ORDER / CASE NO: CASE NO. 4-2009

ORDER / NOTICE OF RECOMMENDATION TYPE: UIC

COUNTY: HARDING

LOCATION(S): T. 22N., R.4E., NE1/4SE1/4 SEC. 18

OPERATOR: LUFF EXPLORATION COMPANY

DATE ORDER ISSUED: 08/13/2009

DATE ORDER CLOSED:

AMENDS:

AMENDED BY:

APPROVAL STATUS: APPROVED

FIELD NAME: BUFFALO FIELD

UNIT NAME: NORTH BUFFALO RED RIVER UNIT
August 13, 2009

David Norby
Operations Manager
Luff Exploration Company
1580 Lincoln Street, Suite 850
Denver, CO 80203

Dear Mr. Norby:

On June 8, 2009, the department received your application for a major modification of Luff’s existing permit to inject to allow for reentering the I-18 Stearns water injection well located in NESE Section 18, Township 22 North, Range 4 East, North Buffalo Red River Unit, Harding County, SD, for the purpose of extending the east horizontal lateral approximately 1320 feet, from its present bottom hole location of 1614 FSL and 340 FWL to the proposed bottom hole location of 1650 FWL and 1650 FSL of Section 17, Township 22 North, Range 4 East. Water is injected into the Red River “B” zone at a depth of approximately 9074 feet to increase the amount of oil recovery from the oil reservoir rock.

The department published a Notice of Recommendation (Case No. 4-2009) recommending approval of the application. The date for intervention was August 10, 2009, and no parties petitioned the Board of Minerals and Environment for a hearing on the application by the deadline.

Therefore, under the provisions of the Administrative Rules of South Dakota 74:10:09:03.04 and 74:10:11.01:05, which authorize the department secretary to approve major modifications of permits to inject, Luff’s application is hereby approved. A copy of the original permit (Order 7-2001) with conditions, all of which are still in effect, is enclosed.

Sincerely,

Steven M. Pirner
Secretary

Enclosure

cc: Richard George, Luff Exploration Company
IN THE MATTER OF THE APPLICATION )
OF LUFF EXPLORATION COMPANY FOR )  CASE NO 7-2001
APPROVAL TO CONVERT THE NO. 1-18 )  APPROVAL
STEARNS WELL TO A LONG TERM )  OF
WATER FLOOD WELL FOR THE PURPOSE )  MAJOR
OF CONTINUED ENHANCED RECOVERY )  MODIFICATION
OF OIL AND GAS IN THE NORTH )
BUFFALO RED RIVER UNIT, HARDING )
COUNTY, SOUTH DAKOTA. )

On June 20, 2001, Luff Exploration Company made application to the Department of
Environment and Natural Resources for approval to convert the 1-18 Stearns horizontally drilled
well, located in NE ¼ SE ¼ Section 18, Township 22 North, Range 4 East, BHM, to a long
term water flood well for the purpose of continued enhanced recovery of oil and gas in
the North Buffalo Red River Unit, Buffalo Field, Harding County, South Dakota.

Pursuant to ARSD 74:10:09:03.04, the Department of Environment and Natural Resources
published a Notice of Recommendation on August 1 and 8, 2001 in the Nation’s Center News,
Buffalo; the Capitol Journal, Pierre; the Black Hills Pioneer, Spearfish; and the Rapid City
Journal, Rapid City. In the Notice of Recommendation, the Department recommended
conditional approval of Luff’s request.

Rule 74:10:09:03.04 authorizes the Secretary of the Department of Environment and
Natural Resources to approve such modifications.

The Notice of Recommendation established a final date for intervention in this matter
as August 27, 2001. No interventions or objections were received by the Department
by the intervention date.
Therefore, the Secretary of the Department of Environment and Natural Resources hereby grants Luff approval to convert the Luff I-18 Stearns well to a long term water flood well. Water produced along with oil from the Red River Formation will be re-injected into the same formation, for the purpose of continued enhanced recovery of oil and gas in the North Buffalo Red River Unit, Harding County, South Dakota. This approval is contingent on compliance with the following conditions:

1. Injection operations authorized by the Department must be conducted in accordance with the rules of the Board and any applicable orders or rules promulgated by the Board.
2. The maximum injection rate must not exceed 1,000 barrels of water per day.
3. The maximum injection pressure must not exceed 1,700 psi during injection operations.
4. The operation must pass a mechanical integrity test to a minimum of 1,700 psi for at least 15 minutes prior to commencing injection operations.
5. The operator is required to notify the Department a minimum of 48 hours prior to running the test.
6. In the event that a unsuccessful pressure test is obtained, the operator will be required to cease operations. Corrective action options include repairing the well so that a successful test result can be obtained, plugging and abandoning the well, or any other action approved by the Department.

Dated this 28th day of August, 2001.

[Signature]

Steven M. Pirner, Secretary
Department of Environment and Natural Resources
AFFIDAVIT OF PUBLICATION
State of South Dakota, County of Hughes

____________________ of said county, being, first duly sworn, on oath, says: That he/she is the publisher or an employee of the publisher of the Capital Journal, a daily newspaper published in the City of Pierre in said County of Hughes and State of South Dakota; that he/she has full and personal knowledge of the facts herein stated, that said newspaper is a legal newspaper as defined in SDCL 17-2-2.1 through 17-2-2.4 inclusive, that said newspaper has been published within the said County of Hughes and State of South Dakota, for at least one year next prior to the first publication of the attached public notice, and that the legal display advertisement headed State of South Dakota Secretary of the Dept. of Env. & Nat. Res. Notice of Recommendation...Case 4-2009 a printed copy of which, taken from the paper in which the same was published, and which is here-to attached and made a part of this affidavit, was published in said newspaper for two successive week(s) to wit:

<table>
<thead>
<tr>
<th>July 20</th>
<th>2009</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>July 22</td>
<td>2009</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
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<tr>
<td>20</td>
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<tr>
<td>20</td>
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</tbody>
</table>

That the full amount of the fee charged for the publication of the attached public notice inures to the sole benefit of the publisher or publishers; that no agreement or understanding for the division thereof has been made with any other person, and that no part thereof has been agreed to be paid to any person whomsoever; that the fees charged for the publication thereof are: $96.15.

Signed: ____________________________

____________________ subscribed and sworn to before me this 30 day of July 2009

Notary Public in and for the County of Hughes, South Dakota. My Commission expires 7/20, 2015.
THE CLASSIFIEDS: Attract Buyers

Looking to sell your used car, television, sofa, baseball card collection or anything else under the sun? Place an ad in the Classifieds! It's fast, easy and profitable way to get rid of your unwanted merchandise.

Capital Journal
www.capjournal.com
Affidavit of Publication

STATE OF SOUTH DAKOTA:
COUNTY OF HARDING:

Stewart Huntington of said County and State being first duly sworn, on his oath says: That the NATION’S CENTER NEWS is a legal weekly newspaper of general circulation, printed and published in the City of Buffalo, in said County and State by Stewart Huntington, and has been such a newspaper during the times hereinafter mentioned; and that said newspaper has a bona fide circulation of at least 200 copies weekly, and has been published within said County in the English language for at least one year prior to the first publication of the notice herein mentioned, and is printed in whole or in part in an office maintained at the place of publication; and that I, Stewart Huntington, the undersigned, am the Publisher of said newspaper and have personal knowledge of all the facts stated in this affidavit; and that the advertisement headed:

Case No. 4-2009

a printed copy of which is hereeto attached, was printed and published in said newspaper for 2 successive and consecutive weeks, the first publication being made on the 16th day of July, 2009, and the last publication on the 23rd day of July, 2009, that the full amount of fees charged for publishing same, to wit: The sum of $ 76.50, insures solely to the benefit of the publisher of the NATION’S CENTER NEWS, that no agreement or understanding for a division thereof has been made with any person and that no part thereof has been agreed to be paid to any other person whomsoever.

Subscribed and sworn to before me this 16th day of July, 2009

Notary Public, Lawrence County, South Dakota
My commission expires: 10-24-2010
Affidavit of Publication

STATE OF SOUTH DAKOTA:
COUNTY OF LAWRENCE:

Stewart Huntington of said County and State being first duly sworn, on his oath says: That the BLACK HILLS PIONEER is a legal daily newspaper of general circulation, printed and published in the City of Spearfish, in said County and State by Stewart Huntington, and has been such a newspaper during the times hereinafter mentioned; and that said newspaper has a bonafide circulation of at least 200 copies weekly, and has been published within said County in the English language for at least one year prior to the first publication of the notice herein mentioned, and is printed in whole or in part in an office maintained at the place of publication; and that I, Stewart Huntington, the undersigned, am the Publisher of said newspaper and have personal knowledge of all the facts stated in this affidavit; and that the advertisement headed:

Case No. 4-2-2009

a printed copy of which is hereto attached, was printed and published in said newspaper for 2 successive and consecutive weeks, the first publication being made on the 15th day of July 2009, and the last publication on the 20th day of July 2009, that the full amount of fees charged for publishing same, to wit: The sum of $76.52, insures solely to the benefit of the Publisher of the BLACK HILLS PIONEER, that no agreement or understanding for a division thereof has been made with any person and that no part thereof has been agreed to be paid to any other person whomsoever.

Subscribed and sworn to before me this 1st day of August 2009.

Notary Public, Lawrence County, South Dakota
My commission expires: 10-24-2010
NOTICE OF RECOMMENDATION
STATE OF SOUTH DAKOTA
DEPARTMENT OF ENVIRONMENT & NATURAL RESOURCES
BOARD OF MINERS AND ENVIRONMENT
CASE NO: 2009-11-20

IN THE MATTER OF THE APPLICATION OF LUFF EXPLORATION CO. TO MODIFY ITS PERMIT TO INJECT FOR THE 1-8 STORMS (NBRKU) WATER INJECTION WELL LOCATED IN THE NE QUARTER, TOWNSHIP 22 NORTH, RANGE 4 EAST, NORTH BUFFALO RED RIVER UNIT, HARDING COUNTY, SOUTH DAKOTA, FOR THE PURPOSE OF EXTENDING THE EAST HORIZONTAL LATERAL DRILLED IN THE "B" ZONE OF THE RED RIVER FORMATION, AND PRESENTLY UTILIZED AS A WATER INJECTION WELL FOR THE LONG-TERM INJECTION FOR ENHANCED RECOVERY OF OIL FROM THE RED RIVER "B" RESERVOIR.

Notice is hereby given to the public and to all interested persons that pursuant to South Dakota Codified Laws (SDCL) Chapter 1-16 and Chapter 45-9 and further pursuant to the Administrative Rules of South Dakota (ARS), 74:10-9 and 74:10-11, the following matters have come to the attention of the Secretary of the Department of Environmental and Natural Resources, hereinafter "Secretary."

Luff Exploration Co., Denver, Colorado, hereinafter "Luff," has requested a modification of its permit to inject authorized by Board of Miners and Environment Order No. 7-2001. The request entails reentering the 1-8 Storms water injection well, located in the NE 1/4 Section 16, Township 22 North, Range 4 East, North Buffalo Red River Unit, Harding County, South Dakota, to extend the existing east horizontal lateral drilled in the Red River Formation. The purpose of this modification will add an additional area to the existing approved radius of influence. The additional area includes a 24-foot radius of influence around the proposed eastern extension of the lateral.

The existing 1-8 Storms well is completed with 209 feet of 6 1/2-inch steel surface casing cemented to bottom, and 1974 feet of 5 1/2-inch steel casing cemented at intervals from the surface to total depth. The injection zone will be in the "B" zone of the Red River Formation. All potential injection water will come from the "B" zone of the Red River Formation from existing wells in the vicinity of the 1-8 Storms well. No domestic water wells are located within the one-half mile area of review.

The originally approved maximum injection pressure of 1700 pounds per square inch and the originally approved requested duration of the operation will remain the same. The remaining originally approved project life is approximately 12 years.

Since the original application was approved in 2001 by Board Order No. 7-2001, the Luff 1-8 Storms injection well was constructed in the one-half mile area of review in 2004. This well was constructed in a manner that protects all underground sources of drinking water. No additional wells exist in the re-purposed radius of influence. Therefore, the Secretary recommends approval of the application with no additional conditions to the original permit to inject approved in 2001 and all conditions of the original permit will remain in effect.

Authority for the Secretary to approve this application is contained in ARS, 74-10-9 and ARS, 74-10-11.6.1. Unless a person files a petition requesting a hearing on the above application, pursuant to the provisions of ARS, 74-10-9, on or before August 18, 2009, the Secretary's recommendation will be considered final and the Secretary will approve the application in accordance with that recommendation. For additional information regarding the application, please contact Fred V. Steeves, Oil and Gas Supervisor, 2050 West Main Street, Suite A, Rapid City, SD 57702, Telephone: (605) 394-2729.

July 29, 2009
By Steven M. Pirner
Secretary
(Published twice at the total approximate cost of $175.15.)

Affidavit of Publication

STATE OF SOUTH DAKOTA
County of Pennington

Petitioner, being first duly sworn, upon her oath says: That she is now and was at all times hereinafter mentioned, an employee of the RAPID CITY JOURNAL COMPANY, a corporation, of Rapid City, South Dakota, the owner and publisher of the RAPID CITY JOURNAL, a legal and daily newspaper printed and published in Rapid City, in said County of Pennington, and has full and personal knowledge of all the facts herein stated as follows: that said newspaper is and at all of the times herein mentioned has been a legal and daily newspaper with a bona fide paid circulation of at least Two Hundred copies daily, and has been printed and published in the English language, at and within an office maintained by the owner and publisher thereof, at Rapid City, in said County of Pennington, and has been admitted to the United States mail under the second class mailing privilege for at least one year prior to the publication herein mentioned; that the advertisement, a printed copy of which, taken from said RAPID CITY JOURNAL, the paper in which the same was published, is attached to this sheet and made a part of this affidavit, was published in said paper once each week for two successive weeks, the first publication thereof being on the sixteenth day of July, 2009, that the fees charged for the publication thereof are One hundred seventy-five Dollars, and sixteen cents.

Subscribed and sworn to before me this 22nd day of July, 2009.

Notary Public.

Kathy L. Graafsma

State of South Dakota
County of Pennington

July 29, 2009
IN THE ____________________ COURT

COUNTY OF PENNINGTON

Publisher's and Attorney's Affidavit

Filed in the office of ____________________________

__________________________ on

the __________ day of ____________

19 ____________

__________________________

Attorney for ____________________________
July 13, 2009

Richard George
Manager of Engineering
Luff Exploration Company
1580 Lincoln Street, Suite 850
Denver, CO 80203

Dear Mr. George:

Enclosed is a copy of the notice of recommendation for your application, Case No. 4-2009, in Harding County, South Dakota. The notice of recommendation has been sent to the following newspapers for publication two times on or before July 22, 2009: Rapid City Journal, Capital Journal (Pierre), Black Hills Pioneer (Lead), and the Nation’s Center News (Buffalo).

The purpose of this letter is to advise you that it is your responsibility to serve notice on those persons “....whose property may be affected...” as specified in South Dakota Codified Laws 45-9-58.

Please file with this office the following:

1. Affidavit of Notification
2. Certified mail return receipts – at least 10 days prior to the intervention date
3. A list of persons notified

Thank you for your cooperation.

Sincerely,

Fred V. Steece
Oil and Gas Supervisor

Enclosure
IN THE MATTER OF THE APPLICATION OF LUFF EXPLORATION CO. TO MODIFY ITS PERMIT TO INJECT FOR THE I-18 STEARNS (NBRRU) WATER INJECTION WELL LOCATED IN THE NE ¼ SE ¼ SECTION 18, TOWNSHIP 22 NORTH, RANGE 4 EAST, NORTH BUFFALO RED RIVER UNIT, HARDING COUNTY, SOUTH DAKOTA, FOR THE PURPOSE OF EXTENDING THE EAST HORIZONTAL LATERAL DRILLED IN THE “B” ZONE OF THE RED RIVER FORMATION, AND PRESENTLY UTILIZED AS A WATER INJECTION WELL FOR THE LONG-TERM INJECTION FOR ENHANCED RECOVERY OF OIL FROM THE RED RIVER “B” RESERVOIR

NOTICE OF RECOMMENDATION FOR MAJOR MODIFICATION OF PERMIT TO INJECT

CASE NO. 4-2009

Notice is hereby given to the public and to all interested persons that pursuant to South Dakota Codified Laws (SDCL) Chapter 1-26 and Chapter 45-9 and further pursuant to the Administrative Rules of South Dakota (ARSD) 74:10:09 and ARSD 74:10:11.01 the following matter has come to the attention of the Secretary of the Department of Environment and Natural Resources, hereinafter “Secretary.”

Luff Exploration Co., Denver, Colorado, hereinafter “Luff,” has requested a major modification of its permit to inject authorized by Board of Minerals and Environment Order No. 7-2001. The request entails reentering the I-18 Stearns water injection well, located in the NE ¼ SE ¼ Section 18, Township 22 North, Range 4 East, North Buffalo Red River Unit, Harding County, South Dakota, to extend the existing east horizontal lateral drilled in the Red River Formation a distance of 1322 feet. The modification will allow continuation of long-term enhanced recovery of oil from the Red River “B” zone reservoir at a depth of approximately 9000 feet below land surface. The result of this major modification will add an additional area on to the originally approved radius of influence. The additional area includes an 842-foot radius of influence around the proposed eastern extension of the east lateral.

The existing I-18 Stearns well is completed with 2098 feet of 8 5/8-inch steel surface casing cemented top to bottom, and 9074 feet of 5 ½-inch steel casing cemented at intervals from the surface to total depth. The injection zone will be in the “B” zone of the Red River Formation. All potential injection water will come from the “B” zone of the Red River Formation from existing wells in the vicinity of the I-18 Stearns well. No domestic water wells are located within the one-half mile area of review.

The originally approved maximum injection pressure of 1700 pounds per square inch and the originally approved requested duration of the operation will remain the same. The remaining originally approved project life is approximately 12 years.

Since the original application was approved in 2001 by Board Order No. 7-2001, the Luff H-18H NBRRU production well was constructed in the one-half mile area of review in 2004. This well was constructed in a manner that protects all underground sources of drinking water. No additional wells exist in the recalculated radius of influence. Therefore, the Secretary recommends approval of the application without any additional conditions to the original permit to inject approved in 2001 and all conditions of the original permit will remain in effect.
Authority for the Secretary to approve this application is contained in ARSD 74:10:09 and ARSD 74:10:11.01. Unless a person files a petition requesting a hearing on the above application, pursuant to the provisions of ARSD 74:09:01 on or before August 10, 2009, the Secretary’s recommendation will be considered final and the Secretary will approve the application in accordance with that recommendation. For additional information regarding the application, please contact Fred V. Steece, Oil and Gas Supervisor, 2050 West Main Street, Suite #1, Rapid City, SD 57702, telephone 605-394-2229.

July 1, 2009

[Signature]

Steven M. Pirner
Secretary

Published twice at the total approximate cost of ____________.
MEMO TO: Luff I-18 Stearns NBRRU UIC File (2009 modification request)
FROM: Sheldon Hamann, Senior Hydrologist, Ground Water Quality Program
SUBJECT: Technical Review, Radius of Influence Calculations, and Recommendation and Conditions
DATE: June 30, 2009

RADIAL FLOW or EFFECTIVE RADIUS for the RED RIVER “B” ZONE

LUFF I-18 STEARNS HORIZONTAL INJECTION WELL
(with 1322’ proposed extension to existing eastern horizontal injection leg)

Total Injected Fluid to Date: 1,681,353 total barrels of water to date (Based on monthly injection reports through 4/2009)
Maximum Estimated Continued Injection Rate = 1000 Barrels of Water/Day
Expected Project Life = 12 More Years (originally permitted for 20 in 2001)
Porosity (θ) = 18% or .18 (as per porosity given in 2001 application)
Formation ‘Thickness’ (h) = 14’ (see perforated thicknesses in Section 4 of Application)
Total Estimated Amount to be Injected = Amount Injected to Date + Future
Projected Amount to be Injected = 1,681,353 total barrels of water to date (Through 4/2009) + 1000 BWPD * 365.25 Days/Year * 12 Years * 5.61 ft³/Barrel = 26,269,983 Total ft³ to be Injected over Life of Permit

TO DETERMINE EFFECTIVE RADIUS:

\[ V = \text{volume of box} + \text{volume of cylinder} \]

\[ V = (L \times h \times d \times \theta) \]

Volume of box = (L * h * d * θ), where
L = length of horizontal open hole (3,544’ original total leg [Southwest leg + 2000’ + Northeast leg = 1544’] + 1322’ Extension to Northeast leg) = 4866 New Calculated Total Linear Feet of Horizontal legs of well
h = thickness of injection zone (14’)

\( d = \text{diameter of influence} \)
\( \theta = \text{porosity (.18)} \)

volume of cylinder = \((\pi r^2 \cdot h \cdot \theta)\), since \(d = 2r\), \(d = r\), therefore volume of cylinder = \(\frac{(\pi \cdot [d]^2 \cdot h \cdot \theta)}{2}\), or, volume of cylinder = \(\frac{(3.14 \cdot d^2 \cdot h \cdot \theta)}{4}\), where

\( h = \text{thickness of injection zone (14'1)} \)
\( d = \text{diameter of influence} \)
\( \theta = \text{porosity (.18)} \)

\[ V = (d^2 \cdot h \cdot \theta \cdot \pi/4) + (d \cdot L \cdot h \cdot \theta), \] the quadratic equation indicates \(0 = ad^2 + bd + c\), where
\[ a = (h \cdot \theta \cdot \pi/4) = 1.979, \]
\[ b = (L \cdot h \cdot \theta) = 12,262, \text{ and} \]
\[ c = -26,269,983 \]

to solve for the quadratic equation \(d = \frac{-b \pm [b^2 - 4ac]^{1/2}}{2a}\)

therefore:
\[ d = \frac{-12,262 \pm [(12,262)^2 - (4)(1.979)(-26,269,983)]^{1/2},}{(2)(1.979)} \]
\[ d = \frac{-12,262 \pm [150,364,492 + 207,953,185.4]}{3.958} \]
\[ d = 1684, d = r, \text{ therefore radius of influence = 842'} \]

Total anticipated injection in total horizontal legs of the hole will be 26,269,983 barrels of water over the life of the permit. This would create an effective radius extending 842 feet from the injection tube.
All wells within the original area of review (1/2 mile radius of vertical portion of well) were completed properly to prevent contamination of any fresh water zones (Inyan Kara and Fox Hills Formations). The Luff H-18H Stearns (NBRRU) production well was constructed in 2004 (since last well review of the I-18 in 2001), and is in the 1/2-mile Area of Review. However, the well is constructed such that no underground sources of drinking water are endangered. Therefore, there is no problem with this additional well.

The original calculated radius of influence was less than 2640' (1/2-mile). The originally calculated 1470' effective radius from the injection tube did not incorporate any additional wells. The recalculated radius of influence due to the proposed addition of 1322 linear feet of open hole beyond the existing end of the northeast leg of the well will not incorporate any additional wells. Therefore, there are no problems with any wells in the radius of influence.

Overall, there is no problem with allowing this Major Modification Request, and it should therefore be approved without any additional conditions to the original Board Order.
# WELL COMPLETION OR RECOMPLETION REPORT

**Type of Completion:**
- [X] Oil Well
- Gas Well
- Injection
- Workover
- Deepen
- Plug Back
- [X] Other: Dual Horizontal laterals

**Name and Address of Operator:**
LUFF EXPLORATION COMPANY 1580 LINCOLN ST. STE. 850 DENVER CO 80203
303-861-2468

**Name and Address of Drilling Contractor and Rig No:**
Nabors Drlg. USA, Rig 42, Williston, ND C&H Well Service, Rig 104, Gillette, WY

**Surface Location of well:** Qtr-Qtr, Sec, Twp, Rge, County, feet from nearest lines of section, and latitude and longitude (if available):
SENE Sec. 18-22N 4E 1500' FNL & 200' FEL

**If Directional, top of pay and bottom hole location from nearest lines of section:**
- **SE leg - 8983'** MD=8928' TVD 1546' FNL & 143' FEL Sec. 18; 10564' MD=8941' TVD 2119' FNL & 1305' FWL Sec. 17
- **W leg - 8982'** MD=8928' TVD 1526' FNL & 338' FEL Sec. 18; 11662' MD=8914' TVD 1989' FNL & 2968' FEL Sec. 18

**Well Name and No.**
Stearns H-18

**Field and Pool, or Wildcat**
N. Buffalo Red River

**Permit No.**
1710

**API No.**
40 063 20581

**Date Issued**
5-20-04

**Spud Date**
5-29-04 Vert.
7-11-04 Horz.

**TD Date**
6-17-04
7-23-04

**Compl Date**
3215.7
7-30-04

**Elevation**
Graded

**Total Depth (MD & TVD)**
Vertical - 9020'MD
11662' MD=8914' TVD

**Plug Back TD (MD & TVD)**
8975' MD
8921'MD=TVD

**Producing Interval(s), this Completion, Top, Bottom, Name (MD & TVD)**
Red River B
SE leg - 8983'MD=8928'TVD to 10564'MD=8941'TVD
W leg - 8982'MD=8928'TVD to 11662'MD=8914'TVD

**No. of DST's Run One (see page 2)**

**Was Well cored?**
No

**List Intervals:**
- 2690

**Type Electric and Other Logs Run:**
- Induction, CNL, CBL, Gyro survey, MWD Directional surveys, Mud log w/GR
- Date Directional Survey Submitted Attached

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

<table>
<thead>
<tr>
<th>Hole Size</th>
<th>Casing Size</th>
<th>Weight (lb/ft)</th>
<th>Depth Set</th>
<th>Amount Pulled</th>
<th>Sacks and Type of Cement</th>
<th>Top of Cement</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 ½</td>
<td>8 5/8</td>
<td>24</td>
<td>1926</td>
<td>none</td>
<td>600 Prem. lite + 200 G</td>
<td>Surface</td>
</tr>
<tr>
<td>7 7/8</td>
<td>5 ½</td>
<td>15.5, 17, 23</td>
<td>9020</td>
<td>None</td>
<td>1st stage 76 Lite, 185 G</td>
<td></td>
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</table>

## TUBING RECORD

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<tr>
<th>Size</th>
<th>Weight (lb/ft)</th>
<th>Depth Set</th>
<th>Packer Type &amp; Depth</th>
<th>Size</th>
<th>Depth Intervals</th>
<th>Sacks and Type of Cement</th>
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<tbody>
<tr>
<td>2 7/8</td>
<td>6.5</td>
<td>8875</td>
<td>Anchor - 8749</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## LINER RECORD

<table>
<thead>
<tr>
<th></th>
<th>Sacks and Type of Cement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## PERFORATION RECORD

<table>
<thead>
<tr>
<th>Interval/Depth</th>
<th>Holes Per Ft.</th>
<th>Formation Isolated</th>
<th>Amount and Type of Cement used (indicate if squeeze cemented). Amount and Type of Acid and/or Sand used. Use additional page(s) if needed.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SE leg 8983' - 10564'</td>
<td>4 ½&quot; open hole</td>
<td>None</td>
<td></td>
</tr>
</tbody>
</table>
WELL CHRONOLOGY

05/30/04  Present Depth: 1721'. Present Operation: Drilling surface @ 1721'. 24 hr Footage: 1681'. Days from Spud: 1. Operations Summary: Continue to rig up to spud 12-1/4" surface hole. SPUD @ 0900 5/29/04. Drill 12-1/4" surface hole 40-1721' – ROP 88.47. Surveys: 3/4° @ 254'; 1/2° @ 612'; 1/2° @ 1054'; 3/4° @ 1499'. Bit #1A: 12-1/4", R/Tip, L117; Jets: 16x16x16, in @ 40', 1681' in 19 hrs. MWt: 8.33, Vis: 28.
Pump Pressure: 1050 psi, SPM 100

05/31/04  Present Depth: 1927'. Present Operation: Nipple up BOP and manifold and related equipment. 24 hr Footage: 206'. Days from Spud: 2. Operations Summary: Drill 12-1/4" surface hole 1681-1816' - ROP 135. Circ and cond hole for wiper trip @ 1816'. Wiper trip (hole tight on trip out). Wash and ream to bottom @1816'. Drill 12-1/4" surface hole 1816-1927' - ROP 111. Circ and cond hole for 8-5/8" casing. Drop survey. POOH to run 8-5/8" surface casing. LD 3-8" DC's. Run 45 jts 8/5/8", 24#, ST&C casing - total 1926' and set @ 1926' KB. Circ and cond hole for cement @ 1926' = .250 psi @ 110 SPM=325 GPM. Cement with 600 sx lead premium @ 12# ppg ; 200 sx tail “G” @ 15.8 ppg (CIP @ 2230 hrs). WOC. Cement to surface. Approximately 75 bbls good cement - 100% returns thru out job. Cement dropped down 1' and stayed. Cut off 16° & 8-5/8", weld on and test head to 800# for 15 mins - test OK. Start nipple up.
Surveys: 1/2° @ 1927'. Bit #1A: 12-1/4", R/Tip, L117; Jets: 16x16x16, in @ 40', out @ 1927', 1887' in 21 hrs. MWt: 8.33, Vis: 28. Pump Pressure: 1050 psi, SPM 100

06/01/04  Present Depth: 2788'. Present Operation: Drilling w/Bit #1 @ 2788'. 24 hr Footage: 862'. Days from Spud: 3. Operations Summary: Continue nipple up to test BOP's. Test BOP and all related equipment as per State of South Dakota. All tested OK – 250# 5 mins, 3000# 10 mins, Hydrl – 1000#, tested to 1500# - 15 mins. Rig service and RIH w/Bit #1 – tagged cement @ 1847'. Disp hole to invert w/50 bbls diesel spacer.
Drill cement plug, float, cement and shoe to 1926'. Drill 1926-2421' – ROP 66 @ reduced Wt 13K and pump rate @ 100 SPM=293 gals. Circ and WLS. Drill 2421-2788' – ROP 91.75 @ 22/25 Wt and pump rate @ 115 SPM = 330 gals. Surveys: 1/2° @ 2400'. Bit #1: 7-7/8", HTCO, GT-1; Jets: 12x12x12, in @ 1926', 862' in 11.5 hrs. MWt: 9.5, Vis: 66; PV/YP: 18/12; Gels: 8/12; WL 3.2: Salts: 55,000; Solids: 3.4%; O/W Ratio: 73/27. Pump Pressure: 1250 psi, SPM 115

06/02/04  Present Depth: 4582'. Present Operation: Drilling w/Bit #1 @ 4582'. 24 hr Footage: 1794'. Days from Spud: 4. Operations Summary: Drill 2788-2915' – ROP 84.6. Cir and WLS. Drill 2915-3518' – ROP 100.5. Cir and WLS. Rig service and function test BOP's. Drill 3518-4200' – ROP 85.25. Cir and WLS. Drill 4200-4493' – ROP 65.11. Rig service. Repair airline #2 pump clutch. Drill 4493-4582' – ROP 89.0. Surveys: 1/2° @ 2915'; 3/4° @ 3518'; 1° @ 4200'. Bit #1: 7-7/8", HTCO, GT-1; Jets: 12x12x12, in @ 1926', 2656' in 32.5 hrs. MWt: 9.3, Vis: 55; PV/YP: 14/13; Gels: 8/12; WL 3.0; Salts: 45,000; Solids: 3.2%; O/W Ratio: 76/24. Pump Pressure: 1350 psi, SPM 115
RTCO, TD-53A, 3-12’s, in @ 8176’, 569’ in 43.5 hrs. MWt: 9.0, Vis: 44; PV/YP: 12/7; Gels: 5/8; WL 2.8; Solids: 3.1%; O/W Ratio: 80/20. PP: 1460 psi, SPM 110.

06/15/04 Present Depth: 8930’. Present Operation: Circ and cond mud and hole for DST #1 RR B 8911-8930’. 24 hr Footage: 185’. Days from Spud: 17. Operations Summary: Drill from 8745-8885’- ROP 12.17’. Rig service & function test BOP’s. Drill from 8885-8930’- ROP 12.85. Circ and cond mud and hole for wiper trip. Hole taking 5 bbls hr while circ @ ECD 9.45. Wiper trip to 7000’. Check for losses. Hole static @ 7000’, lost 3 bbls in 1 hr (hole condition good). Circ and cond mud and hole at reduced pump rate 80 SPM = 235 GPM = losses while circ = 5.0 bbls. Bit #4: 7 7/8” RTCO, TD-53A, 3-12’s, in @ 8176’, out @ 8930’, 754’ in 58.5 hrs. MWt: 9.0, Vis: 45; PV/YP: 11/10; Gels: 5/8; WL 2.8; Solids: 2.6%; O/W Ratio: 80/20. PP: 850 psi, SPM 80

06/16/04 Present Depth: 8930’. Present Operation: POOH with DST #1. 24 hr Footage: 0. Days from Spud: 18. Operations Summary: Circ and cond mud and hole for DST #1 @ 8930’. Drop survey @ 8930’. POOH w/Bit #4. Use pipe spinners for trip out. PU and MU test tool. RIH w/DST #1. PU extra 6’ts DP (tightly going thru Dakota). DST #1 Red River B 8911-8930’. Tool open @ 2230 hrs CST 6/15/04; 30 mins/90 mins/300 mins. Surveys: 1/2@ 8930’. MWt: 9.0, Vis: 45; PV/YP: 12/9; Gels: 5/8; WL 2.7; Salts: 50,000; Solids: 2.6%; O/W Ratio: 80/20. Pump Pressure: 850 psi, SPM 80

06/17/04 Present Depth: 9020’. Present Operation: POOH for E logs. 24 hr Footage: 90’. Days from Spud: 19. Operations Summary: POOH with DST #1. Headup and reverse out. POOH with DST #1. Drain sample chamber. Break down and load out tools. RIH w/Bit #5. Break circ @ 4000’ & 7000’. Continue RIH to 8870’ kelleyup – break circ. Wash and ream to bottom @ 8930’. Drill 8930-9020’ – ROP 12.0. Circ and cond mud and hole for E logs. POOH for E logs. Bit #5: 7-7/8”, STCO, Fl-30VR; Jets: 13x13x13, in @ 8930’, out @ 9020’, 90’ in 7.5 hrs. MWt: 9.1+, Vis: 50; PV/YP: 14/12; Gels: 7/10; WL 2.7; Salts: 50,000; Solids: 3.5%; O/W Ratio: 81/19. Pump Pressure: 1250 psi, SPM 110

06/18/04 Present Depth: 9020’. Present Operation: RIH w/Bit #5. Run to circ and cond for 5-1/2” casing. 24 hr Footage: 0’. Days from Spud: 20. Operations Summary: POOH for E logs (Dakota tight). RU Schlumberger. Log – logger’s depth 9024’ – driller’s depth 9020’. RD Schlumberger. RIH w/Bit #5 to 1900’. Wait on casing. Clean shaker tank and sand trap. Pull wear ring. Cont RIH and break circ @ 4370’. Cont RIH. Bit RR #5: 7-7/8”, STCO, Fl-30VR; Jets: 13x13x13, in @ 8930’, out @ 9020’, 90’ in 7.5 hrs. MWt: 9.1+, Vis: 50; PV/YP: 14/12; Gels: 7/10; WL 2.7; Salts: 50,000; Solids: 3.5%; O/W Ratio: 81/19. Pump Pressure: 1250 psi, SPM 110

06/19/04 Present Depth: 9020’. Present Operation: RU to circ 5-1/2” casing to bottom. 24 hr Footage: 0’. Days from Spud: 21. Operations Summary: Cont RIH to 8930’. Wash 90’ to bottom @ 9020’. Circ and cond mud and hole for 5-1/2” casing. LD DP, DC’s and break Kelly. RU casing crew and run 209’ts 5-1/2” casing – total pipe run 9021.77’. Break circ @ 4500’ and 7000’ – run to bottom @ 9020’.
MWt: 9.0+, Vis: 50; PV/YP: 12/12; Gels: 6/9; WL 2.6; Salts: 50,000; Solids: 2.2%; O/W Ratio: 81/19. Pump Pressure: 275 psi, SPM 85

06/20/04 Present Depth: 9020’. Present Operation: Rig down. 24 hr Footage: 0’. Days from Spud: 22. Operations Summary: Circ 5-1/2” casing on bottom @ 8020’ @ 85 SPM/65PM @ 275 psi. Cement 1st stage w/115 sx Premium Lite and tail w/175 sx G, bump plug and test float. Drop bomb and open DV tool @ 900 psi. Circ for 2nd stage @ 85 SPM/250 psi @ 65PM (circ out 12 bbls cement). Cement 2nd stage with 140 sx Premium Lite and tail w/430 sx G, bump plug and close DV tool @ 3200 psi. Good returns thru out cement job. ND BOP, set slip @ 130K and make rough cut 5-1/2” casing. Clean mud tanks and RD. MWt: 8.9+, Vis: 44; PV/YP: 10/9; Gels: 5/7; WL 2.8; Salts: 46,000; Solids: 3.5%; O/W Ratio: 82/18.

5-1/2” casing record:

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<tr>
<th>Interval</th>
<th>Length</th>
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<tbody>
<tr>
<td>Shoe 9020.00’ - 9019.26’</td>
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<tr>
<td>1 shoe jt N-80 17# 9019.26’ - 8976.66’</td>
<td>42.60’</td>
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<td>Float 8976.66’ - 8974.98’</td>
<td>1.68’</td>
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<td>44 jts N-80 17# 8974.98’ - 7085.30’</td>
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<td>DV Tool 7085.30’ - 7083.13’</td>
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<td>22 jts N-80 17# 7083.13’ - 6138.58’</td>
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<td>9 jts P-110 23# 6138.58’ - 5732.21’</td>
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<td>91 jts J-55 15.5# 5732.21’ - 1808.07’</td>
<td>3924.14’</td>
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<tr>
<td>42 jts N-80 17# 1808.07’ - Surface</td>
<td>1808.07’</td>
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06/21/04 Present Depth: 9020’. Present Operation: Rig down and load out rig. 24 hr Footage: 0’. Days from Spud: 23. Operations Summary: Rig down, lay derrick over and load out rig - 80% rigged down. FINAL REPORT. Rig released 6/20/04.

06/22/04 WO completion rig.

06/23/04 MIRU. Install BOP. PU 4-1/2” bit, 5-1/2” casing scraper and 4-9/16” string mill. Start picking up tubing. Picked up 150 jts. SDFN.

06/24/04 Tag up @ 7023’ KB. RU circulator and power swivel. Drill up cement stringers down to DV collar. Drill up DV collar. Stand back power swivel. RIH. Tag up @ 8895’ KB. SDFN.

06/25/04 RU power swivel. Drill down to TD @ 8974’. Circ hole clean. Pressure casing to 1000#. Held on 15 min test. RD power swivel. LD 150 jts. SDFN.

06/28/04 Finish laying down tubing. Remove BOP. RU High Plains. RIH with GR/CC/CBL-VDL tool. Log well under 1000# pressure. Top of cement @ 2690’. RD High Plains. RD.
# PRODUCTION

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<tr>
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<th>Producing Method (Flowing, gas lift, pumping - size and type of pump)</th>
<th>Well Status (Producing or shut-in)</th>
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<td>Pumping 1.75&quot; rod pump</td>
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<tr>
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<th>Hours Tested</th>
<th>Choke Size</th>
<th>Production For Test</th>
<th>Oil (Bbls)</th>
<th>Gas (Mcf)</th>
<th>Water (Bbls &amp; %)</th>
<th>Oil Gravity - API (Corr.)</th>
<th>Gas-Oil Ratio</th>
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<td>33.8</td>
<td>308 70%</td>
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Disposition of Oil (Purchaser and Transporter), and Gas (sold, used for fuel, vented, etc.)
Teppco/Plains Gas used for fuel and vented

Test Witnessed By
K. Barnhart

List of Attachments/Comments
Directional Survey

# GEOLOGIC MARKERS

<table>
<thead>
<tr>
<th>FORMATION NAME AND BRIEF DESCRIPTION</th>
<th>MEASURED DEPTH</th>
<th>TRUE VERTICAL DEPTH</th>
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<td>Red River</td>
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</tbody>
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Use additional page(s) if needed.

# DRILL STEM TEST DATA

Drill Stem Test Results Attached
If not attached, list Depth Interval Tested, Cushion Used, Time Tool Open, Flowing and Shut-in Pressures, and Recoveries.

Previously sent.

Use additional page(s) if needed.

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

Robert C. Arceneaux
Signature

Robert C. Arceneaux
Name (Print)

Operations Mgr
Title
Date: 9-14-04

FOR OFFICE USE ONLY

Approved By: Title: Operations Mgr
Date: SEP 24 2004
07/02/04  Present depth: 9020’. Present Operation: MIRU C&H Rig #104. Operations Summary: MIRU C&H Rig and equipment – 100% moved and 35% rigged up.


07/13/04  Present Depth: 8950’ MD, 8920’ TVD. Present Operation: RU swivel to sidetrack @ 8921’. 24 hr Footage: 70’. Days from Spud: 2. Operations Summary: Dir drill 4-1/2” build section 8880-8921’. Saw high build rates. Circ hole clean. RD swivel. POOH. LD bit. MU Baker 4-1/2” Dir Assy #2. Change motor bent housing E3.4” to 2.7”. Surface test tools – OK. Rerun bit. RIH to 5721’. Saw tight spot. Work thru several times. Pull 5K overpull and 5K set down thru tight spot. RIH to 8921’. RU swivel. Pump up survey. Showed 121 L toolface. Work up. Dir drill 4-1/2” build section 8921-8950’. First survey from new motor. Adjustment showed 56.4” incl, previous incl 58.4”. Appeared motor housing unscrewed or tool was scribed wrong. POOH. Inspect Baker BHA. Found tool scribed wrong. Had 56°, should have been 156° - 100° off. LD tools. MU Baker 4-1/2” Dir Assy #3 (bent housing 2.8”). Surface test tools – OK. RIH to 8921’ to sidetrack. Daily water loss 42 bbls; total water loss 42 bbls. Bit #1: 4-1/2” RTC, S13AKPR, Jets: 24x24x24, in @ 8829’, out @ 8921’, 92’ in 7.5 hrs. Bit #2RR: 4-1/2”, RTC, S13AKPR, Jets: 24x24x24, in @ 8829’, out @ 8950’, 29’ in 3.5 hrs. MWt: 8.5, Vis: 27. Pump Pressure: 1350 psi, SPM 60

07/14/04  Present Depth: 9011’ MD, 8928’ TVD. Present Operation: RIH w/Baker 4-

07/15/04 Present Depth: 9861′ MD, 8933′ TVD. Present Operation: Dir drill ahead. 24 hr Footage: 850′. Days from Spud: 4. Operations Summary: RIH w/Baker 4-1/2″ Steerable Assy #4. Dir drill 4-1/2″ hole 9011-9861′. Local dip is flat. Max gas 4000 units Upper B, 3000 units Lower B. Upper B porosity is 1.4″ thick – excellent shows. Daily water loss 380 bbls; total water loss 422 bbls. Bit #4: 4-1/2″, RTC, SI53AKPR, Jets: 24x24x24, in @ 9011′, 850′ in 22.5 hrs. MWT: 8.5, Vis: 27. PP: 1550 psi, SPM 63

07/16/04 Present Depth: 10,564′ MD, 8942′ TVD. Present Operation: LD excess DP. 24 hr Footage: 703′. Days from Spud: 5. Operations Summary: Dir drill 4-1/2″ hole 9861-10,366′. Circ samples up. Survey. No Upper B samples. 1000 units gas. Dir drill 4-1/2″ hole 10,366-10,564′ MD, 8942′ TVD. Unable to turn and maintain direction. TD lateral due to hardline. TD is 19° north of the south hardline. Max gas 3815 units. 25% oil covering possum belly. Pump HV sweeps. Circ hole clean. Disp lateral w/inhibited fresh water. RD swivel. LD excess 2-7/8″ DP. Daily water loss 667 bbls; total water loss 1089 bbls. Bit #4: 4-1/2″, RTC, SI53AKPR, Jets: 24x24x24, in @ 9011′, out @ 10,564′, 1553′ in 42 hrs. MWT: 8.6, Vis: 28. Pump Pressure: 1700 psi, SPM 65


07/22/04 Present Depth: 10,236’ MD, 8927’ TVD. Present Operation: Dir drill West Lateral. 24 hr Footage: 937’. Days from Spud: 11. Operations Summary: Dir drill 4-1/2” hole 9299-10,236’. Max gas 4000 units. Upper B porosity 2.0’ thick. 10% oil covering possum belly. Dip rate – flat to 10,075’ then went to 1.3’/100’ up dip. Gamma Ray went out @ 9457’ MD. Daily water loss 887 bbls; total water loss 3104 bbls. Bit #7: 4-1/2”, HTC, STX-30, Jets: 24x24x24, in @ 8996’, 1240’ in 31.5 hrs MWh: 8.6, Vis: 28. Pump Pressure: 1750 psi, SPM 66

07/23/04 Present Depth: 11,204’ MD, 8924’ TVD. Present Operation: Dir drill West Lateral. 24 hr Footage: 968’. Days from Spud: 12. Operations Summary: Dir drill 4-1/2” hole 10,236-11,204’. Max gas 4000 units. Upper B porosity 2.0’ thick. 50% oil covering possum belly. Dip rate – 1.7’/100’ up dip. Daily water loss 925 bbls; total water loss 4029 bbls. Bit #7: 4-1/2”, HTC, STX-30, Jets: 24x24x24, in @ 8996’, 2208’ in 55.5 hrs. MWh: 8.6, Vis: 28. Pump Pressure: 1850 psi, SPM 66

07/24/04 Present Depth: 11,662’ MD, 8914’ TVD. Present Operation: LD Baker 4-1/2” dir tools. 24 hr Footage: 458’. Days from Spud: 13. Operations Summary: Dir drill 4-1/2” hole 11,204-11,662’. TD well due to lost porosity – 0.6’ thick. Pump HV sweep. Hole hole clean. Disp hole w/inhibited fresh water. POOH. LD Baker BHA #8. Motor checked out OK. Bit 30% worn and in gauge. Daily water loss 975 bbls; total water loss 5004 bbls. Bit #7: 4-1/2”, HTC, STX-30, Jets: 24x24x24, in @ 8996’, out @ 11,662, 2666’ in 72.5 hrs. MWh: 8.6, Vis: 28. Pump Pressure: 1875 psi, SPM 63


07/26/04 Present Depth: 11,662’ MD, 8914’ TVD. Present Operation: Secure well. Release C&H Rig #104. Days from Spud: 15. Operations Summary: Dump and clean mud tank. RD swivel and rack on skid. RD tongs and floor equipment. ND flowline. ND BOP config and choke manifold. NU wellhead flange and secure well. Release C&H Rig #104 7-25-04. FINAL REPORT.
Cement Program

Surface Casing

8 5/8" casing in 12 1/4" hole, 600' 5x Premium Cement @ 12#/gal. = Lite Cement 1.24 + 4 1/2#/gal. 8 due to loss to formation.

(600'X1.24)+4.5/538 = 2139 linear feet cement in 1926' deep cycle = Cement to surface

Production casing

5 1/2" casing in 7 7/8" hole = 57719 linear feet / 43.8. Due to loss to formation.

1st stage: 5 1/2" casing in 7 7/8" hole = 57719 linear feet / 43.8. 115 5x Premium Lite Cement @ 1.84 + 4 1/2#/gal. Tailed by 146 5x Class "G" cement @ 1.15 + 4 1/2#/gal. 8 due to loss to formation. 9020' deep cylinder.

(115'X1.15+4.5/538)X5.7719 Linear 43'X8 = 977 Linear Feet Cement + (146'X1.15+4.5/538)X5.7719 Linear 43'X8 = 929 Linear Feet Cement = 1906 total Linear (cont.)

Cement in 9020'

2nd stage: DU tool 7084' deep, B.O.C. 1905x Premium Light Cement @ 1.84 + 4 1/2#/gal. Tailored by 435x Class "G" cement @ 1.15 + 4 1/2#/gal.

(140'X1.84+4.5/538)X8 = 1187 linear feet cement + (435'X1.15+4.5/538)X8 = 57719 linear feet cement = 2293 linear feet cement total in 7084' deep cylinder = 3612' calculated top of cement

3612' T.O.C. CAC. ALL fluid bearing formation cement off from each other. No problem with this well.

Created by: S.R. Hamann 6/16/2009

Cast iron bridge plug set @ 8921' deep when drilling horizontal tail legs.

West leg - 11, 662' total made depth - 8812' mill window = 2850 total feet open hole

9020' Southeast leg - 10, 866' total made depth - 8824' deep mill window = 1740' total open hole
APPLICATION FOR PERMIT TO DRILL

Type of Work:  
- [ ] Drill New Well  
- [ ] Extend Existing Well  
- [ ] Drill Directional Well  
- [ ] Other  
Type of Well:  
- [ ] Oil Well  
- [ ] Gas Well  
- [x] Injection

Name and Address of Owner:  
LUFF EXPLORATION COMPANY, 1580 LINCOLN STREET, SUITE 850, DENVER, CO 80203  
Telephone: (303) 861-2468

Name and Address of Surface Owner:  
Stearns Brothers, P.O. Box 890, Bowman, ND 58623

Name and Address of Drilling Contractor and Rig Number:  
Key Energy Services, Inc., 115 34th St. West, Williston, ND 58801, Rig #233

Surface Location of Well:  
- Qtr-Qt, Sec, Twp, Rge, County, Feet from Nearest Lines of section, and latitude and longitude (if available):  
  NESE Sec. 18-T22N-R4E, Harding County, 1650' FSL x 990' FEL; Lat = 45° 52' 4.967", Long = 103° 40' 12.021"

If Directional, top of pay and bottom hole location from nearest lines of section:  
- East Lateral Extension: Top est @ 11,722' MD = 8857' TVD; BHL 1650' FWL x 1650' FSL, Sec.17-T22N-R4E

Acres in Spacing (Drilling) Unit  
Total Unitized area: approx. ± 28744.44 acres  
Description of Spacing Unit:  
North Buffalo Red River Unit

| Steams I-18 WIW | 1) 12-1/4" | 8-5/8" | 24# | 2098' | 925 sks | 4930' | Surf
| Size of Hole | Size of Casing | Weight per Foot | Depth | Cementing Program (amount, type, additives) | Depth |
| 2) 7-7/8" | 5-1/2" | 15.5#:17#, 20#, & 23# | 9074' | 1420 sks - Two Stage |
| 3) | | | |
| 4) | | | |

Describe Proposed Operations (Clearly State all Pertinent Details, and Give Pertinent Dates, Including Estimated Date of Starting any Proposed Work). Use Additional Page(s) if appropriate.

Estimated start date of July 5, 2009. Original Permit # 1327 issued on 7/23/84. Re-Entry Permit #1658 issued 11/13/00. Original API # 40 063 20407. Re-Entry API # 40 063 20407.01

Propose to re-enter and kick off @ 10,400' MD, extending the east lateral to approximately 11,722' MD, 8857' TVD. A fresh wtr/polymer will be used to drill the extension. All drilling fluids and cuttings will be contained in a pit lined with 12 mil plastic. All liquids will be disposed of in an approved manner, the liner and the cuttings will be buried in place. Completion will be open hole in the horizontal section.

I hereby certify that the foregoing as to any work or operation performed is a true and correct report of such work or operation.

Signature:  
David A. Norby  
Operations Manager  
6/3/09

FOR OFFICE USE ONLY

Approved by:  
Title: Oil and Gas Supervisor  
Permit No: 1943  
API No: 40 063 20407.02  
Date Issued: June 19, 2009

Conditions, if any, on attached page.
June 29, 2009

Via Federal Express Overnight Package

Mr. Sheldon Hamann
South Dakota Department of
Environment and Natural Resources
523 East Capitol Avenue
Pierre, South Dakota 57501

RE: Proposed Horizontal Re-Entry
Stearns I-18 WIW
North Buffalo Red River Unit
Buffalo Field
Harding County, South Dakota

Dear Mr. Hamann:

Luff Exploration Company has filed an application with the Oil and Gas Program of the SD-DENR to extend the east horizontal lateral in the Stearns I-18, a horizontal water injection well in the North Buffalo Red River Unit.

By this letter, Luff is also requesting that the proposed well work be considered a major modification for Underground Injection Control (UIC) permit purposes.

The proposed well work, in concert with horizontal lateral extensions for the offsetting horizontal producing wells, is designed to improve sweep efficiency and increase secondary recovery of oil. The attached plat shows the proposed lateral extensions. The application for the horizontal re-entry is on file with the Rapid City office of the Oil and Gas Program.

Luff is not requesting any changes to the maximum daily water injection rate, nor the maximum surface injection pressure, at this time.

Please let me know if you have questions or comments.

Very Truly Yours,

LUFF EXPLORATION COMPANY

Richard D. George
Manager of Engineering

Cc Fred Steece, SD-DENR, Oil & Gas Program
John Morrison, Fleck Mather & Strutz

1580 LINCOLN STREET • SUITE 850 • DENVER, COLORADO • 80203 • 303.861.2468 • FAX 303.861.2481
Approval letter
see Luff april
21-2008
NOR
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In June I issued permit 1943 to extend lateral on Ministry W I W

Now we are approving a major mod
As they have a bigger "hot dog" type volume.