

OCD-ARTESIA

Form 3160-4
(April 2004)

UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF LAND MANAGEMENT

WELL COMPLETION OR RECOMPLETION REPORT AND LOG

FORM APPROVED
OMB NO. 1004-0137
Expires: March 31, 2007

Month-Year
MAR - 5 2007
OCD-ARTESIA, NM

1. Type of Well <input type="checkbox"/> Oil Well <input type="checkbox"/> Gas Well <input type="checkbox"/> Dry <input type="checkbox"/> Other b. Type of Completion: <input type="checkbox"/> New Well <input checked="" type="checkbox"/> Work Over <input type="checkbox"/> Deepen <input type="checkbox"/> Plug Back <input type="checkbox"/> Diff. Resvr., Other _____				5. Lease Serial No. NM - 0557371					
2. Name of Operator NAVAJO REFINING COMPANY				8. Lease Name and Well No. WDW - 3					
3. Address P.O. BOX 159, ARTESIA, NM 88211				3a. Phone No. (include area code)					
4. Location of Well (Report location clearly and in accordance with Federal requirements)* At surface 790' FROM THE SOUTH LINE AND 2250' FROM THE WEST LINE At top prod. interval reported below 7650' AT THE SAME LOCATION AS ABOVE At total depth PLUG BACK 10,119' AT THE SAME LOCATION AS ABOVE				9. AFI Well No. 30 - 015 - 26575					
14. Date Spudded 12/22/1990				15. Date T.D. Reached 01/29/1991		16. Date Completed <input type="checkbox"/> D & A <input type="checkbox"/> Ready to Prod.			
18. Total Depth: MD 10,119' TVD 10,119'				19. Plug Back T.D.: MD 9022' TVD 9022'		20. Depth Bridge Plug Set: MD CMT 9051'-9022' TVD CMT 9051'-9022'			
21. Type Electric & Other Mechanical Logs Run (Submit copy of each) CBL/VDL, MULTI-ARM CALIPER, TEMP, RADIOACTIVE TRACER (2006)				22. Was well cored? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (Submit analysis) Was DST run? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (Submit report) Directional Survey? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (Submit copy)					
23. Casing and Liner Record (Report all strings set in well)									
Hole Size	Size/Grade	Wt. (#/ft.)	Top (MD)	Bottom (MD)	Stage Cementer Depth	No. of Sk. & Type of Cement	Shurry Vol. (BBL)	Cement Top*	Amount Pulled
17 1/2"	13 3/8"	54.5	SURF	400'	400'	425 CLASS C		SURF	NONE
12 1/4"	9 5/8"	36	SURF	2604'	2604'	1025 "C"		SURF	NONE
8 3/4"	7"	29 & 26	SURF	9450'	9450'	1350 "H"		900'	NONE
6 1/4"	4 1/2"		9051'	10,119'	10,119'	175 CLASS H		9051'-TOL	NONE
24. Tubing Record									
Size	Depth Set (MD)	Packer Depth (MD)	Size	Depth Set (MD)	Packer Depth (MD)	Size	Depth Set (MD)	Packer Depth (MD)	
4 1/2"	7567'	7567'							
25. Producing Intervals									
Formation		Top	Bottom	Perforated Interval		Size	No. Holes	Perf Status	
A) CISCO		7650'	8450'	7660' - 8450'		0.5"	1580	2 JSPF / 60°	
B) CANYON		8540'	8620'	8540' - 8620'		0.5"	160	2 JSPF / 60°	
C)									
D)									
27. Acid, Fracture, Treatment, Cement Squeeze, etc.									
Depth Interval		Amount and Type of Material							
7050' - 7102'		80 SKS PREM 14.8 PPG NEAT CMT FOR PERF SQZ ON PREVIOUS PERFORATION							
7262' - 7278'		100 SKS PREM 14.8 PPG NEAT CMT FOR PERF SQZ ON PREVIOUS PERFORATION							
7304' - 7314'		80 SKS PREM 14.8 PPG NEAT CMT FOR PERF SQZ ON PREVIOUS PERFORATIONS							
28. Production - Interval A									
Date First Produced	Test Date	Hours Tested	Test Production	Oil BBL	Gas MCF	Water BBL	Oil Gravity Corr. API	Gas Gravity	Production Method
			→						NON-HAZAROUS CLASS I WELL
Choke Size	Tbg. Press. Flwg. SI	Csg. Press.	24 Hr. Rate	Oil BBL	Gas MCF	Water BBL	Gas/Oil Ratio	Well Status	
			→						WAITING ON STATE APPROVAL TO INJECT
28a. Production - Interval B									
Date First Produced	Test Date	Hours Tested	Test Production	Oil BBL	Gas MCF	Water BBL	Oil Gravity Corr. API	Gas Gravity	Production Method
			→						NON-HAZAROUS CLASS I WELL
Choke Size	Tbg. Press. Flwg. SI	Csg. Press.	24 Hr. Rate	Oil BBL	Gas MCF	Water BBL	Gas/Oil Ratio	Well Status	
			→						WAITING ON STATE APPROVAL TO INJECT

*(See instructions and spaces for additional data on page 2)

ACCEPTED FOR RECORD

FEB 28 2007

 FREDERICK WRIGHT
 PETROLEUM ENGINEER

28b. Production - Interval C

Date First Produced	Test Date	Hours Tested	Test Production →	Oil BBL	Gas MCF	Water BBL	Oil Gravity Corr. API	Gas Gravity	Production Method
Choke Size	Tbg. Press. Flwg. SI	Csg. Press.	24 Hr. Rate →	Oil BBL	Gas MCF	Water BBL	Gas/Oil Ratio	Well Status	

28c. Production - Interval D

Date First Produced	Test Date	Hours Tested	Test Production →	Oil BBL	Gas MCF	Water BBL	Oil Gravity Corr. API	Gas Gravity	Production Method
Choke Size	Tbg. Press. Flwg. SI	Csg. Press.	24 Hr. Rate →	Oil BBL	Gas MCF	Water BBL	Gas/Oil Ratio	Well Status	

29. Disposition of Gas (Sold, used for fuel, vented, etc.)

N/A (NON-HAZARDOUS CLASS I WELL)

30. Summary of Porous Zones (Include Aquifers):

Show all important zones of porosity and contents thereof: Cored intervals and all drill-stem tests, including depth interval tested, cushion used, time tool open, flowing and shut-in pressures and recoveries.

31. Formation (Log) Markers

Formation	Top	Bottom	Descriptions, Contents, etc.	Name	Top Meas. Depth

32. Additional remarks (include plugging procedure):

THE PLUGGED AND ABANDONED WELL WAS ACQUIRED FROM MEWBOURNE OIL COMPANY BY NAVAJO REFINING. NAVAJO RECOMPLETED THE WELL FOR INJECTING NON-HAZARDOUS WASTE WATER FROM THEIR REFINERY IN ARTESIA, NM. THE EXISTING PLUGS WERE DRILLED OUT TO THE TOP OF THE LINER PLUG AT 9022' AND THE EXISTING PERFORATIONS WERE SQUEEZED OFF WITH CEMENT AT 7050' TO 7102', 7262' TO 7278', AND FROM 7304' TO 7314'. A 4 1/2" 11.6 #/FT TUBING STRING WAS SET WITH A TENSION PACKER AT 7568' AND BOTTOM OF PACKER AT 7575'. MIT WAS WITNESSED BY OCD.

(SEE ATTACHED WELL SUMMARY FOR MORE DETAILS)

33. Indicate which items have been attached by placing a check in the appropriate boxes:

- ☒ Electrical/Mechanical Logs (1 full set req'd.)
 ☐ Geologic Report
 ☐ DST Report
 ☐ Directional Survey
☒ Sundry Notice for plugging and cement verification
 ☐ Core Analysis
 ☐ Other:

34. I hereby certify that the foregoing and attached information is complete and correct as determined from all available records (see attached instructions)*

Name (please print)

Darrell Moore

Title

Env. Mgr for Water & Waste

Signature

Darrell Moore

Date

1/24/07

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

INSTRUCTIONS

GENERAL: This form is designed for submitting a complete and correct well completion/recompletion report and log on all types of wells on Federal and Indian leases to a Federal agency, pursuant to applicable Federal laws and regulations. Any necessary special instructions concerning the use of this form and the number of copies to be submitted, particularly with regard to local, area, or regional procedures and practices, either are shown below or will be issued by, or may be obtained from, the local Federal office.

If not filed prior to the time this summary record is submitted, copies of all currently available logs (drillers, geologists, sample and core analysis, and all types electric), formation and pressure tests, and directional surveys, should be attached hereto, to the extent required by applicable Federal laws and regulations. All attachments should be listed on this form, see item 33.

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

ITEM 17: Indicate which reported elevation is used as reference (where not otherwise shown) for depth measurements given in other spaces on this form and in any attachments.

ITEM 23: Show how reported top(s) of cement were determined, i.e. circulated (CIR), or calculated (CAL), or cement bond log (CBL), or temperature survey (TS).

PRIVACY ACT

The Privacy Act of 1974 and the regulation in 43 CFR 2.48 (d) provide that you be furnished the following information in connection with information required by this application.

AUTHORITY: 30 U.S.C. 181 et seq., 351 et seq., 25 U.S.C. et seq.; 43 CFR 3160.

PRINCIPAL PURPOSE: The information is to be used to evaluate the actual operations performed in the drilling, completing and testing of a well on a Federal or Indian lease.

ROUTINE USES: (1) Evaluate the equipment and procedures used during the drilling and completing/recompleting of a well. (2) The review of geologic zones and formation encountered during drilling. (3) Analyze future applications to drill in light of data obtained and methods used. (4)(5) Information from the record and/or the record will be transferred to appropriate Federal, State, local or foreign agencies, when relevant to civil, criminal or regulatory investigations or prosecutions.

EFFECT OF NOT PROVIDING INFORMATION: Filing of this report and disclosure of the information is mandatory once a well drilled on a Federal or Indian lease is completed/recompleted.

The Paperwork Reduction Act of 1995 requires us to inform you that:

This information is being collected to allow evaluation of the technical, safety, and environmental factors involved with drilling and completing/recompleting wells on Federal and Indian oil and gas leases.

This information will be used to analyze operations and to compare equipment and procedures actually used with those proposed and approved.

Response to this request is mandatory only if the operator elects to initiate drilling and completing/recompleting operations on an oil and gas lease.

BLM would like you to know that you do not have to respond to this or any other Federal agency-sponsored information collection unless it displays a currently valid OMB control number.

BURDEN HOURS STATEMENT

Public reporting burden for this form is estimated to average 60 minutes per response, including the time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding the burden estimate or any other aspect of this form to U.S. Department of the Interior, Bureau of Land Management (1004-0137), Bureau Information Collection Clearance Officer, (WO-630), MS 401 LS, 1849 C Street, N.W., Washington, D.C. 20240.

Well Summary

Navajo Refining Company (Navajo) contracted Subsurface Technology, Inc. (Subsurface), to prepare an application for permit and to reenter a plugged and abandoned (P&A) oil and gas well. The Application for Permit to Drill or Reenter and the Sundry Notices and Reports on Wells was submitted to the Department of the Interior, Bureau of Land Management (BLM), on June 29, 2006 and approved. The Application for Permit to Drill, Re-enter, Deepen, Plug Back, or add a Zone was submitted to the State of New Mexico Oil Conservation Commission (OCD) on June 29, 2006 and approved.

Subsurface prepared an engineering plan to reenter the P&A'ed oil and gas well formally owned by Mewbourne Oil Company. The original well name was Caulk Bluff Federal #1 (API number 30-015-26575), and a Change of Operator application was submitted to the OCD on December 5, 2000 and approved under the well name of WDW-3. Under contract to Navajo, Subsurface commenced field operations on September 25, 2006. The existing location was cleared and prepared for reentry operations. An earthen lined reserve pit was dug to catch returns. All depths unless stated are referenced to rig floor at six feet to seven feet above ground level. The rig floor was moved from six feet to seven feet after drilling out the cast iron bridge plugs.

A workover rig and reverse unit was placed on location and the existing wellhead was removed. The first cast iron bridge plug (CIBP) at 7010 feet was drilled and the perforated interval from 7050 feet to 7102 feet was squeezed off with neat cement and successfully pressured tested to six hundred eighty pounds per square inch gauge pressure (680 psig). The second and third CIBP at 7190 feet and 7279 feet was drilled. There appeared to be ten feet of cement on top of the third CIBP. The perforated interval from 7262 feet to 7278 feet and from 7304 feet to 7314 feet was squeezed with neat cement. The squeezed interval was pressure tested to 920 psig and would not hold. A second cement squeeze was performed across the perforated interval from 7262 feet to 7278 feet and from 7304 feet to 7314. The interval was pressured tested to 630 psig and continued to lose pressure at a rate of two pounds per square inch every thirty minutes (2 psi/30 min). The fourth CIBP at 7595 feet was drilled and at 7838 feet a cement plug was encountered and drilled through. Cement was tagged twenty nine (29) feet above the top of the liner at 9022 feet. The hole was circulated clean and prepared for logging.

A Cement Bond Log (CBL), Variable Density Log (VDL), caliper log, and temperature survey were performed. The CBL/VDL showed that the top of the cement (TOC) behind the 7-inch casing was located 900 feet from the surface. The OCD was notified and approved the existing well condition. The casing was perforated from 7660 feet to 8450 feet and from 8540 feet to 8620 feet at 2-JSPF on sixty degree (60°) phasing.

A packer was set at 7546 feet with 2 7/8-inch PH-6 tubing, the well was swabbed back and samples of the formation fluid were recovered. It was estimated that two hundred twenty six barrels (226 bbls) of formation fluid was returned to the surface. A pressure test on the annulus between the 7-inch and 2 7/8-inch was performed at 660 psig with the annulus losing pressure at a rate of 8 psi/hr.

An injection test was performed on the well down the 2 7/8-inch tubing with the annulus open to the bottom of the well. The open annulus will allow for the calculation of the bottom hole pressure while pumping down the 2 7/8-inch tubing with out the influence of tubing friction pressure on the bottom hole calculations. The injection rates were from two barrels per minute (2 bpm) to ten barrels per minute (10 bpm). From the data collected during the injection test it appears that the well will be able to accept an injection rate up to 10 bpm at the permitted pressure of 1550 psig with 4 1/2-inch, 11.6 pound per foot (11.6 lb/ft) tubing in the wellbore.

At the request of the OCD, Subsurface went back into the wellbore with a retrievable bridge plug (RBP) to test the casing and isolate any leaks to within 1000 feet. The RBP was set at 7550 feet and the packer was set at 6985 feet to isolate the squeezed interval from 7050 feet to 7314 feet. The squeezed interval was pressure tested to 490 psig and the annulus to 632 psig. The squeezed interval was losing pressure at a rate of 6 psi/hr and the annulus was gaining pressure due to thermal affects. The RBP was moved up the wellbore to 1255 feet and casing pressure tested to 569 psig. The casing above 1255 feet was losing pressure at a rate of 2 psi/hr. The casing leaks were isolated to the squeezed interval from 7050 feet to 7314 feet and in the interval from surface to 1255 feet. The OCD was called and approved the 300PSI sealing application to stop the casing leaks across the two intervals.

The 4 1/2-inch tubing was run into the wellbore and the Arrow X-1 packer was set at 7575.73 feet with 37,000 lbs of tension. Prior to running the 4 1/2-inch tubing a new Superior hanging spool was installed. Prior to setting the tubing packer, the annulus between the 4 1/2-inch tubing and the 7-inch casing was filled with inhibited brine, with the 300psi sealant across the squeezed perforations and across the upper section of the 7-inch casing. Once the packer was set and casing hung off in the spool a new Superior wellhead was installed and the P-seals were pressure tested to 3000 psig. After the wellhead was assembled the annulus was squeezed at 545 psig for four hours (4 hrs) as specified by the sealant manufacture representative on site. The annulus was then pressure tested to 480 psig overnight with no pressure loss. Workover rig was disassembled and moved off location with all associated equipment.

A 12 hr pump in and falloff test was performed down the 4 1/2-inch tubing. To maintain a surface injection pressure that was below the permitted pressure of 1550 psi the injection rate was lowered to 9 bpm at the end of the pump in procedure. The BHP gauge was placed at 8630 feet for 14 hrs to monitor BHP, when the gauge was pulled five minute (5 min) gradient stops were made every 1000 feet with the first stop at 7000 feet. The analysis of the data showed interference from the adjacent injection wells, which skewed the results for determination of the skin and possibly the permeability. The equipment used to perform the falloff testing was moved off location to prepare for mechanical integrity testing (MIT).

The MIT was performed and witnessed by the OCD. The MIT consisted of an annulus pressure test, and a radioactive tracer survey. The temperature survey was performed during the CBL/VDL logging event and will be used as a baseline for any future temperature surveys. The annulus pressure test was performed at 530 psia and lost 2.5 psi over a one hour period, which was within the OCD requirements of five percent (5%)

over a 30 min time interval. The radioactive tracer survey showed no signs of fluid flow out of the permitted interval above 7650 feet. The OCD witnessed the annular pressure test and the first half of the radioactive tracer survey.

The annulus monitoring system was installed and tested. The well was turned over to Navajo for injection.



**LOGGING
SERVICES**

R/A TRACER LOG INTERPRETATION

11/27/2006

PLANT: NAVAJO REFINING CO.

C/O: SUBSURFACE TECHNOLOGY

WELL NAME: CHALK BLUFF FEDERAL # 1 WDW # 3

RE: Radioactive Tubing & Packer Survey ran on 11/18/2006

A Pre Base Log was run from 9020' to 7350' to detect and record background gamma counts.

Iodine 131 was then ejected at a depth of 7375' and pumped down the tubing and into the permitted interval. Overlapping logging passes tracked the R/A tracer material as it moved down in the wellbore. The R/A material was seen traveling down the tubing, past the packer, and exiting the permitted injection interval.

The flow profile log was then repeated and this survey also showed R/A material going out into the permitted interval.

Two Stationary Time Drive surveys were run with the tool at 7640'. No indications of upward migration were recorded.

A Post Base log was then run from 9016' to 7342' and noted that all R/A material was flushed out of the wellbore into the permitted interval.

A handwritten signature in cursive script, appearing to read 'John Croce'.

John Croce