staff.

Sincerely yours,

F. E. Wilborn

F. E. Wilborn
Deputy Enforcement Officer

FEW:lb

**TOTAL**
**Total Petroleum, Inc.**

ONE DENVER PLACE - SUITE 3100
999 18TH STREET
DENVER, COLORADO

TELEPHONE 303 291-2000

MAILING ADDRESS
P. O. BOX 500
DENVER, COLORADO 80201



March 7, 1985

North Dakota State Industrial Commission
Oil and Gas Division
900 East Boulevard
Bismarck, North Dakota 58505

Re: Cedar Hills 1-22
Red River Pool
Bowman County, North Dakota
NE NW Sec. 22, T131N, R105W
Permit No. 11409

Gentlemen:

In connection with the drilling of the above-referenced wildcat well, Total Petroleum Inc. requests that any and all information concerning this well be held tight.

Should you have any questions concerning this matter, please do not hesitate to contact this office.

Very truly yours,

Laurna Miller
Production Department

LM:lm

Well File #11409

**TOTAL**

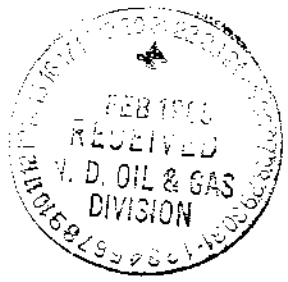
**Total Petroleum, Inc.**

ONE DENVER PLACE · SUITE 3100
999 18TH STREET
DENVER COLORADO

TELEPHONE 303 291-2000

MAILING ADDRESS
P. O. BOX 500
DENVER, COLORADO 80201

February 15, 1985




North Dakota Industrial Commission
Oil & Gas Division
900 East Blvd.
Bismarck, ND 58505

Attn: Mr. Jack Wilborn
Deputy Enforcement Officer

Re: Application to Drill
Cedar Hills #1-22
NE NW Sec. 22, T131N, R105W
Bowman County, ND

Dear Sir:

The captioned application to drill was mailed to your office on February 11, 1985. It included a copy of the surveyor's telecopied plat. Enclosed for your file, please find four direct and more legible copies of that same plat. Your assistance in gaining approval for this well is sincerely appreciated.

Yours truly,

Daniel J. Petri
Sr. Petroleum Engineer

DJP:cll

Encl.

February 15, 1985

Daniel J. Petri
Total Petroleum, Inc.
P.O. Box 500, Ste. 3100
Denver, CO 80201

Dear Mr. Petri:

Check No. 736422 in the amount of $100.00 was received.

Enclosed is Permit No. 11409 to drill the Cedar Hills #1-22 well, located in the Bowman County, North Dakota.

It is requested that notification be given, immediately upon the spudding of the well. This information shall be relayed to the Oil and Gas Division, in Bismarck, via telephone. The following information should be included: well name, legal location, Permit Number, drilling contractor, company representative, and date and time of spudding. Office hours are 8:00 a.m. to 12:00 noon, and 1:00 p.m. to 5:00 p.m. Central Time. Our telephone number is Area Code 701, 224-2969.

Thank you for your cooperation.

Sincerely yours,

F. E. Wilborn
Deputy Enforcement Officer

lb
enc.

FORM 4

Well File No. 11409

North Dakota State Industrial Commission
Oil and Gas Division
900 EAST BOULEVARD - BISMARCK, NORTH DAKOTA - 58505

# SUNDRY NOTICES AND REPORTS ON WELLS

| | | | |
|---|---|---|---|
| 1. Notice of Intention to Drill or Redrill | X | 7. Report of Casing | |
| 2. Notice of Intention to Change Plans | | 8. Report of Redrilling or Repair | |
| 3. Notice of Intention to Pull Casing | | 9. Supplementary History | |
| 4. Notice of Intention to Abandon Well | | 10. Well Potential Test | |
| 5. Report of Water Shut-Off | | 11. Drilling Prognosis | |
| 6. Report of Shooting or Acidizing | | 12. | |

NAME OF LEASE Cedar Hills Date February 11, 19 85

WELL NO. 1-22 is located 1250 ft. from (N) (S) line and 1650 ft. from the (E) (W) lin

of Section 22 Township 131N Range 105W in Bowman

County, Wildcat Field Red River Pool. The elevation of the ungraded ground

is 2926.3 feet above sea level.

Name and Address of Contractor, or Company which will do work is:

Not yet determined.

(DETAILS OF WORK)

(State names of, and expected depth of objective sand; show sizes, weight, and lengths of proposed casing, indicate mud weights, cementing points, and all other details of work)

1. Plan to drill 12¼" hole to 2,000'.
2. Run 8-5/8" surface casing & cement to surface.
3. Pressure test casing, BOP & drill 7-7/8" hole to 10,050' or sufficient to test Red River formation. Run DST's as necessary.
4. Run DLL/GR, BHC Sonic and FDC/CNL log.
5. If productive, 5½", 17#, 20# & 23# casing will be run and cemented with sufficient cement to cover the top of the Dakota formation.

Attachment #1 - location & elevation plat

Company Total Petroleum, Inc.

Address Suite 3100, Box 500, Denver, CO 80201

By Daniel J. Petri

Title Sr. Petroleum Engineer

Do not write in this space

Approved FEB 15 1985 19

By

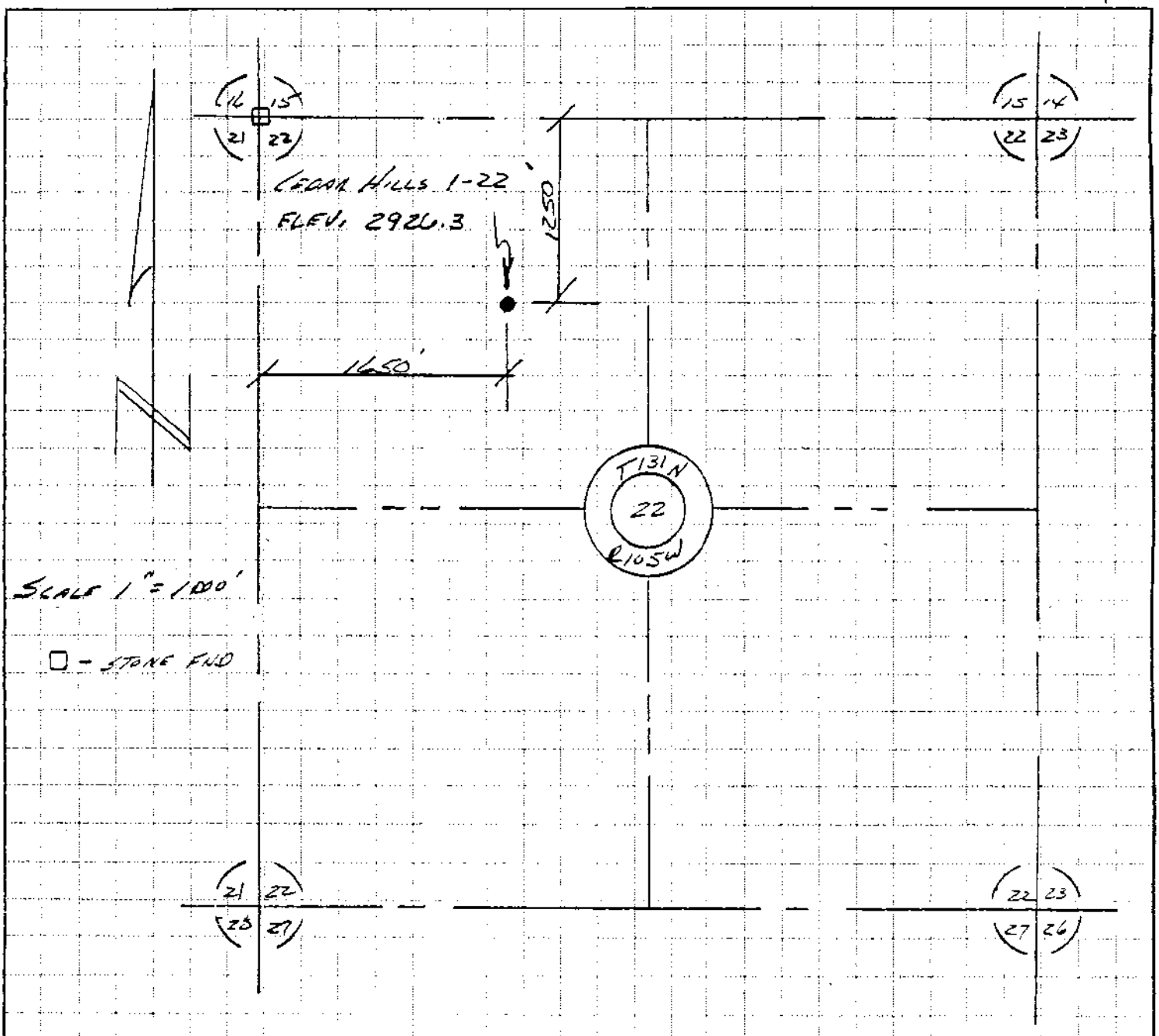
Title

(Instructions Over)

**BROSZ ENGINEERING**
P.O. BOX 357
BOWMAN, NORTH DAKOTA 58623
(701) 523-3340

CLIENT Total Petroleum
JOB Cedar Hills 1-22 1650 FNL - 1250 FWL
LOCATION Sec 22, T131N, R105W, Bowman Co. ND
DRAWN BY DSB DATE 1-11-85

11409




I, Danny S. Brosz, Registered Land Surveyor in the State of North Dakota, do hereby certify that the above survey was completed by me or under my direct supervision and the location and dimensions are true and correct as shown.

DANNY S. BROSZ
REGISTERED
LAND
SURVEYOR
L.S. 2679
NORTH DAKOTA

Danny S. Brosz #2679

FORM 1

North Dakota State Industrial Commission
Oil and Gas Division
900 EAST BOULEVARD - BISMARCK, NORTH DAKOTA - 58505

# APPLICATION FOR PERMIT TO DRILL

(File original and 3 copies with the Oil & Gas Division, 900 East Boulevard, Bismarck, North Dakota 58505)

Type of work: Drill new well X, Reenter old well _____, Drill directional well _____.

Type of well: Oil _____, gas _____, disposal _____, injection _____, others _____.

NAME OF OPERATOR: Total Petroleum, Inc.

ADDRESS: Suite 3100, P.O. Box 500, Denver, CO 80201

NAME AND ADDRESS OF SURFACE OWNER OR TENNANT: Robert, Willard & Dennis Swanke, Rhame, ND

WELL NAME AND NO.: Cedar Hills #1-22

LOCATION OF WELL: Qtr.-Qtr., NE NW Sec., 22 Twp., 131N Rge., 105W COUNTY: Bowman

Surface location is 1250 feet from (N) ~~(S)~~ section line and 1650 feet and from ~~(E)~~ (W) section line.

If directional, top of pay is NA feet from (N) (S) section line and NA feet and from (E) (W) section line.

Distance from proposed location to nearest spacing (drilling) unit line 990 ft.

Distance from proposed location to nearest permitted or completed well in the same pool is 10,741 ft.

Acres in spacing (drilling) unit 160 Description of spacing unit is NW Section 22

ELEVATION: 2926.3 (GROUND) _____ (GRADED) ESTIMATED TOTAL DEPTH: 10,050'

PROJECTED HORIZON (Pool Name): Red River APPROXIMATE DATE WORK WILL START: March, 1985

REMARKS: Spacing unit will be N/2 Sec. 22 if 320 acres are found to be appropriate.

I hereby swear or affirm that the information herein provided is true, complete and correct as determined from all available recor

Daniel J. Petri — Signature
Sr. Petroleum Engineer — Title
February 11, 1985 — Date

STATE OF Colorado )
COUNTY OF Denver ) SS

On this 12th day of February, 1985 before me personally appeared Daniel J. Petri to me known as the person described in and who executed the foregoing instrume and acknowledged that (s)he executed the same as his/her free act and deed.

Notary Public

My Commission expires 1-30-88

FOR STATE USE ONLY

API NO. 33-011-00429

PERMIT NO. & WELL FILE NO. 11409

APPROVAL DATE ~~FEB 15 1985~~ FEB 15 1985

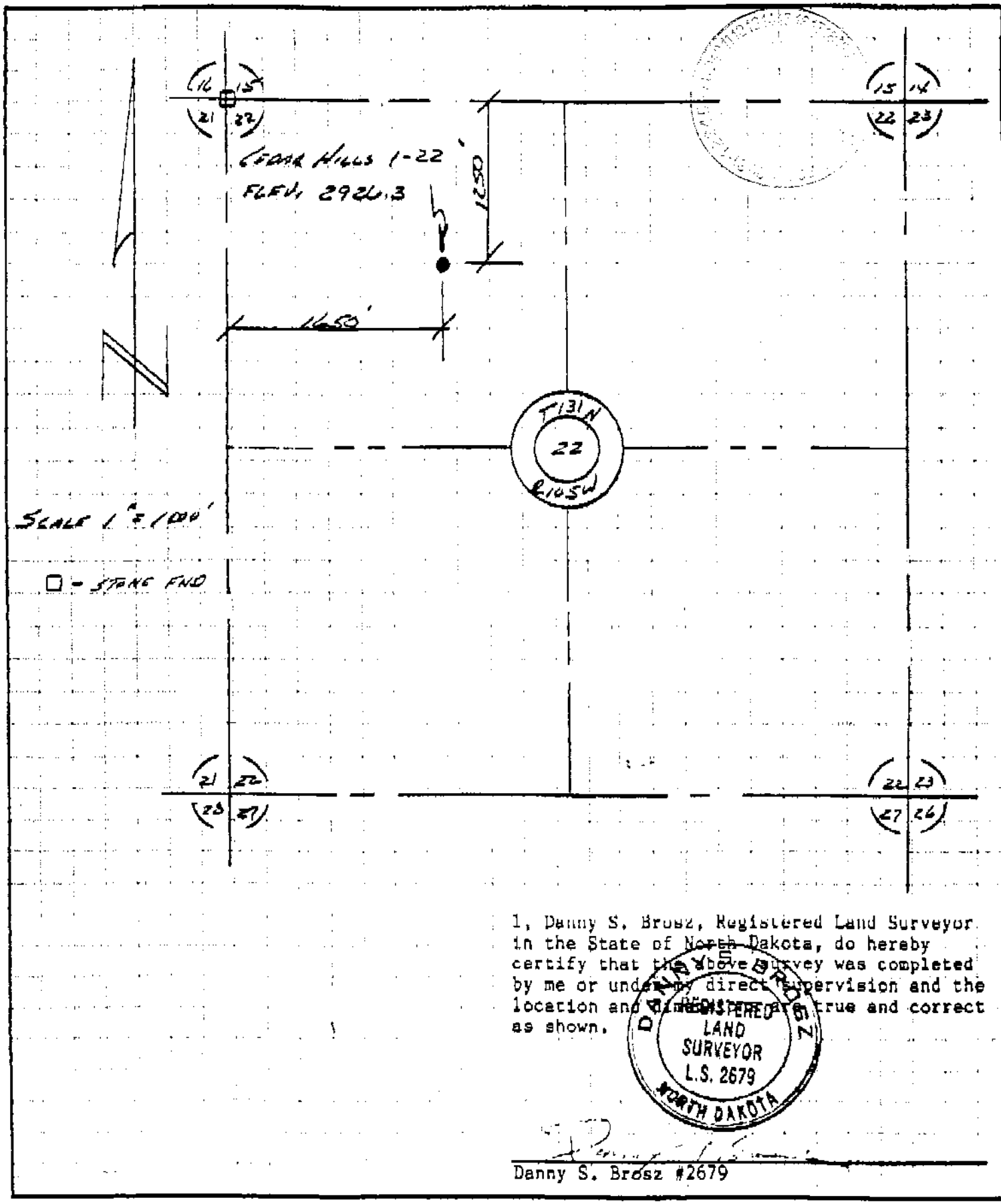
BY: F. Williams

Notary Seal

(SEE INSTRUCTIONS ON REVERSE SIDE)

**BROSZ ENGINEERING**
P.O. BOX 357
BOWMAN, NORTH DAKOTA 58623
(701) 523-3340

CLIENT TOTAL PETROLEUM
JOB CEDAR HILLS 1-22 1650 FWL 1250 FNL
LOCATION SEC 22, T131N, R105W, BOWMAN Co. ND
DRAWN BY DSB DATE 1-11-85




I, Danny S. Brosz, Registered Land Surveyor in the State of North Dakota, do hereby certify that the above survey was completed by me or under my direct supervision and the location and dimensions are true and correct as shown.

DANNY S. BROSZ
REGISTERED
LAND
SURVEYOR
L.S. 2679
NORTH DAKOTA

Danny S. Brosz #2679

**TOTAL**
**Total Petroleum, Inc.**

ONE DENVER PLACE · SUITE 3100
999 18TH STREET
DENVER COLORADO

TELEPHONE 303 291-2000

MAILING ADDRESS
P. O. BOX 500
DENVER, COLORADO 80201

February 11, 1985


North Dakota Industrial Commission
Oil & Gas Division
900 East Blvd.
Bismarck, ND 58505

Attn: Mr. Jack Wilborn
Deputy Enforcement Officer

Re: Application to Drill
Cedar Hills #1-22
NE NW Sec. 22, T131N, R105W
Bowman County, ND

Dear Sir:

Please find enclosed, four copies of Form 1 Application to Drill, Form 4 Sundry Notice and location plat for the captioned well. This is a wildcat well located directly north of Skull Creek Field which is spaced on 320's. Your assistance in gaining approval for this well is sincerely appreciated.

Sincerely,

Daniel J. Petri
Sr. Petroleum Engineer

DJP:cll

Encl.

CHECK SHEET

DATE: February 15, 1985 FILE NO: 11409

COMPANY: Total Petroleum, Inc.

WELL NAME: Cedar Hills #1-22

LOCATION: NE NW Sec.22-131N-105W, Bowman Co.

| | |
|---|---|
| Permit Fee | x |
| Application to Drill | X |
| Organization Report | X |
| $100,000 Bond | X |
| $50,000 Bond | |
| $15,000 Bond | |
| Certified Plat | X |
| Notice of Intention to Drill | X |
| Sundry Notice | X |
| Completion Report | |
| Plugging Report | |
| Authorization to Transport Oil | |
| DST Reports | |
| Geological Reports | |
| Core Analysis Reports | |
| Logs | |

PERMIT NO. 11409 ISSUED: February 15, 19

Inspection Date: _____ Inspector: _____

Terrain: Tillable, Prairie, Badlands Type (Circle One)

If Producer: Return check sheet promptly when reclamation is first noticed.

If Plugged and Abandoned: Is drill site acceptable for bond release? Yes____ No____
If no, please explain below.

_____

_____

_____

_____

CHECK SHEET

DATE: February 15, 1985 FILE NO: 11409

COMPANY: Total Petroleum, Inc.

WELL NAME: Cedar Hills #1-22

LOCATION: NE NW Sec.22-131N-105W, Bowman Co.

| | |
|---|---|
| Permit Fee | x |
| Application to Drill | X |
| Organization Report | X |
| $100,000 Bond | X |
| $50,000 Bond | |
| $15,000 Bond | |
| Certified Plat | X |
| Notice of Intention to Drill | X |
| Sundry Notice | X |
| Completion Report | |
| Plugging Report | X |
| Authorization to Transport Oil | |
| DST Reports | 2 - enclosed |
| Geological Reports | yes - enclosed |
| Core Analysis Reports | yes - enclosed |
| Logs | CDCN, DLL, WEL 4-2485 ← Rec'd missing logs |

Well file OK
Sent letter to
Release from Bond
4-28-87
lk

PERMIT NO. 11409 ISSUED: February 15, 1

Inspection Date: _____ Inspector: _____

Terrain: Tillable, Prairie, Badlands Type (Circle One)

If Producer: Return check sheet promptly when reclamation is first noticed.

If Plugged and Abandoned: Is drill site acceptable for bond release? Yes____ No____
If no, please explain below.

_____

_____

_____

_____

CHECK SHEET

Noble 57

DATE: February 15, 1985

FILE NO: 11409

COMPANY: KK

WELL NAME: DB

Total Petroleum, Inc.

Cedar Hills #1-22

LOCATION: NE NW Sec.22-131N-105W, Bowman Co.

| | |
|---|---|
| Permit Fee | X |
| Application to Drill | X |
| Organization Report | X |
| $100,000 Bond | X |
| $50,000 Bond | |
| $15,000 Bond | |
| Certified Plat | X |
| Notice of Intention to Drill | X |
| Sundry Notice | X |
| Completion Report | |
| Plugging Report | X |
| Authorization to Transport Oil | |
| DST Reports | 2- Enc |
| Geological Reports | Yes - Enc |
| Core Analysis Reports | Yes Enc |
| Logs | CDCN, DLL, WEL |

Well File OK.
Sent Letter for BR
4-28-87
lh

PERMIT NO. 11409

ISSUED: February 15, 1

Inspection Date: 4-14-87 Inspector: Scott Radig

Terrain: Tillable, (Prairie,) Badlands Type (Circle One)

If Producer: Return check sheet promptly when reclamation is first noticed.

If (Plugged and Abandoned:) Is drill site acceptable for bond release? Yes X No
If no, please explain below.

P+A 3.21.85

4-14-87 OK for bond release. Fair grass + clover coming up.

Becca. Jaki Reed