DATE IN 5.24.12	SUSPENSE 6/9/12	ENGINEER WVJ	LOGGED IN 5.24.12	TYPE SWD 1344	APP NO. 1214628253

pTGW

ABOVE THIS LINE FOR DIVISION USE ONLY

Key Energy 19797

Grace Carlsbad #1

30-015-20573

NEW MEXICO OIL CONSERVATION DIVISION

- Engineering Bureau -

1220 South St. Francis Drive, Santa Fe, NM 87505

RECEIVED OCD 2012 MAY 24 A

ADMINISTRATIVE APPLICATION CHECKLIST

THIS CHECKLIST IS MANDATORY FOR ALL ADMINISTRATIVE APPLICATIONS FOR EXCEPTIONS TO DIVISION RULES AND REGULATIONS WHICH REQUIRE PROCESSING AT THE DIVISION LEVEL IN SANTA FE

Application Acronyms:

[NSL-Non-Standard Location] [NSP-Non-Standard Proration Unit] [SD-Simultaneous Dedication]
[DHC-Downhole Commingling] [CTB-Lease Commingling] [PLC-Pool/Lease Commingling]
[PC-Pool Commingling] [OLS - Off-Lease Storage] [OLM-Off-Lease Measurement]
[WFX-Waterflood Expansion] [PMX-Pressure Maintenance Expansion]
[SWD-Salt Water Disposal] [IPI-Injection Pressure Increase]
[EOR-Qualified Enhanced Oil Recovery Certification] [PPR-Positive Production Response]

[1] **TYPE OF APPLICATION** - Check Those Which Apply for [A]

[A] Location - Spacing Unit - Simultaneous Dedication
☐ NSL ☐ NSP ☐ SD

I-36-22S-26E

Check One Only for [B] or [C]

[B] Commingling - Storage - Measurement
☐ DHC ☐ CTB ☐ PLC ☐ PC ☐ OLS ☐ OLM

[C] Injection - Disposal - Pressure Increase - Enhanced Oil Recovery
☐ WFX ☐ PMX ■ SWD ☐ IPI ☐ EOR ☐ PPR

[D] Other: Specify ______________________

[2] **NOTIFICATION REQUIRED TO:** - Check Those Which Apply, or ☐ Does Not Apply

[A] ☐ Working, Royalty or Overriding Royalty Interest Owners

[B] ■ Offset Operators, Leaseholders or Surface Owner

[C] ■ Application is One Which Requires Published Legal Notice

[D] ■ Notification and/or Concurrent Approval by BLM or SLO
U.S. Bureau of Land Management - Commissioner of Public Lands, State Land Office

[E] ■ For all of the above, Proof of Notification or Publication is Attached, and/or,

[F] ☐ Waivers are Attached

[3] **SUBMIT ACCURATE AND COMPLETE INFORMATION REQUIRED TO PROCESS THE TYPE OF APPLICATION INDICATED ABOVE.**

[4] **CERTIFICATION:** I hereby certify that the information submitted with this application for administrative approval is **accurate** and **complete** to the best of my knowledge. I also understand that **no action** will be taken on this application until the required information and notifications are submitted to the Division.

Note: Statement must be completed by an individual with managerial and/or supervisory capacity.

Loren Molleur — Print or Type Name

Loren K. Molleur — Signature

Senior VP, Permian Basin Marketplace
Fluid Management Services,
Key Energy Services, Inc.

May 7, 2012 — Date

lmolleur@keyenergy.com — E-Mail Address

May 7, 2012

Energy, Minerals and Natural Resources Department
Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

Attention: Ms. Jami Bailey, CPG
Division Director

Re: Form C-108
Key Energy Services, LLC
Grace Carlsbad No. 1
API No. 30-015-20573
1980' FSL & 660' FEL, Unit I
Section 36, T-22S, R-26E, NMPM,
Eddy County, New Mexico

Dear Ms. Bailey,

Enclosed please find a Division Form C-108 (Application for Authorization to Inject) for the Key Energy Services, LLC ("Key") Grace Carlsbad Well No. 1. Key proposes to convert this existing well from a Canyon producing well to a commercial produced water disposal well, injection to occur into the Brushy Canyon member of the Delaware formation through selectively perforated intervals from 4,082 feet to 5,200 feet. Produced water from various oil and gas producing formations in Southeast New Mexico will be injected into this well.

I believe that all the information necessary to approve the application is enclosed. If additional information is needed, please contact me at (432) 620-6926, Wayne Price at (505) 713-2809 or David Catanach at (505) 690-9453.

Sincerely,

Loren R. Molleur

Loren Molleur
Senior VP, Permian Basin Marketplace,
Fluid Management Services, Key Energy Services, Inc.
1301 McKinney Street, Suite 1800
Houston, Texas 77010

Xc: OCD-Artesia

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL
RESOURCES DEPARTMENT

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, New Mexico 87505

FORM C-108
Revised June 10, 2003

APPLICATION FOR AUTHORIZATION TO INJECT

I. PURPOSE: _____ Secondary Recovery _____ Pressure Maintenance __X__ Disposal _____ Storage
Application qualifies for administrative approval? __X__ Yes _____ No

II. OPERATOR: Key Energy Services, LLC (OGRID-19797)

ADDRESS: 1301 McKinney Street, Suite 1800 Houston, Texas 77010

CONTACT PARTY: Loren Molleur-(432) 620-6926 Wayne Price-(505) 713-2809
David Catanach-(505) 690-9453

III. WELL DATA: Complete the data required on the reverse side of this form for each well proposed for injection. Additional sheets may be attached if necessary.

IV. Is this an expansion of an existing project? _____ Yes __X__ No
If yes, give the Division order number authorizing the project: _____

V. Attach a map that identifies all wells and leases within two miles of any proposed injection well with a one-half mile radius circle drawn around each proposed injection well. This circle identifies the well's area of review.

VI. Attach a tabulation of data on all wells of public record within the area of review which penetrate the proposed injection zone. Such data shall include a description of each well's type, construction, date drilled, location, depth, record of completion, and a schematic of any plugged well illustrating all plugging detail.

VII. Attach data on the proposed operation, including:

1. Proposed average and maximum daily rate and volume of fluids to be injected;
2. Whether the system is open or closed;
3. Proposed average and maximum injection pressure;
4. Sources and an appropriate analysis of injection fluid and compatibility with the receiving formation if other than reinjected produced water; and,
5. If injection is for disposal purposes into a zone not productive of oil or gas at or within one mile of the proposed well, attach a chemical analysis of the disposal zone formation water (may be measured or inferred from existing literature, studies, nearby wells, etc.).

*VIII. Attach appropriate geologic data on the injection zone including appropriate lithologic detail, geologic name, thickness, and depth. Give the geologic name, and depth to bottom of all underground sources of drinking water (aquifers containing waters with total dissolved solids concentrations of 10,000 mg/l or less) overlying the proposed injection zone as well as any such sources known to be immediately underlying the injection interval.

IX. Describe the proposed stimulation program, if any.

*X. Attach appropriate logging and test data on the well. (If well logs have been filed with the Division, they need not be resubmitted).

*XI. Attach a chemical analysis of fresh water from two or more fresh water wells (if available and producing) within one mile of any injection or disposal well showing location of wells and dates samples were taken.

XII. Applicants for disposal wells must make an affirmative statement that they have examined available geologic and engineering data and find no evidence of open faults or any other hydrologic connection between the disposal zone and any underground sources of drinking water.

XIII. Applicants must complete the "Proof of Notice" section on the reverse side of this form.

XIV. Certification: I hereby certify that the information submitted with this application is true and correct to the best of my knowledge and belief.

NAME: Loren Molleur TITLE: Senior VP, Permian Basin Marketplace, Fluid Management Services, Key Energy Services, Inc.

SIGNATURE: Loren R. Molleur DATE: May 7, 2012

E-MAIL ADDRESS: lmolleur@keyenergy.com

* If the information required under Sections VI, VIII, X, and XI above has been previously submitted, it need not be resubmitted. Please show the date and circumstances of the earlier submittal: _____

DISTRIBUTION: Original and one copy to Santa Fe with one copy to the appropriate District Office

III. WELL DATA

A. The following well data must be submitted for each injection well covered by this application. The data must be both in tabular and schematic form and shall include:

(1) Lease name; Well No.; Location by Section, Township and Range; and footage location within the section.

(2) Each casing string used with its size, setting depth, sacks of cement used, hole size, top of cement, and how such top was determined.

(3) A description of the tubing to be used including its size, lining material, and setting depth.

(4) The name, model, and setting depth of the packer used or a description of any other seal system or assembly used.

Division District Offices have supplies of Well Data Sheets which may be used or which may be used as models for this purpose. Applicants for several identical wells may submit a "typical data sheet" rather than submitting the data for each well.

B. The following must be submitted for each injection well covered by this application. All items must be addressed for the initial well. Responses for additional wells need be shown only when different. Information shown on schematics need not be repeated.

(1) The name of the injection formation and, if applicable, the field or pool name.

(2) The injection interval and whether it is perforated or open-hole.

(3) State if the well was drilled for injection or, if not, the original purpose of the well.

(4) Give the depths of any other perforated intervals and detail on the sacks of cement or bridge plugs used to seal off such perforations.

(5) Give the depth to and the name of the next higher and next lower oil or gas zone in the area of the well, if any.

XIV. PROOF OF NOTICE

All applicants must furnish proof that a copy of the application has been furnished, by certified or registered mail, to the owner of the surface of the land on which the well is to be located and to each leasehold operator within one-half mile of the well location.

Where an application is subject to administrative approval, a proof of publication must be submitted. Such proof shall consist of a copy of the legal advertisement which was published in the county in which the well is located. The contents of such advertisement must include:

(1) The name, address, phone number, and contact party for the applicant;

(2) The intended purpose of the injection well; with the exact location of single wells or the Section, Township, and Range location of multiple wells;

(3) The formation name and depth with expected maximum injection rates and pressures; and,

(4) A notation that interested parties must file objections or requests for hearing with the Oil Conservation Division, 1220 South St. Francis Dr., Santa Fe, New Mexico 87505, within 15 days.

NO ACTION WILL BE TAKEN ON THE APPLICATION UNTIL PROPER PROOF OF NOTICE HAS BEEN SUBMITTED.

NOTICE: Surface owners or offset operators must file any objections or requests for hearing of administrative applications within 15 days from the date this application was mailed to them.

C-108 Application
Key Energy Services, LLC
Grace Carlsbad Well No. 1
API No. 30-015-20573 1980' FSL & 660' FEL (Unit I)
Section 36, T-22S, R-26E, NMPM
Eddy County, New Mexico

I. The purpose of the application is to request approval to convert the Grace Carlsbad Well No. 1 to a commercial produced water disposal well in the Brushy Canyon member of the Delaware formation.

II. Key Energy Services, LLC ("Key")
1301 McKinney Street, Suite 1800
Houston, Texas 77010
Contact Parties: Loren Molleur-(432) 620-6926
Wayne Price-(505) 713-2809
David Catanach (505) 690-9453

III. Injection well data sheet is attached. In addition, attached are three (3) wellbore schematic diagrams. Schematic No. 1 shows the current wellbore configuration. Since the current condition of the 7" casing in the well is unknown, Key would like the opportunity to run a casing inspection log prior to determining whether or not to leave the 7" casing in the well, or cutting and pulling this casing string. Consequently, Schematic No. 2 illustrates the proposed wellbore configuration if the 7" casing is left in place in the well. Cement would likely be circulated to surface from the current TOC @ 8,606', and the well would be plugged back from the current Canyon producing interval to the Brushy Canyon member of the Delaware formation. (**Note: The plug-back depths and methods were determined in consultation with the OCD District Office in Hobbs.**) If log testing of the 7" casing shows unacceptable mechanical integrity, Key would like the opportunity to cut and pull the 7" casing at a depth of approximately 8,600'. Schematic No. 3 illustrates the proposed wellbore configuration if the 7" casing is cut and pulled at this depth. In this scenario, the well would be plugged back from the current Canyon producing interval in accordance with a procedure approved by the Division. Key believes that either method of completing the well for disposal will protect fresh water zones and other producing formations in this area.

IV. This is not an expansion of an existing project.

V. A map showing all wells/leases within a 2-mile radius of the Grace Carlsbad Well No. 1 is attached. Also attached is a more detailed map showing the ½-mile Area of Review ("AOR") for the Grace Carlsbad No. 1.

VI. Area of review well data is attached. As shown in the table, there are only two wells in the AOR of the Grace Carlsbad No. 1, and both are plugged and abandoned. Plugging diagrams for each of these wells are attached. Plugging data shows that these two wells are plugged so as to preclude the migration of fluid from the proposed injection interval.

VII. 1. The average injection rate is anticipated to be approximately 1,500 BWPD. The maximum rate will be approximately 5,000 BWPD. If the average or maximum rates increase in the future, the Division will be notified.

2. This will be an open system.

3. The injection pressure will initially be in conformance with the Division assigned gradient of 0.2 psi/ft. or 816 psi. If a higher injection pressure is necessary, Key will conduct a step rate injection test to determine the fracture pressure of the injection interval.

4. Produced water from various producing formations in Southeast New Mexico will be injected into the Grace Carlsbad No. 1. Attached is a water analysis from the Bone Spring formation in this area. Also attached is a water analysis from a storage tank located at Key's BKE Well No. 1, which is a commercial disposal well located in Unit H of Section 13, Township 23 South, Range 27 East, NMPM. This water analysis is a mixture of various produced waters in Southeast New Mexico and Key believes this water is representative of the water that will be injected into the Grace Carlsbad No. 1.

5. Injection is to occur into the Brushy Canyon member of the Delaware formation, There are currently no wells producing from the Delaware formation in Section 36. The closest well producing from the Delaware interval is located approximately 0.9 mile northeast of the Grace Carlsbad No. 1. This well, which is currently not capable of producing, was perforated in the interval from 2,600'-2,700', 2,822'-2,842' and 5,202'-5,213'. The Grace Carlsbad No. 1 appears to be located in an area that is non-productive in the Delaware formation, however, there appears to be Delaware production approximately 2.5 miles to the southeast, 3.25 miles to the west, 2 miles to the north and 6 miles to the northeast of the Grace Carlsbad No. 1.

VIII. Attached is a report entitled "Potential Horizons for Salt Water Disposal in the Delaware Mountain Group T22S, R26E, Section 36, Eddy County, New Mexico". The report was prepared for Key Energy Services, LLC by Dennis W. Powers, Ph.D., Consulting Geologist. This report explains in great detail, the geologic characteristics of the Delaware formation in this area. Also attached is a hydrologic report that examines the underground sources of fresh water in this area, including the Pecos River Valley Alluvial Aquifer and the Permian Capitan Reef.

IX. No stimulation is planned.

X. Logs were filed at the time of drilling.

XI. Within the hydrologic report is a water analysis from the Brantley fresh water well located in Section 30, T-22 South, R-26 East.

XII. Affirmative statement is attached.

XIII. Proof on notice is attached.

INJECTION WELL DATA SHEET

OPERATOR: Key Energy Services, LLC

WELL NAME & NUMBER: Grace Carlsbad No. 1

WELL LOCATION:	1980' FSL & 660' FEL	I	36	22 South	26 East
	FOOTAGE LOCATION	UNIT LETTER	SECTION	TOWNSHIP	RANGE

WELLBORE SCHEMATIC

See Attached Wellbore Schematics

WELL CONSTRUCTION DATA

Surface Casing

Hole Size: 17" Casing Size: 13 3/8" @ 382'
Cemented with: 400 Sx. or _____ ft^3
Top of Cement: Surface Method Determined: Circulated

Intermediate Casing

Hole Size: 12 1/4" Casing Size: 9 5/8" @ 5,200'
Cemented with: 1200 Sx. or _____ ft^3
Top of Cement: 1,451' Method Determined: T. S.

Production Casing

Hole Size: 8 3/4" Casing Size: 7" @ 10,727'
Cemented with: 335 Sx. or _____ ft^3
Top of Cement: 8,606' Method Determined: T.S.

Production Liner

Hole Size: 6 1/4" Casing Size: 4 ½" @ 10,630'-11,875'
Cemented with: 200 Sx. or _____ ft^3
Top of Cement: 10,634' Method Determined: Well File

Total Depth: 11,875'

Injection Interval

Delaware Formation: 4,082'-5,200'

INJECTION WELL DATA SHEET

Tubing Size: 3 1/2" Lining Material: Internally Plastic Coated

Type of Packer: Arrowset 1-X Packer

Packer Setting Depth: 3,982' or within 100' of the uppermost injection perforations

Other Type of Tubing/Casing Seal (if applicable): None

Additional Data

1. Is this a new well drilled for injection: ____ Yes ____X____ No

   If no, for what purpose was the well originally drilled: Well was initially drilled in 1972 as a producing well in the Morrow formation. The well was also subsequently produced from the Strawn and Canyon formations.

2. Name of the Injection Formation: Delaware Formation

3. Name of Field or Pool (if applicable): N/A

4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail, i.e. sacks of cement or plug(s) used.

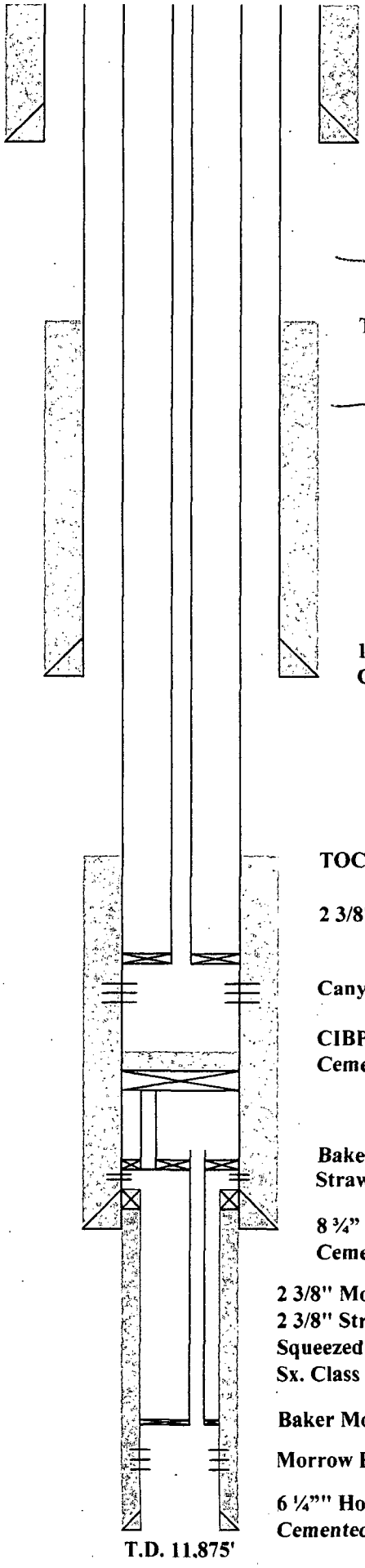
   Morrow-11,486'-11,526'; Strawn-10,270'-10,492' (Both intervals squeezed w/310 Sx.)
   Canyon-9,946'-9,962' Currently Open

5. Give the name and depths of any oil or gas zones underlying or overlying the proposed injection zone in this area:

   Within Section 36, T-22S, R-26E are the following pools: South Carlsbad-Strawn Gas Pool (74120) & South Carlsbad-Morrow Gas Pool (73960). There are no Delaware pools in Section 36.

Schematic No. 1: Current Wellbore Configuration

Key Energy Services, LLC
Grace Carlsbad No. 1
API No. 30-015-20573
1980' FSL & 660' FEL (Unit I)
Section 36, T-22 South, R-26 East, NMPM



17" Hole; Set 13 3/8"48# J-55 Csg @ 382'. Cemented w/400 Sx. Cement circulated to Surface

Drilled: 2/1972

1300'
OFFSETTING BRINE WELL DEPTHS
5000'

TOC @ 1,451' by T.S.

12 ¼" Hole; Set 9 5/8" 36 & 40# J-55 Csg @ 5,200' Cemented w/1200 Sx. TOC @ 1,451' by T.S.

TOC @ 8,606' by T.S.

2 3/8' Tbg. @ 9,911'

Canyon Perforations: 9,946'-9,962'

CIBP @ 10,052' w/35' of cement on top & Cement Retainer @ 10,052'

Baker Dual Packer @ 10,169'
Strawn Perforations: 10,270'-10,492'

8 ¾" Hole; Set 7" 23 & 26# Csg. @ 10,727' Cemented w/335 Sx. TOC @ 8,606' by T.S.

2 3/8" Morrow Tbg. Cut @ 10,150'
2 3/8" Strawn Tbg. Cut @ 10,054'
Squeezed Strawn & Morrow intervals w/310 Sx. Class H.

Baker Model A-1 Packer @ 11,380'

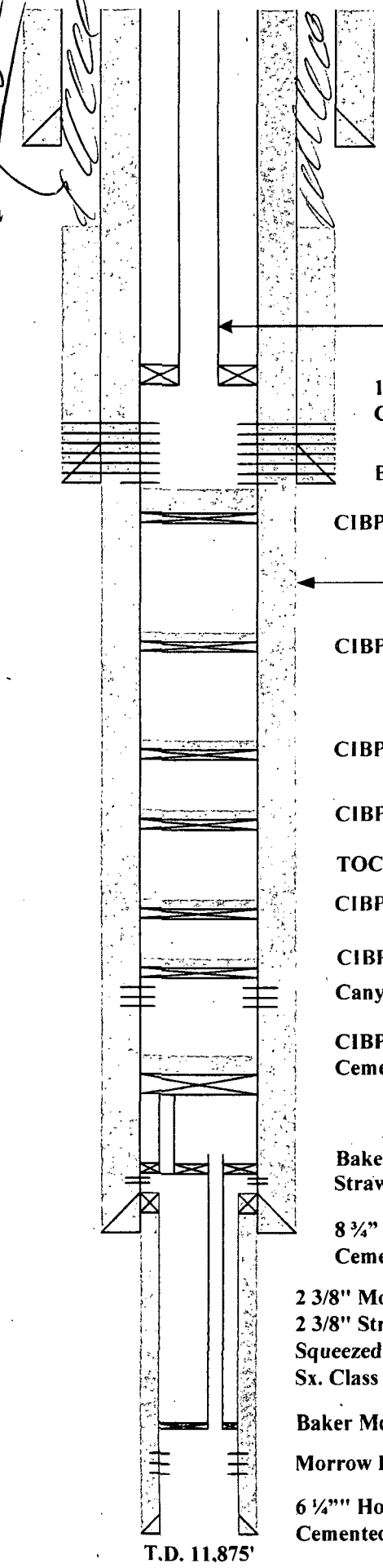
Morrow Perforations: 11,486'-11,526'

6 ¼"" Hole; Set 4 ½" Liner 10,630'-11,875' Cemented w/200 Sx. TOC @ Liner Top

T.D. 11,875'

Schematic No. 2: Leave 7" Casing in Wellbore

Key Energy Services, LLC
Grace Carlsbad No. 1
API No. 30-015-20573
1980' FSL & 660' FEL (Unit I)
Section 36, T-22 South, R-26 East, NMPM



17" Hole; Set 13 3/8"48# J-55 Csg @ 382'. Cemented w/400 Sx. Cement circulated to Surface

Drilled: 2/1972

TOC @ 1,451' by T.S.

3 ½" IPC Tubing set in a Arrowset 1-X Packer @ 3,982'

12 ¼" Hole; Set 9 5/8" 36 & 40# J-55 Csg @ 5,200' Cemented w/1200 Sx. TOC @ 1,451' by T.S.

Brushy Canyon Injection Perforations: 4,082'-5,200'

CIBP @ 5,250' w/50' cmt.

TOC behind the 7" casing is currently at 8,606'. If 7" casing is left in the well, cement will be circulated from 8,606' to surface, or to a depth approved by NMOCD

CIBP @ 6,280' w/35' cmt. Top Bone Spring/1st Bone Spring Sand

CIBP @ 7,790' w/35' cmt. Top 2nd Bone Spring Sand

CIBP @ 8,120' w/35' cmt. Top 3rd Bone Spring Sand

TOC @ 8,606' by T.S.

CIBP @ 9,030' w/ 35' cmt. Top Wolfcamp

CIBP @ 9,900' w/35' cmt. Isolate Canyon Perfs.

Canyon Perforations: 9,946'-9,962'

CIBP @ 10,052' w/35' of cement on top & Cement Retainer @ 10,052'

Baker Dual Packer @ 10,169'
Strawn Perforations: 10,270'-10,492'

8 ¾" Hole; Set 7" 23 & 26# Csg. @ 10,727' Cemented w/335 Sx. TOC @ 8,606' by T.S.

2 3/8" Morrow Tbg. Cut @ 10,150'
2 3/8" Strawn Tbg. Cut @ 10,054'
Squeezed Strawn & Morrow intervals w/310 Sx. Class H.

Baker Model A-1 Packer @ 11,380'

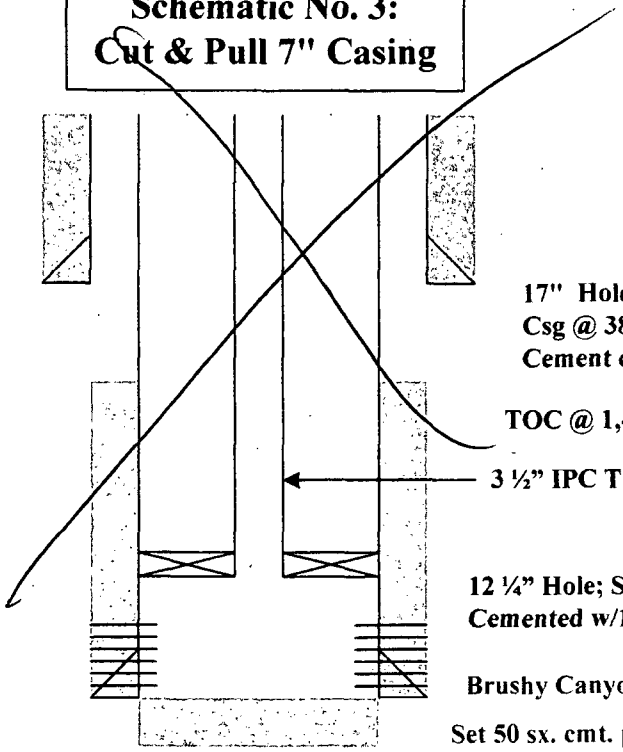
Morrow Perforations: 11,486'-11,526'

6 ¼"" Hole; Set 4 ½" Liner 10,630'-11,875' Cemented w/200 Sx. TOC @ Liner Top

T.D. 11,875'

Schematic No. 3:
Cut & Pull 7" Casing

Key Energy Services, LLC
Grace Carlsbad No. 1
API No. 30-015-20573
1980' FSL & 660' FEL (Unit I)
Section 36, T-22 South, R-26 East, NMPM



17" Hole; Set 13 3/8"48# J-55
Csg @ 382'. Cemented w/400 Sx.
Cement circulated to Surface

Drilled: 2/1972

TOC @ 1,451' by T.S.

3 ½" IPC Tubing set in a Arrowset 1-X Packer @ 3,982'

12 ¼" Hole; Set 9 5/8" 36 & 40# J-55 Csg @ 5,200'
Cemented w/1200 Sx. TOC @ 1,451' by T.S.

Brushy Canyon Injection Perforations: 4,082'-5,200'

Set 50 sx. cmt. plug @ 5,200'

Set 50 sx. cmt. plug @ 6,280'. Top Bone Spring/1st Bone Spring Sand

Set 50 sx. cmt. plug @ 7,790'. Top 2nd Bone Spring Sand

Set 50 sx. cmt. plug @ 8,120'. Top 3rd Bone Spring Sand

Cut & pull 7" casing @ 8,600'. Set 50 Sx.
cmt. stub plug 8,550'-8,650'
TOC @ 8,606' by T.S.

CIBP @ 9,030' w/35' cmt. Isolate Wolfcamp

CIBP @ 9,900' w/35' cmt. Isolate Canyon Perfs.
Canyon Perforations: 9,946'-9,962'

CIBP @ 10,052' w/35' of cement on top &
Cement Retainer @ 10,052'

Baker Dual Packer @ 10,169'
Strawn Perforations: 10,270'-10,492'

8 ¾" Hole; Set 7" 23 & 26# Csg. @ 10,727'
Cemented w/335 Sx. TOC @ 8,606' by T.S.

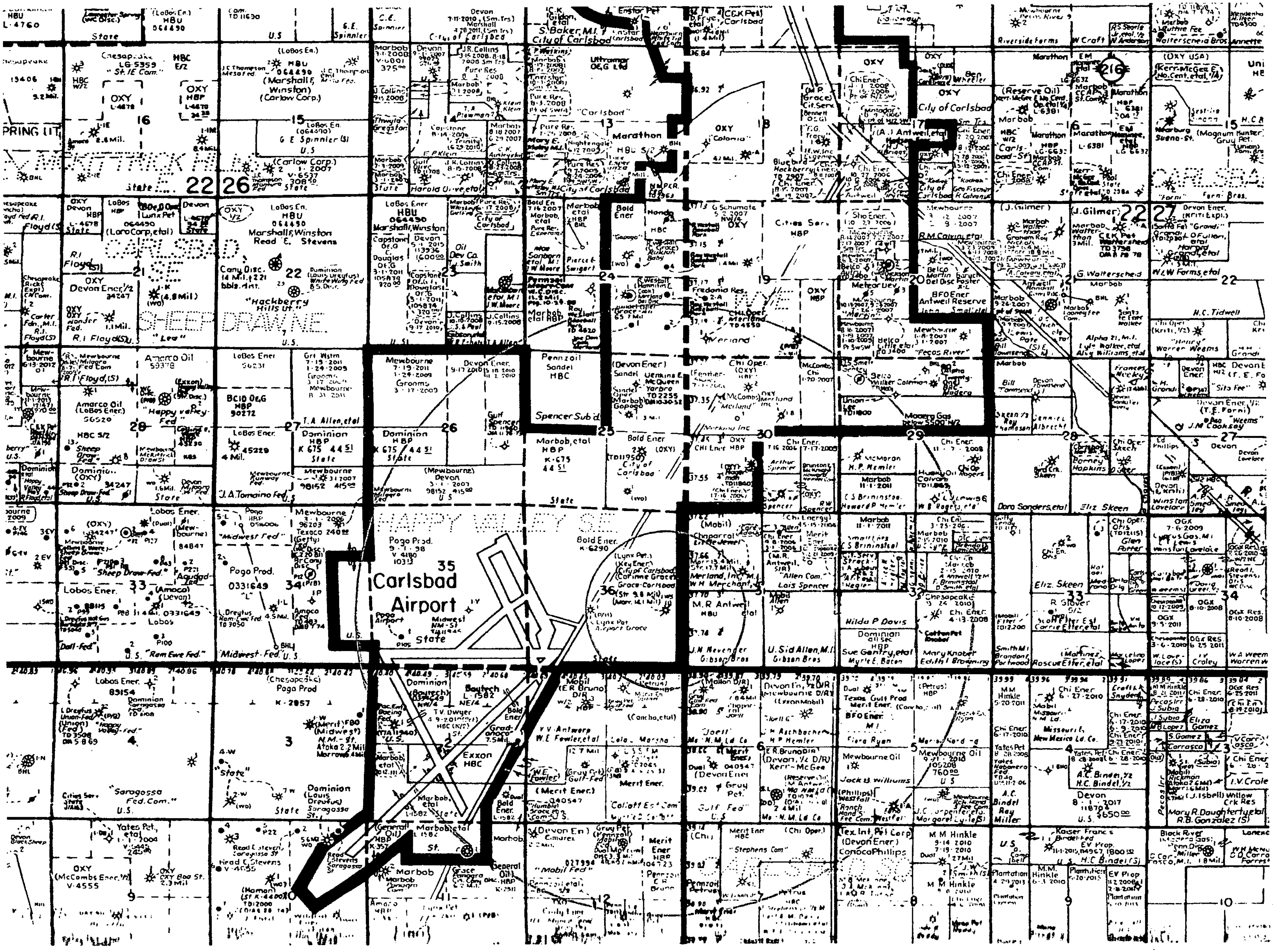
2 3/8" Morrow Tbg. Cut @ 10,150'
2 3/8" Strawn Tbg. Cut @ 10,054'
Squeezed Strawn & Morrow intervals w/310
Sx. Class H.

Baker Model A-1 Packer @ 11,380'

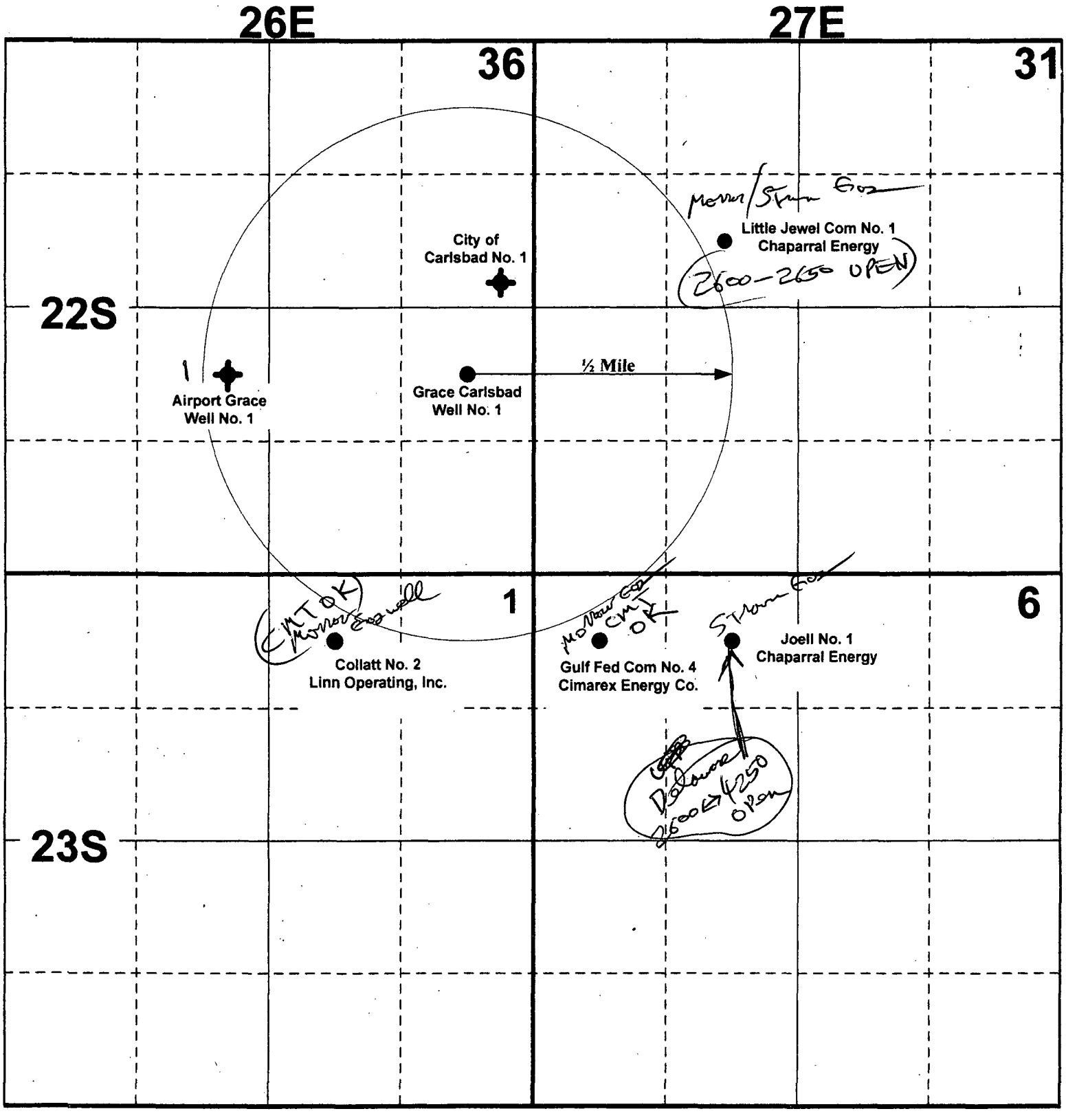
Morrow Perforations: 11,486'-11,526'

6 ¼"" Hole; Set 4 ½" Liner 10,630'-11,875'
Cemented w/200 Sx. TOC @ Liner Top

T.D. 11,875'



Carlsbad Airport
HAPPY VALLEY S.E.
SHEEP DRAW N.E.
City of Carlsbad
Spencer Sub'd.
Carlsbad
Marathon
OXY
Mewbourne
Devon
Dominion
Pogo Prod.
Lobos Ener.
Marbob
Chi Ener.
Merit Ener.
Exxon HBC
Bold Ener.
Chesapeake
Pennzoil Sandel HBC
U.S.
State

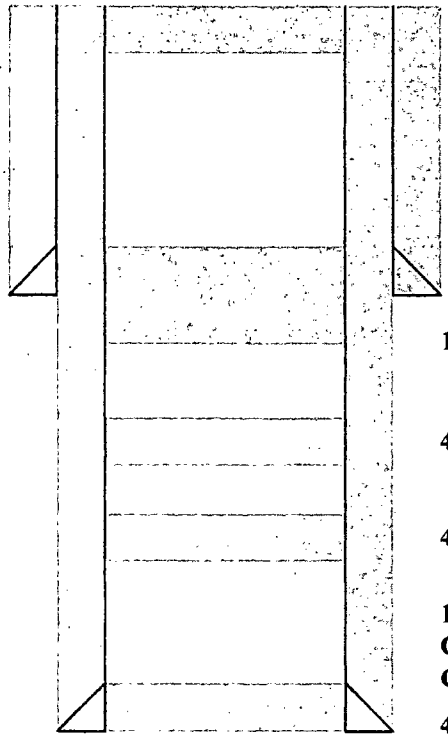


Key Energy Services, LLC
½ Mile Area of Review Map
Grace Carlsbad Well No. 1

KEY ENERGY SERVICES, LLC
AREA OF REVIEW WELL DATA
GRACE CARLSBAD No. 1

API NUMBER	OPERATOR	LEASE NAME	WELL NO.	WELL TYPE	STATUS	FTG. N/S	N/S	FTG. E/W	E/W	UNIT	SEC.	TSHP	RNG.	DATE DRILLED	TOTAL DEPTH	HOLE SIZE	CSG. SIZE	SET AT	SX. CMT.	CMT. TOP	MTD.	HOLE SIZE	CSG. SIZE	SET AT	SX. CMT.	CMT. TOP	MTD.	COMPLETION	REMARKS
30-015-20829	Bold Energy, LP	Airport Grace	1	P	PA	1980'	S	2164'	W	K	36	22S	26E	Mar-73	11,956'	17"	13 3/8"	358'	375	Surface	Circ.	12 1/4"	9 5/8"	5,395'	1650	Surface	Circ.	9,862'-9,866' Perf.	PA'd 2/2007. Schematic Attached
																8 3/4"	7"	11,956'	680	6,900'	File								
30-015-21842	Key Energy Services, LLC	City of Carlsbad	1	Brine	PA	2420'	N	330'	E	H	36	22S	26E	Jul-76	930'	13"	8 5/8"	350'	225	Surface	Circ.	7 7/8"	5 1/2"	710'	150	Surface	Circ.	710'-930' O.H.	PA'd 10/2008. Schematic Attached

Bold Energy, LP
Airport Grace No. 1
API No. 30-015-20829
1980' FSL & 2164' FWL (Unit K)
Section 36, T-22 South, R-26 East, NMPM



35 Sx. 100'-
Surface

17" Hole; Set 13 3/8" Csg @ 358'
Cemented w/375 Sx.
Cement circulated to Surface

Drilled: 3/1973
Plugged: 2/2007

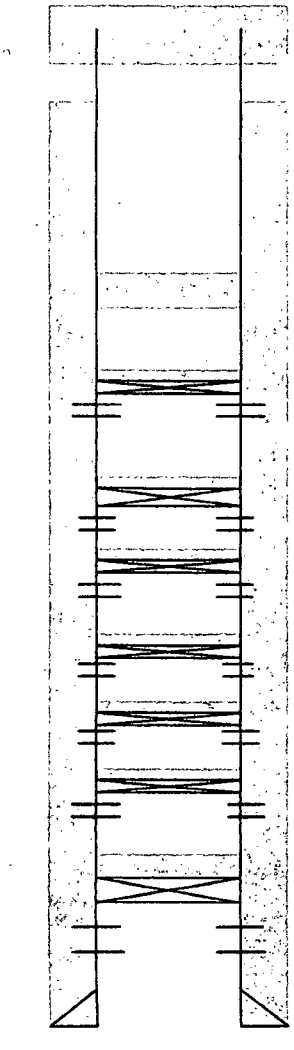
100 Sx. cement plug 212'-500'

45 Sx. cement plug 1,423'-1,500'

40 Sx. cement plug 1,876'-1,984'

12 ¼" Hole; Set 9 5/8" Csg @ 5,395'
Cemented w/1650 Sx.
Calculated TOC @ surface.

45 Sx. cement plug 5,276'-5,400'



7" Csg. Cut & pulled @ 6,500'
Set 60 sx. cement plug 6,389'-6,600'

TOC @ 6,900'

25 Sx. cement plug 8,763'-8,900'

CIBP @ 9,800' w/25 Sx. of cement on top
Canyon Perforations: 9,862'-9,866'

CIBP @ 10,160' w/35' of cement on top
Canyon Perforations: 10,200'-10,205'

CIBP @ 10,395' w/35' of cement on top
Strawn Perforations: 10,435'-10,560'

CIBP @ 10,865' w/35' of cement on to
Atoka Perforations: 10,900'-10,904'

CIBP @ 11,400' w/35' of cement on top
Morrow Perforations: 11,429'-11,439'

CIBP @ 11,500' w/10' of cement on top
Morrow Perforations: 11,518'-11,528'

CIBP @ 11,606' w/10' of cmt. on top

Morow Perforations: 11,610'-11,712'

8 ¾" Hole; Set 7" Csg. @ 11,956'
Cemented w/680 Sx.
TOC @ 6,900' by Well File

T.D. 11,956'

Well: AIRPORT GRACE **No.:** 001
Operator: Nabors Well Service LTD
API: 3001520829
1980 FSL X 2164 FWL
Township: 22.0S **Range:** 26E
Section: 36 **Unit:** K
Land Type: S **County:** Eddy **True Vertical Depth:** 11956

Well was spudded 3/28/1973 by Michael P. Grace as a Morrow test
Cement volumes and tops were taken and calculated from NMOCD records
Well is currently a non-producing Carlsbad, Canyon, South Gas Well
Please see attached wellbore schematic for available well data
Well is located on Fee surface and state minerals with in the City limits of Carlsbad,NM

Spud 3/28/1973
13 3/8" 48# &72# casing was set at 358ft in a 17" hole
Cemented with 375 sacks of Class "C" cement with 2% CaCl
Cement circulated to the surface

9 5/8" 36# & 40#casing was set at 5391ft in a 12 ¼" hole
Cemented with 1250 sacks of Halliburton lite and 400 sacks Class "C"
No record in well file of cement circulating
Cement volumes sufficient to circulate at 70% fill

7" 23# & 32# casing was set at 11956ft in a 8 ¾" hole
Cemented with 320 sacks of Class "C" 50-50 poz mix Followed by 360 sacks Class "H" cement.
Calculated TOC at 7960ft using 70% fill

Morrow Perforations 11610 -11712ft
Cast iron bridge plug set at 11400ft, capped with 35ft of cement
Atoka Perforations 10900 -10904ft
Cast iron bridge plug set at 10865ft, capped with 35ft of cement
Strawn Perforations 10435 – 10564ft
Cast iron bridge plug set at 10395ft, capped with 35ft of cement
Wolfcamp Perforations 10200 – 10205ft
Cast iron bridge plug set at 10160ft, capped with 35ft of cement
Canyon Perforations 9862 – 9866ft

Submit 3 Copies To Appropri[redacted]ct Office
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 South St. Francis Dr.
Santa Fe, NM 87505

Form C-103
May 27, 2004

WELL API NO.
30-015-20829
5. Indicate Type of Lease
STATE ☒ FEE ☐
6. State Oil & Gas Lease No.

SUNDRY NOTICES AND REPORTS ON WELLS
(DO NOT USE THIS FORM FOR PROPOSALS TO DRILL OR TO DEEPEN OR PLUG BACK TO A DIFFERENT RESERVOIR. USE "APPLICATION FOR PERMIT" (FORM C-101) FOR SUCH PROPOSALS.)

7. Lease Name or Unit Agreement Name: **Airport Grace**

1. Type of Well: Oil Well ☐ Gas Well ☒ Other

8. Well No. **1**

2. Name of Operator
Bold Energy, L P

9. OGRID Number

3. Address of Operator
415 W. Wall, Ste 500, Midland, TX 79701

10. Pool name or Wildcat

Month - Year
FEB 2 2 2007
OCD - ARTESIA, NM

4. Well Location
Unit Letter **K** : **1980** feet from the **South** line and **2164** feet from the **West** line
Section **36** Township **22S** Range **26E** NMPM County **Eddy**

11. Elevation *(Show whether DR, RKB, RT, GR, etc.)*
3221

Pit or Below-grade Tank Application ☐ **or Closure** ☐
Pit type ______ **Depth to Groundwater** ______ **Distance from nearest fresh water well** ______ **Distance from nearest surface water** ______
Pit Liner Thickness: ______ **mil** **Below-Grade Tank: Volume** ______ **bbls; Construction Material** ______

12. Check Appropriate Box to Indicate Nature of Notice, Report or Other Data

NOTICE OF INTENTION TO:		SUBSEQUENT REPORT OF:	
PERFORM REMEDIAL WORK ☐	PLUG AND ABANDON ☐	REMEDIAL WORK ☐	ALTERING CASING ☐
TEMPORARILY ABANDON ☐	CHANGE PLANS ☐	COMMENCE DRILLING OPNS. ☐	P AND A ☒
PULL OR ALTER CASING ☐	MULTIPLE COMPLETION ☐	CASING/CEMENT JOB ☐	
OTHER: ☐		OTHER: ☐	

13. Describe proposed or completed operations. (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work). SEE RULE 1103. For Multiple Completions: Attach wellbore diagram of proposed completion or recompletion.

1/10/07 MIRU
1/11/07 Through 1/18/07 Blow tbg. and casing pressure down. Load hole with brine. POH w/ tbg.
1/22/07 WIH w/ 7" CIBP. Set @ 9800. COH / wireline. WIH w/ 62 jts tbg. SDFN
1/24/07 WIH w/243 jts. tbg. Circ. hole w/ 290 bbls 10 lb. brine. Spot 25 sx cement on top CICB @ 9800' POH w/192 jts. tbg. SDFN. 1/25/07 POH w/ 75 jts tbg. ND well head. SDFN. 1/26/07 RIH w/ 7" jet cutter to 8897'. COH w/ wireline. Could not pull casing. SDFN. 1/27/07 WIH w/ 20 jts tbg & 7" packer. Pressure up to 1500 psi. Held. WIH w/ tbg to 8900'. Spot 25 sx cement. POH w/ 160 jts. SDFN.. 1/29/07 Tag plug @ 8763. POH w/ tbg. RIH w/ jet cutter cut pipe @ +/- 6500. POH wireline. Rig up Jacks Pull casing free. Rig down Jacks. SDFN. 1/30/07 Lay down 175 jts. 7" XLine casing. SDFN. 1/31/07 Lay down 18jts. casing. RIH w/ tbg to 6600'. Spot 60 sx. cement plug SDFN. 2/01/07 Tag plug @ 6389'. Spot 45 sx cement @ 5400'. POH SDFN. 2/02/07. Tag plug @ 5276. Spot 40 sx cement @ 1984. WOC 4 hrs. Tag plug @ 1867'. Spot 45 sx. plug @ 1500'. POH SDFN. 2/05/07 Tagged plug @ 1423'. Spot 100 sx. cement plug @ 500'. WOC 4 hrs. Tagged plug @ 212'. Circ. 35 sx cement from 100' to surface. ND BOP. & wellhead. SDFN. 2/06/07 Dug out cellar. Cut off well head. Weld on Dry Hole Marker. Rig down move off.

Plugging of the well bore. Liability under bond is retained until surface restoration, environmental remediation and final inspection is completed.

I hereby certify that the information above is true and complete to the best of my knowledge and belief. I further certify that any pit or below-grade tank has been/will be constructed or closed according to NMOCD guidelines ☐, a general permit ☐ or an (attached) alternative OCD-approved plan ☐.

SIGNATURE [signature] TITLE Operations Mgr. DATE 2/19/07

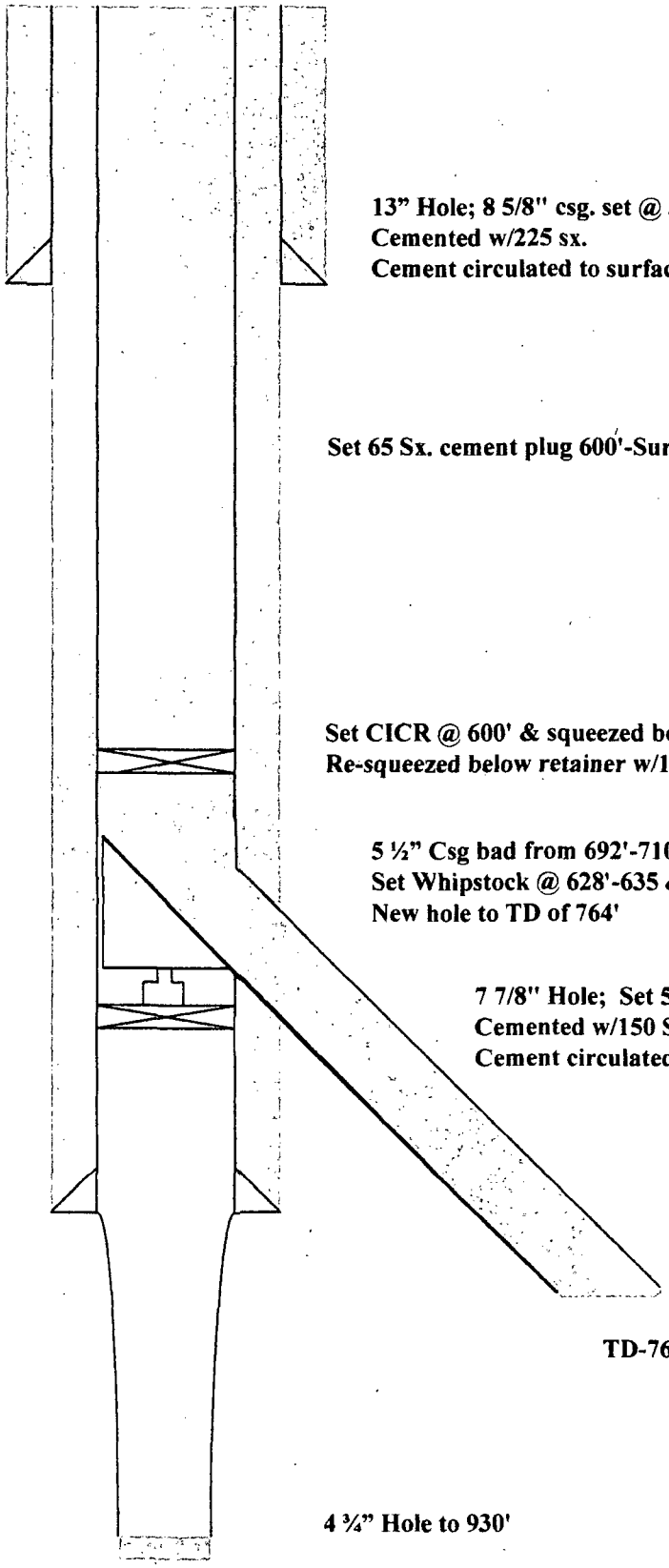
Type or print name Shannon Klier E-mail address: Shannon.Klier@boldenergy.com Telephone No. 432-686-1100

For State Use Only

APPROVED BY [signature] TITLE **Gerry Guye Deputy Field Inspector District II - Artesia** DATE FEB 2 3 2007

Conditions of Approval (if any):

Key Energy Services, LLC
City of Carlsbad No. 1
API No. 30-015-21842
2420' FNL & 330' FEL, Unit H
Section 36, T-22S, R-26E
Type Well: Brine Well



13" Hole; 8 5/8" csg. set @ 350'
Cemented w/225 sx.
Cement circulated to surface

Date Drilled: 7/76
Date PA'd: 10/08

Set 65 Sx. cement plug 600'-Surface

Set CICR @ 600' & squeezed below retainer w/100 sx.
Re-squeezed below retainer w/100 sx.

5 ½" Csg bad from 692'-710' Set BP @ 642'
Set Whipstock @ 628'-635 & drilled
New hole to TD of 764'

7 7/8" Hole; Set 5 ½" Csg. @ 710'
Cemented w/150 Sx.
Cement circulated to surface

TD-764'

4 ¾" Hole to 930'

PBTD.-908'
TD-930'

Submit 3 Copies To Appropriate District Office
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 South St. Francis Dr.
Santa Fe, NM 87505

Form C-103
May 27, 2004

WELL API NO.
30-015-21842

5. Indicate Type of Lease
STATE ☒ FEE ☐

6. State Oil & Gas Lease No.

SUNDRY NOTICES AND REPORTS ON WELLS
(DO NOT USE THIS FORM FOR PROPOSALS TO DRILL OR TO DEEPEN OR PLUG BACK TO A DIFFERENT RESERVOIR. USE "APPLICATION FOR PERMIT" (FORM C-101) FOR SUCH PROPOSALS.)

7. Lease Name or Unit Agreement Name
City of Carlsbad

1. Type of Well: Oil Well ☐ Gas Well ☒ Other Brine

8. Well Number 1

2. Name of Operator
Key Energy Services LLC

NOV - 1 2008

9. OGRID Number

3. Address of Operator
6 Desta Drive, Ste 4400, Midland, Texas 79705

OCD-ARTESIA

10. Pool name or Wildcat
Brine Mining Well

4. Well Location
Unit Letter H : 2420 feet from the North line and 330 feet from the East line
Section 36 Township 22S Range 26E NMPM Lea County

11. Elevation *(Show whether DR, RKB, RT, GR, etc.)*

Pit or Below-grade Tank Application ☐ or Closure ☐

Pit type Steel Depth to Groundwater Distance from nearest fresh water well Distance from nearest surface water

Pit Liner Thickness: mil Below-Grade Tank: Volume bbls; Construction Material

12. Check Appropriate Box to Indicate Nature of Notice, Report or Other Data

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
PERFORM REMEDIAL WORK	☐	PLUG AND ABANDON	☐	REMEDIAL WORK	☐	ALTERING CASING	☐
TEMPORARILY ABANDON	☐	CHANGE PLANS	☐	COMMENCE DRILLING OPNS.	☐	P AND A	☒
PULL OR ALTER CASING	☐	MULTIPLE COMPL	☐	CASING/CEMENT JOB	☐		
OTHER:	☐			OTHER:	☐		

13. Describe proposed or completed operations. (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work). SEE RULE 1103. For Multiple Completions: Attach wellbore diagram of proposed completion or recompletion.

10-20-08 Set CICR @ 600'. Sqz'd 100 sks of C cmt displacing 10' below retainer. WOC.

10-21-08 Sting into retainer & established injection rate @ 2 bpm 500 psi. Called Tim Gum w/ NMOCD & received his OK to re-sqz. Sqz'd 100 sks of cmt displacing 10' below retainer. WOC

10-22-08 Sting into retainer & pressure up on cmt. Pressure test to 680 psi recording test on 30 minute chart. Sting out of retainer. Spot 65 sks of cmt from 600'- surface.

Cut off wellhead and anchors 3' BGL. Installed dry hole marker.

I hereby certify that the information above is true and complete to the best of my knowledge and belief. **I further certify that any pit or below-grade tank has been/will be constructed or closed according to NMOCD guidelines ☐, a general permit ☐ or an (attached) alternative OCD-approved plan ☐.**

SIGNATURE _____ TITLE PA Manager Key Energy Services DATE 10-31-08

Type or print name Jack Shelton E-mail address: jshelton@keyenergy.com Telephone No.432-523-5155

For State Use Only Accepted for record NMOCD

APPROVED BY: _____ TITLE _____ DATE 11/3/08

Conditions of Approval (if any):

Approved for plugging of well bore only. Liability under bond is retained pending receipt of C-103 (Subsequent Report of Well Plugging) which may be found at OCD Web Page under Forms, www.emnrd.state.nm.us/ocd.

Potential Horizons for Salt Water Disposal in the Delaware Mountain Group T22S, R26E, Section 36, Eddy County, New Mexico

prepared for Key Energy Services

Dennis W. Powers, Ph.D.
Consulting Geologist
170 Hemley Road
Anthony, TX 79821

March 21, 2012

Potential Horizons for Salt Water Disposal in the Delaware Mountain Group T22S, R26E, Section 36, Eddy County, New Mexico

Dennis W. Powers, Ph.D.
Consulting Geologist
170 Hemley Road
Anthony, TX 79821

March 21, 2012

EXECUTIVE SUMMARY

Key Energy Services proposes to drill and operate a salt water disposal (SWD) well in section 36, T22S, R26E, in Eddy County, New Mexico. The interval of primary interest is the lower formation (Brushy Canyon) of the Upper Permian Delaware Mountain Group (DMG). The formations were evaluated from readily available geophysical logs.

The DMG consists of three formations of mainly sandstone, siltstone, and some limestone intervals. From the top of the Bone Spring Limestone, the formations in order are Brushy Canyon, Cherry Canyon, and Bell Canyon. They are equivalent stratigraphically to Guadalupian rocks of the Guadalupe Mountains, with the uppermost (Bell Canyon) stratigraphically equivalent to the Capitan Limestone (reef and related rocks).

The formations were evaluated for best continuous intervals of ~20 ft thick (or more) for the following characteristics: lower gamma (more sand), middle range acoustic travel time (generally sand), lower neutron (higher H content), and lower resistivity (fluid content).

The Brushy Canyon includes the most intervals with favorable characteristics, and several are recommended for penetration and testing for hydraulic properties. The Cherry Canyon is more uniformly high in gamma, indicating less sand and poorer prospects for porosity and permeability suitable for injection. The Bell Canyon has limited potential intervals.

Some zones at the top of Cherry Canyon and basal Brushy Canyon are producing in the general area around the prospective site. These zones are to be minimized as possible.

The Brushy Canyon has no stratigraphic connection to the Capitan reef or older Goat Seep reef rocks. The elevation of the upper contact of the Bone Spring Limestone across the Capitan reef front does not show displacement due to faulting that could potentially connect deep zones to Capitan.

INTRODUCTION

Task

Key Energy Services proposes to drill and operate a salt water disposal (SWD) well in section 36, T22S, R26E, in Eddy County, New Mexico (Figure 1). The interval of primary interest is the lower formation (Brushy Canyon) of the Upper Permian Delaware Mountain Group (DMG).

This report provides the background information used to evaluate the DMG formations for intervals suitable for testing as injection sites. These formations were evaluated from geophysical logs readily available from the New Mexico Oil Conservation Department (OCD), supplemented in a few instances by purchasing logs from TGS-NOPEC.

Methods

Geophysical logs provide basic properties that are useful as a guide to the suitability of intervals for fluid injection. The main desired properties are adequate porosity and thickness for storage and permeability for efficiency of inection. The following suite of logs, where available, was used to indicate suitable properties (see Figure 5):

natural gamma – in clastic rocks, lower gamma is typically associated with sand and higher gamma with more clay content. The standard 100 API units is typical of a North American Pennsylvanian black shale. Quartz sand will have low natural gamma, possibly less than 10 API units. The DMG rocks are fairly fine-grained, with high natural gamma. Intervals with lower natural gamma were preferred, and an artificial filter of 70 API units was used to identify preferred intervals.

acoustic travel time – acoustic travel time is related to the density and lithification of the rock. High density, well lithified rocks such as anhydrite and dolomite, have high velocity and short travel times. Well compacted sandstone has slightly lower velocities and longer travel times. Shale or siltstones, common components of these formations, have quite variable travel times (see Figure 5). The acoustic or sonic log is very useful as a lithologic indicator and for stratigraphic correlation; in combination with other logs, it can be used for porosity estimates.

neutron – the neutron log responds to hydrogen (H) in the rock; lower neutron returns to the sensor indicate more H, although the form (e.g., water, oil, gas, mineral form such as hydrated minerals or clays) is not indicated by this log. High neutron intervals are avoided here because they are likely cemented, with little available porosity.

density – density is particularly useful in diagnosing lithology, especially in evaporites where halite is present. Here, high density rocks such as limestones are generally not selected as they tend to exhibit other characteristics not expected to be suitable.

resistivity – several kinds of "electric" logs measure resistivity. Here the laterolog is the most common. Resistivity is an important characteristic as it is related strongly to the permeability and porosity of the rock. Fluid type (e.g., brine vs fresh water) affect resistivity, but this analysis focuses more simply on lower resistivity in general, with the general assumption that water at these depths is unlikely to be fresh.

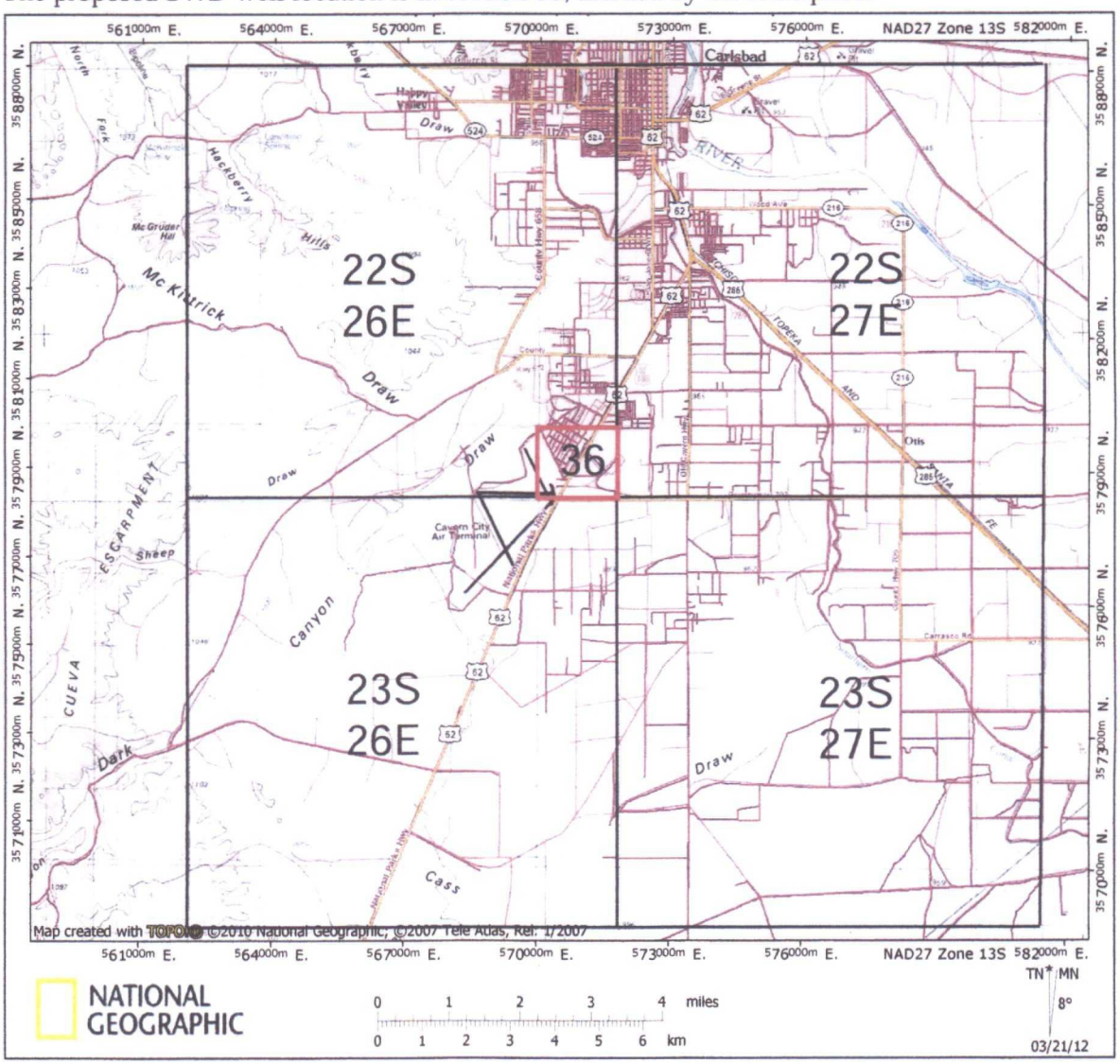
other – the log files include many other types of logs, and these were generally not examined because of the presence of more suitable log types.

Data Sources

Geophysical logs are publically available through the OCD website (http://ocdimage.emnrd.state.nm.us/imaging/). Because some logs were not available from this source or the log images were poor, a few logs were purchased by me from TGS-NOPEC. These are available to anyone who has a membership. All logs used in illustrations in this report are from public sources.

The literature on the DMG and related rocks is voluminous. A few references are cited here. The New Mexico Bureau of Geology & Mineral Resources (formerly New Mexico Bureau of Mines and Mineral Resources) produces publications and staff reports that are relevant to this and other aspects of New Mexico geology (http://geoinfo.nmt.edu/).

Figure 1. General location map with topography. Stratigraphic data were obtained mainly from these townships and immediately west to determine continuity and properties of DMG rocks. The proposed SWD well location is in section 36, marked by the red square.



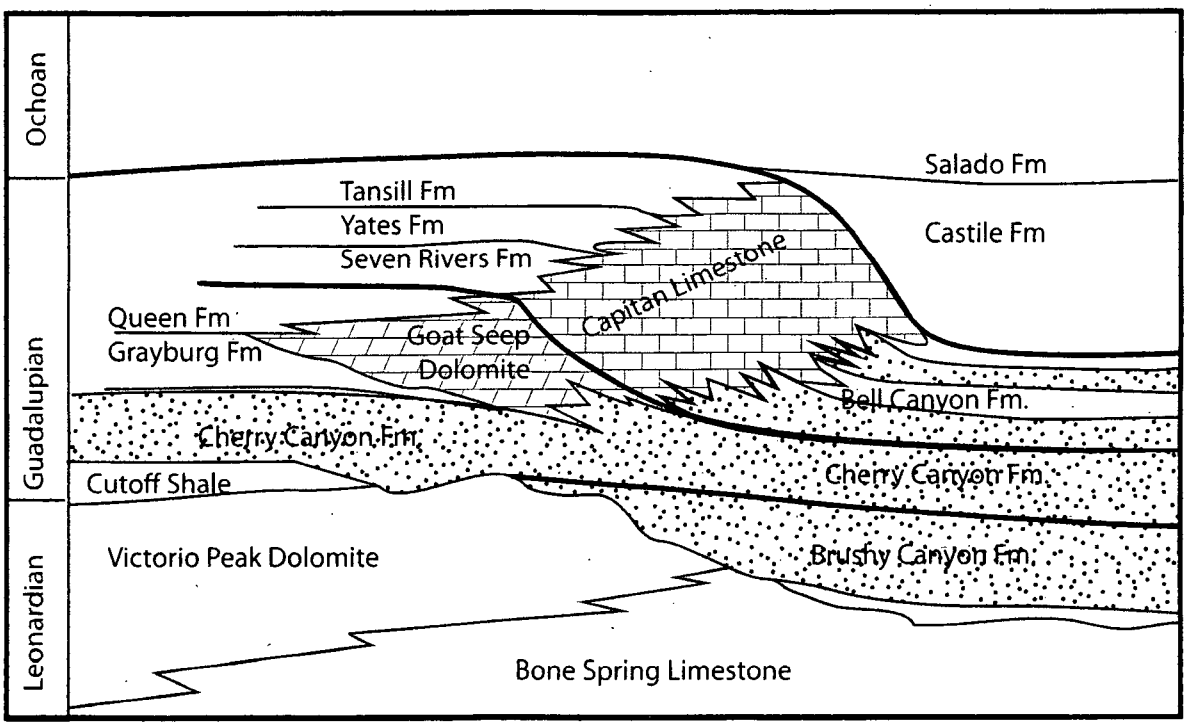
BACKGROUND GEOLOGY

Stratigraphic Units

The three formations of the DMG (Figure 2) are basin facies of shelf, reef, and backreef rocks of the Guadalupe Mountains. Their physical and stratigraphic relationships are complex and have been studied in great detail in outcrops and subsurface (e.g., King, 1948; Newell et al., 1972; Dunham, 1972). They were deposited mainly as slide and debris flow sediments driven by density currents along the sediment-water interface. They exhibit some erosive channeling with coarser deposits as well as lateral and distal fining as the density currents wane with distance into the deeper Delaware Basin. As a consequence, these deposits tend to be more elongate as sands and have finer "overbank" deposits. Delaware Basin drilling patterns since the mid to late 1980s for DMG exploration and development tend to show these channels very well.

The underlying unit to the DMG is the Bone Spring Limestone. It is persistent well beyond northwestern limits of the Delaware Basin. Broadhead and Gillard (2005) developed structure contours (elevation) on the top of the formation across southeastern New Mexico, with some data in the vicinity of the proposed SWD well location. For the geophysical log interpretation, the top was picked as closely as practical to the same signatures as Broadhead and Gillard used. They report (op cit., p. 7) that "in most places within the Delaware Basin, the top of the Bone Spring is marked by the boundary between the dark micritic limestones of the uppe Bone Spring and the sandstone, siltstone, and shales of the overlying Brushy

Figure 2. Stratigraphic units in the area around the proposed SWD location. Delaware Mountain Group units (Brushy Canyon, Cherry Canyon, and Bell Canyon are mainly Delaware Basin equivalents to reef and earlier rocks in the Guadalupe Mountains.



Canyon Formation of the Delaware Mountain Group." In many logs, there is a short section of high natural gamma at or near the top of the high density limestones that may be called the Cutoff Shale or Formation. It is not distinguished here from Brushy Canyon. The natural gamma and acoustic travel time log from Airport Grace No. 1 (API 30-015-20829) located 1980' fsl, 2164' fwl, section 36, T22S, R26E is taken as a reference log (Figure 3) in section 36 in view of the variable information from other wells. It displays the sharp increase in acoustic velocity of the dense limestones below the contact compared to the lower velocities in the overlying Brushy Canyon (and Cutoff).

The Brushy Canyon is about 1148 ft thick at the reference well (5230 ft - 4082 ft). The natural gamma shows generally shorter segments of lower values (less than ~70 API units) indicating sands. Some of these segments are overlain by intervals of increasing natural gamma upward that indicate upward fining (e.g. 4900-4700 ft). Higher acoustic travel times (lower velocity) coincident with some of the lower natural gamma may be indicating somewhat limited cements and greater porosity/permeability (e.g., 4540-4500 ft). These alternating signatures are consistent with the origin of of the formation by deep-water density currents (Harms, 1974).

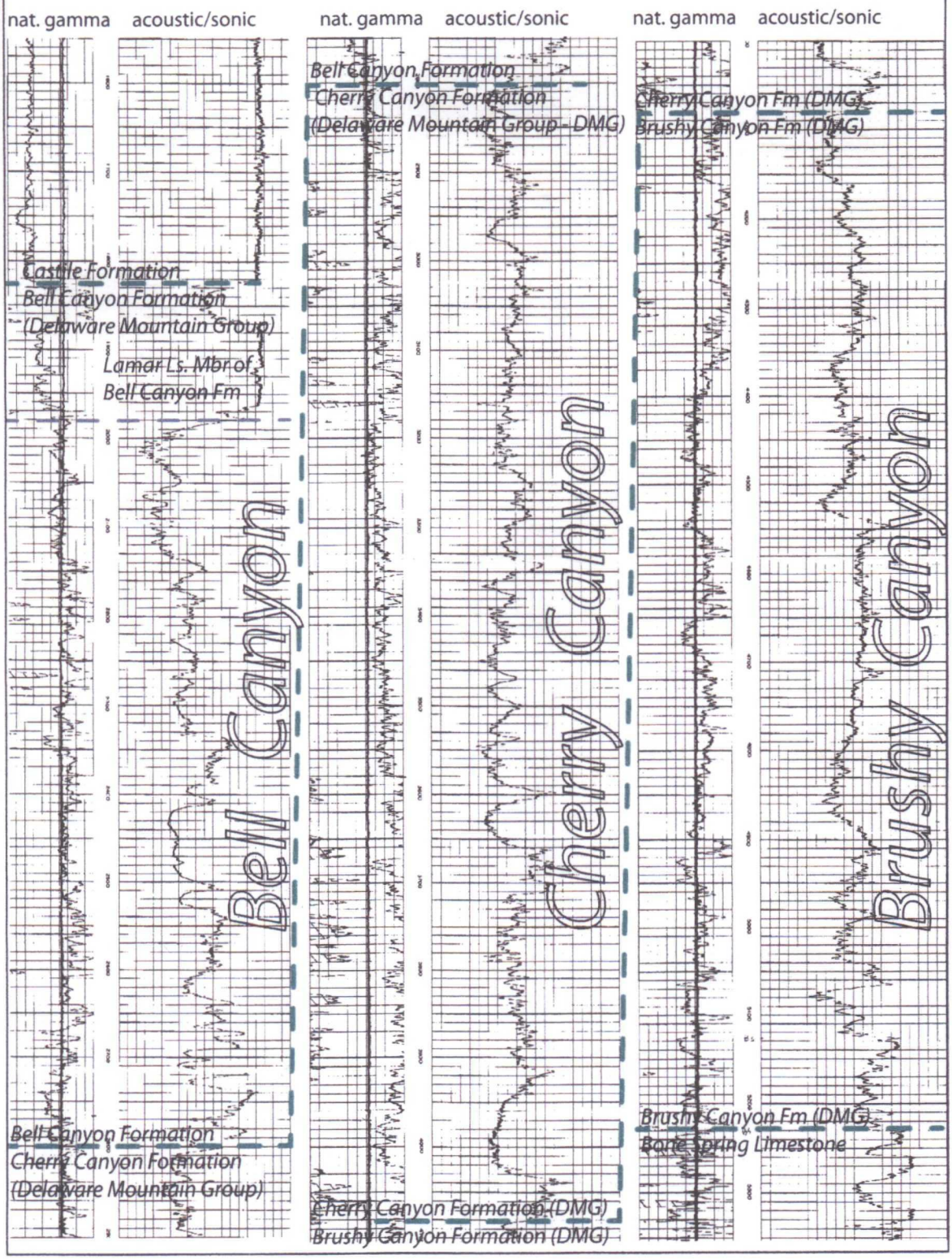
The Cherry Canyon is ~1276 ft thick (4082-2806 ft) as interpreted here. The basal contact with the Brushy Canyon is commonly marked by a large increase in natural gamma above the main body of the Brushy Canyon. At the reference well, there is an increase in the acoustic velocity (lower travel time), followed upward by a decrease in gamma and decrease in velocity. This contact was not clearly defined in several wells interpreted within the area around the proposed site. The upper contact of Cherry Canyon with Bell Canyon is placed at the base of a small sandstone (lower natural gamma) that is associated with a marked increase in acoustic velocity as well as changes in neutron, density, and resistivity. The Cherry Canyon displays much increased natural gamma in the lower half (compared to the underlying Brushy Canyon), a zone of relatively uniform natural gamma ~400 ft thick, and another zone of increased and variable natural gamma toward the top of the formation. It formed similarly to Brushy Canyon, but in general appears to be finer-grained.

The Bell Canyon is 981 ft thick (2806-1825 ft) as interpreted at the reference well. The upper contact with the base of Castile Formation is marked by a sharp upward decrease in natural gamma to a very low baseline level and a high acoustic velocity or density above the contact. The Bell Canyon displays characteristics between that of Brushy Canyon and Cherry Canyon. The natural gamma tends to be lower than Cherry Canyon and somewhat more uniform. The acoustic log displays considerable variation between low and moderate velocities. From 1980-1870 ft, a low natural gamma and high acoustic velocity zone is here called the Lamar Limestone, a member of the Brushy Canyon. This unit is persistent in the area. Well files from OCD for the Salty Bill SWD well in section 36 indicate the equivalent zone is anhydrite. The velocity signature is consistent with either lithology, but the natural gamma is slightly high for most anhydrites in the basin.

Basin Structure and Alleged Faulting

The margin of the Delaware Basin is complex stratigraphically, with facies changes for the DMG that also reflect considerable difference in elevation for equivalent beds over short distances. To evaluate the local structure and

Figure 3 Delaware Mountain Group Stratigraphy
in Section 35, T22S, R26E, Airport Grace #1 (API 30-015-20829)



potential for faults, the contacts at top of Bone Spring, top of Brushy Canyon, top of Cherry Canyon, and base of Lamar Limestone were mapped as elevations and contoured (Figure 4; at end of report due to dimensions). The Bone Spring map was extended to the west to evaluate the alleged Carlsbad fault along the edge of the escarpment west of the proposed SWD location.

The Bone Spring contour map shows two important features: general eastward dip and no apparent displacements along the trend of the alleged Carlsbad fault (Kelley, 1971). This is consistent also with the findings of Hayes and Bachman (1979), in which they concluded (p. 9) "a careful field examination of the area of the Carlsbad Fault as described by Kelley failed to reveal any fault planes or fault scarps." The Carlsbad fault was located in section 6, T23S, R26E by Kelley and trended northeast across T22S, R26E.

The top of Brushy Canyon indicates an east to east-northeast dip and some possible channeling on the top of the formation by the overlying Cherry Canyon. There is uncertainty associated with interpreting this contact, as noted earlier, that make the channeling somewhat less certain, but it is not a feature that requires resolving for this project. There is some possible increase in dip to the west.

The top of Cherry Canyon is similar to top of Brushy Canyon. Data are sparse along the trend of the alleged Carlsbad fault.

The base of Lamar Limestone Member also displays general eastward dip. There are variations in the south central part of T22S, R26E, along the trend of the alleged fault, but these are much more likely due to facies changes along the reef front, part of which is equivalent to the Lamar.

PROPOSED INJECTION INTERVALS

Criteria

The main inferences that can be drawn from geophysical logs relate to basic lithology and the potential for favorable properties (porosity and permeability). In the vicinity of the proposed SWD well location, each of the formations of the DMG was examined for several logs (Figure 5), and favorable zones were noted for each log. Intervals exceeding ~20 ft thickness and with favorable characteristics for several log properties were chosen and prioritized by quality, thickness, and depth.

The main criteria, as described previously, were for low (or lower) gamma (sandier), low neutron (presence of H), low resistivity (fluid and connectivity) and general range of acoustic travel times.

An overlay layer layer in Figure 5 includes the following:
labelled red dashed line on the left log to mark 70 API units, and
colored zones on the acoustic log indicating common ranges for some important lithologies.

The natural gamma log for each formation shows reddish rectangles opposite zones of gamma < 70 API units. The neutron log for each formation shows some orange rectangles for low neutron zones. The resistivity log for each formation shows pink rectangles for low resistivity. For each formation, the criteria were the same.

The results are simple to summarize. The Brushy Canyon shows thicker and more numerous zones with common more favorable properties for each log type. The Cherry Canyon shows little that is favorable, compared to the Brushy Canyon. The Bell

Figure 5 Delaware Mountain Group Log for Formations in Section 35, T22S, R26E, Airport Grace #1 (API 30-015-20829)

Note: figure has layers for each formation that can be accessed with Acrobat

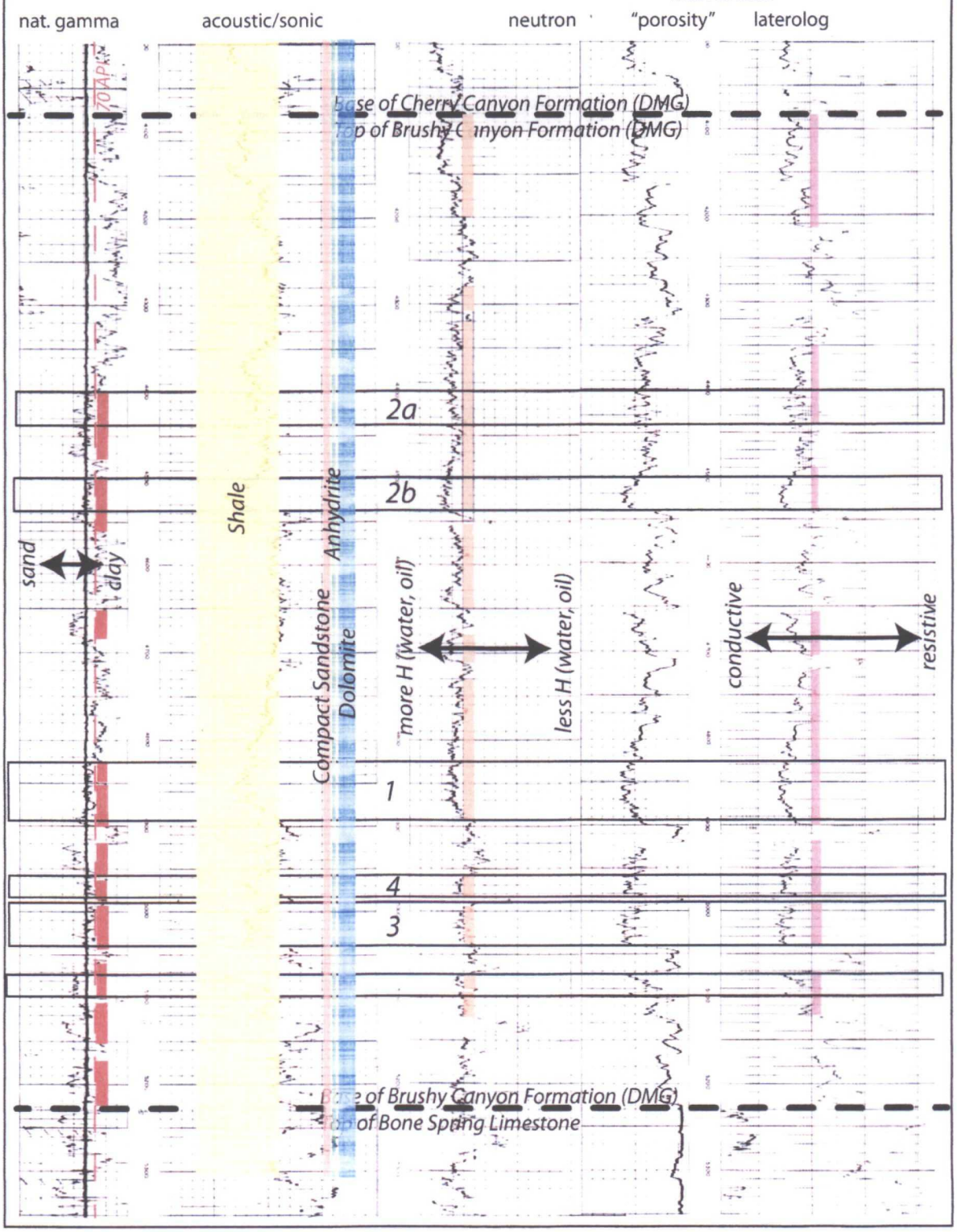


Figure 5 Delaware Mountain Group Log for Formations in Section 35, T22S, R26E, Airport Grace #1 (API 30-015-20829)

Note: figure has layers for each formation that can be accessed with Acrobat

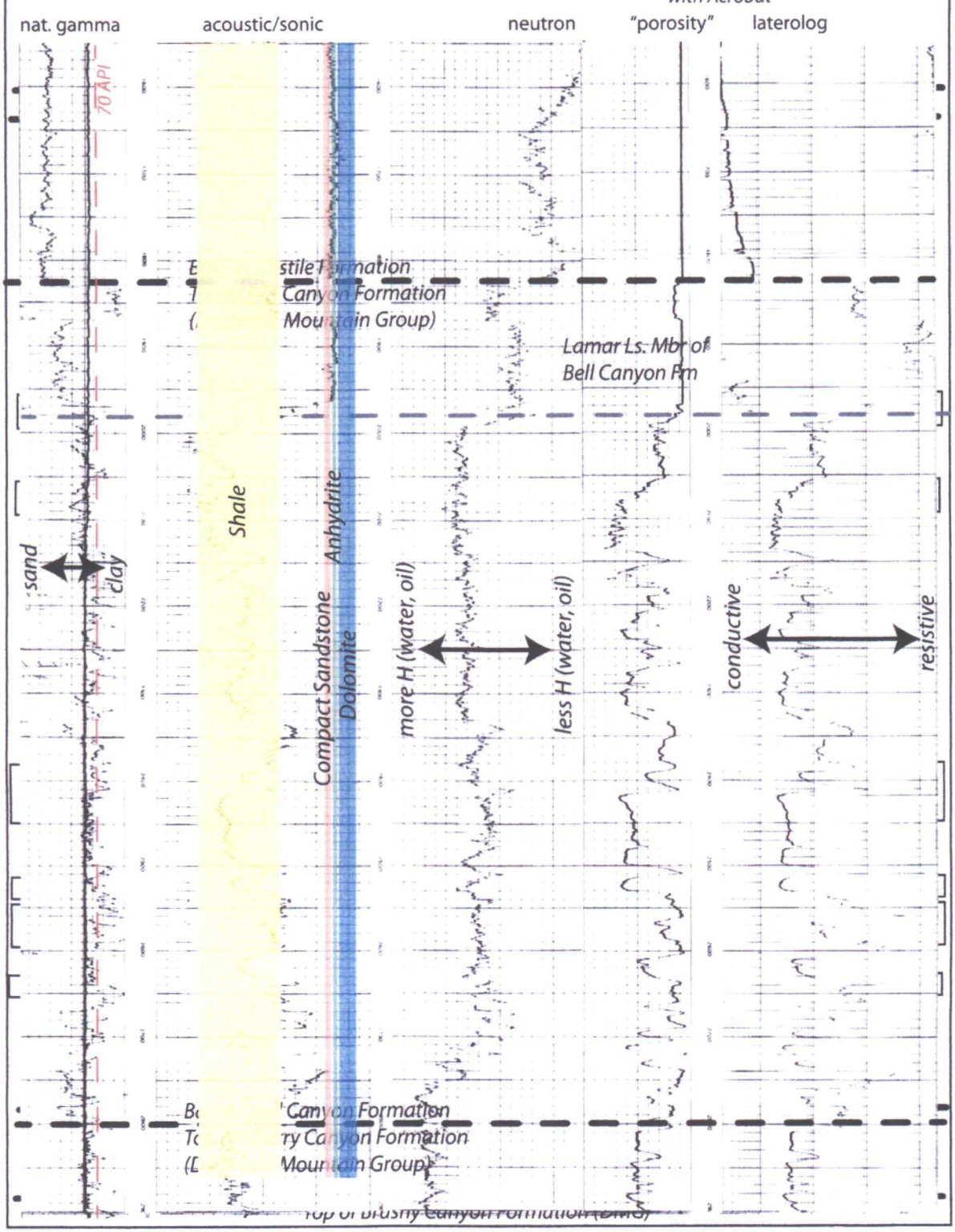


Figure 5 Delaware Mountain Group Log for Formations in Section 35, T22S, R26E, Airport Grace #1 (API 30-015-20829)

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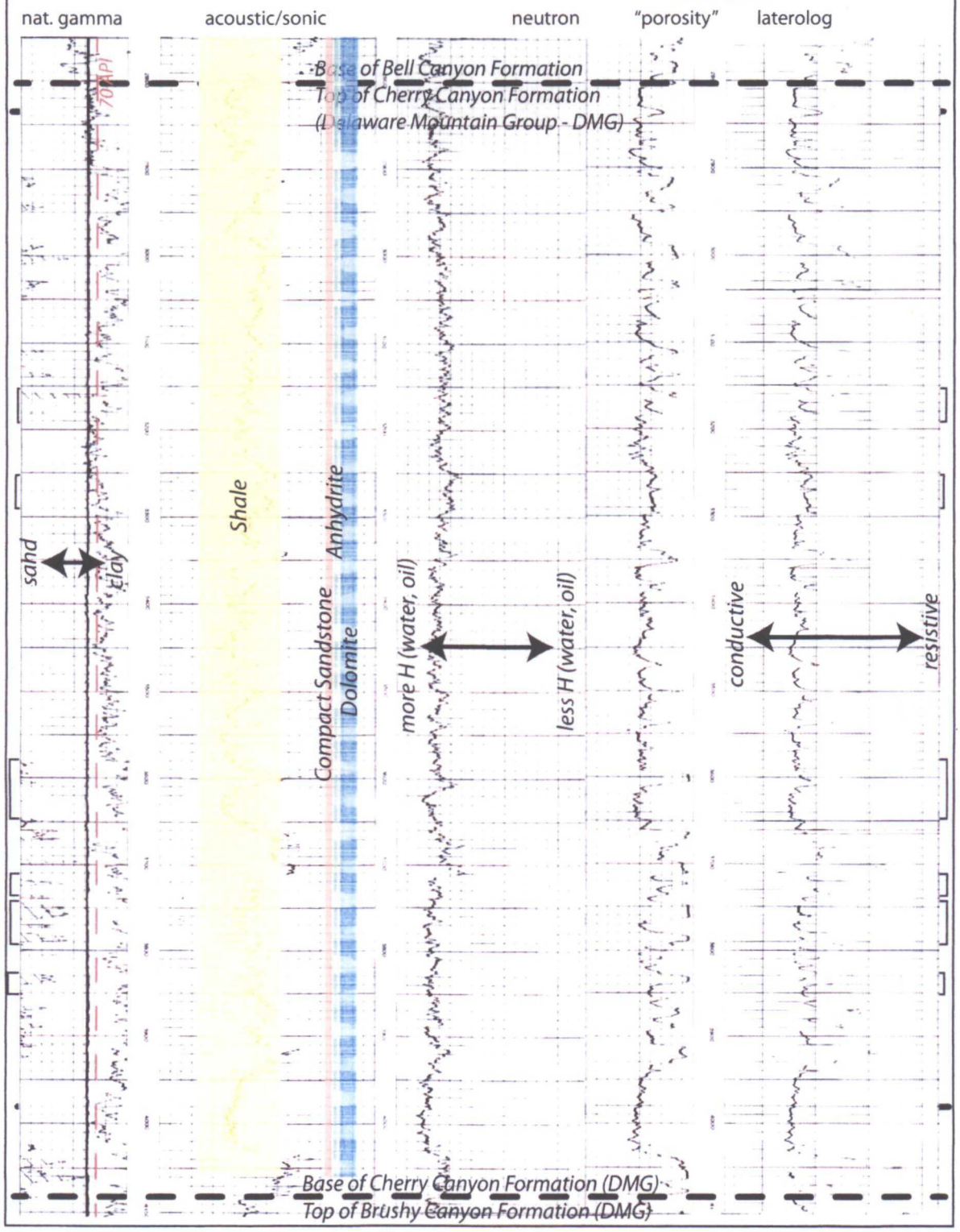


Canyon is somewhat more promising than Cherry Canyon but mainly lacks thicker intervals.

The Brushy Canyon is also a preferred interval because it lacks direct stratigraphic connection to the Capitan reef, a significant local source of water. Other formations that are higher and closer to the Capitan have been used as injection wells without apparent issue, but first priority is for a different unit without direct connection.

Short log cross-sections (Figure 6; E-W, N-S) across the proposed location indicate both continuity and lateral heterogeneity of the rocks of the Brushy Canyon. Some of the sand units are correlated, while others appear to truncate or pinch out laterally. Some correlations suggest potential channeling. More detailed cross-sections with shorter spaces can better discriminate such channeling. There is apparent significant continuity with some of the intervals to indicate larger areas for the injection unit, while the heterogeneity indicate lateral limits to migration of the injected fluid.

Lateral heterogeneity of the formation also indicates that specific intervals at the proposed location may differ somewhat from the reference well, requiring some adjustment based on geophysical logging of the well.

Priorities

Only intervals within the Brushy Canyon are given priority for testing.

Interval 1 is ~65 ft thick (4890-4825 ft). It is the thickest interval without combining short intervals of less favorable characteristics.

Interval 2a and 2b may offer ~80 ft combined if perforated separately. These two intervals are ~300 ft higher than interval 1.

Intervals 3 and 4, if combined, offer ~70-75 ft with preferred characteristics. These two intervals might be combined with interval 1 for ~150 ft.

Recommendations

As many of the suitable intervals 1-4 as are practical should be tested. Interval 1 is top priority as a single interval, but combining 1, 3, and 4 would be better. Intervals 2a and 2b, even if combined, would be lower priority although 2b has possibly the best characteristics overall.

A good range of open hole logs are recommended, to include natural gamma (spectral if possible), borehole compensated (BHC) neutron and BHC density, and multi-depth electrical logs (e.g., dual laterolog or better). I also recommend monitoring cuttings closely for hydrocarbon shows.

Resource Conflicts

There is some potential for conflict with resources in these formation, but they appear to be avoidable. Broadhead and Justman (undated) describe production from the lower Brushy Canyon sandstones south of the proposed location. This production may require additional examination to determine if there is conflict with some of the preferred lower intervals. There is also some production in the area from upper Cherry Canyon, but not immediately adjacent to the site.

These formations all produce in different parts of the basin.

Figure 6 North-South and East-West Log Cross-sections of Brushy Canyon Formation Through T22S, R26E, Section 36

Note: figure has layers for each formation that can be accessed with Acrobat

REFERENCES CITED

Broadhead, R.F., and Gillard, L., 2005, Structure contours on Bone Spring Formation (Lower Permian), Delaware Basin: Open file report 488, New Mexico Bureau of Geology and Mineral Resources, Socorro, NM.

Dunham, R.J., 1972, Capitan reef, New Mexico and Texas: facts and questions to aid interpreetation and group discussion: Permian Basin Section, Society of Economic Paleontologists and Mineralogists, 310 p.

Harms, J.C., 1974, Brushy Canyon Formation, Texas: A deep-water density current deposit: Geological Society of America Bulletin, v. 85, p. 1763-1784.

Kelley, V.C., 1971, Geology of the Pecos country, southeastern New Mexico: New Mexico Bureau of Mines and Mineral Resources, Memoir 24, 75 p.

King, P.B., 1948, Geology of the southern Guadalup Mountains, Texas: U.S. Geological Survey Professional Paper 251, 183 p.

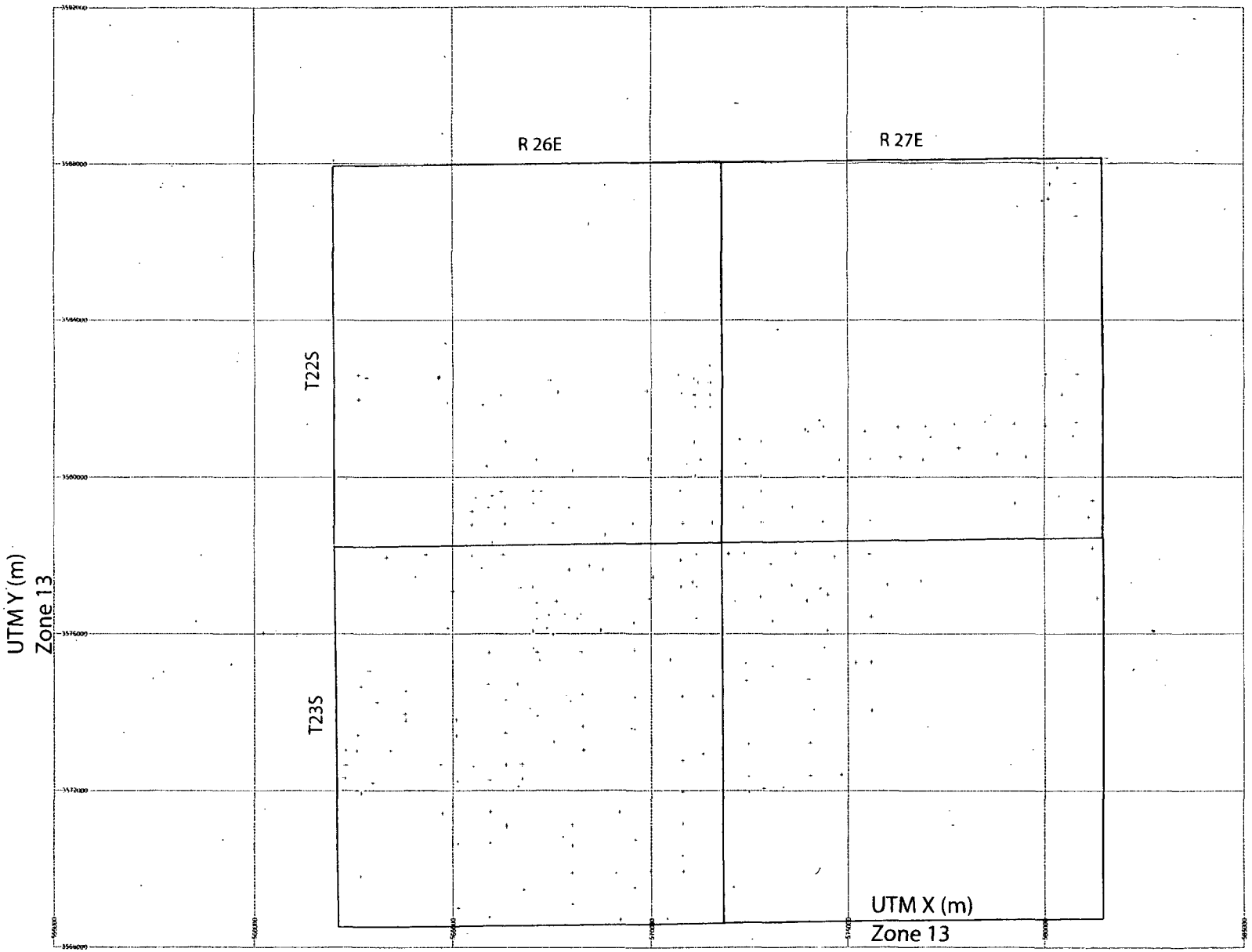
Newell, N.D., Rigby, J.K., Fischer, A.G., Whiteman, A.J., Hickox, J.E., and Bradley, J.S., 1972, The Permian reef complex of the Guadalup Mountains region, Texas and New Mexico: A study in Paleoecology: Hafner Publishing Company, New York, 236 p.

Figure 4
Elevation (ft amsl) of the Bone Spring, Brushy Canyon, Cherry Canyon, and Lamar Limestone Member of the Bell Canyon Formation.

Note: each map can be observed separately in the pdf.

Contour interval 100 ft

Red contours are lows



C-108 Section VIII (underground sources of drinking water) and Section X1 (chemical analysis of water wells).

AREA Hydrology:

Introduction:

The proposed saltwater disposal (SWD) injection well API # 30-015-20573, UL I- Section 36-Township 22 South-Range 26 East, is sited in the Pecos River Valley which is part of the Carlsbad Underground Water Basin in southeastern New Mexico.

There are two important aquifers in the Carlsbad area: The *Pecos River Valley alluvial aquifer* associated with the Pecos River and its tributaries, and a karstic carbonate aquifer associated with the *Permian Capitan Reef*. Both aquifers provide significant amounts of water for irrigation, municipal, and industrial purposes. Other formations provide small amounts of water to wells. Water in these formations, for the most part, are disconnected from the alluvial and reef aquifers (Bjorklund and Motts, 1959).

The proposed SWD injection well is located within the alluvial aquifer and is approximately four miles east of the eastern edge of the Capitan Reef. Figure 2-1 in the Appendix shows the location of the proposed SWD injection well in reference to the configuration of the Capitan Reef and Alluvial Aquifers in the Carlsbad area.

Currently, the closest public water supply that could be impacted is located over five miles from the site. Figure 2-1 modified shows the locations of the Carlsbad, Loving, and Otis-Malaga water well fields in retrospect to the proposed SWD. Ground water in this area is somewhat limited, with some dry holes being encountered, while in other wells, groundwater may be present both in shallow lenses 30-60 feet deep and in deeper horizons i.e. 100-250 feet. The shallow groundwater in this area is typically not used for drinking water and when found is in very limited quantity. The deeper zone is considered usable as an irrigation water source, when sufficient quantities are found, with an average quality concentration of 500-2000 mg/l of total dissolved solids.

The closest major surface water feature is Dark Canyon located west of the proposed SWD approximately one mile. The rim of the canyon has an elevation higher than the proposed site thus no run-off from the site would impact this feature. The site drains very well with most of the water sheet flowing generally in an easterly direction. The proposed location is not within a designated floodplain pursuant to the city of Carlsbad and Eddy County FEMA maps.

The *Pecos River Valley Alluvium aquifer* consists of surficial deposits associated with the Pecos River and its tributaries. This aquifer connects directly to stream courses in the region and is recharged by a variety of natural and artificial sources.

The *Capitan Reef* is primarily a subterranean structure that underlies the northern part of the alluvial aquifer. Where the *reef aquifer is not present, as in the proposed SWD area*, the alluvial aquifer is directly underlain by the Permian Castile formation comprising up to 2,500 feet of evaporite beds and forms the basal boundary of most of the alluvial aquifer. These units form the southern and northern boundaries of the Pecos Valley Alluvium.

The alluvial aquifer consists of a variety of materials, ranging from very transmissive sands and gravels to low-permeability clays. Layers of hard, mineralized alluvial material are sometimes found at depth in the alluvium; such material can produce considerable amounts of water where it is either fractured or rendered more permeable by dissolution of carbonate rock.

Some alluvial aquifer wells near Dark Canyon obtain water from solution passages in dense limestone conglomerate (Hale, 1945). One such non-potable well is the old US Army airport well (now Carlsbad Airport Well #1) located in the NE/4 of Section 35-Ts 22S-R26E on the one mile fringe of the SWD area of review. Key Energy has sampled this well and the results are included in the Appendix for review

Generally groundwater levels in the alluvial aquifer slope from north to south and from west to east, indicating southward and southeastward groundwater flow toward the Pecos River. These general flow patterns are probably similar to the natural directions of flow that occurred in the basin before the effects of human activities were observed. However, due to excessive pumping and influence from the river canal system in the area, the groundwater flow at the site is now in a south-southwest direction.

Within the one-mile area of review, in the NW/4 of Section of 31-Ts-22s-R27e, Mr. Will Brantley, a local landowner, drilled an exploratory well 180 feet deep and encountered no water, either shallow or deep. However, In Section 30, Mr. Brantley has a water-well that is approximately 80-100 feet deep. Key Energy has sampled this well and the results are included in the Appendix for review.

A comprehensive review of water wells in the area was conducted by downloading records from the office of the State Engineers' (OSE) website and observations from on-site field visits. The review area included all sections surrounding the proposed location of the SWD well. It included sections 31,32,29,30,25,36,1,2,and 6 of Townships 22 & 23 South and Ranges 26 & 27 East.

The number of water wells were counted from each section and noted as follows: Section 31 has 08 wells, Section 32 has 21 wells, Section 29 has 16 wells, Section 30 has 11 wells, and Section 32 has 21 wells, Section 25 has 77 wells, Section 36 has 03 wells, Section 01 has 09 wells, and Section 02 has 07 wells, and Section 06 with 07 wells. A "one-mile" area of review (AOR) revealed that only 19 water wells are located within one-mile of the proposed SWD well site, and no wells were found within a (1/2) mile. Included in the Appendix is Figure AOR-1, showing the one-mile Area of Review (AOR) around the proposed SWD well injection site.

Reference Notes: The above referenced material *"in part"* was taken directly from the most recent study conducted by the New Mexico Office of the State Engineer (OSE), "THE CARLSBAD AREA GROUNDWATER FLOW MODEL" Prepared by: Dr. Peggy Barroll, New Mexico Office of the State Engineer-2004. The compilation of water wells and the area of review, including water samples were collected and generated by Wayne Price-Price LLC, a full time consultant for Key Energy Services LLC.

Area Hydrology Appendix:

Figure 2-1:	Configuration of the Capitan Reef and Alluvial Aquifers Near Carlsbad, NM.
Figure 2-1 Modified:	Local Groundwater Information.
Water Analysis:	Old Army Airport #1 (NE/4 of Section 35-Ts 22S-R26E).
	Brantley Well (Section 30-Ts 22S-R27E).
Figure AOR-1:	One Mile Area of Review map showing all water wells.

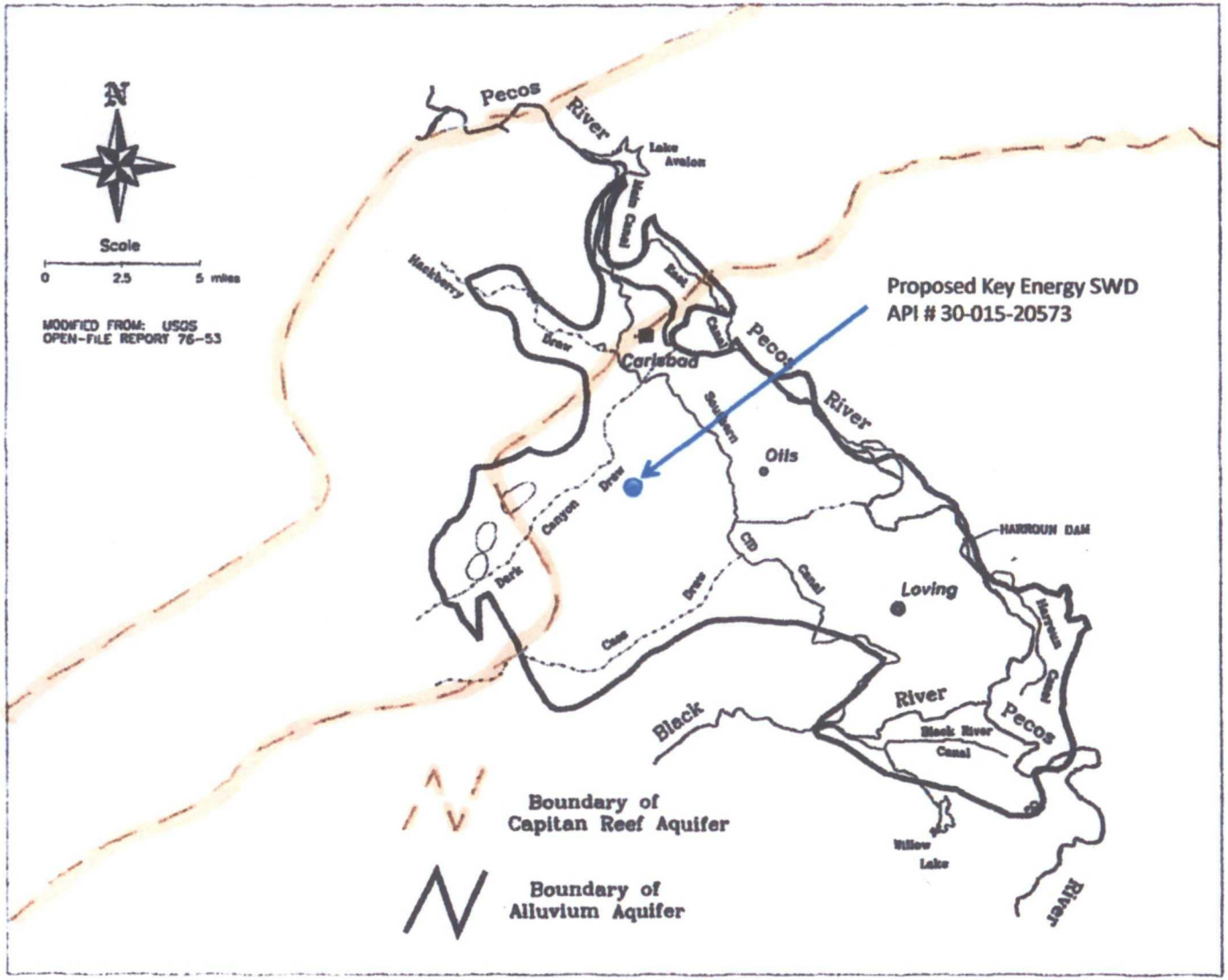


Figure 2-1. Configuration of the Capitan Reef and Alluvial Aquifers Near Carlsbad.

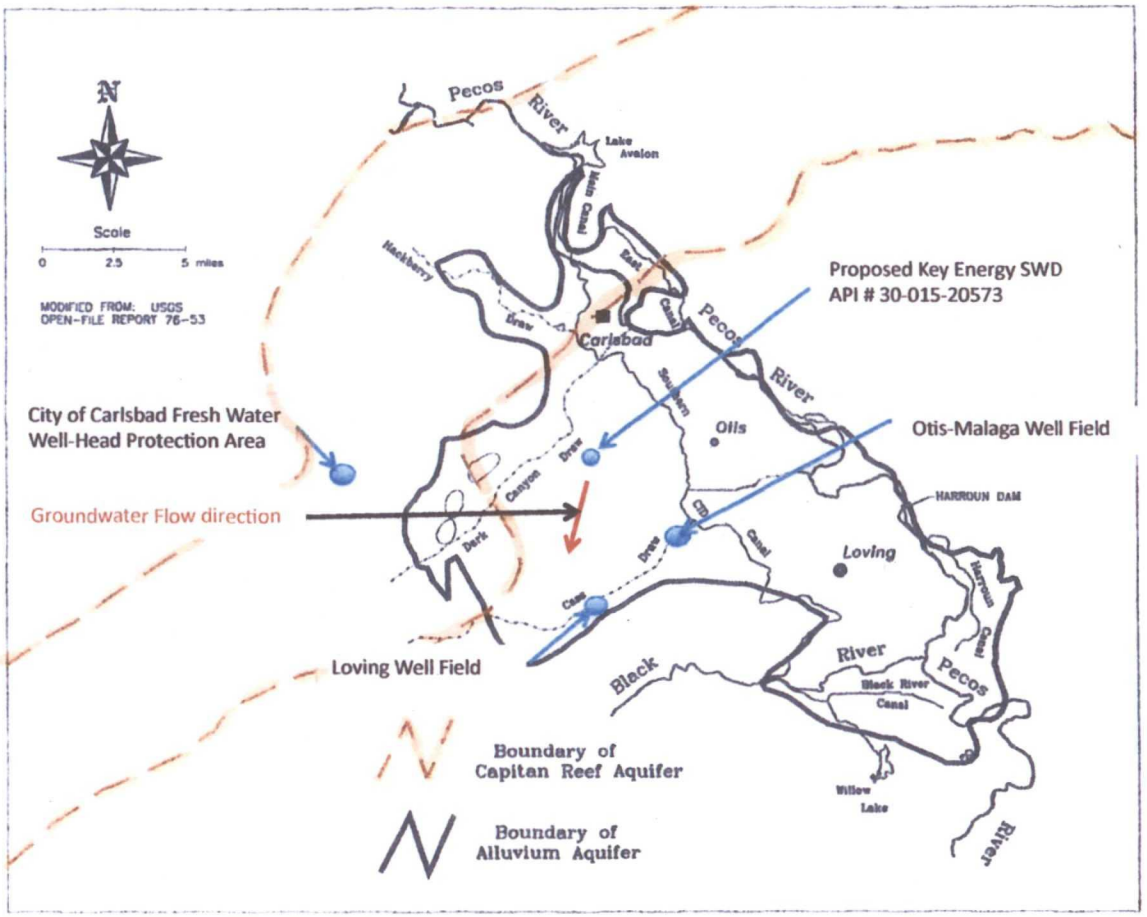


Figure 2-1. Configuration of the Capitan Reef and Alluvial Aquifers Near Carlsbad.

Figure 2-1 Modified: Local Groundwater Information- by Price LLC Feb 11, 2012

Form C-108
Affirmative Statement
Key Energy Services, LLC
Grace Carlsbad Well No. 1
Section 36, T-22 South, R-26 East, NMPM,
Eddy County, New Mexico

Available geologic and engineering data has been examined and no evidence of open faults or hydrological connection between the injection zone and any underground sources of drinking water has been found.

Dennis W. Powers, Ph.D.
Consulting Geologist
Key Energy Services, LLC

May 2, 2012
Date

Summary Report

Wayne Price
Key Energy-Carlsbad
1609 E Green
Carlsbad, NM 88220

Report Date: July 6, 2011

Work Order: 11062823

Project Location: Carlsbad, NM
Project Name: Airport #1 WN
Project Number: Key-062711

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
270590	WW #1	water	2011-06-27	11:10	2011-06-28

Sample: 270590 - WW #1

Param	Flag	Result	Units	RL
Dissolved Silver		<0.00500	mg/L	0.005
Dissolved Aluminum		<0.0500	mg/L	0.05
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1
Carbonate Alkalinity		<1.00	mg/L as CaCo3	1
Bicarbonate Alkalinity		**240**	mg/L as CaCo3	4
Total Alkalinity		**240**	mg/L as CaCo3	4
Dissolved Arsenic		<0.0100	mg/L	0.01
Dissolved Boron		**0.0790**	mg/L	0.01
Dissolved Barium		**0.0800**	mg/L	0.01
Biochemical Oxygen Demand		<7.50	mg/L	2
Bromide	Q8	<5.00	mg/L	0.5
Dissolved Calcium		**81.5**	mg/L	1
Dissolved Potassium		**2.15**	mg/L	1
Dissolved Magnesium		**28.3**	mg/L	1
Dissolved Sodium		**17.5**	mg/L	1
Dissolved Cadmium		<0.00500	mg/L	0.005
Dissolved Cobalt		<0.00500	mg/L	0.005
Chemical Oxygen Demand		<50.0	mg/L	50
Specific Conductance		**683**	uMHOS/cm	
Dissolved Chromium		<0.0100	mg/L	0.01
Dissolved Copper		**0.0190**	mg/L	0.005

continued ...

sample 270590 continued ...

Param	Flag	Result	Units	RL
Density		**0.970**	g/ml	
Dissolved Iron		<0.0100	mg/L	0.01
Dissolved Mercury		<0.000200	mg/L	0.0002
Chloride	Qs	<25.0	mg/L	2.5
Fluoride	Qs	<5.00	mg/L	0.5
Sulfate	Qs	**54.7**	mg/L	2.5
Dissolved Manganese		<0.00500	mg/L	0.005
Dissolved Molybdenum		<0.0500	mg/L	0.05
Dissolved Nickel		<0.0100	mg/L	0.01
Nitrite-N	Qs	<5.00	mg/L	0.5
Nitrate-N	Qs	**5.81**	mg/L	0.5
Oil and Grease		<5.00	mg/L	5
Naphthalene		<0.000201	mg/L	0.0002
2-Methylnaphthalene		<0.000201	mg/L	0.0002
1-Methylnaphthalene		<0.000201	mg/L	0.0002
Acenaphthylene		<0.000201	mg/L	0.0002
Acenaphthene		<0.000201	mg/L	0.0002
Dibenzofuran		<0.000201	mg/L	0.0002
Fluorene		<0.000201	mg/L	0.0002
Anthracene		<0.000201	mg/L	0.0002
Phenanthrene		<0.000201	mg/L	0.0002
Fluoranthene		<0.000201	mg/L	0.0002
Pyrene		<0.000201	mg/L	0.0002
Benzo(a)anthracene		<0.000201	mg/L	0.0002
Chrysene		<0.000201	mg/L	0.0002
Benzo(b)fluoranthene		<0.000201	mg/L	0.0002
Benzo(k)fluoranthene		<0.000201	mg/L	0.0002
Benzo(a)pyrene		<0.000201	mg/L	0.0002
Indeno(1,2,3-cd)pyrene		<0.000201	mg/L	0.0002
Dibenzo(a,h)anthracene		<0.000201	mg/L	0.0002
Benzo(g,h,i)perylene		<0.000201	mg/L	0.0002
Dissolved Lead		<0.00500	mg/L	0.005
pH		**7.14**	s.u.	2
Dissolved Selenium		<0.0200	mg/L	0.02
Pyridine		<0.00500	mg/L	0.005
N-Nitrosodimethylamine		<0.00500	mg/L	0.005
2-Picoline		<0.00500	mg/L	0.005
Methyl methanesulfonate		<0.00500	mg/L	0.005
Ethyl methanesulfonate		<0.00500	mg/L	0.005
Phenol		<0.00500	mg/L	0.005
Aniline		<0.00500	mg/L	0.005
bis(2-chloroethyl)ether		<0.00500	mg/L	0.005
2-Chlorophenol		<0.00500	mg/L	0.005
1,3-Dichlorobenzene (meta)		<0.00500	mg/L	0.005
1,4-Dichlorobenzene (para)		<0.00500	mg/L	0.005
Benzyl alcohol		<0.00500	mg/L	0.005
1,2-Dichlorobenzene (ortho)		<0.00500	mg/L	0.005

continued ...

sample 270590 continued ...

Param	Flag	Result	Units	RL
2-Methylphenol		<0.00500	mg/L	0.005
bis(2-chloroisopropyl)ether		<0.00500	mg/L	0.005
4-Methylphenol / 3-Methylphenol		<0.00500	mg/L	0.005
N-Nitrosodi-n-propylamine		<0.00500	mg/L	0.005
Hexachloroethane		<0.00500	mg/L	0.005
Acetophenone		<0.00500	mg/L	0.005
Nitrobenzene		<0.00500	mg/L	0.005
N-Nitrosopiperidine		<0.00500	mg/L	0.005
Isophorone		<0.00500	mg/L	0.005
2-Nitrophenol		<0.00500	mg/L	0.005
2,4-Dimethylphenol		<0.00500	mg/L	0.005
bis(2-chloroethoxy)methane		<0.00500	mg/L	0.005
2,4-Dichlorophenol		<0.00500	mg/L	0.005
1,2,4-Trichlorobenzene		<0.00500	mg/L	0.005
Benzoic acid		<0.00500	mg/L	0.005
Naphthalene		<0.000200	mg/L	0.0002
a,a-Dimethylphenethylamine		<0.00550	mg/L	0.0055
4-Chloroaniline		<0.00500	mg/L	0.005
2,6-Dichlorophenol		<0.0100	mg/L	0.01
Hexachlorobutadiene	Qc	<0.00500	mg/L	0.005
N-Nitroso-di-n-butylamine		<0.00500	mg/L	0.005
4-Chloro-3-methylphenol		<0.00500	mg/L	0.005
2-Methylnaphthalene		<0.000200	mg/L	0.0002
1-Methylnaphthalene		<0.000200	mg/L	0.0002
1,2,4,5-Tetrachlorobenzene		<0.00500	mg/L	0.005
Hexachlorocyclopentadiene		<0.00500	mg/L	0.005
2,4,6-Trichlorophenol		<0.0100	mg/L	0.01
2,4,5-Trichlorophenol		<0.00500	mg/L	0.005
2-Chloronaphthalene		<0.00500	mg/L	0.005
1-Chloronaphthalene		<0.00500	mg/L	0.005
2-Nitroaniline		<0.00500	mg/L	0.005
Dimethylphthalate		<0.00500	mg/L	0.005
Acenaphthylene		<0.000200	mg/L	0.0002
2,6-Dinitrotoluene		<0.00500	mg/L	0.005
3-Nitroaniline		<0.00500	mg/L	0.005
Acenaphthene		<0.000200	mg/L	0.0002
2,4-Dinitrophenol		<0.00500	mg/L	0.005
Dibenzofuran		<0.000200	mg/L	0.0002
Pentachlorobenzene		<0.00500	mg/L	0.005
4-Nitrophenol		<0.0250	mg/L	0.025
2,4-Dinitrotoluene		<0.00500	mg/L	0.005
1-Naphthylamine		<0.00500	mg/L	0.005
2,3,4,6-Tetrachlorophenol		<0.0100	mg/L	0.01
2-Naphthylamine		<0.00500	mg/L	0.005
Fluorene		<0.000200	mg/L	0.0002
4-Chlorophenyl-phenylether		<0.00500	mg/L	0.005
Diethylphthalate		<0.00500	mg/L	0.005

continued ...

sample 270590 continued ...

Param	Flag	Result	Units	RL
4-Nitroaniline		<0.00500	mg/L	0.005
Diphenylhydrazine		<0.00500	mg/L	0.005
4,6-Dinitro-2-methylphenol		<0.00500	mg/L	0.005
Diphenylamine		<0.00500	mg/L	0.005
4-Bromophenyl-phenylether		<0.00500	mg/L	0.005
Phenacetin		<0.00500	mg/L	0.005
Hexachlorobenzene		<0.00500	mg/L	0.005
4-Aminobiphenyl		<0.00500	mg/L	0.005
Pentachlorophenol		<0.100	mg/L	0.1
Anthracene		<0.000200	mg/L	0.0002
Pentachloronitrobenzene		<0.00500	mg/L	0.005
Pronamide		<0.00500	mg/L	0.005
Phenanthrene		<0.000200	mg/L	0.0002
Di-n-butylphthalate		<0.00500	mg/L	0.005
Fluoranthene		<0.000200	mg/L	0.0002
Benzidine		<0.0250	mg/L	0.025
Pyrene		<0.000200	mg/L	0.0002
p-Dimethylaminoazobenzene		<0.00500	mg/L	0.005
Butylbenzylphthalate		<0.00500	mg/L	0.005
Benzo(a)anthracene		<0.000200	mg/L	0.0002
3,3-Dichlorobenzidine		<0.00500	mg/L	0.005
Chrysene		<0.000200	mg/L	0.0002
bis(2-ethylhexyl)phthalate		<0.00500	mg/L	0.005
Di-n-octylphthalate	Qc	<0.00500	mg/L	0.005
Benzo(b)fluoranthene		<0.000200	mg/L	0.0002
Benzo(k)fluoranthene		<0.000200	mg/L	0.0002
7,12-Dimethylbenz(a)anthracene		<0.00500	mg/L	0.005
Benzo(a)pyrene		<0.000200	mg/L	0.0002
3-Methylcholanthrene		<0.00500	mg/L	0.005
Dibenzo(a,j)acridine		<0.00500	mg/L	0.005
Indeno(1,2,3-cd)pyrene		<0.000200	mg/L	0.0002
Dibenzo(a,h)anthracene	Qs	<0.000200	mg/L	0.0002
Benzo(g,h,i)perylene		<0.000200	mg/L	0.0002
Dissolved Strontium		**0.374**	mg/L	0.005
Total Dissolved Solids		**401.0**	mg/L	10
Total Organic Carbon		<1.00	mg/L	1
Total Cyanide		<0.0150	mg/L	0.015
Total Suspended Solids		**3.00**	mg/L	1
Total Uranium		<0.0300	mg/L	0.03
Bromochloromethane		<1.00	µg/L	1
Dichlorodifluoromethane	Qc	<1.00	µg/L	1
Chloromethane (methyl chloride)		<1.00	µg/L	1
Vinyl Chloride		<1.00	µg/L	1
Bromomethane (methyl bromide)		<5.00	µg/L	5
Chloroethane		<1.00	µg/L	1
Trichlorofluoromethane		<1.00	µg/L	1
Acetone	Qc	<10.0	µg/L	10

continued ...

sample 270590 continued ...

Param	Flag	Result	Units	RL
Iodomethane (methyl iodide)		<5.00	µg/L	5
Carbon Disulfide		<1.00	µg/L	1
Acrylonitrile		<1.00	µg/L	1
2-Butanone (MEK)	Qc	<5.00	µg/L	5
4-Methyl-2-pentanone (MIBK)		<5.00	µg/L	5
2-Hexanone	Qc	<5.00	µg/L	5
trans 1,4-Dichloro-2-butene		<10.0	µg/L	10
1,1-Dichloroethene		<1.00	µg/L	1
Methylene chloride		<5.00	µg/L	5
MTBE		<1.00	µg/L	1
trans-1,2-Dichloroethene		<1.00	µg/L	1
1,1-Dichloroethane		<1.00	µg/L	1
cis-1,2-Dichloroethene		<1.00	µg/L	1
2,2-Dichloropropane		<1.00	µg/L	1
1,2-Dichloroethane (EDC)		<1.00	µg/L	1
Chloroform		<1.00	µg/L	1
1,1,1-Trichloroethane		<1.00	µg/L	1
1,1-Dichloropropene		<1.00	µg/L	1
Benzene		<1.00	µg/L	1
Carbon Tetrachloride		<1.00	µg/L	1
1,2-Dichloropropane		<1.00	µg/L	1
Trichloroethene (TCE)		<1.00	µg/L	1
Dibromomethane (methylene bromide)		<1.00	µg/L	1
Bromodichloromethane		<1.00	µg/L	1
2-Chloroethyl vinyl ether		<5.00	µg/L	5
cis-1,3-Dichloropropene		<1.00	µg/L	1
trans-1,3-Dichloropropene		<1.00	µg/L	1
Toluene		<1.00	µg/L	1
1,1,2-Trichloroethane		<1.00	µg/L	1
1,3-Dichloropropane		<1.00	µg/L	1
Dibromochloromethane		<1.00	µg/L	1
1,2-Dibromoethane (EDB)	Qs	<1.00	µg/L	1
Tetrachloroethene (PCE)	Qc	<1.00	µg/L	1
Chlorobenzene	Qs	<1.00	µg/L	1
1,1,1,2-Tetrachloroethane		<1.00	µg/L	1
Ethylbenzene	Qs	<1.00	µg/L	1
m,p-Xylene	Qs	<1.00	µg/L	1
Bromoform		<1.00	µg/L	1
Styrene	Qs	<1.00	µg/L	1
o-Xylene	Qs	<1.00	µg/L	1
1,1,2,2-Tetrachloroethane	Qc	<1.00	µg/L	1
2-Chlorotoluene	Qs	<1.00	µg/L	1
1,2,3-Trichloropropane		<1.00	µg/L	1
Isopropylbenzene	Qs	<1.00	µg/L	1
Bromobenzene		<1.00	µg/L	1
n-Propylbenzene	Qs	<1.00	µg/L	1
1,3,5-Trimethylbenzene	Qs	<1.00	µg/L	1

continued ...

sample 270590 continued ...

Param	Flag	Result	Units	RL
tert-Butylbenzene		<1.00	µg/L	1
1,2,4-Trimethylbenzene	Qs	<1.00	µg/L	1
1,4-Dichlorobenzene (para)	Qs	<1.00	µg/L	1
sec-Butylbenzene		<1.00	µg/L	1
1,3-Dichlorobenzene (meta)	Qs	<1.00	µg/L	1
p-Isopropyltoluene		<1.00	µg/L	1
4-Chlorotoluene	Qs	<1.00	µg/L	1
1,2-Dichlorobenzene (ortho)	Qs	<1.00	µg/L	1
n-Butylbenzene		<1.00	µg/L	1
1,2-Dibromo-3-chloropropane		<5.00	µg/L	5
1,2,3-Trichlorobenzene	Qc	<5.00	µg/L	5
1,2,4-Trichlorobenzene	Qc	<5.00	µg/L	5
Naphthalene	Qc	<5.00	µg/L	5
Hexachlorobutadiene	Qc	<5.00	µg/L	5
Dissolved Zinc		**0.474**	mg/L	0.005

Summary Report

Wayne Price
Key Energy-Rio Rancho
312 Encanatado Ridge Ct. NE
Rio Rancho, NM 87124

Report Date: May 26, 2011

Work Order: 11051620

Project Location: Carlsbad, NM
Project Name: Brantley WW-Sec. 30
Project Number: BWW-30

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
266643	Brantley WW-30	water	2011-05-12	16:46	2011-05-16

Sample: 266643 - Brantley WW-30

Param	Flag	Result	Units	RL
Total Silver		<0.00500	mg/L	0.005
Total Aluminum		**0.116**	mg/L	0.05
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1
Carbonate Alkalinity		<1.00	mg/L as CaCo3	1
Bicarbonate Alkalinity		**190**	mg/L as CaCo3	4
Total Alkalinity		**190**	mg/L as CaCo3	4
Total Arsenic		<0.0100	mg/L	0.01
Total Boron		**0.130**	mg/L	0.01
Total Barium		**0.0190**	mg/L	0.01
Bromide		<25.0	mg/L	0.5
Dissolved Calcium		**148**	mg/L	0.1
Dissolved Potassium		**6.27**	mg/L	0.1
Dissolved Magnesium		**67.2**	mg/L	0.1
Dissolved Sodium		**88.0**	mg/L	0.1
Total Cadmium		<0.00500	mg/L	0.005
Chloride		**164**	mg/L	2.5
Total Cobalt		<0.00500	mg/L	0.005
Specific Conductance		**1680**	uMHOS/cm	
Total Chromium		<0.0100	mg/L	0.01
Total Copper		<0.00500	mg/L	0.005
Total Iron		**0.122**	mg/L	0.01

continued ...

sample 266643 continued ...

Param	Flag	Result	Units	RL
Fluoride		<25.0	mg/L	0.5
Total Mercury		<0.000200	mg/L	0.0002
Total Manganese		<0.00500	mg/L	0.005
Total Molybdenum		<0.0500	mg/L	0.05
Total Nickel		<0.0100	mg/L	0.01
Nitrate-N		<25.0	mg/L	0.5
Total Lead		<0.00500	mg/L	0.005
pH		**7.36**	s.u.	2
Total Selenium		<0.0200	mg/L	0.02
Sulfate		**316**	mg/L	2.5
Total Dissolved Solids		**1068**	mg/L	10
Total Cyanide		<0.0150	mg/L	0.015
Total Suspended Solids		**7.00**	mg/L	1
Total Uranium		<0.0300	mg/L	0.03
Total Zinc		<0.00500	mg/L	0.005

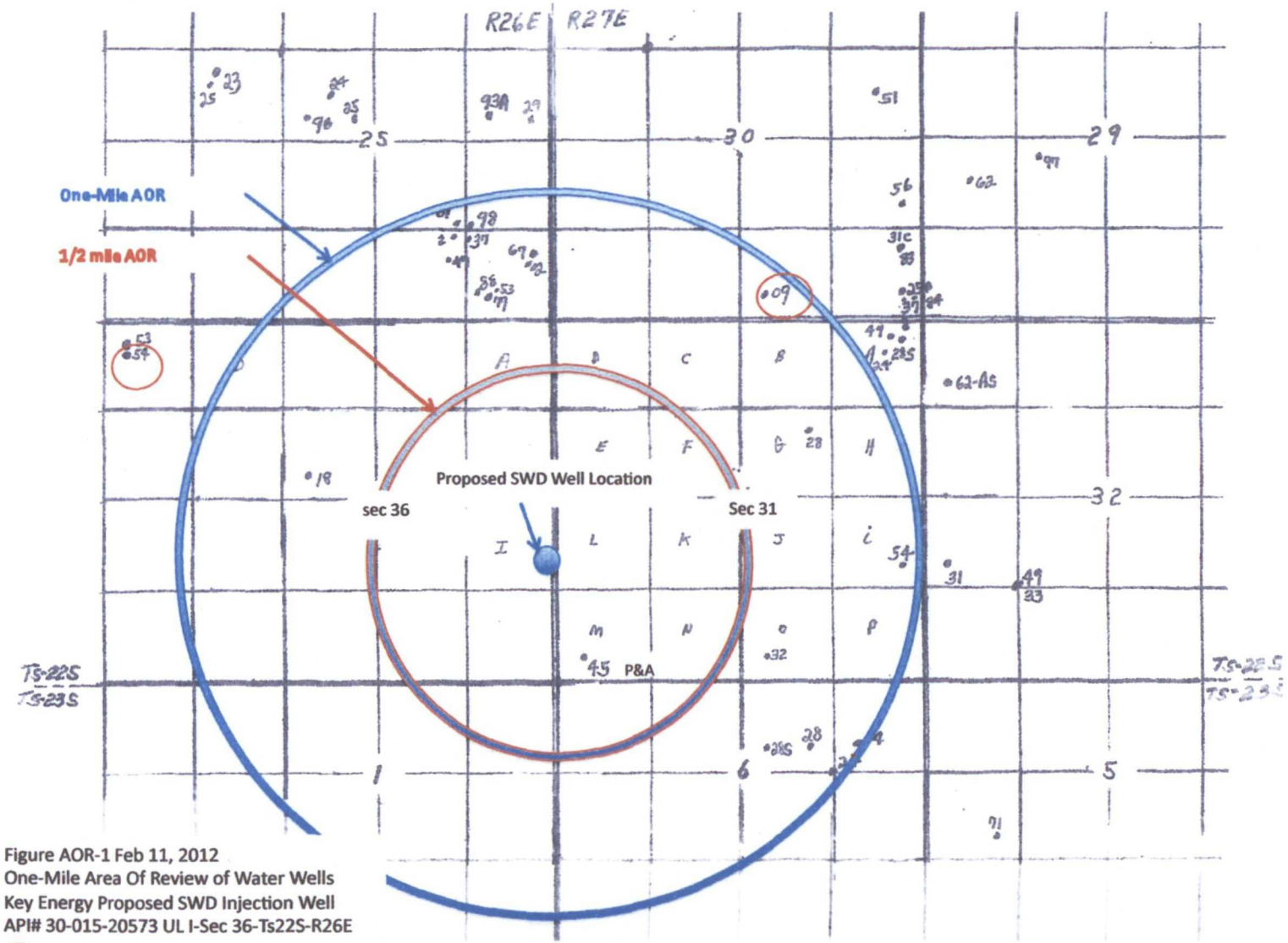


Figure AOR-1 Feb 11, 2012
One-Mile Area Of Review of Water Wells
Key Energy Proposed SWD Injection Well
API# 30-015-20573 UL I-Sec 36-Ts22S-R26E

○ Denotes wells that were sampled

Note: Well locations were taken from the NMOSE website. Wells are labeled using the last two digits of the POD#.
Example: Well #28 shown in UL G-Sec 31-Ts22S-R27E is well# C00228 as registered on the OSE website list.
Well 45 in UL M-31-Ts22S-R27E is P&A.

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

April 20, 2012

KEY ENERGY

KEY ENERGY - EUNICE

P. O. BOX 99

EUNICE, NM 88230

RE: BKE LOVING, NM

Enclosed are the results of analyses for samples received by the laboratory on 04/02/12 14:45.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-11-3. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (*). For a complete list on accredited analytes and matrices visit the TCEQ website at www.tceq.texas.gov/field/qa/lab_accred_certif.html.

Cardinal Laboratories is accreditated through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V1, V2, V3)

Accreditation applies to public drinking water matrices.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Celey D. Keene

Celey D. Keene

Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

KEY ENERGY - EUNICE P. O. BOX 99 EUNICE NM, 88230	Project: BKE LOVING, NM Project Number: NOT GIVEN Project Manager: KEY ENERGY Fax To: NOT GIVEN	Reported: 20-Apr-12 09:14

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
P WATER TANK	H200775-01	Water	02-Apr-12 11:30	02-Apr-12 14:45
P WATER THE BONE SPRIN	H200775-02	Water	02-Apr-12 11:30	02-Apr-12 14:45

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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Analytical Results For:

KEY ENERGY - EUNICE P. O. BOX 99 EUNICE NM, 88230	Project: BKE LOVING, NM Project Number: NOT GIVEN Project Manager: KEY ENERGY Fax To: NOT GIVEN	Reported: 20-Apr-12 09:14

P WATER TANK

H200775-01 (Water)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
Cardinal Laboratories									
Inorganic Compounds									
Alkalinity, Bicarbonate	**181**	5.00	mg/L	1	2041909	HM	11-Apr-12	310.1M	
Calcium	**7210**	50.0	mg/L	50	2041906	CK	17-Apr-12	200.7	GAL
Alkalinity, Carbonate	ND	0.00	mg/L	1	2041909	HM	11-Apr-12	310.1M	
Chloride	**118000**	4.00	mg/L	1	2040412	AP	09-Apr-12	4500-Cl-B	
Conductivity	**324000**	1.00	uS/cm	1	2041108	HM	03-Apr-12	120.1	
Magnesium	**1330**	50.0	mg/L	50	2041906	CK	17-Apr-12	200.7	GAL
pH	**6.26**	0.100	pH Units	1	2041107	HM	03-Apr-12	150.1	
Potassium	**1160**	50.0	mg/L	50	2041906	CK	17-Apr-12	200.7	GAL
Sodium	**53000**	50.0	mg/L	50	2041906	CK	17-Apr-12	200.7	GAL
Sulfate	**849**	10.0	mg/L	1	2040403	HM	03-Apr-12	375.4	
TDS	**186000**	5.00	mg/L	1	2040402	HM	03-Apr-12	160.1	
Alkalinity, Total	**148**	4.00	mg/L	1	2041909	HM	11-Apr-12	310.1M	

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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Analytical Results For:

KEY ENERGY - EUNICE P. O. BOX 99 EUNICE NM, 88230	Project: BKE LOVING, NM Project Number: NOT GIVEN Project Manager: KEY ENERGY Fax To: NOT GIVEN	Reported: 20-Apr-12 09:14

P WATER THE BONE SPRINGS

H200775-02 (Water)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
Cardinal Laboratories									
Inorganic Compounds									
Alkalinity, Bicarbonate	**259**	5.00	mg/L	1	2041909	HM	11-Apr-12	310.1M	
Calcium	**3610**	50.0	mg/L	50	2041906	CK	17-Apr-12	200.7	GAL
Alkalinity, Carbonate	ND	0.00	mg/L	1	2041909	HM	11-Apr-12	310.1M	
Chloride	**134000**	4.00	mg/L	1	2040412	HM	09-Apr-12	4500-Cl-B	
Conductivity	**350000**	1.00	uS/cm	1	2041108	HM	03-Apr-12	120.1	
Magnesium	**751**	50.0	mg/L	50	2041906	CK	17-Apr-12	200.7	GAL
pH	**6.26**	0.100	pH Units	1	2041107	HM	03-Apr-12	150.1	
Potassium	**1420**	50.0	mg/L	50	2041906	CK	17-Apr-12	200.7	GAL
Sodium	**58800**	50.0	mg/L	50	2041906	CK	17-Apr-12	200.7	GAL
Sulfate	**833**	10.0	mg/L	1	2040403	HM	03-Apr-12	375.4	
TDS	**175000**	5.00	mg/L	1	2040402	HM	03-Apr-12	160.1	
Alkalinity, Total	**212**	4.00	mg/L	1	2041909	HM	11-Apr-12	310.1M	

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PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

KEY ENERGY - EUNICE P. O. BOX 99 EUNICE NM, 88230	Project: BKE LOVING, NM Project Number: NOT GIVEN Project Manager: KEY ENERGY Fax To: NOT GIVEN	Reported: 20-Apr-12 09:14

Inorganic Compounds - Quality Control

Cardinal Laboratories

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2040402 - Filtration										
Blank (2040402-BLK1)				Prepared: 03-Apr-12 Analyzed: 05-Apr-12						
TDS	ND	5.00	mg/L							
LCS (2040402-BS1)				Prepared & Analyzed: 03-Apr-12						
TDS	250		mg/L	240		104	80-120			
Duplicate (2040402-DUP1)	**Source: H200776-01**			Prepared: 03-Apr-12 Analyzed: 05-Apr-12						
TDS	3130	5.00	mg/L		3160			0.954	20	
Batch 2040403 - NO PREP										
Blank (2040403-BLK1)				Prepared & Analyzed: 03-Apr-12						
Sulfate	ND	10.0	mg/L							
LCS (2040403-BS1)				Prepared & Analyzed: 03-Apr-12						
Sulfate	22.6	10.0	mg/L	20.0		113	80-120			
LCS Dup (2040403-BSD1)				Prepared & Analyzed: 03-Apr-12						
Sulfate	22.3	10.0	mg/L	20.0		111	80-120	1.34	20	
Duplicate (2040403-DUP1)	**Source: H200737-01**			Prepared & Analyzed: 03-Apr-12						
Sulfate	333	10.0	mg/L		354			6.11	20	
Batch 2040412 - General Prep - Wet Chem										
Blank (2040412-BLK1)				Prepared & Analyzed: 04-Apr-12						
Chloride	ND	4.00	mg/L							

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CARDINAL Laboratories

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Analytical Results For:

KEY ENERGY - EUNICE P. O. BOX 99 EUNICE NM, 88230	Project: BKE LOVING, NM Project Number: NOT GIVEN Project Manager: KEY ENERGY Fax To: NOT GIVEN	Reported: 20-Apr-12 09:14

Inorganic Compounds - Quality Control

Cardinal Laboratories

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2040412 - General Prep - Wet Chem										
LCS (2040412-BS1)				Prepared & Analyzed: 04-Apr-12						
Chloride	100	4.00	mg/L	100		100	80-120			
LCS Dup (2040412-BSD1)				Prepared & Analyzed: 04-Apr-12						
Chloride	100	4.00	mg/L	100		100	80-120	0.00	20	
Duplicate (2040412-DUP1)		**Source: H200777-01**		Prepared & Analyzed: 04-Apr-12						
Chloride	2200	4.00	mg/L		2100			4.65	20	
Batch 2041107 - General Prep - Wet Chem										
LCS (2041107-BS1)				Prepared & Analyzed: 03-Apr-12						
pH	10.1		pH Units	10.0		101	90-110			
Duplicate (2041107-DUP1)		**Source: H200747-01**		Prepared & Analyzed: 03-Apr-12						
pH	8.91	0.100	pH Units		8.86			0.563	20	
Batch 2041108 - General Prep - Wet Chem										
LCS (2041108-BS1)				Prepared & Analyzed: 02-Apr-12						
Conductivity	515		uS/cm	500		103	80-120			
Duplicate (2041108-DUP1)		**Source: H200747-01**		Prepared & Analyzed: 02-Apr-12						
Conductivity	4710	1.00	uS/cm		4730			0.424	20	
Batch 2041906 - Dissolved/Potentially Dissolved Metals										
Blank (2041906-BLK1)				Prepared: 12-Apr-12 Analyzed: 17-Apr-12						
Calcium	ND	1.00	mg/L							
Sodium	ND	1.00	mg/L							
Magnesium	ND	1.00	mg/L							
Potassium	ND	1.00	mg/L							

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Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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Analytical Results For:

KEY ENERGY - EUNICE P. O. BOX 99 EUNICE NM, 88230	Project: BKE LOVING, NM Project Number: NOT GIVEN Project Manager: KEY ENERGY Fax To: NOT GIVEN	Reported: 20-Apr-12 09:14

DISSOLVED METALS BY ICP - Quality Control

Cardinal Laboratories

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2041906 - Dissolved/Potentially Dissolved Metals										
LCS (2041906-BS1)				Prepared: 12-Apr-12 Analyzed: 17-Apr-12						
Calcium	5.27		mg/L	5.00		105	85-115			
Potassium	10.6		mg/L	10.0		106	85-115			
Magnesium	27.1		mg/L	25.0		108	85-115			
Sodium	8.58		mg/L	8.10		106	85-115			
LCS Dup (2041906-BSD1)				Prepared: 12-Apr-12 Analyzed: 17-Apr-12						
Magnesium	27.2		mg/L	25.0		109	85-115	0.368	20	
Sodium	8.56		mg/L	8.10		106	85-115	0.233	20	
Calcium	5.27		mg/L	5.00		105	85-115	0.00	20	
Potassium	10.8		mg/L	10.0		108	85-115	1.87	20	
Batch 2041909 - General Prep - Wet Chem										
Blank (2041909-BLK1)				Prepared & Analyzed: 11-Apr-12						
Alkalinity, Carbonate	ND	0.00	mg/L							
Alkalinity, Bicarbonate	9.76	5.00	mg/L							
Alkalinity, Total	8.00	4.00	mg/L							
LCS (2041909-BS1)				Prepared & Analyzed: 11-Apr-12						
Alkalinity, Carbonate	ND	0.00	mg/L				80-120			
Alkalinity, Bicarbonate	117	5.00	mg/L				80-120			
Alkalinity, Total	104	4.00	mg/L	100		104	80-120			
LCS Dup (2041909-BSD1)				Prepared & Analyzed: 11-Apr-12						
Alkalinity, Carbonate	ND	0.00	mg/L				80-120		20	
Alkalinity, Bicarbonate	122	5.00	mg/L				80-120	4.18	20	
Alkalinity, Total	100	4.00	mg/L	100		100	80-120	3.92	20	

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Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

KEY ENERGY - EUNICE P. O. BOX 99 EUNICE NM, 88230	Project: BKE LOVING, NM Project Number: NOT GIVEN Project Manager: KEY ENERGY Fax To: NOT GIVEN	Reported: 20-Apr-12 09:14

Inorganic Compounds - Quality Control

Cardinal Laboratories

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2041909 - General Prep - Wet Chem										
Duplicate (2041909-DUP1)	**Source: H200775-01**			Prepared & Analyzed: 11-Apr-12						
Alkalinity, Carbonate	ND	0.00	mg/L		0.00				20	
Alkalinity, Bicarbonate	185	5.00	mg/L		181			2.19	20	
Alkalinity, Total	152	4.00	mg/L		148			2.67	20	
Matrix Spike (2041909-MS1)	**Source: H200775-01**			Prepared & Analyzed: 11-Apr-12						
Alkalinity, Carbonate	ND	0.00	mg/L		0.00		70-130			
Alkalinity, Bicarbonate	332	5.00	mg/L		181		70-130			
Alkalinity, Total	272	4.00	mg/L	100	148	124	70-130			

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Notes and Definitions

GAL	Analysis subcontracted to Green Analytical Laboratories, a subsidiary of Cardinal Laboratories.
ND	Analyte NOT DETECTED at or above the reporting limit
RPD	Relative Percent Difference
**	Samples not received at proper temperature of 6°C or below.
***	Insufficient time to reach temperature.
-	Chloride by SM4500Cl-B does not require samples be received at or below 6°C
	Samples reported on an as received basis (wet) unless otherwise noted on report

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

101 East Marland, Hobbs, NM 88240
(575) 393-2326 FAX (575) 393-2476

Company Name:	KEY	**BILL TO**	
Project Manager:	N/A	**P.O. #:**	N/A
Address:	N/A	**Company:**	KEY
City:	N/A **State:** N/A **Zip:** N/A	**Attn:**	N/A
Phone #:	N/A **Fax #:** N/A	**Address:**	N/A
Project #:	N/A **Project Owner:** N/A	**City:**	N/A
Project Name:	N/A	**State:** N/A **Zip:** N/A	
Project Location:	BKE Loving NM	**Phone #:**	N/A
Sampler Name:	Leston Wayne Price Jr.	**Fax #:**	N/A

ANALYSIS REQUEST

Standard Chain of Custody

FOR LAB USE ONLY				MATRIX						PRESERV.			SAMPLING													
Lab I.D.	**Sample I.D.**	(G)RAB OR (C)OMP.	# CONTAINERS	GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER:	ACID/BASE:	ICE / COOL	OTHER:	**DATE**	**TIME**													
H200175																										
1	P Water Tank		2		X						X		4/2/12	11:30AM	X											
2	P Water The Bone Spring		1		X						X		4/2/12	11:30AM	X											

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising whether based in contract or tort, shall be limited to the amount paid by the client for the analyses. All claims including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within 30 days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise.

Relinquished By:	**Date:** 4/2/12	**Received By:**	Phone Result: ☐ Yes ☒ No Add'l Phone #: N/A
Leston Wayne Price Jr.	**Time:** 2:45pm	Jodi Henson	Fax Result: ☐ Yes ☒ No Add'l Fax #: N/A
Relinquished By:	**Date:**	**Received By:**	**REMARKS:** PLEASE EMAIL RESULTS TO: wayneprice77@eunitelink.net
	Time:		
Delivered By: (Circle One) Sampler - UPS - Bus - Other:		**Sample Condition** Cool: ☑ Yes ☐ No (3°C) Intact: ☑ Yes ☐ No	**CHECKED BY:** (Initials) GH

† Cardinal cannot accept verbal changes. Please fax written changes to 505-393-2476

#96

May 7, 2012

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

TO: OFFSET OPERATORS/LEASEHOLD OWNERS & SURFACE OWNER

Re: Key Energy Services, LLC
Form C-108 (Application for Authorization to Inject)
Grace Carlsbad Well No. 1
API No. 30-015-20573
1980' FSL & 660' FEL, Unit I, Section 36, T-22S, R-26E, NMPM,
Eddy County, New Mexico

Ladies & Gentlemen:

Enclosed please find a copy of Oil Conservation Division Form C-108 (Application for Authorization to Inject) for the Key Energy Services, LLC Grace Carlsbad Well No. 1. You are being provided a copy of the application as an offset operator, offset leaseholder or surface owner. Key Energy Services, LLC proposes to convert this existing well to a produced water disposal well, injection to occur into the Brushy Canyon member of the Delaware formation through selectively perforated intervals from 4,082'-5,200'.

Objections must be filed with the Oil Conservation Division, 1220 South St. Francis Drive, Santa Fe, New Mexico 87505, within 15 days.

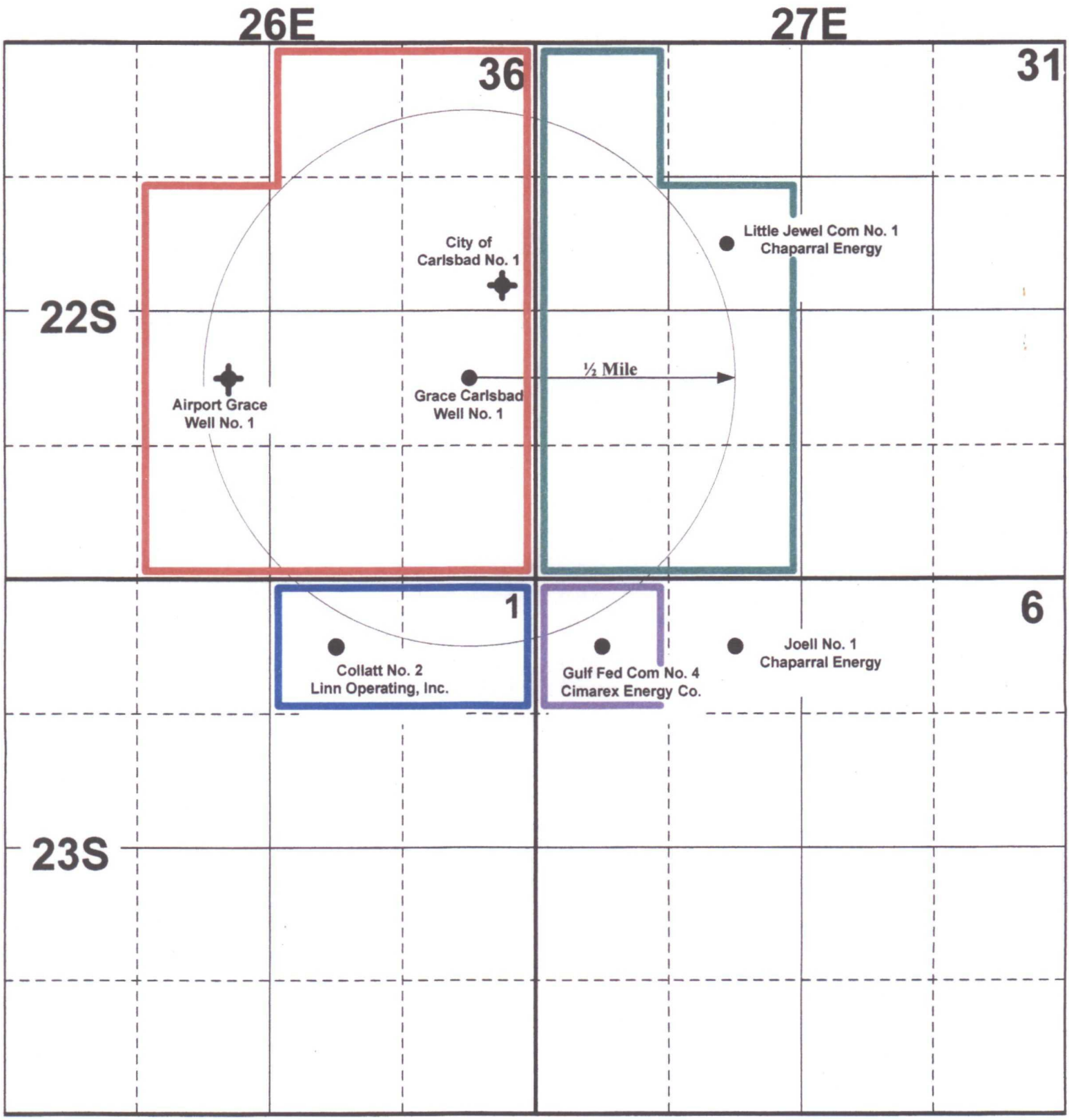
If you should have any questions, please contact me at (432) 620-6926, Wayne Price at (505) 713-2809 or David Catanach at (505) 690-9453.

Sincerely,

Loren R. Molleur

Loren Molleur, Senior VP, Permian Basin Marketplace
Fluid Management Services,
Key Energy Services, Inc.
1301 McKinney Street, Suite 1800
Houston, Texas 77010

Enclosure



Tract 1 Notice Area
Tract 2 Notice Area
Tract 3 Notice Area
Tract 4 Notice Area

Key Energy Services, LLC
Grace Carlsbad Well No. 1
Notice Area Map

Key Energy Services, LLC

Form C-108
Grace Carlsbad No. 1
1980' FSL & 660' FEL (Unit I)
Section 36, T-22 South, R-26 East, NMPM,
Eddy County, New Mexico

Offset Operator/Leasehold Owner Notification List (Page 1)

Tract 1

Lease Owner:

State of New Mexico
Commissioner of Public Lands
P.O. Box 1148
Santa Fe, New Mexico 87504

Tract 2

Operator:

Chaparral Energy, LLC
701 Cedar Lake Blvd.
Oklahoma City, Oklahoma 73114

Lessees: All Depths

ExxonMobil Corp.
5959 Las Colinas Blvd.
Irving, Texas 75039-4202

Isabel Sanditen Revocable Trust u/t/a 6/1/96
2140 E. 30th
Tulsa, Oklahoma 74101

Murray M. Cash &
Goldie Cash Revocable Trust
3109 S. Atlanta
Tulsa, Oklahoma 74101

Citation 1987-II Investment Ltd. Partnership
South Atrium, Suite 300
16800 Greenspoint Park Drive
Houston, Texas 77060-2304

Reserve Oil, Inc.
P.O. Box 5568
Denver, Colorado 80217

BFO Energy, Inc.
1161 One Energy Square
4925 Greenville Ave.
Dallas, Texas 75206

Chaparral Energy, LLC
701 Cedar Lake Blvd.
Oklahoma City, OK 73114

Mar Oil & Gas Corp.
P.O. Box 5155
Santa Fe, New Mexico
87502-5155

Snowmass Energy Partners Ltd.
3300 S. 14th St., Suite 322
Abilene, Texas 79605

CEI Bristol Acquisition LP
701 Cedar Lake Blvd.
Oklahoma City, OK 73114

Key Energy Services, LLC

Form C-108
Grace Carlsbad No. 1

Offset Operator/Leasehold Owner Notification List (Page 2)

Tract 3

Operator:

Linn Operating, Inc.
600 Travis Street, Suite 5100
Houston, Texas 77002

Lessees: All Depths

ExxonMobil Corp.
5959 Las Colinas Blvd.
Irving, Texas 75039-4202

Magnum Hunter Resources, Inc.
(c/o Cimarex Energy Company)
600 N. Marienfeld St., Suite 600
Midland, Texas 79701

Petrus Oil Company, LP
12201 Merit Dr., Suite 900
Dallas, Texas 75251

Diverse GP III
16414 San Pedro, Suite 340
San Antonio, Texas 78232

S.E.S. Investments, Ltd.
P.O. Box 271
Midland, Texas 79702

Brazos Limited Partnership
300 N. Breckenridge Ave.
Breckenridge, Texas
76424-3506

Canaan Resources, LLC
211 N. Robinson Ave., #N1000
Oklahoma City, Oklahoma 73114

Merit Energy Company
6748 West Highway 80
Midland, Texas 79706

Linn Energy Holdings, LLC
600 Travis Street, Suite 5100
Houston, Texas 77002

Murchison Oil & Gas, Inc.
1100 Mira Vista Blvd.
Plano, Texas 75093

Chi Energy, Inc.
P.O. Box 1799
Midland, Texas 79702

TMBR/Sharp Drilling, LLC
P.O. Box 1416
Snyder, Texas 79550

McCombs Energy, Ltd.
5599 San Felipe, Suite 1200
Houston, Texas 77056

Concho Resources, Inc.
550 W. Texas Ave., Suite 1300
Midland, Texas 79701

States, Inc.
P.O. Box 911
Breckenridge, Texas 76424

Jeremiah, LLC
P.O. Box 924
Hobbs, New Mexico 88241

Bonefish, LLC
200 Sunset Road, Suite D
El Paso, Texas 79922

Chesapeake Energy Corp.
P.O. Box 18496
Oklahoma City, OK
73154-0496

Tract 4

Operators:

Chaparral Energy, LLC
701 Cedar Lake Blvd.
Oklahoma City, Oklahoma 73114

Cimarex Energy Company
600 N. Marienfeld St., Suite 600
Midland, Texas 79701

Key Energy Services, LLC

Form C-108
Grace Carlsbad No. 1

Offset Operator/Leasehold Owner Notification List (Page 3)

Tract 4

Lessees: All Depths

ExxonMobil Corp.
5959 Las Colinas Blvd.
Irving, Texas 75039-4202

Magnum Hunter Resources, Inc.
(c/o Cimarex Energy Company)
600 N. Marienfeld, Suite 600
Midland, Texas 79701

Atapaz Petroleum, Inc.
P.O. Box 1828
Midland, Texas 79702-1828

Isabel Sanditen Revocable Trust u/t/a 6/1/96
2140 E. 30th St.
Tulsa, Oklahoma 74101

Citation 1987-II Investment Ltd. Partnership
South Atrium, Suite 300
16800 Greenspoint Park Drive
Houston, Texas 77060-2304

Reserve Oil, Inc.
P.O. Box 5568
Denver, Colorado 80217

BFO Energy, Inc.
1161 One Energy Square
4925 Greenville Ave.
Dallas, Texas 75206

Kerr-McGee Corporation
Kerr-McGee Oil & Gas Corp.
Kerr-McGee North American
Onshore Corp.
c/o Anadarko Petroleum Corp.
P.O. Box 1330
Houston, Texas 77251-1330

Faubon Oil & Gas Corp.
5599 San Felipe St., Suite 1104
Houston, Texas 77056-2721

Frank M. Agar
4 Hanover Drive
Midland, Texas 79705

Diverse GP III
16414 San Pedro, Suite 340
San Antonio, Texas 78232

Kona-Ltd.
816 Congress Ave., #1130
Austin, Texas 78701-2471

Canaan Resources, LLC
211 N. Robinson Ave., #N1000
Oklahoma City, Oklahoma 73114

Brighthawk/Burkhead Venture
601 Jefferson Street, Suite 3705
Houston, Texas 77002

EGL Resources, Inc.
P.O. Box 10886
Midland, Texas 79702

Devon Energy Production Co. LP
20 North Broadway, Suite 1500
Oklahoma City, Oklahoma 73102

Amarco Oil Corporation
P.O. Box 10886
Midland, Texas 79702

Finwing Corporation
P.O. Box 10886
Midland, Texas 79702

Manta Oil & Gas Corporation
P.O. Box 10886
Midland, Texas 79702

Olwick Corporation
P.O. Box 10886
Midland, Texas 79702

Petraitis Oil & Gas, Inc.
P.O. Box 10886
Midland, Texas 79702

Tiburon Oil & Gas, Inc.
P.O. Box 10886
Midland, Texas 79702

Lynx Petroleum Consultants
P.O. Box 1708
Hobbs, New Mexico 88241

Murray M. Cash &
Goldie Cash Revocable Trust
3109 S. Atlanta
Tulsa, Oklahoma 74101

Apache Corporation
300 Veterans Airpark Lane, Suite 3000
Midland, Texas 79705

M & W Petroleum
13435 Rogers Road
Edcouch, Texas 78538

Key Energy Services, LLC

Form C-108
Grace Carlsbad No. 1

Offset Operator/Leasehold Owner Notification List (Page 4)

Tract 4 (Cont.)

Lessees: All Depths

Chaparral Energy, LLC
701 Cedar Lake Blvd.
Oklahoma City, Oklahoma 73114

CEI Bristol Acquisition LP
701 Cedar Lake Blvd
Oklahoma City, Oklahoma 73114

Centurion Energy Corporation
214 W. Texas Ave., Suite 810
Midland, Texas 79701-4647

Surface Owner-Grace Carlsbad No. 1

Danny C. Stafford
5501 Old Cavern HWY
Carlsbad, New Mexico 88220

Form C-108
Key Energy Services, LLC
Grace Carlsbad Well No. 1 (API No. 30-015-20573)
1980' FSL & 660' FEL (Unit I)
Section 36, T-22 South, R-26 East, NMPM,
Eddy County, New Mexico

Legal notice will be published in the:

Carlsbad Current-Argus
P.O. Box 1629
Carlsbad, New Mexico 88221-1629

A copy of the legal advertisement will be forwarded to the Division upon publication.

Key Energy Services, LLC, 1301 McKinney Street, Suite 1800, Houston, Texas 77010 has filed a Form C-108 (Application for Authorization to Inject) with the Oil Conservation Division seeking administrative approval to convert its Grace Carlsbad Well No. 1 (API No. 30-015-20573) located 1980' FSL & 660' FEL (Unit I) of Section 36, Township 22 South, Range 26 East, NMPM, Eddy County, New Mexico to a produced water disposal well. The well will be utilized to dispose produced water from various producing formations in Southeast New Mexico. Injection will occur into the Brushy Canyon member of the Delaware formation through selectively perforated intervals from 4,082'-5,200'. The average and maximum injection rates will be 1,500 and 5,000 barrels of water per day and the average and maximum surface injection pressure is anticipated to be 816 psi and 2,000 psi, respectively.

Interested parties must file objections with the New Mexico Oil Conservation Division, 1220 S. St Francis Drive, Santa Fe, New Mexico 87505, within 15 days of the date of this publication.

Additional information can be obtained by contacting Loren Molleur at (432) 620-6926, Wayne Price at (505) 713-2809 or David Catanach at (505) 690-9453

Affidavit of Publication

State of New Mexico,
County of Eddy, ss.

Kathy McCarroll, being first duly sworn, on oath says:

That she is the Classified Supervisor of the Carlsbad Current-Argus, a newspaper published daily at the City of Carlsbad, in said county of Eddy, state of New Mexico and of general paid circulation in said county; that the same is a duly qualified newspaper under the laws of the State wherein legal notices and advertisements may be published; that the printed notice attached hereto was published in the regular and entire edition of said newspaper and not in supplement thereof on the date as follows, to wit:

May 15 2012

That the cost of publication is **$69.48** and that payment thereof has been made and will be assessed as court costs.

Kathy McCarroll

Subscribed and sworn to before me this

16th day of May, 2012

Shirley Maxwell

My commission Expires on May 18, 2015

Notary Public

OFFICIAL SEAL
Shirley Maxwell
NOTARY PUBLIC
STATE OF NEW MEXICO
My Commission Expires 5/18/15

May 15, 2012

Key Energy Services, LLC, 1301 McKinney Street, Suite 1800, Houston, Texas 77010 has filed a Form C-108 (Application for Authorization to Inject) with the Oil Conservation Division seeking administrative approval to convert its Grace Carlsbad Well No. 1 (API No. 30-015-20573) located 1980' FSL & 660' FEL (Unit I) of Section 36, Township 22 South, Range 26 East, NMPM, Eddy County, New Mexico to a produced water disposal well. The well will be utilized to dispose produced water from various producing formations in Southeast New Mexico. Injection will occur into the Brushy Canyon member of the Delaware formation through selectively perforated intervals from 4,082'-5,200'. The average and maximum injection rates will be 1,500 and 5,000 barrels of water per day and the average, and maximum surface injection pressure is anticipated to be 816 psi and 2,000 psi, respectively.

Interested parties must file objections with the New Mexico Oil Conservation Division, 1220 S. St Francis Drive, Santa Fe, New Mexico 87505, within 15 days of the date of this publication.

Additional information can be obtained by contacting Loren Molleur at (432) 620-6926, Wayne Price at (505) 713-2809 or David Catanach at (505) 690-9453.

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City, State, ZIP+4: HOBBS, NM 88241

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Restricted Delivery Fee (Endorsement Required)	$0.00
Total Postage & Fees	$ $10.65

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Street, Apt. No.; or PO Box No.: P.O. BOX 10886
City, State, ZIP+4: MIDLAND, TX 79702

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Restricted Delivery Fee (Endorsement Required)	$0.00
Total Postage & Fees	$ $10.80

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Sent To: BRIGHTHAWK/BURKHEAD VENTURE
Street, Apt. No.; or PO Box No.: 601 JEFFERSON ST, ST. 3705
City, State, ZIP+4: HOUSTON, TX, 77002

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Total Postage & Fees	$ $10.55

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Sent To: PANNY C. STAFFORD
Street, Apt. No.; or PO Box No.: 5501 OLD CAVERN HWY
City, State, ZIP+4: CARLSBAD, NM 88220

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City, State, ZIP+4: MIDLAND, TX 79701-4647

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City, State, ZIP+4 MIDLAND, TX 79705

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City, State, ZIP+4 MIDLAND, TX 79702-1828

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Street, Apt. No.; or PO Box No. P.O BOX 10886
City, State, ZIP+4 MIDLAND, TX 79702

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Total Postage & Fees	$ $10.65

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Street, Apt. No.; or PO Box No. P.O. BOX 10886
City, State, ZIP+4 MIDLAND, TX 79702

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Sent To DEVON ENERGY PRODUCTION CO, L.P.
Street, Apt. No.; or PO Box No. 20 NORTH BROADWAY, ST 1500
City, State, ZIP+4 OKLAHOMA, OK 73102

PS Form 3800, August 2006 See Reverse for Instructions

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05/22/2012

Sent To FRANK M. AGAR
Street, Apt. No.; or PO Box No. 4 HANOVER DRIVE
City, State, ZIP+4 MIDLAND, TX 79705

PS Form 3800, August 2006 See Reverse for Instructions

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HOUSTON TX 77056 OFFICIAL USE

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Sent To: FAULCON OIL + GAS CORP.
Street, Apt. No.; or PO Box No.: 5599 SAN FELIPE ST., S+1104
City, State, ZIP+4: HOUSTON, TX 77056-2721

PS Form 3800, August 2006 See Reverse for Instructions

7011 0470 0002 1602 6252

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AUSTIN TX 78701 OFFICIAL USE

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Street, Apt. No.; or PO Box No.: 816 CONGRESS AVE #1130
City, State, ZIP+4: AUSTIN, TX 78701-2471

PS Form 3800, August 2006 See Reverse for Instructions

7011 0470 0002 1602 6214

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MIDLAND TX 79701 OFFICIAL USE

Postage	$ $5.35
Certified Fee	$2.95
Return Receipt Fee (Endorsement Required)	$2.35
Restricted Delivery Fee (Endorsement Required)	$0.00
Total Postage & Fees	$ $10.65

0124 RIO RANCHO STATION RIO RANCHO, NM 87124 USPS 09 Postmark Here MAY 22 2012 05/22/2012

Sent To: CIMAREX ENERGY COMPANY
Street, Apt. No.; or PO Box No.: 600 N. MARIENFELD ST. S+600
City, State, ZIP+4: MIDLAND, TX 79701

PS Form 3800, August 2006 See Reverse for Instructions

7011 0470 0002 1602 6207

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OKLAHOMA CITY OK 73154 OFFICIAL USE

Postage	$ $5.35
Certified Fee	$2.95
Return Receipt Fee (Endorsement Required)	$2.35
Restricted Delivery Fee (Endorsement Required)	$0.00
Total Postage & Fees	$ $10.65

0124 RIO RANCHO STATION RIO RANCHO, NM 87124 USPS 09 Postmark Here MAY 22 2012 05/22/2012

Sent To: CHESAPEAKE ENERGY CORP.
Street, Apt. No.; or PO Box No.: P.O. BOX 18496
City, State, ZIP+4: OKLAHOMA CITY, OK 73154-0496

PS Form 3800, August 2006 See Reverse for Instructions

7011 0470 0002 1602 6191

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For delivery information visit our website at www.usps.com®
BRECKENRIDGE TX 76424 OFFICIAL USE

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Return Receipt Fee (Endorsement Required)	$2.35
Restricted Delivery Fee (Endorsement Required)	$0.00
Total Postage & Fees	$ $10.65

0124 RIO RANCHO STATION RIO RANCHO, NM 87124 USPS 09 Postmark Here MAY 22 2012 05/22/2012

Sent To: STATES, INC.
Street, Apt. No.; or PO Box No.: P.O. BOX 911
City, State, ZIP+4: BRECKENRIDGE, TX 76424

7011 2000 0000 3782 7952

U.S. Postal Service™
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For delivery information visit our website at www.usps.com®
HOUSTON TX 77251 OFFICIAL USE

Postage	$ $5.50
Certified Fee	$2.95
Return Receipt Fee (Endorsement Required)	$2.35
Restricted Delivery Fee (Endorsement Required)	$0.00
Total Postage & Fees	$ $10.80

0124 RIO RANCHO STATION RIO RANCHO, NM 87124 USPS 09 Postmark Here MAY 22 2012 05/22/2012

Sent To: KERR-MCGEE NORTH AMERICAN ONSHORE CORP
KERR-MCGEE CORP, KERR MCGEE O.I. + GAS CORP
Street, Apt. No.; or PO Box No.: C/O ANADARKO PETROLEUM CORP. P.O. BOX 1330
City, State, ZIP+4: HOUSTON, TX 77251-1330

PS Form 3800, August 2006

7011 0470 0002 1602 6139

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For delivery information visit our website at www.usps.com®
MIDLAND TX 79701 OFFICIAL USE

Postage	$ $5.35
Certified Fee	$2.95
Return Receipt Fee (Endorsement Required)	$2.35
Restricted Delivery Fee (Endorsement Required)	$0.00
Total Postage & Fees	$ $10.65

0124 09 MAY 22 2012 Postmark Here
RIO RANCHO STATION RIO RANCHO, NM 87124
USPS 05/22/2012

Sent To: CONCHO RESOURCES, INC
Street, Apt. No.; or PO Box No.: 550 W. TEXAS AVE, ST. 1300
City, State, ZIP+4: MIDLAND, TX 79701

PS Form 3800, August 2006 See Reverse for Instructions

7011 0470 0002 1602 6146

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For delivery information visit our website at www.usps.com®
EL PASO TX 79922 OFFICIAL USE

Postage	$ $5.25
Certified Fee	$2.95
Return Receipt Fee (Endorsement Required)	$2.35
Restricted Delivery Fee (Endorsement Required)	$0.00
Total Postage & Fees	$ $10.55

0124 09 MAY 22 2012 Postmark Here
RIO RANCHO STATION RIO RANCHO, NM 87124
USPS 05/22/2012

Sent To: BONEFISH, LLC
Street, Apt. No.; or PO Box No.: 200 SUNSET ROAD, ST. D
City, State, ZIP+4: EL PASO, TX 79922

PS Form 3800, August 2006 See Reverse for Instructions

7011 0470 0002 1602 6283

U.S. Postal Service™
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For delivery information visit our website at www.usps.com®
MIDLAND TX 79702 OFFICIAL USE

Postage	$ $5.35
Certified Fee	$2.95
Return Receipt Fee (Endorsement Required)	$2.35
Restricted Delivery Fee (Endorsement Required)	$0.00
Total Postage & Fees	$ $10.65

0124 09 MAY 22 2012 Postmark Here
RIO RANCHO STATION RIO RANCHO, NM 87124
05/22/2012

Sent To: PETRATIS OIL & GAS INC,
Street, Apt. No.; or PO Box No.: P.O. BOX 10886
City, State, ZIP+4: MIDLAND, TX 79702

PS Form 3800, August 2006 See Reverse for Instructions

7011 0470 0002 1602 6122

U.S. Postal Service™
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For delivery information visit our website at www.usps.com®
MIDLAND TX 79702 OFFICIAL USE

Postage	$ $5.35
Certified Fee	$2.95
Return Receipt Fee (Endorsement Required)	$2.35
Restricted Delivery Fee (Endorsement Required)	$0.00
Total Postage & Fees	$ $10.65

0124 09 MAY 22 2012 Postmark Here
RIO RANCHO STATION RIO RANCHO, NM 87124
USPS 05/22/2012

Sent To: CHI ENERGY, INC
Street, Apt. No.; or PO Box No.: P.O. BOX 1799
City, State, ZIP+4: MIDLAND, TX 79702

PS Form 3800, August 2006 See Reverse for Instructions

7011 0470 0002 1602 6269

U.S. Postal Service™
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For delivery information visit our website at www.usps.com®
MIDLAND TX 79702 OFFICIAL USE

Postage	$ $5.35
Certified Fee	$2.95
Return Receipt Fee (Endorsement Required)	$2.35
Restricted Delivery Fee (Endorsement Required)	$0.00
Total Postage & Fees	$ $10.65

0124 09 MAY 22 2012 Postmark Here
RIO RANCHO STATION RIO RANCHO, NM 87124
USPS 05/22/2012

Sent To: EG-L RESOURCES, INC
Street, Apt. No.; or PO Box No.: P.O. BOX 10886
City, State, ZIP+4: MIDLAND, TX 79702

PS Form 3800, August 2006 See Reverse for Instructions

7011 0470 0002 1602 6276

U.S. Postal Service™
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For delivery information visit our website at www.usps.com®
MIDLAND TX 79702 OFFICIAL USE

Postage	$ $5.35
Certified Fee	$2.95
Return Receipt Fee (Endorsement Required)	$2.35
Restricted Delivery Fee (Endorsement Required)	$0.00
Total Postage & Fees	$ $10.65

0124 09 MAY 22 2012 Postmark Here
RIO RANCHO STATION RIO RANCHO, NM 87124
USPS 05/22/2012

Sent To: FINWING CORPORATION
Street, Apt. No.; or PO Box No.: P.O. BOX 10886
City, State, ZIP+4: MIDLAND, TX 79702

PS Form 3800, August 2006 See Reverse for Instructions

7011 2000 0000 3787 4727

U.S. Postal Service™
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For delivery information visit our website at www.usps.com®
SANTA FE NM 87504 OFFICIAL USE

Postage	$ $5.20
Certified Fee	$2.95
Return Receipt Fee (Endorsement Required)	$2.35
Restricted Delivery Fee (Endorsement Required)	$0.00
Total Postage & Fees	$ $10.50

0124 09 Postmark Here MAY 22 2012 05/22/2012 USPS RIO RANCHO STATION RIO RANCHO, NM 87124

Sent To: State of NM - COMMISSIONER OF PUBLIC LANDS
Street, Apt. No.; or PO Box No.: P.O. Box 1148
City, State, ZIP+4: SANTA FE, NM 87504

PS Form 3800, August 2006 See Reverse for Instructions

7011 0470 0002 1602 5941

U.S. Postal Service™
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For delivery information visit our website at www.usps.com®
OKLAHOMA CITY OK 73114 OFFICIAL USE

Postage	$ $5.35
Certified Fee	$2.95
Return Receipt Fee (Endorsement Required)	$2.35
Restricted Delivery Fee (Endorsement Required)	$0.00
Total Postage & Fees	$ $10.65

0124 09 Postmark Here MAY 22 2012 05/22/2012 USPS RIO RANCHO STATION RIO RANCHO, NM 87124

Sent To: CHAPARRAL ENERGY LLC
Street, Apt. No.; or PO Box No.: 701 CEDAR LAKE BLVD.
City, State, ZIP+4: OKLAHOMA CITY, OK 73114

PS Form 3800, August 2006 See Reverse for Instructions

7011 0470 0002 1602 6177

U.S. Postal Service™
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For delivery information visit our website at www.usps.com®
HOUSTON TX 77002 OFFICIAL USE

Postage	$ $5.50
Certified Fee	$2.95
Return Receipt Fee (Endorsement Required)	$2.35
Restricted Delivery Fee (Endorsement Required)	$0.00
Total Postage & Fees	$ $10.80

0124 09 Postmark Here MAY 22 2012 05/22/2012 USPS RIO RANCHO STATION RIO RANCHO, NM 87124

Sent To: LINN ENERGY HOLDINGS, LLC
Street, Apt. No.; or PO Box No.: 600 TRAVIS ST. ST. 5100
City, State, ZIP+4: HOUSTON, TX 77002

PS Form 3800, August 2006 See Reverse for Instructions

7011 0470 0002 1602 6184

U.S. Postal Service™
CERTIFIED MAIL™ RECEIPT
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For delivery information visit our website at www.usps.com®
SNYDER TX 79550 OFFICIAL USE

Postage	$ $5.35
Certified Fee	$2.95
Return Receipt Fee (Endorsement Required)	$2.35
Restricted Delivery Fee (Endorsement Required)	$0.00
Total Postage & Fees	$ $10.65

0124 09 Postmark Here MAY 22 2012 05/22/2012 USPS RIO RANCHO STATION RIO RANCHO, NM 87124

Sent To: TMBR/SHARP DRILLING, LLC
Street, Apt. No.; or PO Box No.: P.O. BOX 1416
City, State, ZIP+4: SNYDER, TX 79550

PS Form 3800, August 2006 See Reverse for Instructions

7011 0470 0002 1602 6153

U.S. Postal Service™
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For delivery information visit our website at www.usps.com®
DALLAS TX 75251 OFFICIAL USE

Postage	$ $5.35
Certified Fee	$2.95
Return Receipt Fee (Endorsement Required)	$2.35
Restricted Delivery Fee (Endorsement Required)	$0.00
Total Postage & Fees	$ $10.65

0124 09 Postmark Here MAY 22 2012 05/22/2012 USPS RIO RANCHO STATION RIO RANCHO, NM 87124

Sent To: PETRUS OIL COMPANY, LP
Street, Apt. No.; or PO Box No.: 12201 MERIT DR. ST 900
City, State, ZIP+4: DALLAS, TX 75251

7011 0470 0002 1602 6160

U.S. Postal Service™
CERTIFIED MAIL™ RECEIPT
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For delivery information visit our website at www.usps.com®
BRECKENRIDGE TX 76424 OFFICIAL USE

Postage	$ $5.35
Certified Fee	$2.95
Return Receipt Fee (Endorsement Required)	$2.35
Restricted Delivery Fee (Endorsement Required)	$0.00
Total Postage & Fees	$ $10.65

0124 09 Postmark Here MAY 22 2012 05/22/2012 USPS RIO RANCHO STATION RIO RANCHO, NM 87124

Sent To: BRAZOS LIMITED PARTNERSHIP
Street, Apt. No.; or PO Box No.: 300 N. BRECKENRIDGE AVE.
City, State, ZIP+4:

7011 0470 0002 1602 5996

U.S. Postal Service™
CERTIFIED MAIL™ RECEIPT
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For delivery information visit our website at www.usps.com®
TULSA OK 74101 OFFICIAL USE

Postage	$ $5.50
Certified Fee	$2.95
Return Receipt Fee (Endorsement Required)	$2.35
Restricted Delivery Fee (Endorsement Required)	$0.00
Total Postage & Fees	$ $10.80

0124 RIO RANCHO, NM 87124 USPS
09 Postmark Here
MAY 22 2012
05/22/2012

Sent To: ISABEL SANDITEN REVOCABLE TRUST U/T/A 6/1/96
Street, Apt. No.; or PO Box No.: 2140 E. 30TH
City, State, ZIP+4: TULSA, OK 74101

PS Form 3800, August 2006 See Reverse for Instructions

7011 0470 0002 1602 6009

U.S. Postal Service™
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For delivery information visit our website at www.usps.com®
HOUSTON TX 77060 OFFICIAL USE

Postage	$ $5.50
Certified Fee	$2.95
Return Receipt Fee (Endorsement Required)	$2.35
Restricted Delivery Fee (Endorsement Required)	$0.00
Total Postage & Fees	$ $10.80

0124 RIO RANCHO, NM 87124 USPS
09 Postmark Here
MAY 22 2012
05/22/2012

Sent To: CITATION 1987-II INVESTMENT LTD. PARTNERSHIP
Street, Apt. No.; or PO Box No.: SOUTH ATRIUM, SUITE 300 16800 GREENSPOINT PARK DRIVE
City, State, ZIP+4: HOUSTON, TX 77060-2304

PS Form 3800, August 2006 See Reverse for Instructions

7011 0470 0002 1602 5972

U.S. Postal Service™
CERTIFIED MAIL™ RECEIPT
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For delivery information visit our website at www.usps.com®
DENVER CO 80217 OFFICIAL USE

Postage	$ $5.35
Certified Fee	$2.95
Return Receipt Fee (Endorsement Required)	$2.35
Restricted Delivery Fee (Endorsement Required)	$0.00
Total Postage & Fees	$ $10.65

0124 RIO RANCHO, NM 87124 USPS
09 Postmark Here
MAY 22 2012
05/22/2012

Sent To: RESERVE OIL, INC
Street, Apt. No.; or PO Box No.: P.O. BOX 5568
City, State, ZIP+4: DENVER, CO 80217

PS Form 3800, August 2006 See Reverse for Instructions

7011 0470 0002 1602 5989

U.S. Postal Service™
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For delivery information visit our website at www.usps.com®
SANTA FE NM 87502 OFFICIAL USE

Postage	$ $5.20
Certified Fee	$2.95
Return Receipt Fee (Endorsement Required)	$2.35
Restricted Delivery Fee (Endorsement Required)	$0.00
Total Postage & Fees	$ $10.50

0124 RIO RANCHO, NM 87124 USPS
09 Postmark Here
MAY 22 2012
05/22/2012

Sent To: MAR OIL & Gas Corp.
Street, Apt. No.; or PO Box No.: P.O. BOX 5155
City, State, ZIP+4: SANTA FE, NM 87502-5155

PS Form 3800, August 2006 See Reverse for Instructions

7011 0470 0002 1602 5958

U.S. Postal Service™
CERTIFIED MAIL™ RECEIPT
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For delivery information visit our website at www.usps.com®
IRVING TX 75039 OFFICIAL USE

Postage	$ $5.35
Certified Fee	$2.95
Return Receipt Fee (Endorsement Required)	$2.35
Restricted Delivery Fee (Endorsement Required)	$0.00
Total Postage & Fees	$ $10.65

0124 RIO RANCHO STATION RIO RANCHO, NM 87124 USPS
09 Postmark Here
MAY 22 2012
05/22/2012

Sent To: EXXONMOBIL CORP.
Street, Apt. No.; or PO Box No.: 5959 LAS COLINAS BLVD.
City, State, ZIP+4: IRVING, TX 75039-4202

PS Form 3800, August 2006 See Reverse for Instructions

7011 0470 0002 1602 5965

U.S. Postal Service™
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For delivery information visit our website at www.usps.com®
TULSA OK 74101 OFFICIAL USE

Postage	$ $5.50
Certified Fee	$2.95
Return Receipt Fee (Endorsement Required)	$2.35
Restricted Delivery Fee (Endorsement Required)	$0.00
Total Postage & Fees	$ $10.80

0124 RIO RANCHO, NM 87124 USPS
09 Postmark Here
MAY 22 2012
05/22/2012

Sent To: MURRAY M. CASH & GAYLE CASH
Street, Apt. No.; or PO Box No.: REVOCABLE TRUST 3109 S. ATLANTA
City, State, ZIP+4: TULSA, OK 74101

U.S. Postal Service™
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For delivery information visit our website at www.usps.com®

OFFICIAL USE

SAN ANTONIO TX 78232

Postage	$ $5.50
Certified Fee	$2.95
Return Receipt Fee (Endorsement Required)	$2.35
Restricted Delivery Fee (Endorsement Required)	$0.00
Total Postage & Fees	$ $10.80

0124

Postmark Here
MAY 22 2012
05/22/2012

7011 0470 0002 1602 6047

Sent To: DIVERSE GP III
Street, Apt. No.; or PO Box No.: 16414 SAN PEDRO, SUITE 340
City, State, ZIP+4: SAN ANTONIO, TX 78232

PS Form 3800, August 2006 — See Reverse for Instructions

U.S. Postal Service™
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For delivery information visit our website at www.usps.com®

OFFICIAL USE

MIDLAND TX 79702

Postage	$ $5.35
Certified Fee	$2.95
Return Receipt Fee (Endorsement Required)	$2.35
Restricted Delivery Fee (Endorsement Required)	$0.00
Total Postage & Fees	$ $10.65

0124

Postmark Here
MAY 22 2012
05/22/2012

7011 0470 0002 1602 6108

Sent To: SES INVESTMENTS, LTD.
Street, Apt. No.; or PO Box No.: P.O. BOX 271
City, State, ZIP+4: MIDLAND, TX 79702

PS Form 3800, August 2006 — See Reverse for Instructions

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OFFICIAL USE

OKLAHOMA CITY OK 73114

Postage	$ $5.35
Certified Fee	$2.95
Return Receipt Fee (Endorsement Required)	$2.35
Restricted Delivery Fee (Endorsement Required)	$0.00
Total Postage & Fees	$ $10.65

0124

Postmark Here
MAY 22 2012
05/22/2012

7011 0470 0002 1602 6030

Sent To: CEF BRISTOL ACQUISITION LP
Street, Apt. No.; or PO Box No.: 701 CEDAR LAKE BLVD
City, State, ZIP+4: OKLAHOMA CITY, OK 73114

PS Form 3800, August 2006 — See Reverse for Instructions

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For delivery information visit our website at www.usps.com®

OFFICIAL USE

HOUSTON TX 77002

Postage	$ $5.50
Certified Fee	$2.95
Return Receipt Fee (Endorsement Required)	$2.35
Restricted Delivery Fee (Endorsement Required)	$0.00
Total Postage & Fees	$ $10.80

0124

Postmark Here
MAY 22 2012
05/22/2012

7011 0470 0002 1602 6221

Sent To: LINN OPERATING, INC.
Street, Apt. No.; or PO Box No.: 600 TRAVIS ST, ST 5100
City, State, ZIP+4: HOUSTON, TX 77002

PS Form 3800, August 2006 — See Reverse for Instructions

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For delivery information visit our website at www.usps.com®

OFFICIAL USE

ABILENE TX 79605

Postage	$ $5.35
Certified Fee	$2.95
Return Receipt Fee (Endorsement Required)	$2.35
Restricted Delivery Fee (Endorsement Required)	$0.00
Total Postage & Fees	$ $10.65

0124

Postmark Here
MAY 22 2012
05/22/2012

7011 0470 0002 1602 6023

Sent To: SNOW MASS ENERGY PARTNERS LTD
Street, Apt. No.; or PO Box No.: 3300 S. 14TH ST. SUITE 322
City, State, ZIP+4: ABILENE, TX 79605

PS Form 3800, August 2006 — See Reverse for Instructions

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OFFICIAL USE

DALLAS TX 75206

Postage	$ $5.35
Certified Fee	$2.95
Return Receipt Fee (Endorsement Required)	$2.35
Restricted Delivery Fee (Endorsement Required)	$0.00
Total Postage & Fees	$ $10.65

0124

Postmark Here
MAY 22 2012
05/22/2012

7011 0470 0002 1602 6016

Sent To: BFO ENERGY, INC.
Street, Apt. No.; or PO Box No.: 1161 ONE ENERGY SQUARE 4925 GREENVILLE AVE.
City, State, ZIP+4: DALLAS, TX 75206

PS Form 3800, August 2006

7011 0470 0002 1602 6085

U.S. Postal Service™
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For delivery information visit our website at www.usps.com®
HOBBS NM 88241 OFFICIAL USE

Postage	$ $5.25
Certified Fee	$2.95
Return Receipt Fee (Endorsement Required)	$2.35
Restricted Delivery Fee (Endorsement Required)	$0.00
Total Postage & Fees	$ $10.55

0124 RIO RANCHO STATION RIO RANCHO, NM 87124 USPS MAY 22 2012 Postmark 05/22/2012

Sent To: JEREMIAH, LLC
Street, Apt. No.; or PO Box No.: P.O. Box 924
City, State, ZIP+4: HOBBS, NM 88241

PS Form 3800, August 2006 — See Reverse for Instructions

7011 0470 0002 1602 6061

U.S. Postal Service™
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(Domestic Mail Only; No Insurance Coverage Provided)

For delivery information visit our website at www.usps.com®
PLANO TX 75093 OFFICIAL USE

Postage	$ $5.35
Certified Fee	$2.95
Return Receipt Fee (Endorsement Required)	$2.35
Restricted Delivery Fee (Endorsement Required)	$0.00
Total Postage & Fees	$ $10.65

0124 09 RIO RANCHO STATION RIO RANCHO, NM 87124 USPS Postmark Here MAY 22 2012 05/22/2012

Sent To: MURCHISON OIL & GAS, INC.
Street, Apt. No.; or PO Box No.: 1100 MIRA VISTA BLVD
City, State, ZIP+4: PLANO, TX 75093

PS Form 3800, August 2006 — See Reverse for Instructions

7011 0470 0002 1602 6054

U.S. Postal Service™
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For delivery information visit our website at www.usps.com®
OKLAHOMA CITY OK 73114 OFFICIAL USE

Postage	$ $5.35
Certified Fee	$2.95
Return Receipt Fee (Endorsement Required)	$2.35
Restricted Delivery Fee (Endorsement Required)	$0.00
Total Postage & Fees	$ $10.65

0124 09 RIO RANCHO STATION RIO RANCHO, NM 87124 USPS Postmark Here MAY 22 2012 05/22/2012

Sent To: CANAAN RESOURCES, LLC
Street, Apt. No.; or PO Box No.: 211 N. ROBINSON AVE, #N1000
City, State, ZIP+4: OKLAHOMA CITY, OK 73114

PS Form 3800, August 2006 — See Reverse for Instructions

7011 0470 0002 1602 6078

U.S. Postal Service™
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For delivery information visit our website at www.usps.com®
HOUSTON TX 77056 OFFICIAL USE

Postage	$ $5.50
Certified Fee	$2.95
Return Receipt Fee (Endorsement Required)	$2.35
Restricted Delivery Fee (Endorsement Required)	$0.00
Total Postage & Fees	$ $10.80

0124 09 RIO RANCHO STATION RIO RANCHO, NM 87124 USPS Postmark Here MAY 22 2012 05/22/2012

Sent To: MCCOMBS ENERGY, Ltd.
Street, Apt. No.; or PO Box No.: 5599 SAN FELIPE, ST 1200
City, State, ZIP+4: HOUSTON, TX 77056

PS Form 3800, August 2006 — See Reverse for Instructions

7011 0470 0002 1602 6092

U.S. Postal Service™
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For delivery information visit our website at www.usps.com®
MIDLAND TX 79701 OFFICIAL USE

Postage	$ $5.35
Certified Fee	$2.95
Return Receipt Fee (Endorsement Required)	$2.35
Restricted Delivery Fee (Endorsement Required)	$0.00
Total Postage & Fees	$ $10.65

0124 09 RIO RANCHO STATION RIO RANCHO, NM 87124 USPS Postmark Here MAY 22 2012 05/22/2012

Sent To: MAGNUM HUNTER RESOURCES, INC
Street, Apt. No.; or PO Box No.: C/O CIMAREX ENERGY CO 600 N. MARIENFELD ST. ST 600
City, State, ZIP+4: MIDLAND, TX 79701

PS Form 3800, August 2006 — See Reverse for Instructions

7011 0470 0002 1602 6115

U.S. Postal Service™
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For delivery information visit our website at www.usps.com®
MIDLAND TX 79706 OFFICIAL USE

Postage	$ $5.35
Certified Fee	$2.95
Return Receipt Fee (Endorsement Required)	$2.35
Restricted Delivery Fee (Endorsement Required)	$0.00
Total Postage & Fees	$ $10.65

0124 09 RIO RANCHO STATION RIO RANCHO, NM 87124 USPS Postmark Here MAY 22 2012 05/22/2012

Sent To: MERIT ENERGY COMPANY
Street, Apt. No.; or PO Box No.: 6748 WEST HIGHWAY 80
City, State, ZIP+4: MIDLAND, TX 79706

PS Form 3800, August 2006 — See Reverse for Instructions

7011 2000 0000 3782 3367

U.S. Postal Service™
CERTIFIED MAIL™ RECEIPT
(Domestic Mail Only; No Insurance Coverage Provided)

For delivery information visit our website at www.usps.com®

CARLSBAD NM 88220 OFFICIAL USE

Postage	$ $5.25	0124
Certified Fee	$2.95	
Return Receipt Fee (Endorsement Required)	$2.35	Postmark Here
Restricted Delivery Fee (Endorsement Required)	$0.00	
Total Postage & Fees	$ $10.55	06/27/2012

RIO RANCHO STATION RIO RANCHO, NM 87124 JUN 27 2012 USPS

Sent To: ATTN: BLM - MR WESLEY INGRAM
Street, Apt. No.; or PO Box No.: 620 E. GREEN ST.
City, State, ZIP+4: CARLSBAD, NM 88220

PS Form 3800, August 2006 — See Reverse for Instructions

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

BUREAU OF LAND MANAGEMENT
620 E. GREEN ST.
CARLSBAD, N.M 88220
ATTN: MR. WESLEY INGRAM

COMPLETE THIS SECTION ON DELIVERY

A. Signature X [signature] ☑ Agent ☐ Addressee

B. Received by (Printed Name) Heather [illegible] C. Date of Delivery 7/2/12

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

CARLSBAD JUL - 2 2012 USPS

3. Service Type
☑ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number (Transfer from service label) 7011 2000 0000 3782 3367

PS Form 3811, February 2004 — Domestic Return Receipt — 102595-02-M-1540

Jones, William V., EMNRD

From: Jones, William V., EMNRD
Sent: Monday, June 18, 2012 11:42 AM
To: 'drcatanach@netscape.com'; 'lmolleur@keyenergy.com'
Cc: Ezeanyim, Richard, EMNRD; Brooks, David K., EMNRD; Shapard, Craig, EMNRD; Dade, Randy, EMNRD
Subject: Disposal application from Key Energy Services, LLC: Grace Carlsbad #1 30-015-20573 Brushy Canyon from 4082 to 5200 feet

Tracking:

Recipient	Read
'drcatanach@netscape.com'	
'lmolleur@keyenergy.com'	
Ezeanyim, Richard, EMNRD	Read: 6/18/2012 1:07 PM
Brooks, David K., EMNRD	Read: 6/18/2012 11:52 AM
Shapard, Craig, EMNRD	Read: 6/18/2012 11:43 AM
Dade, Randy, EMNRD	Read: 6/18/2012 6:57 PM

Hello,
Some feedback and requests,

Even though these entities probably know about this already, would you please send a certified copy of this application to both the City of Carlsbad and the BLM's CFO (Wesley Ingram).

Would you please ask a geologist pick the top of the Brushy Canyon and Bone Spring. This info may have been in the application and I missed it.

Please include plans to raise cement to surface on the intermediate casing (the BLM agrees with me on this).

This logically seems a good spot for disposal, but the near-Reef facies appear to be a bit unpredictable – that is troubling.

Very nice application.

Thank You,

William V Jones, P.E.
Engineering, Oil Conservation Division
1220 South St. Francis Drive, Santa Fe, NM 87505
Tel 505.476.3448 ~ Fax 505.476.3462

Jones, William V., EMNRD

From: Jones, William V., EMNRD
Sent: Thursday, July 05, 2012 7:00 PM
To: 'wayne price'
Cc: drcatanach@netscape.com; Griswold, Jim, EMNRD
Subject: RE: Disposal application from Key Energy Services, LLC: Grace Carlsbad #1 30-015-20573 Brushy Canyon from 4082 to 5200 feet

Hello Mister Wayne,
Please send me the mailer notice showing a copy of the SWD application was sent to the BLM and I can start my 15 day clock..

Take Care,

Will Jones
New Mexico
Oil Conservation Division
Images Contacts

From: wayne price [mailto:wayneprice77@earthlink.net]
Sent: Thursday, July 05, 2012 1:14 PM
To: Jones, William V., EMNRD
Cc: drcatanach@netscape.com; Griswold, Jim, EMNRD
Subject: Re: Disposal application from Key Energy Services, LLC: Grace Carlsbad #1 30-015-20573 Brushy Canyon from 4082 to 5200 feet

Dear Mr. Jones:

Please find answer to your questions below marked in Red. Key Energy is preparing to build a "Super Service Center" in Carlsbad NM. As part of that center our yard will have a Brine Well, SWD well, Main office, Shops, a Rig-up yard, Rig yard, Trucking yard, and a future water treating plant as required by the city of Carlsbad. We plan on using the SWD for both commercial disposal and treated water disposal.

This SWD well is central of our operations, which we have spent close to 2 million dollars to date. We negotiated with the City to convert produced water to fresh water for the brine well. In order to complete this step we have to have a source of produced water. The commercial SWD will be that source. At this time, the SWD well is a stand along permit not to be associated with any produce water treating at this time.

If you need any further information please do not hesitate to call or write.

On Jul 5, 2012, at 9:50 AM, Jones, William V., EMNRD wrote:

7/5 = Carlsbad CITY was NOTIFIED
? = BLM NOT YET (7/12)
Where is Brine well?

Jones, William V., EMNRD

From: wayne price [wayneprice77@earthlink.net]
Sent: Thursday, July 05, 2012 1:14 PM
To: Jones, William V., EMNRD
Cc: drcatanach@netscape.com; Griswold, Jim, EMNRD
Subject: Re: Disposal application from Key Energy Services, LLC: Grace Carlsbad #1 30-015-20573 Brushy Canyon from 4082 to 5200 feet
Attachments: 5-2011 Public Notice landowne Letter.pdf

Dear Mr. Jones:

Please find answer to your questions below marked in Red. Key Energy is preparing to build a "Super Service Center" in Carlsbad NM. As part of that center our yard will have a Brine Well, SWD well, Main office, Shops, a Rig-up yard, Rig yard, Trucking yard, and a future water treating plant as required by the city of Carlsbad. We plan on using the SWD for both commercial disposal and treated water disposal.

This SWD well is central of our operations, which we have spent close to 2 million dollars to date. We negotiated with the City to convert produced water to fresh water for the brine well. In order to complete this step we have to have a source of produced water. The commercial SWD will be that source. At this time, the SWD well is a stand along permit not to be associated with any produce water treating at this time.

If you need any further information please do not hesitate to call or write.

On Jul 5, 2012, at 9:50 AM, Jones, William V., EMNRD wrote:

Thanks Mr. DRC !!

Jim Griswold says there will be a new brine well within ½ mile of this location.
Does Key anticipate that the mined salt will extend to this well's location or affect this well?

Q. Does Key anticipate that the mined salt will extend to this well's location or affect this well?

Answer: The quick and correct answer is no! This well is costing Key over 4 $million dollars to drill and develop. Included in the design is a strict limit on life of the well, i.e 20 years or a maximum radius of 150 ft whichever comes first. In addition, it will be the first brine well in New Mexico to have a hydrocarbon blanket which will protect the roof of the salt cavern. Also, this well will have oversized tubing (41/2) to accommodate the largest sonar tool available.

and will be sonar on a regular basis to capture the horizontal migration. In addition, this well will have a dynamic development profile where PB Energy will be moving the tubing strings constantly to prevent a preferential growth in a certain direction. The sonar results have been marginal at best in the past, that is because the agency did not require then until the well had 15-20 years of like and some of the anhydrite layers had already began to collapse preventing sonar entry. The Key well design is not anticipating any downhole collapses due to the way it will be developed and operated. Horizontal migrations from old brine wells have been noted to occur along the upper anhydrite layers where fresh water was injected causing some severe migration pathways. Key's well will not inject fresh water at the salt-anhydrite interface, but deep downhole in differnt locations which will prevent any horizonal migration.

Q. Please let me know the vertical depths that brine well will be completed in.

Answer: The brine well will be completed in the Castile Salt Formation from approximately 1300-1500 ft BGL. Also attached is a copy of the brine well Public Notice.

Q. and whether the owner of the brine well is also Key Energy Services, LLC.
If the owner's name is not Key Energy Services, LLC – probably should send a formal notice to that entity name.

Answer: The Owner of the Injection Well and Brine well are the same, Key Energy Services, LLC. We have notified ourselves.

From: David Catanach [mailto:drcatanach@netscape.com]
Sent: Wednesday, June 27, 2012 11:35 AM
To: Jones, William V., EMNRD
Cc: lmolleur@keyenergy.com; Ezeanyim, Richard, EMNRD; Brooks, David K., EMNRD; Shapard, Craig, EMNRD; Dade, Randy, EMNRD; Wayne Price
Subject: Re: Disposal application from Key Energy Services, LLC: Grace Carlsbad #1 30-015-20573 Brushy Canyon from 4082 to 5200 feet

Mr. Jones,

Pursuant to your request, please find the following responses:

Page 5 of the report included in the C-108 application entitled "Potential Horizons for Salt Water Disposal in the Delaware Mountain Group T-22S, R-26E, Section 36, Eddy County, New Mexico" states that the top of the Brushy Canyon at the Airport Grace Well No. 1, which is located approximately 1/2 mile west of the Grace Carlsbad No. 1, is at a depth of 4,082 feet and is approximately 1,148 feet thick. The top of the Bone Spring formation is at a depth of 5,230 feet.

Also, the Executive Summary of this geologic report (Page 1) states that: "The Brushy Canyon has no stratigraphic connection to the Capitan reef or older Goat seep reef rocks. The elevation of the upper contact of the Bone Spring Limestone across the Capitan reef front does not show displacement due to faulting that could potentially connect deep zones to Capitan".

If required, Key will perforate the 9 5/8" intermediate casing at a depth of 1,451' feet (current TOC by T.S.) and circulate cement to surface in accordance with a procedure approved by the Artesia District Office of the Division.

A copy of the C-108 application will be mailed to the BLM Carlsbad Field Office. A copy of the application has been hand-delivered to the City of Carlsbad.

If you have further questions, please advise.

David Catanach
Agent-Key Energy Services,

--- William.V.Jones@state.nm.us wrote:

From: "Jones, William V., EMNRD" <William.V.Jones@state.nm.us>
To: "drcatanach@netscape.com" <drcatanach@netscape.com>, "lmolleur@keyenergy.com" <lmolleur@keyenergy.com>
CC: "Ezeanyim, Richard, EMNRD" <richard.ezeanyim@state.nm.us>, "Brooks, David K., EMNRD" <david.brooks@state.nm.us>, "Shapard, Craig, EMNRD" <craig.shapard@state.nm.us>, "Dade, Randy, EMNRD" <Randy.Dade@state.nm.us>
Subject: Disposal application from Key Energy Services, LLC: Grace Carlsbad #1 30-015-20573 Brushy Canyon from 4082 to 5200 feet
Date: Mon, 18 Jun 2012 17:42:07 +0000

Hello,
Some feedback and requests,
Even though these entities probably know about this already, would you please send a certified copy of this application to both the City of Carlsbad and the BLM's CFO (Wesley Ingram).
Would you please ask a geologist pick the top of the Brushy Canyon and Bone Spring. This info may have been in the application and I missed it.
Please include plans to raise cement to surface on the intermediate casing (the BLM agrees with me on this).
This logically seems a good spot for disposal, but the near-Reef facies appear to be a bit unpredictable – that is troubling.
Very nice application.
Thank You,
William V Jones, P.E.
Engineering, Oil Conservation Division
1220 South St. Francis Drive, Santa Fe, NM 87505
Tel 505.476.3448 – Fax 505.476.3462

<image001.jpg>

Public Notice Letter

Legal notification to property owner(s) of the site per Water Quality Control Commission Regulations 20.6.2.3.108.B.3 NMAC

Certified Mail Return Receipt Requested:

Property Owner of Record:

Name:

Address:

City/County:

State:

Public Notice

Key Energy Services LLC, 6 Desta Drive Suite 4300 Midland, TX 79705, Dan Gibson Corporate Environmental Director, has filed an application with the New Mexico Oil Conservation Division (OCD) to install and operate a replacement class III brine well for its existing brine and fresh water station previously permitted by the OCD as BW-19. This well site will be located approximately 3 miles southwest of Carlsbad, New Mexico, Eddy County, in the Carlsbad ET Zone, located east of the airport and US highway 62-180. The portion of the land is actually part of the east side of the Old Carlsbad Army Airbase, currently used for commercial and industrial activity.

The existing water station and replacement brine well may be located within one-third mile (i.e. 1760 ft) from your property boundary or on your property. An aerial photo has been attached in this notification for your review.

The existing water station is located in (SE/4 NE/4 UL H of Section 36 -Township 22 South- Range 26 East) on private land. The new replacement brine well will be located approximately 1000 feet east of the existing facility in (SW/4 NW/4 UL E of Section 31-Township 22 South-Range 27 East) on private land.

Brine water is used in the Oil and Gas industry to supply a "heavy pure sodium chloride" concentrated salt water (i.e. brine water) with a total dissolved solids concentration of approximately 320,000 mg/l and a density that is 20% higher than fresh water. Heavy brine water is essential in preventing blow-outs in high pressure gas wells and prevents loss of circulation when drilling through salt zones typically found in the Carlsbad area.

Fresh water will be injected deep into the Castile salt formation at a depth ranging from 1300 to 1500 feet below the surface to produce brine water. The Castile formation is the same deep stable formation found under the WIPP site. The formation is known to contain a pure "Sodium" salt that is preferred in the oil and gas drilling operations. Other salts typically found, in the potash area, playa lakes and salt-water aquifers, can interfere with the drilling mud programs, thus causing significant control problems and added cost.

The Castile formation contains thick continuous anhydrite rock layers, that act a lot like natural concrete beams, that overly the targeted salt section. These layers have been identified and geo-engineering calculations show they will provide a natural support and barrier for the cavern created as a result of solution mining. An engineering model that included safety factors was developed to verify the long-term stability of the site.

The brine well will be designed to produce at a rate of less than 1700 barrels per day, which equates to approximately 12 million barrels of brine water over a 20-year life period. The anticipated cavern radius will be approximately 150 feet. The well has been located on private land to generally provide a minimum of 1000 feet separation from all existing significant features, such as houses, roads, utilities, pipelines, water supplies, buildings, schools, businesses, etc.

This site has no public water supplies that may be impacted, and ground water in this area is somewhat limited, with some dry holes being encountered while in other wells groundwater may be present, both in shallow lenses 30-60 feet deep and in deeper horizons i.e. 100-250 feet. The shallow groundwater in this area is typically not used for drinking water and when found is in very limited quantity. The deeper zone is considered usable as an irrigation water source, when sufficient quantities are found, with an average quality concentration of 500-2000 mg/l of total dissolved solids.

This facility will be designed and permitted to have no intentional water contaminants discharged to the surface or subsurface for the protection of groundwater. The system will have concrete and synthetic liners to prevent any spills or leaks from reaching the ground surface. The brine well will have double-cemented casing and tubing pipes to protect groundwater.

Key Energy has determined that bulk mixing of purchased pure salt is neither, economically feasible or environmentally safe. The volumes required during drilling programs cannot be met other than using brine caverns that can safely store large volumes of brine water.

If you have any questions or concerns please do not hesitate to contact Key Energy at the address above or you may contact Wayne Price 505-715-2809 or E-mail wayneprice77@earthlink.net. Key welcomes your input.

The New Mexico Oil Conservation Division (OCD) will accept comments and statements of interest regarding this application and will create a facility-specific mailing list for persons who wish to receive future notices. Interested persons may contact Jim Griswold, Oil Conservation Division (OCD) 505-476-3465 or by writing 1220 South Saint Francis, Santa Fe, New Mexico, 87505.

Para obtener más información sobre esta solicitud en espanol, sirvase comunicarse por favor: New Mexico Energy, Minerals and Natural Resources Department (Depto. Del Energia, Minerals y Recursos Naturales de Nuevo México), Oil Conservation Division (Depto. Conservacio´n Del Petróleo), 1220 South St. Francis Drive, Santa Fe, New México (Contacto: Dorothy Phillips, 505-476-3461)

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Jones, William V., EMNRD

From: Ingram, Wesley W [wingram@blm.gov]
Sent: Friday, July 06, 2012 4:39 PM
To: Jones, William V., EMNRD; Hawkins, Phil, EMNRD; Shapard, Craig, EMNRD
Subject: RE: Proposed disposal permit for Key: Grace Carlsbad Well No 1 near Carlsbad in Eddy County 30-015-20573

Will,

Proposed well is about 3 miles to the southeast of the Capitan Reef.

If I am understanding correctly, the Canyon perforations are still open. I did find a sundry where a plugging was to occur, but no subsequent to confirm that any of that was completed.

If there is not a plug for the Canyon perforations, the BLM would require that plug prior to cutting the casing. After cutting the casing and prior to perforating the 9-5/8" casing, the BLM would require a stub plug at the top of the cut casing, a plug at the top of the Wolfcamp and a plug at the top of the Bone Spring. Then the cementing of the 9-5/8" could commence.

I agree that if the casing/cementing conditions cannot be met, the permit terminates.

It would probably be beneficial to have a CBL on the 7" that would be installed if they get that far.

Sincerely,
Wesley W. Ingram
Supervisory Petroleum Engineer
Bureau of Land Management
Carlsbad Field Office
620 E. Greene Street
Phone: 575-234-5982
Fax: 575-234-5927

From: Jones, William V., EMNRD [mailto:William.V.Jones@state.nm.us]
Sent: Friday, July 06, 2012 9:31 AM
To: Hawkins, Phil, EMNRD; Ingram, Wesley W; Shapard, Craig, EMNRD
Subject: Proposed disposal permit for Key: Grace Carlsbad Well No 1 near Carlsbad in Eddy County 30-015-20573

This is a draft – asking for feedback on the special requirements (repairs to casing).

Injection Permit Checklist (11/15/2010)

WFX_____ PMX_____ SWD 1344 Permit Date 7/17/12 UIC Qtr (A/M/J)

\# Wells 1 Well Name(s): GRACE CARLSBAD #1

API Num: 30-0 15-20573 Spud Date: 2/72 New/Old: O (UIC primacy March 7, 1982)

Footages 1980 FSL / 660 FEL Unit I Sec 36 Tsp 22S Rge 26E County EDDY

General Location: 5 mi South of Carlsbad / 4 mi East of Reef

Operator: Key Energy Services LLC Contact Loran Molleur / DRC / Wayne Price

OGRID: 19797 RULE 5.9 Compliance (Wells) 1/11 (Finan Assur) OK IS 5.9 OK? OK

Well File Reviewed ___ Current Status: Sqzd Wo Morrow / Sqzd Strawn / (Open) Canyon

Planned Work to Well: SQZ 9 5/8, SQZ 7", PLUG BACK INJECT

Diagrams: Before Conversion ✓ After Conversion ✓ Elogs in Imaging File: Deep enough? → 7"?

Well Details:	Sizes Hole.......Pipe		Setting Depths	Stage Tool	Cement Sx or Cf	Determination Method
New __Existing __Surface	17	13 3/8	382'		~~382~~ 400sx	CIRC
New__Existing __Interm	12 1/4	9 5/8	5200'		1200sx	1451 TS
New__Existing __ LongSt	8 3/4	7	10727		336	8606 TS
New__Existing __ Liner						
New__Existing __ OpenHole						

Depths/Formations:	Depths, Ft.	Formation	Tops?	
Formation(s) Above	1870	Del	✓	
	4082	Brushy	✓	
Injection TOP:	4082'	Brushy C.	Max. PSI 816	OpenHole___ Perfs ✓
Injection BOTTOM:	5200'	" "	Tubing Size 3 1/2	Packer Depth 3982'
Formation(s) Below	5228	BS	✓	

~~Capitan Reef? ___ (Potash? ___ Noticed? ___)~~ [~~WIPP? ___ Noticed? ___~~] Salado Top/Bot underlain BY Castile ~~Cliff House?~~

Fresh Water: Depths: <500' Formation Pecos River Valley ALLUVIAM Wells? yes Analysis? ✓ Affirmative Statement ✓

Disposal Fluid Analysis? ✓ Sources: Commercial - Trucked

Disposal Interval: Analysis? ___ Production Potential/Testing:

Notice: Newspaper Date 5/15/12 Surface Owner SLO. Mineral Owner(s)

RULE 26.7(A) Affected Persons: See LIST

AOR: Maps? ✓ Well List? ✓ Producing in Interval? NO Wellbore Diagrams? ✓

.......Active Wells O Repairs? — WhichWells? —

.........P&A Wells ~~2~~ 1 Repairs? O Which Wells? —

Issues: Check Lower perfs for Prod. / Make Sure (2) Protection CSG is over

Request Sent _____ Reply: _____

NO PSI INCrease allowed.