

Dist  
1301  
Phone:(505) 748-8333 Fax:(505) 748-9720

**State of New Mexico**  
**Energy, Minerals and Natural Resources**  
**Oil Conservation Division**  
**1220 S. St Francis Dr.**  
**Santa Fe, NM 87505**

Form C-101  
Permit 50081

Month - Year  
MAR 29 2007  
OCD - ARTESIA, NM

**APPLICATION FOR PERMIT TO DRILL, RE-ENTER, DEEPEN, PLUGBACK, OR ADD A ZONE**

1. Operator Name and Address RANGE OPERATING NEW MEXICO INC 777 MAIN STREET FT WORTH, TX 76102		2. OGRID Number 227588  3. API Number 30-015-35514
4. Property Code 300270	5. Property Name SOUTH CULEBRA BLUFF 23	6. Well No. 021

**7. Surface Location**

UL - Lot	Section	Township	Range	Lot Idn	Feet From	N/S Line	Feet From	E/W Line	County
I	23	23S	28E	I	2460	S	1160	E	EDDY

**8. Pool Information**

LOVING;BRUSHY CANYON, EAST	40350
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**Additional Well Information**

9. Work Type New Well	10. Well Type I	11. Cable/Rotary Rotary	12. Lease Type Private	13. Ground Level Elevation 2997
14. Multiple N	15. Proposed Depth 6350	16. Formation Brushy Canyon	17. Contractor	18. Spud Date 5/4/2007
Depth to Ground water 75		Distance from nearest fresh water well		Distance to nearest surface water
Pit: Liner: Synthetic <input type="checkbox"/> mls thick      Clay <input type="checkbox"/> Pit Volume:      bbls      Drilling Method: Closed Loop System <input checked="" type="checkbox"/> Fresh Water <input checked="" type="checkbox"/> Brine <input type="checkbox"/> Diesel/Oil-based <input type="checkbox"/> Gas/Air <input type="checkbox"/>				

**19. Proposed Casing and Cement Program**

Type	Hole Size	Casing Type	Casing Weight/ft	Setting Depth	Sacks of Cement	Estimated TOC
Surf	12.25	8.625	24	300	350	0
Prod	7.875	5.5	15.5	6350	1670	0

**Casing/Cement Program: Additional Comments**

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**Proposed Blowout Prevention Program**

Type	Working Pressure	Test Pressure	Manufacturer
DoubleRam	3000	3000	Schaffer

I hereby certify that the information given above is true and complete to the best of my knowledge and belief. I further certify that the drilling pit will be constructed according to NMOCD guidelines <input checked="" type="checkbox"/> a general permit <input type="checkbox"/> or an (attached) alternative OCD-approved plan <input type="checkbox"/> . Printed Name: <u>Linda C. Stiles</u> Title: <u>Sr Engineering Tech</u> Email Address: <u>lstiles@rangeresources.com</u> Date: <u>3-26-2007</u> Phone: <u>817-810-1908</u>	<b>OIL CONSERVATION DIVISION</b>  Approved By: <b>BRYAN G. ARRANT</b> Title: <b>DISTRICT II GEOLOGIST</b> Approved Date: <b>MAR 30 2007</b> Expiration Date: <b>MAR 30 2008</b>
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District I

1625 N. French Dr., Hobbs, NM 88240

District II

1301 W. Grand Ave., Artesia, NM 88210

District III

1000 Rio Brazos Rd., Aztec, NM 87410

District IV

1220 S. St Francis Dr., Santa Fe, NM 87505

**State of New Mexico****Energy, Minerals and Natural Resources****Oil Conservation Division****1220 S. St Francis Dr.****Santa Fe, NM 87505**Form C-102  
Permit 50081Month - Year  
MAR 29 2007  
OCD - ARTESIA, NM**WELL LOCATION AND ACREAGE DEDICATION PLAT**

1. API Number	2. Pool Code 40350	3. Pool Name LOVING;BRUSHY CANYON, EAST
4. Property Code 300270	5. Property Name SOUTH CULEBRA BLUFF 23	6. Well No. 021
7. OGRID No. 227588	8. Operator Name RANGE OPERATING NEW MEXICO INC	9. Elevation 2997

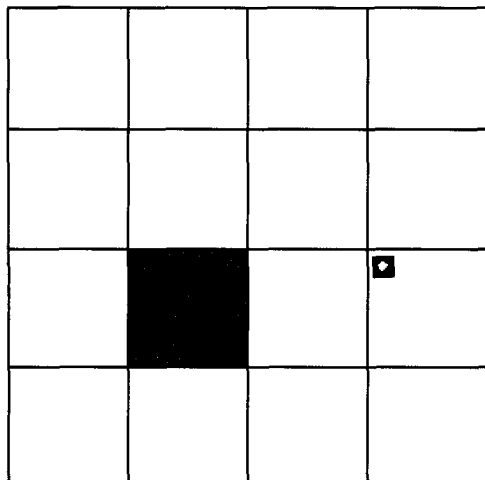
**10. Surface Location**

UL - Lot I	Section 23	Township 23S	Range 28E	Lot Idn I	Feet From 2460	N/S Line S	Feet From 1160	E/W Line E	County EDDY
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**11. Bottom Hole Location If Different From Surface**

UL - Lot	Section	Township	Range	Lot Idn	Feet From	N/S Line	Feet From	E/W Line	County
12. Dedicated Acres 40.00		13. Joint or Infill		14. Consolidation Code		15. Order No.			

**NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION**

**OPERATOR CERTIFICATION**

*I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location(s) or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.*

E-Signed By: *George C. Aguirre*

Title: Sr Engineering Tech

Date: 3-26-2007

**SURVEYOR CERTIFICATION**

*I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.*

Surveyed By: Gary Eidson

Date of Survey: 1/2/2007

Certificate Number: 12641

## State of New Mexico

Energy, Minerals and Natural Resources Department

## DISTRICT I

1625 N. FRENCH DR., HORBS, NM 88240

## DISTRICT II

1301 W. GRAND AVENUE, ARTESIA, NM 88210

## DISTRICT III

1000 Rio Brazos Rd., Aztec, NM 87410

## DISTRICT IV

1220 S. ST. FRANCIS DR., SANTA FE, NM 87505

## OIL CONSERVATION DIVISION

1220 SOUTH ST. FRANCIS DR.

Santa Fe, New Mexico 87505

North - West  
MAR 29 2007  
OCD - ARTESIA, NMRevised October 2005  
Submit to Appropriate District  
State Lease Policies  
Fee Lease - 4 Copies

## WELL LOCATION AND ACREAGE DEDICATION PLAT

☐ AMENDED REPORT

API Number	Pool Code 4c35c	Pool Name Loving; Brushy Canyon, East
Property Code	Property Name SCB 23	Well Number 21
OGRID No.	Operator Name RANGE OPERATING NEW MEXICO, INC.	Elevation 2997'

## Surface Location

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
1	23	23-S	28-E		2460	SOUTH	1160	EAST	EDDY

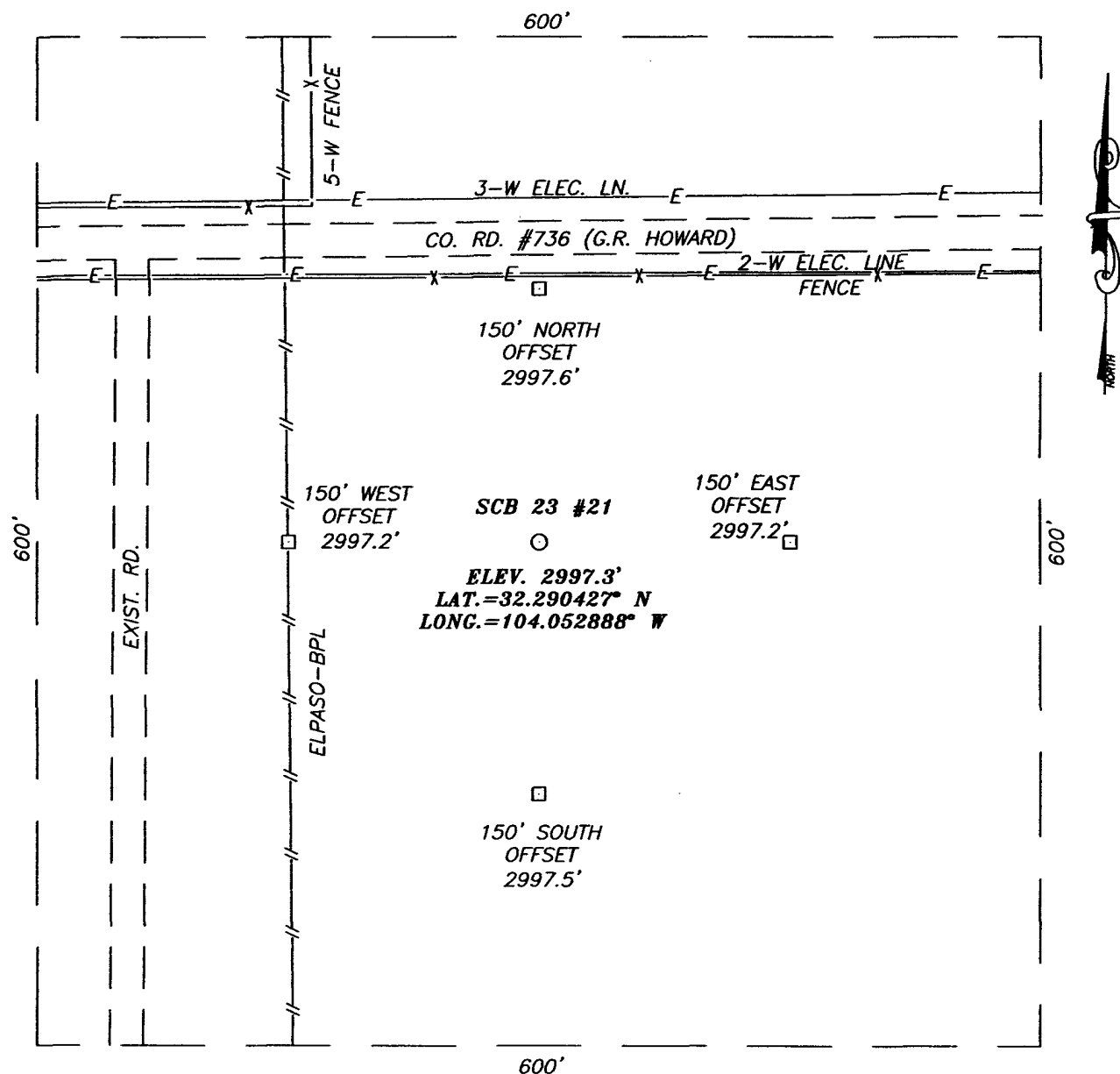
## Bottom Hole Location If Different From Surface

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
Dedicated Acres	Joint or Infill	Consolidation Code	Order No.						

NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED  
OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

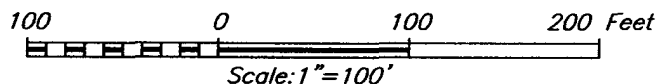
<p>GEODETIC COORDINATES NAD 27 NME</p> <p>Y=469487.6 N X=586661.5 E</p> <p>LAT.=32.290427° N LONG.=104.052888° W</p>		<p>1160'</p> <p>2460'</p>	<p><b>OPERATOR CERTIFICATION</b></p> <p>I hereby certify that the information herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.</p> <p><i>William F. Frey</i> 1/29/07 Signature Date</p> <p>William F. Frey Printed Name</p> <p><b>SURVEYOR CERTIFICATION</b></p> <p>I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.</p> <p>JANUARY 2, 2007</p> <p>Date Surveyed AR</p> <p>Signature &amp; Seal of Professional Surveyor</p> <p><i>Gary L. Edson</i> 1/10/07 06.11.1402</p> <p>Certificate No. GARY EDSON 12641</p>
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**SECTION 23, TOWNSHIP 23 SOUTH, RANGE 28 EAST, N.M.P.M.,**  
 EDDY COUNTY, NEW MEXICO



**DIRECTIONS TO LOCATION**

FROM THE INTERSECTION OF CO. RD. #740 (DONALDSON FARM RD.) AND CO. RD. #736 (G.R. HOWARD RD.), GO EAST ON CO. RD. #736 APPROX. 0.8 MILES. THIS LOCATION IS APPROX. 180 FEET SOUTH.



**RANGE OPERATING NEW MEXICO, INC.**

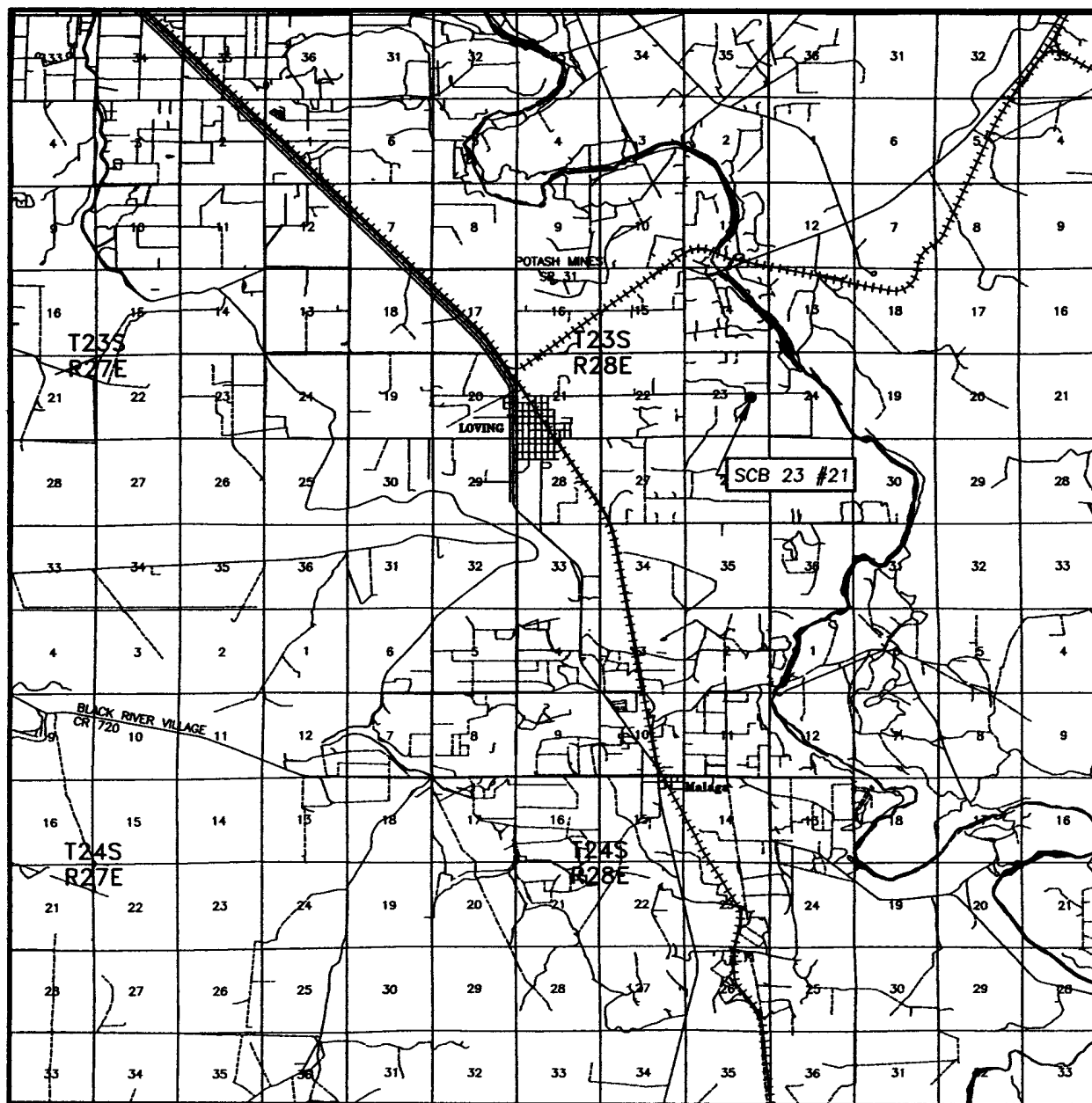
SCB 23 #21  
 LOCATED 2460 FEET FROM THE SOUTH LINE  
 AND 1160 FEET FROM THE EAST LINE OF SECTION 23,  
 TOWNSHIP 23 SOUTH, RANGE 28 EAST, N.M.P.M.,  
 EDDY COUNTY, NEW MEXICO.

Survey Date: 01/02/07		Sheet 1 of 1 Sheets	
W.O. Number: 06.11.1402		Dr By: AR	Rev 1:N/A
Date: 01/05/07	Disk: CD#6	06111402	Scale: 1"=100'




PROVIDING SURVEYING SERVICES  
 SINCE 1946  
**JOHN WEST SURVEYING COMPANY**  
 412 N. DAL PASO  
 HOBBS, N.M. 88240  
 (505) 393-3117

# VICINITY MAP



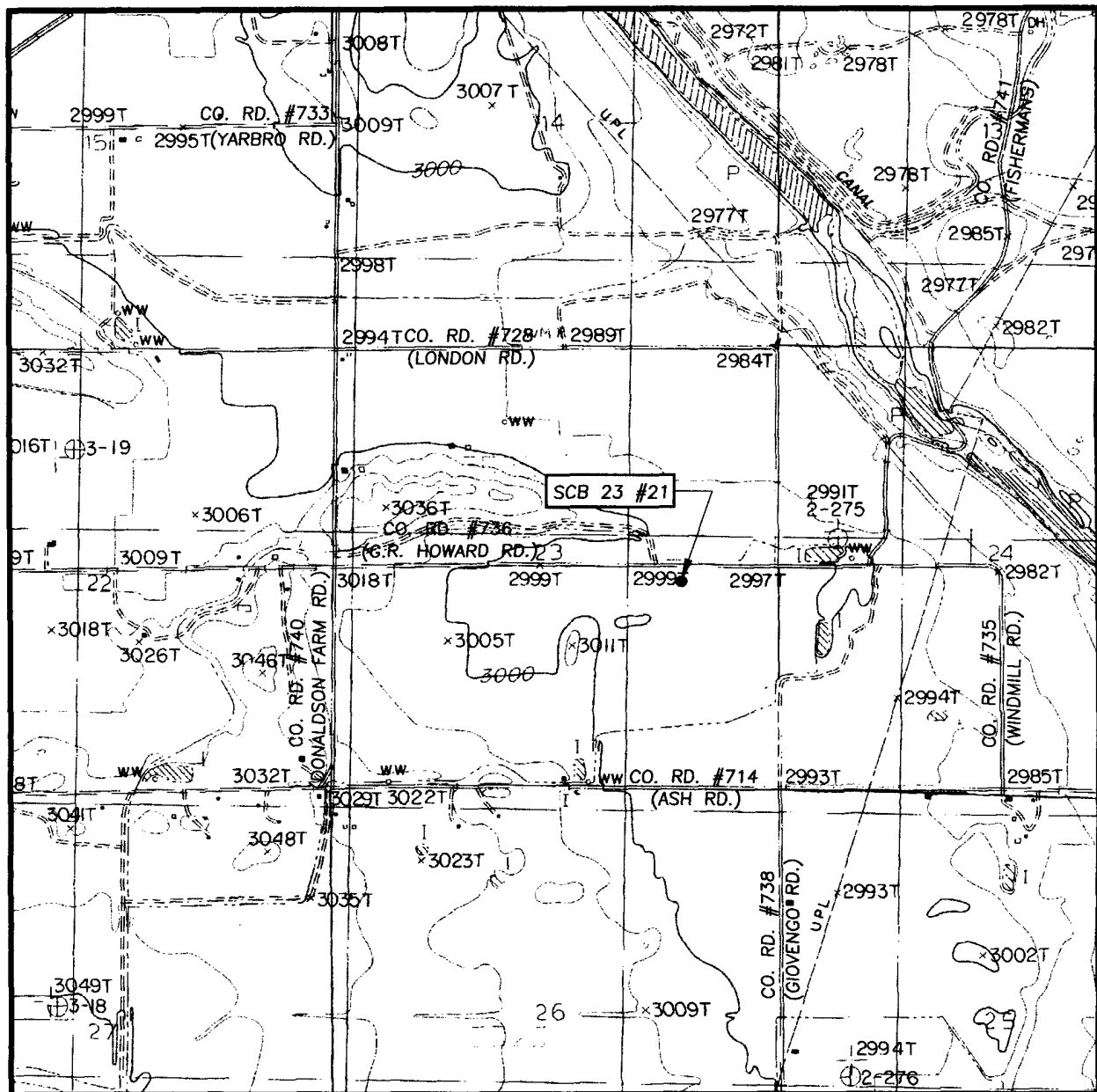
SCALE: 1" = 2 MILES

SEC. 23 TWP. 23-S RGE. 28-E  
 SURVEY N.M.P.M.  
 COUNTY EDDY STATE NEW MEXICO  
 DESCRIPTION 2460' FSL & 1160' FEL  
 ELEVATION 2997'  
 OPERATOR RANGE OPERATING  
NEW MEXICO, INC.  
 LEASE SCB 23



PROVIDING SURVEYING SERVICES  
 SINCE 1946  
**JOHN WEST SURVEYING COMPANY**  
 412 N. DAL PASO  
 HOBBS, N.M. 88240  
 (505) 393-3117

# LOCATION VERIFICATION MAP



SCALE: 1" = 2000'

CONTOUR INTERVAL:  
LOVING, N.M. - 10'

SEC. 23 TWP. 23-S RGE. 28-E

SURVEY N.M.P.M.

COUNTY EDDY STATE NEW MEXICO

DESCRIPTION 2460' FSL & 1160' FEL

ELEVATION 2997'

OPERATOR RANGE OPERATING  
NEW MEXICO, INC.

LEASE SCB 23

U.S.G.S. TOPOGRAPHIC MAP  
LOVING, N.M.

PROVIDING SURVEYING SERVICES  
SINCE 1946

**JOHN WEST SURVEYING COMPANY**

412 N. DAL PASO  
HOBBS, N.M. 88240  
(505) 393-3117

STATE OF NEW MEXICO  
ENERGY, MINERALS, AND NATURAL RESOURCES DEPARTMENT  
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING  
CALLED BY THE OIL CONSERVATION  
DIVISION FOR THE PURPOSE OF  
CONSIDERING:

CASE NO. 13705  
ORDER NO. R-12601

APPLICATION OF RANGE OPERATING NEW MEXICO, INC. FOR APPROVAL OF ITS EAST LOVING DELAWARE LEASEHOLD PILOT WATERFLOOD PROJECT INCLUDING SIX INJECTION WELLS TO BE LOCATED AT UNORTHODOX WELL LOCATIONS AND QUALIFICATION OF THE PROJECT AREA FOR THE RECOVERED OIL TAX RATE PURSUANT TO THE ENHANCED OIL RECOVERY ACT, EDDY COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This case came on for hearing at 8:15 a.m. on May 11, June 8 and July 6, 2006, at Santa Fe, New Mexico, before Examiners David R. Catanach, William V. Jones, and Richard Ezeanyim, respectively.

NOW, on this 26<sup>th</sup> day of July, 2006, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner,

FINDS THAT:

(1) Due public notice has been given, and the Division has jurisdiction of this case and its subject matter.

(2) The applicant, Range Operating New Mexico, Inc. ("applicant" or "Range"), seeks authority to institute a leasehold pilot waterflood project within the following-described area by the injection of produced water into the Brushy Canyon interval of the Delaware formation, East Loving-Brushy Canyon Pool, through six proposed injection wells located at locations considered unorthodox for producing wells in Section 23, Township 23 South, Range 28 East, NMPM, Eddy County, New Mexico:

TOWNSHIP 23 SOUTH, RANGE 28 EAST, NMPM

Section 23:            N/2, N/2 S/2

Case No. 13705  
Order No. R-12601  
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(3) The proposed injection wells are either existing wells (South Culebra Bluff "23" Well No. 15), or wells to be drilled (South Culebra Bluff "23" Wells No. 17, 18, 19, 20 and 21) at the following-described locations in Section 23. According to applicant's evidence, the South Culebra Bluff "23" Wells No. 18 and 19 will be directionally drilled in order to accommodate the request of the surface owners:

<u>Well Name &amp; Number</u>	<u>Well Location</u>
South Culebra Bluff "23" Well No. 15	1430' FNL & 1150' FEL (Unit H)
South Culebra Bluff "23" Well No. 17	2440' FSL & 1500' FWL (Unit K)
South Culebra Bluff "23" Well No. 18	1815' FNL & 1200' FWL (Unit E) <u>Surface</u> 1000' FNL & 1300 FWL (Unit D) <u>BHL</u>
South Culebra Bluff "23" Well No. 19	1950' FNL & 2470' FWL (Unit F) <u>Surface</u> 1300' FNL & 2620' FEL (Unit B) <u>BHL</u>
South Culebra Bluff "23" Well No. 20	2520' FSL & 2460' FEL (Unit J)
South Culebra Bluff "23" Well No. 21	2531' FSL & 1252' FEL (Unit I)

(4) This case was originally heard on May 11 and June 8, 2006 and was subsequently taken under advisement. Subsequent to the hearing, it was determined that the publication notice was published in the wrong county, and that the advertisement for the case contained errors. The case was reopened and heard on July 6, 2006 to correct these deficiencies.

(5) On May 4, 2006, the Division received an objection to the application from the Martin Law Firm on behalf of John Draper Brantley, Jr., Claibourne M. Power, Merland, Inc., Will Matthew Brantley and Johnny Reid (collectively "Brantley"). These parties own a mineral or surface interest within the proposed project area.

(6) Range testified that a stipulated agreement was reached with Brantley prior to the hearing. In accordance with that agreement, Range requested that the following provision be incorporated into this order:

"Range, as the operator of the East Loving Delaware Pilot Leasehold Waterflood Project, upon the written request of John Draper Brantley, Jr., or Claibourne M. Power, or Will Matthew Brantley, or Merland, Inc. or Johnny Reid (or their heirs, successors or assigns) shall obtain a water analysis for each of the following water sources, but not more frequently than once every two years and provide a copy to the Division and to each of the parties:

- i) SCB Water Well No. 1, located approximately 3500 feet from the East line and 1300 feet from the North line of Section 23, Township 23 South, Range 28 East, NMPM, Eddy County, New Mexico;



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Order No. R-12601  
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- ii) SCB Water Well No. 2 located approximately 1320 feet from the East line and 720 feet from the North line of Section 23, Township 23 South, Range 28 East, NMPM, Eddy County, New Mexico; and
- iii) SCB Water Well No. 3 located approximately 850 feet from the West line and 2600 feet from the North line of Section 23, Township 23 South, Range 28 East, NMPM, Eddy County, New Mexico."

(7) The proposed pilot waterflood project is fully contained within the East Loving-Brushy Canyon Pool.

(8) The applicant presented geologic evidence that demonstrates that:

- (a) within the project area, there are six distinct producing intervals within the Brushy Canyon formation;
- (b) initial waterflood operations will be limited to the two lowermost intervals within the Brushy Canyon formation due to the fact that the upper producing intervals are generally characterized by poor reservoir quality, including low permeability and high water saturations;
- (c) the two lowermost intervals within the Brushy Canyon formation are laterally continuous within the project area, and appear to be suitable for waterflood operations; and
- (d) injection operations may be vertically expanded in the future to encompass additional producing intervals in the Brushy Canyon formation depending on the success of pilot waterflood operations.

(9) The applicant presented engineering evidence that demonstrates that:

- (a) a five-spot injection pattern containing six (6) injection wells and thirteen (13) producing wells will be initially utilized within the project area;
- (b) waterflood operations within the two lowermost intervals in the Brushy Canyon formation should result in the recovery of an additional 900,000 barrels of oil. If the project is expanded to ultimately include all of the producing intervals within the Brushy Canyon, additional recovery from all zones is estimated to be approximately 1.9 million barrels of oil; and

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Order No. R-12601  
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- (c) production during waterflood operations will be allocated on a lease-basis.
- (10) The wells within the project area are in an advanced state of depletion.
- (11) Range estimates that it will cost approximately \$5.415 million dollars to implement waterflood operations within the proposed project area.
- (12) Approval of the subject pilot waterflood project should result in the recovery of additional oil and gas reserves from the project area that may otherwise not be recovered, thereby preventing waste, and will not violate correlative rights.
- (13) The applicant further seeks to qualify the pilot waterflood project as an "Enhanced Oil Recovery Project" pursuant to the "Enhanced Oil Recovery Act" (NMSA 1978 Sections 7-29A-1 through 7-29A-5).
- (14) The evidence presented demonstrates that:
  - (a) the application for approval of the proposed secondary recovery project has not been prematurely filed either for economic or technical reasons;
  - (b) the area affected by the proposed project has been so depleted by primary operations that it is prudent to apply secondary recovery techniques to maximize the ultimate recovery of crude oil from the pool; and
  - (c) the proposed secondary recovery project meets all the criteria for certification by the Division as a qualified "Enhanced Oil Recovery Project" pursuant to the "Enhanced Oil Recovery Act" (NMSA 1978 Sections 7-29A-1 through 7-29A-5).
- (15) The approved project area should initially comprise the N/2 and the N/2 S/2 of Section 23; however, the "project area" and/or the producing wells eligible for the enhanced oil recovery (EOR) tax rate may be contracted and reduced based upon the evidence presented by the applicant in its demonstration of a positive production response.
- (16) To be eligible for the EOR tax rate, the operator should advise the Division of the date water injection commences within the secondary recovery project. At that time, the Division will certify the project to the New Mexico Taxation and Revenue Department.
- (17) At such time as a positive production response occurs, and within five years from

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Order No. R-12601  
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the date the project was certified to the New Mexico Taxation and Revenue Department, the applicant must apply to the Division for certification of a positive production response. This application shall identify the area benefiting from enhanced oil recovery operations and the specific wells eligible for the EOR tax rate. The Division may review the application administratively or set it for hearing. Based upon the evidence presented, the Division will certify to the New Mexico Taxation and Revenue Department those wells that are eligible for the EOR tax rate.

**IT IS THEREFORE ORDERED THAT:**

(1) Range Operating New Mexico, Inc., is hereby authorized to institute a pilot waterflood project within the following-described area by the injection of water into the Brushy Canyon interval of the Delaware formation, East Loving-Brushy Canyon Pool, Eddy County, New Mexico, through six initial injection wells shown on Exhibit "A" attached to this order located in Section 23, Township 23 South, Range 28 East, NMPM:

Township 23 South, Range 28 East, NMPM  
Section 23: N2, N/2 S/2

(2) The operator shall take all steps necessary to ensure that the injected water enters only the proposed injection interval and is not permitted to escape to other formations or onto the surface from injection, production, or plugged and abandoned wells.

(3) Injection into each of the wells shown on Exhibit "A" shall be accomplished through 2 7/8-inch internally plastic-lined tubing installed in a packer located within 100 feet of the uppermost injection perforations. The casing-tubing annulus in each well shall be filled with an inert fluid and a gauge or approved leak-detection device shall be attached to the annulus in order to determine leakage in the casing, tubing, or packer.

(4) The injection wells or pressurization system shall be equipped with a pressure control device or acceptable substitute that will limit the surface injection pressure to no more than 0.2 psi per foot of depth to the uppermost injection perforation, all as shown on Exhibit A.

(5) The Division Director may administratively authorize a pressure limitation in excess of the above upon a showing by the operator that such higher pressure will not result in the fracturing of the injection formation or confining strata.

(6) Prior to commencing injection operations, the casing in each well shall be pressure tested throughout the interval from the surface down to the proposed packer setting depth to assure the integrity of such casing.

(7) The operator shall give advance notice to the supervisor of the Division's Artesia District Office of the date and time injection equipment will be installed and the mechanical integrity pressure tests conducted on the injection wells so that these operations may be witnessed.

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Order No. R-12601  
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(8) The operator shall immediately notify the supervisor of the Division's Artesia District Office of the failure of the tubing, casing or packer in any of the injection wells or the leakage of water, oil or gas from or around any producing or plugged and abandoned well within the project area, and shall promptly take all steps necessary to correct such failure or leakage.

(9) The waterflood project is hereby designated the East Loving Delaware Leasehold Waterflood Project, and the applicant shall conduct injection operations in accordance with Division Rules No. 701 through 708, and shall submit monthly reports in accordance with Division Rules No. 706 and 1115.

(10) The injection authority granted herein for each well shown on Exhibit "A" shall terminate one year after the date of this order if the operator has not commenced injection operations into the wells; provided, however, the Division, upon written request by the operator, may grant an extension for good cause.

(11) The East Loving Delaware Leasehold Waterflood Project is hereby certified as an "Enhanced Oil Recovery Project." The project area shall initially comprise the area described in Ordering Paragraph No. (1), provided however, the project area and/or the producing wells eligible for the enhanced oil recovery (EOR) tax rate may be contracted and reduced based upon the evidence presented by the applicant in its demonstration of a positive production response.

(12) To be eligible for the EOR tax rate, the operator shall advise the Division of the date and time water injection commences within the secondary recovery project. At that time, the Division will certify the project to the New Mexico Taxation and Revenue Department.

(13) At such time as a positive production response occurs, and within five years from the date the project was certified to the New Mexico Taxation and Revenue Department, the applicant must apply to the Division for certification of a positive production response. This application shall identify the area benefiting from enhanced oil recovery operations and the specific wells eligible for the EOR tax rate. The Division may review the application administratively or set it for hearing. Based upon the evidence presented, the Division will certify to the New Mexico Taxation and Revenue Department those wells that are eligible for the EOR tax rate.

(14) As requested by the applicant, the following provision is hereby incorporated into this order:

"Range, as the operator of the East Loving Delaware Pilot Leasehold Waterflood Project, upon the written request of John Draper Brantley, Jr., or Claibourne M. Power, or Will Matthew Brantley, or Merland, Inc. or Johnny Reid (or their heirs, successors or assigns) shall obtain a water analysis for each of the following water sources, but not more frequently than once every two years and provide a copy to the Division and to each of the parties:

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Order No. R-12601  
Page 7 of 7

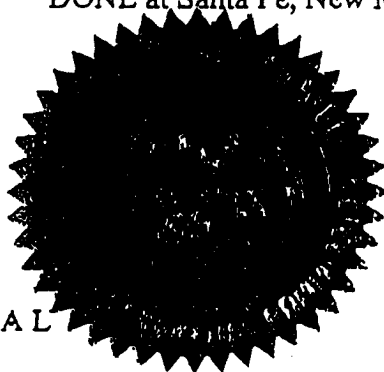
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- i) SCB Water Well No. 1, located approximately 3500 feet from the East line and 1300 feet from the North line of Section 23, Township 23 South, Range 28 East, NMPM, Eddy County, New Mexico;
- ii) SCB Water Well No. 2 located approximately 1320 feet from the East line and 720 feet from the North line of Section 23, Township 23 South, Range 28 East, NMPM, Eddy County, New Mexico; and
- iii) SCB Water Well No. 3 located approximately 850 feet from the West line and 2600 feet from the North line of Section 23, Township 23 South, Range 28 East, NMPM, Eddy County, New Mexico."


(15) Jurisdiction is hereby retained for the entry of such further orders as the Division may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

SEAL



STATE OF NEW MEXICO  
OIL CONSERVATION DIVISION

  
MARK E. FESMIRE, P.E.  
Director

**Exhibit "A"**

**Case No. 13705**

**Division Order No. R-12601**

**East Loving Delaware Leasehold Waterflood Project**

**Approved Injection Wells (All in Section 23, Township 23 South, Range 28 East, NMPPM)**

<b>Well Name &amp; Number</b>	<b>API Number</b>	<b>Well Location</b>	<b>Injection Interval</b>	<b>Packer Depth</b>	<b>Maximum Surface Injection Pressure</b>
South Culebra Bluff "23" No. 15	30-015-33783	1430' FNL & 1150' FEL (Unit H)	5,724'-6,234'	5,624'	1145 PSIG
South Culebra Bluff "23" No. 17	N/A	2440' FSL & 1500' FWL (Unit K)	5,680'-6,205'	5,580'	1136 PSIG
South Culebra Bluff "23" No. 18	N/A	1815' FNL & 1200' FWL (Unit E) Surface 1000' FNL & 1300' FWL (Unit D) BHL	5,695'-6,215'	5,595'	1139 PSIG
South Culebra Bluff "23" No. 19	N/A	1950' FNL & 2470' FWL (Unit F) Surface 1300' FNL & 2620' FEL (Unit B) BHL	5,720'-6,235'	5,620'	1144 PSIG
South Culebra Bluff "23" No. 20	N/A	2520' FSL & 2460' FEL (Unit J)	5,710'-6,225'	5,610'	1142 PSIG
South Culebra Bluff "23" No. 21	N/A	2531' FSL & 1252' FEL (Unit I)	5,725'-6,235'	5,625'	1145 PSIG



**RANGE** RESOURCES

March 23, 2007

New Mexico Oil Conservation Division  
1301 West Grand Avenue  
Artesia, New Mexico 88210



RE: H2S Contingency Plan

Dear Mr. Arrant:

Range Operating New Mexico Inc. has conducted a review to determine if an H2S Contingency Plan is required for the referenced wells listed below. We are able to conclude that any potential hazardous volume would be minimal. H2S concentrations of wells in these areas from surface to total depth are low enough; therefore we do not believe that an H2S Contingency Plan will be necessary.

South Culebra Bluff 23 #17	1500' FWL & 2440' FSL	Section 23 T23S R28E
South Culebra Bluff 23 #18	1052' FWL & 1883' FNL 1300' FWL & 1000' FNL	Section 23 T23S R28E
South Culebra Bluff 23 #19	2470' FWL & 1950' FNL 2620' FEL & 1300' FNL	Section 23 T23S R28E
South Culebra Bluff 23 #20	2460' FEL & 2460' FSL	Section 23 T23S R28E
South Culebra Bluff 23 #21	1160' FEL & 2460' FSL	Section 23 T23S R28E

Please advise if you have a different opinion or need further information.

Sincerely,

Linda C. Stiles  
Operations Department

/lcs

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**RANGE** RESOURCES

LOVING EAST AREA-SE NM

**SCB 23 No 21 (INJECTION)**  
**Eddy Co., New Mexico**  
**50% WI**  
**(Chesapeake Partner 50% WI)**

Locations Calls: **1160' FEL & 2460' FSL** **SL** **GL: 2997**  
**Est. KB: 3007**  
**Sec 23, T 23 S, R 28 E, N.M.P.M.**  
Surface Conditions: **No special notations**  
Classification: **Injection**  
Objective: **Primary: Brushy Canyon C & D**

ESTIMATED/PRE-DRILL

M.D. Subsea Net Phi Avg. Phi

T/ Rustler:	128	2879		
T/ Delaware Grp	2646	361		
T/ Lwr Brushy Canyon "Pardue"	4765	-1758		
T/ Lwr Brushy Canyon "A"	5939	-2932		
T/ Lwr Brushy Canyon "B"	6011	-3004		
T/ Lwr Brushy Canyon "C"	6117	-3110		
T/ Lwr Brushy Canyon "D"	6195	-3188		
B/ Lwr Brushy Canyon "D"	6236	-3229		
(T/ Bone Spring)				
100 ft rathole	6336	-3329		

ACTUAL/POST-DRILL

M.D. Subsea Net Phi Avg. Phi

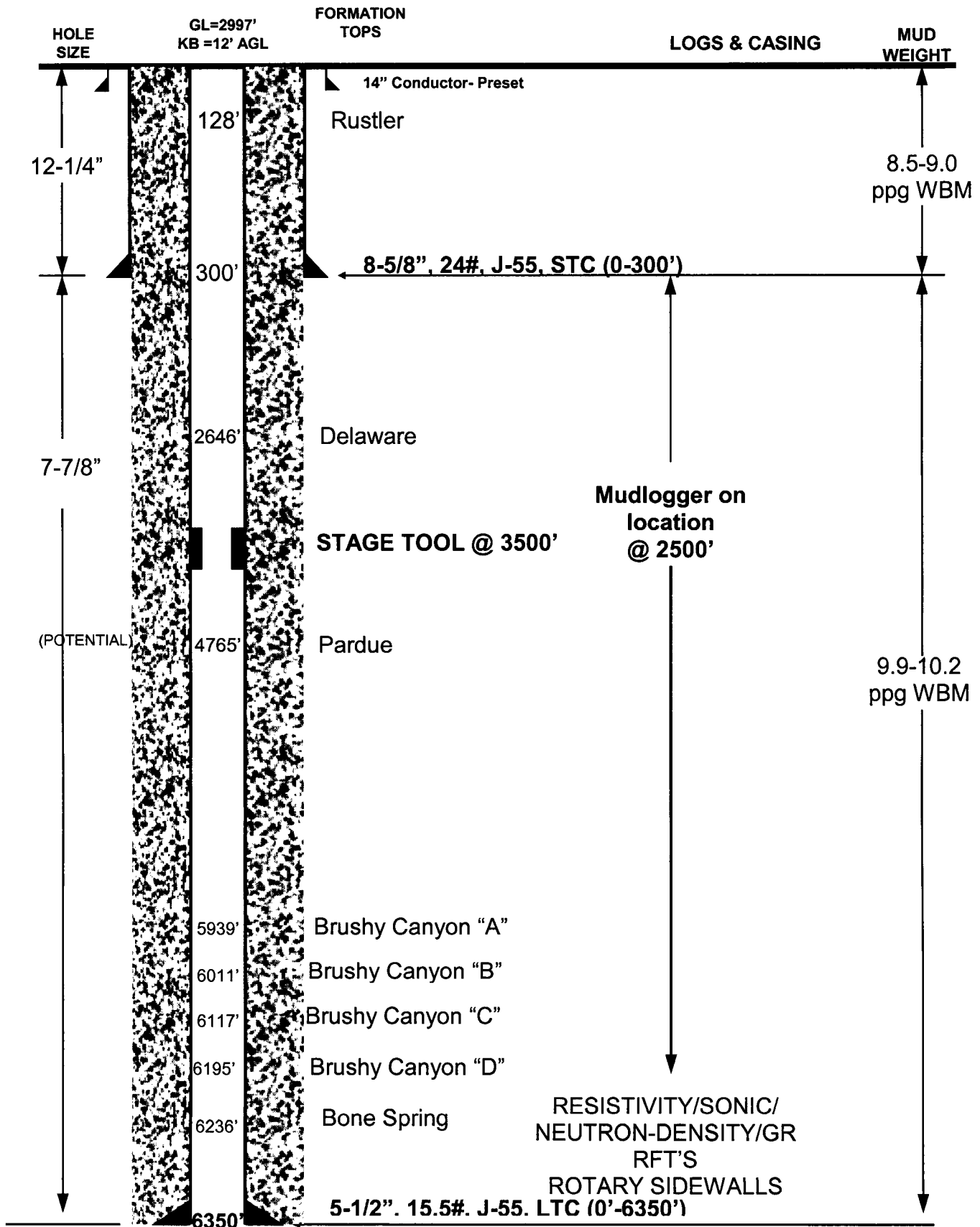

Proposed Total Depth (TVD): **6350**  
(B/Base of Brushy Canyon "D" + ~100 ft. rat hole)

GEOLOGIST: R. Hubnik



**WELL** : SCB #23-21 (INJECTION WELL)  
**SL** : 2460' FSL & 1160' FEL, Sec 23-T23S-R28E  
**COUNTY** : EDDY COUNTY  
**STATE** : NEW MEXICO

**AFE:**  
**FIELD:** East Loving  
**OBJECTIVE TD:** 6350'  
**PERMIT NO:**



RANGE OPERATING NEW MEXICO, INC.

**SCB #23-21**

**Eddy County, NM**

**Drilling Program**

Prepared 3/16/07

**PROPOSED DEPTH:** 6350' MD / 6350' TVD

**GROUND ELEVATION:** 2997'

**KB:** 12'

**LOCATION:** 2460' FSL & 1160' FEL, Sec. 23-T23S-R28E, Eddy County, NM

**ANTICIPATED INJECTION FORMATION:** Brushy Canyon

**API NO:**

**GENERAL:**

Objective is to drill and complete the SCB 23-21, a water injection well in the Brushy Canyon 'C' and 'D' waterflood pilot in Section 23 in the East Loving Field. The recommended injector has an estimated TD of 6350'.

**ESTIMATED FORMATION TOPS: (Log Depths)**

ESTIMATED/PRE-DRILL

M.D.    Subsea    Net Phi    Avg. Phi

T/ Rustler:	128	2879		
T/ Delaware Grp	2646	361		
T/ Lwr Brushy Canyon "Pardue"	4765	-1758		
T/ Lwr Brushy Canyon "A"	5939	-2932		
T/ Lwr Brushy Canyon "B"	6011	-3004		
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T/ Lwr Brushy Canyon "D"	6195	-3188		
B/ Lwr Brushy Canyon "D"	6236	-3229		
(T/ Bone Spring)				
100 ft rathole	6336	-3329		

**DETAILED DRILLING PROCEDURE**

**TIMES AND EVENTS THAT MUST BE NOTED ON DRILLING REPORT:**

- A. SPUD (date and time)
- B. TD (each interval date and time)
- C. Cement in place (date and time)
- D. RIG RELEASE (date and time)

## BIT & HYDRAULICS PLAN

Bit #	Size	Mfg.	Type	IADC	Jets	Out	Hrs	ROP	WOB	RPM	GPM	PSI
1	12.25	SEC	FDS (RR)	116	3-12's	300	4	75	35-45	100	400	1000
2	7.875	HTC	HX20CJ	517	3-11's	5200	116	42	45-50	70-100	330	1800
3	7.875	HTC	HRS30C	537	3-12's	6350	<u>33</u> 153	35	50-55	60-65	300	1800

## BOTTOM HOLE ASSEMBLIES

BHA #1: (0-300') - Bit, 2-8" DC, 10-6.25" DC's

BHA #2: (300'-6350') - Bit, 30 jets of 4.5" HWDP

## USE OF RT TOOL

Two RT tools will be run, one 500' above the top of the collars and the other at 1500' above the top the first RT tool. These tools will be used throughout the 7-7/8" section.

## MUD PROGRAM

INTERVAL	MUD WEIGHT	FUNNEL VIS.	API Fluid Loss
0' - 300'	8.4 – 9.0	36-45	NC
300'-6350'	9.9 – 10.1	28-32	NC

- 1) Level and build an all-weather location and access road.
- 2) MIRU. Perform rig safety inspection and ensure that everything is in proper working order prior to spudding well. The well will be drilled with a closed loop mud system. RU rails and cuttings catch tanks and additional mud cleaning equipment.
- 3) Notify NMOCD of intent to spud, run casing and cement each 24 hours in advance 505-748-1283.
- 4) Spud well with 12.25" mill tooth bit. Drill to +/- 300' (Actual depth will be determined by the length of the casing). Circulate hole clean. Sweep and condition hole to run casing. Drop a TOTCO prior to POOH (must run 1st survey prior to 500' per NMOCD rules). Pull out of hole, lay down 12.25" BHA.

**NOTE:** Mud through this interval will be a native spud mud supplemented with Bentonite. Lime may be used to flocculate the mud and increase the yield point to clean the hole. Mix paper for seepage control. Utilize all solids control equipment to control drill solids. Run as fine of mesh shaker screens as possible. Use water to control mud weight and viscosity. Maintain mud weight at 8.4 – 9.0 ppg.

- 5) Rig up casing crew and run 8-5/8", 24.0#, J-55, ST&C (\$15.50/ft) as follows:

1-8-5/8" Texas Pattern Shoe  
1-8-5/8" Insert Float Collar  
1-8-5/8" x 12-1/4" Centralizer 10' above shoe  
1-8-5/8" x 12-1/4" Centralizer every other joint  
1-8-5/8" Stop Ring

- 6) Circulate for at least bottoms up plus one casing volume with mud prior to cementing. Cement surface casing according to cement recommendation. NOTE: Have field bin, cement, and circulating equipment on location prior to casing job.
- a) Review rates, pressures, displacement volumes and casing pressure rating with Service Company and rig personnel. All cement slurries are to be lab tested; both a pilot test and a test of the actual field blend. Report results, including 24 hour compressive strengths, to the office. **(See Cement Testing Requirements below)**. Also keep two samples of each dry cement in the event that a problem is encountered while cementing. Discard this sample if all indications are positive.
  - b) Cement well as follows: Pump 20 bbl fresh water followed by 350 sxs class "C" with 2% CcCl<sub>2</sub>, 1/4# celloseal mixed @ 14.8ppg & 1.32 ft<sup>3</sup>/sx Tail, Displace with fresh water, Bump plug with w/ 500 psi over final pump pressure.
  - c) If cement is not circulated to surface, contact the office and the NMOCD and prepare to run 1" and top out cement. Have 1" pipe on location for possible top-out.
  - d) If cement falls, fill 12.25" X 8-5/8" annulus with cement.
- 7) Release pressure and check for flow back. Set casing on bottom. If float is holding, base nipple up of wellhead and BOP on the surface cement samples. Well must stand at least 8 hours total before any testing of casing is performed per NMOCD.
- 8) After Cementing casing, run a slip-on, weld-on casing head and test head to 1000 psi. Test BOP blind Rams & choke manifold 250# low & 3000# high. Pick up Bit #2 (7-7/8") & BHA, trip in hole, test BOP pipe rams 250# low & 3000#. Pressure test casing to 1000 psi for 30 minutes prior to drilling out shoe. Clearly report this test information of the daily drilling report.

**MUD NOTES: See Mud Program for details**

After cementing 8-5/8" casing circ pit with brine water. Mix paper for seepage control. Utilize pre-hydrated Gel/Lime sweeps for flushing the hole. Run all available solids control equipment to control weight. Add brine water as needed to maintain volume. Add LCM to system only as needed. Use batch LCM treatment if losses occur and maintain as needed.

- 9) Drill ahead with brine water in 7-7/8" hole taking deviation surveys every ±500' or nearest bit run per NMOCD rules. Use sweeps as needed to clean hole. Drill to +/-6350; exact TD will be determined by the length of the casing. Sweep and condition hole in preparation for logging. Spot a 50 bbl, 40-42 visc pill prior to POOH for logs. Strap out of hole.
- 10) RU Wire line Truck and Tools. Log well as instructed by RB Operating. Rotary sidewall cores may be required along with RFTs.
- 11) Make a conditioning trip prior to running casing. Trip into hole with BHA and drill pipe, break circulation at 2400'. Ream last two stands to bottom. Circulate and condition hole. Maintain viscosity of 38. TOH laying down 4-1/2" drill pipe and drill collars. Clear floor and prepare to run casing.
- 12) Rig up casing crew and run 5-1/2" 15.5#, J-55, LT&C (**\$9.75/ft**) as follows:
- a) Float shoe (thread-lock)
  - b) 2 jts. 5-1/2", 15.5#, J-55, LT&C casing (thread-lock)

- c) Float collar (thread-lock)
- d) 5-1/2", 15.5#, J-55, LT&C Casing to 3500'.
- e) Cement Stage Tool @ 3500'
- f) 5-1/2", 15.5#, J-55, LT&C Casing to surface

The two bottom joints of 5-1/2" casing and the float shoe and float collar should be thread-locked (do not weld pipe). Run 1 centralizer 5' above shoe with limit clamp, one on the next collar, one just below the float collar with limit clamp and one per joint up to 4500'.

- 13) Circulate mud for at least bottoms up plus one casing volume prior to cementing.
- 14) Cement the production casing as follows. Re-figure cement volumes on a basis of: caliper + 20% + 50 sx. Precede Cement with 20 bbl fresh water, 500 gals superflush, 20 bbl fresh water

**Stage One:**

Slurry: PVL Cement + 0.3% D-167 + 0.2% D-65 + 0.1% D-13 + 0.2% D46 + 4#/sk D-24 + 1#/sk D-44

Slurry Weight: 13.0 ppg      Slurry Yield: 1.41 cuft/sk      Water: 6.83 gals/sk

**Stage Two:**

Slurry: 65/35 (Class C/POZ) + 6% D-20 + 5% D-44 + 0.3% S-1 + 4#/sk D-24 + 0.25#/sk

Slurry Weight: 12.4 ppg      Slurry Yield: 2.21 cuft/sk      Water: 12.11 gals/sk

Review rates, pressures, displacement volumes and casing pressure rating with Service Company and rig personnel. All cement slurries are to be lab tested; both a pilot test and a test of the actual field blend. Report results, including 24 hour compressive strengths, to the office. **(See Cement Testing Requirements below)**. Also keep two samples of each dry cement.

- a) Have additional water storage on location as necessary for mixing cement. Have water analyzed by cementing company for compatibility with cement and chemicals.
- b) Reciprocate pipe during 1<sup>st</sup> Stage job. Take special care to move pipe very slowly on the down stroke. Pump spacer and cement at 7-8 BPM. When the last cement has been pumped, maintain rate at 7-8 BPM. Displace with fresh water. When reaching displacement to shoe joint minus 10 bbls slow pump rate to 2 barrels per minute or less prior to bumping plug. Bleed off pressure and check for backflow. If negative, remove the cap and drop the opening bomb for the second stage job. Wait 30 minutes then attempt to open stage tool. Circulate a minimum of 2 hours prior to pumping second stage job.
- c) Cement second stage. Bump plug with 500 psi over final displacement pressure and hold pressure for 15 minutes.
- d) If cement does not circulate notify NMOCD office.
- 15) Release pressure and check for flow back. If floats are holding, continue to make preparations to hang 5-1/2" casing one foot off bottom. If floats do not hold, wait 12 hours on cement.
- 16) Set 5-1/2" slips in "A" section with full string weight. Nipple down BOP, Nipple up well head.
- 17) Install cap. Clean mud pits and release rig.

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Bill Frye	District Engineer	(817) 320-7919	(817) 741-4940	(817) 870-2601
Rennie Hubnik	Chief Geologist	(817) 907-8272	(817) 430-4861	(817) 810-1982
Linda Stiles	Regulatory Tech	(817) 291-4618	(817) 561-5444	(817) 509-1505

TBD	Rig Company		(432)-425-4498
<b>Suttles Logging, Inc. – Midland, TX</b>	Mudlogging	Sam Samford	432-687-3148
<b>Schlumberger-Artesia, NM</b>	Cementing Service	Lynn Northcutt	(505)-748-1392 cell 505-365-7510
<b>Nova Mud, Inc- Hobbs, NM</b>	Drlg Mud	Dale Welch	(800) 530-8786
<b>National – Hobbs, NM</b>	Well Heads		(505) 393-9928
<b>Master Tubulars – Midland, TX</b>	Casing & Tubing	Randy Martin	(800) 682-8996
<b>TFH –Hobbs, NM</b>	Dirt Contractor		(505) 397-3270
<b>Weatherford –Artesia, NM</b>	Float Equipment		
<b>Halliburton Logging –Hobbs, NM</b>	Open Hole Logs	Michael Escriva Tommy Johnson	(505) 392-7543
<b>Allen's Casing Crew -Hobbs, TX</b>	Csg Crew		
<b>Riverside- Carlsbad, TX</b>	Water -		(505) 885-6663
<b>National –Hobbs, NM</b>	General Supplies		(505) 393-9928
<b>TFH –Hobbs, NM</b>	Fork Lift		(505) 397-3270
	Trailer, sewage, water		
<b>Abbot Brothers</b>	Conductor setting		
<b>RTO Sales &amp; Lease</b>	Satellite Internet		432-550-5678