

**APPLICATION FOR AUTHORIZATION TO INJECT**

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

II. OPERATOR: BTA Oil Producers

ADDRESS: 104 S. Pecos; Midland, TX 79701

CONTACT PARTY: Pam Inskeep PHONE: (915) 682-3753

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  No  
If yes, give the Division order number authorizing the project: \_\_\_\_\_  
NOTE: This location is in a potash area.

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.  
Well will be acidized with 3,000 gallons of 15% HCl acid.

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

\*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: Gayle Burleson TITLE: Production Engineer

SIGNATURE: Gayle Burleson DATE: 12/21/00

\* 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: \_\_\_\_\_

### 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, 2040 South Pacheco, Santa Fe, New Mexico 87505, within 15 days.

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

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**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.

BTA Oil Producers  
 Gem 8705 JV-P No. 3  
 660' FSL & 1980' FEL  
 Section 2, T20S, R33E  
 Lea County, New Mexico

Attachment A

III. Well Data

Section A:

1. Lease Name: Gem 8705 JV-P No. 3  
 Location: 660' FSL & 1980' FEL, Sec. 2, T20S, R33E, Lea County, NM  
 Note: Well is located in a potash area. (Michael Stogner advised to note this on the application.)
2. Casing and Cement

EXISTING

<u>Casing Size</u>	<u>Setting Depth</u>	<u>Sacks Cement</u>	<u>Hole Size</u>	<u>Top of Cement</u>
20"	1,385'	2100	26"	Circ to surface
13-3/8"	3,100'	2200	17-1/2"	Circ to surface
9-5/8"	5,426'	1600	12-1/4"	Circ to surface
5-1/2"	13,700'	2900	8-3/4"	Circ to surface

PROPOSED

<u>Casing Size</u>	<u>Setting Depth</u>	<u>Sacks Cement</u>	<u>Hole Size</u>	<u>Top of Cement</u>
20"	1,385'	2100	26"	Circ to surface
13-3/8"	3,100'	2200	17-1/2"	Circ to surface
9-5/8"	5,426'	1600	12-1/4"	Circ to surface
5-1/2"	13,700'	2900	8-3/4"	Circ to surface

3. Tubing: 2-7/8", 6.5# internally plastic coated, set at 7700'.
4. Packer: Arrowset II, set at 7700'.

Section B:

1. Injection Formation: Non-productive Delaware sand (Lower Brushy Canyon, tested wet)

Field or Pool Name: Teas (Delaware)

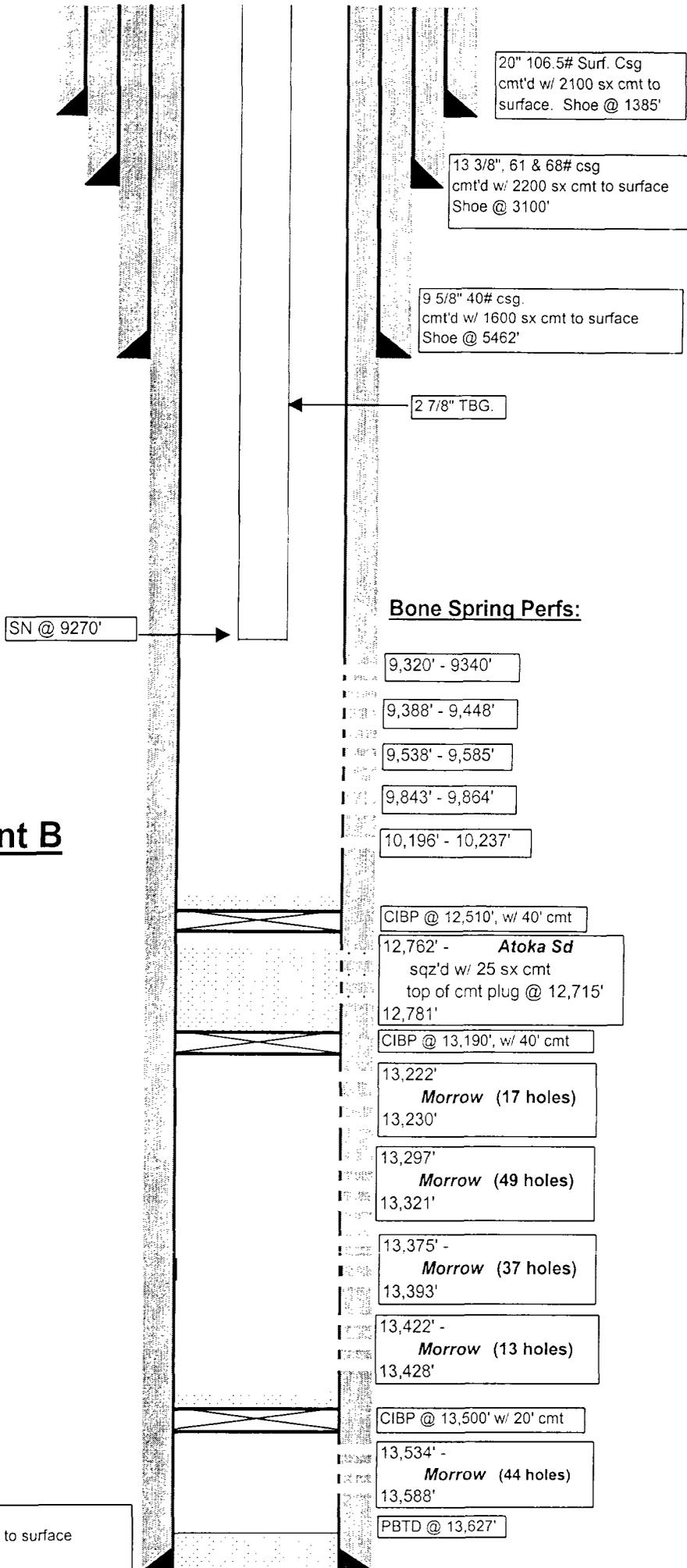
2. Injection Interval: 7743-8022'
3. Original purpose of well: Drilled to test Morrow Formation
4. Other perforated intervals, bridge plugs, cement plugs:
  - Morrow Perforations: 13,534-13,588' CIBP @ 13,500' w/20' cement
  - Morrow Perforations: 13,222-13,393' CIBP @ 13,190' w/40' cement
  - Atoka Sand Perforations: 12,762-12,781' Squeezed w/25 sacks cement; CIBP @ 12,550' w/40' cement
  - Bone Spring Perforations: 9320-9340' CIBP @ 9250' w/30' cement
  - 9388-9448'
  - 9538-9585'
  - 9843-9864'
  - 10196-10237'
5. Next higher oil & gas zone: Delaware (Price Sand at approximately 6600')  
 Next lower oil & gas zone: Bone Springs

See current and proposed wellbore schematic (Attachments B and C)

See Structural Cross-section (Attachment E) which identifies the offsetting productive Delaware interval at approximately -2950' subsea compared to the non-productive Delaware interval, the proposed disposal zone, approximately -3975' subsea.

### III. CURRENT WELLBORE SCHEMATIC

GEM 8705 JV-P, Well No. 3  
 660' FSL & 1980' FEL, SECTION 2, T20S, R33W  
 TEAS (BONE SPRINGS) FIELD  
 LEA COUNTY, NEW MEXICO



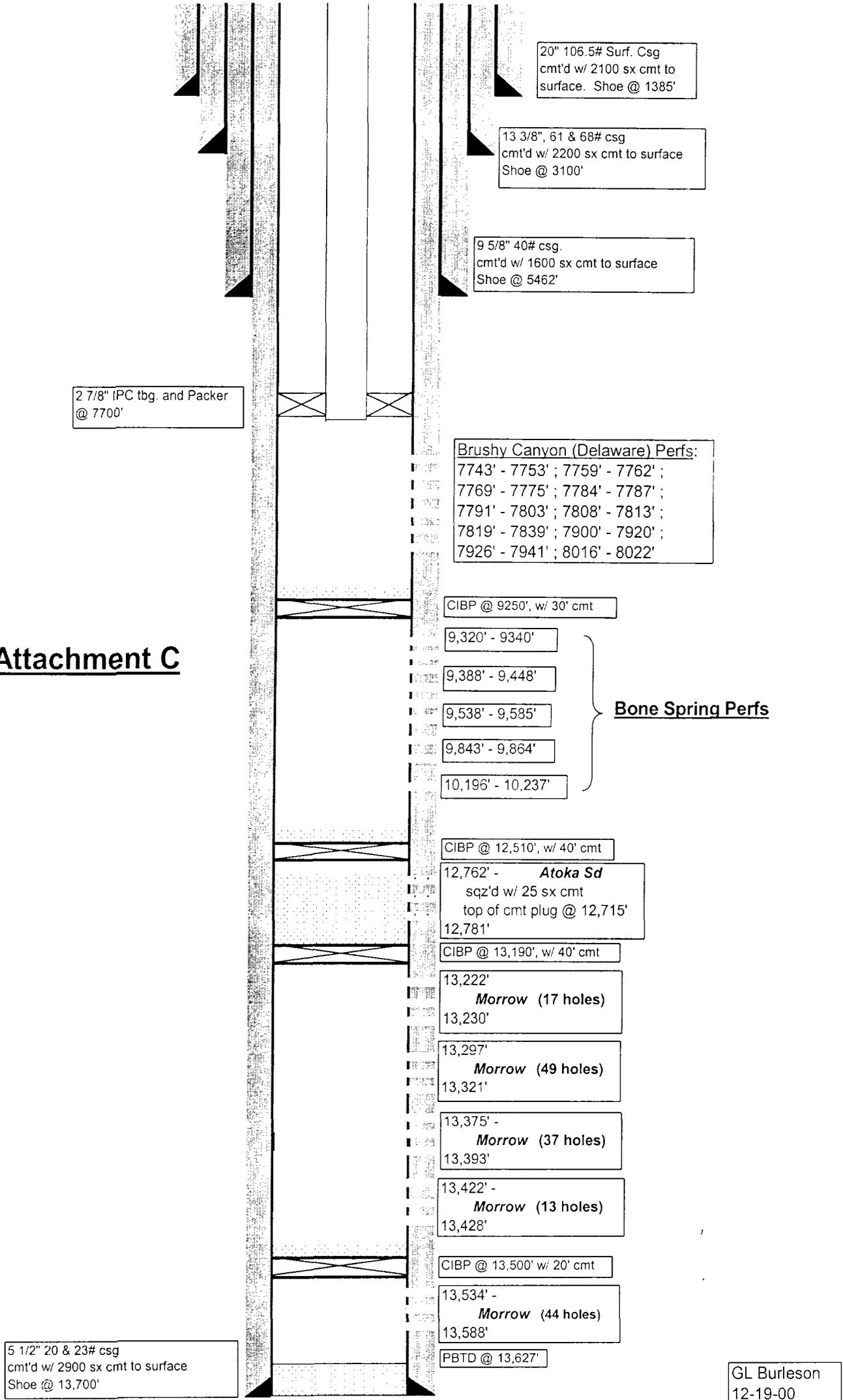
**Attachment B**

GL Burleson  
12-19-00

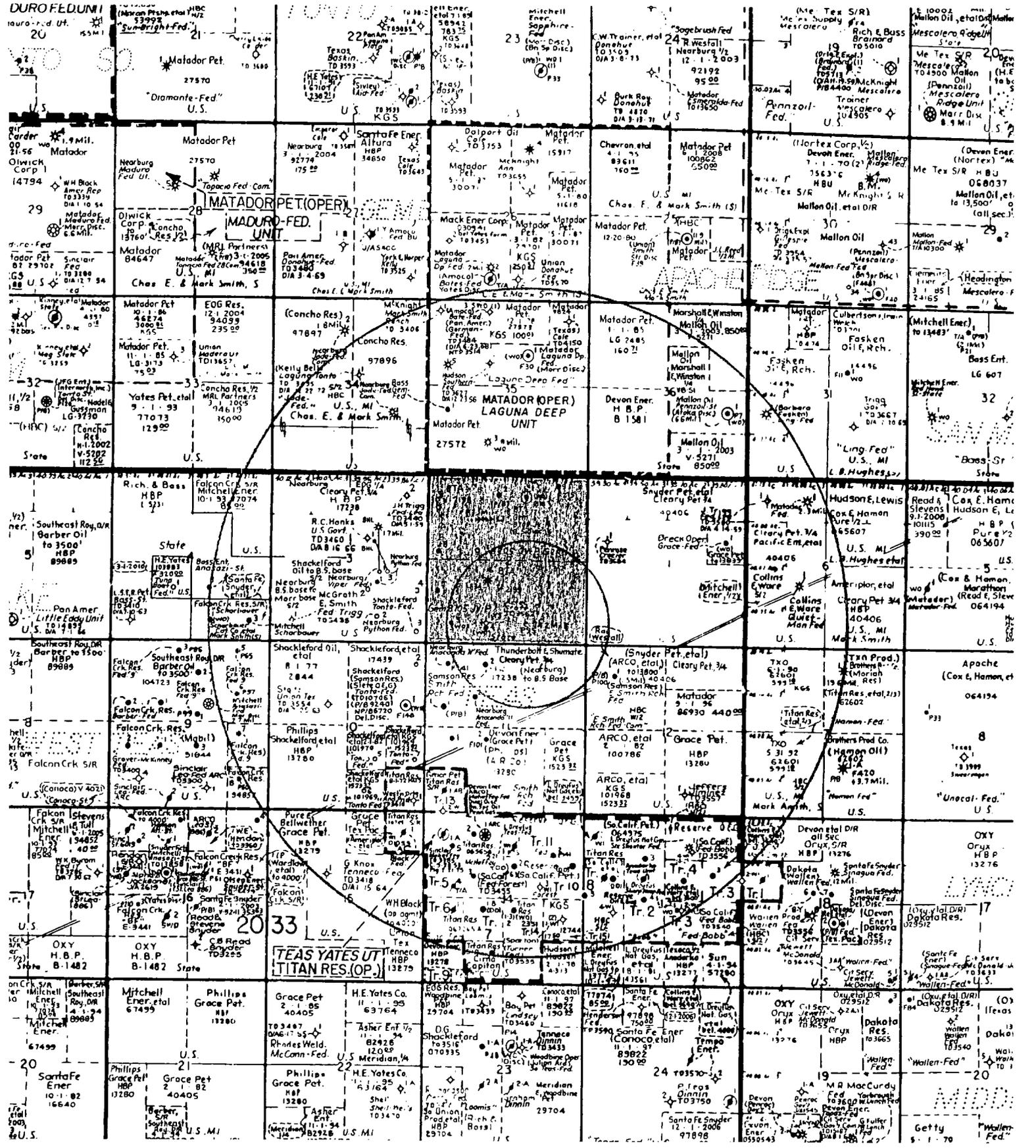
### III. PROPOSED SWD WELLBORE SCHEMATIC

GEM 8705 JV-P, Well No. 3  
 660' FSL & 1980' FEL, SECTION 2, T20S, R33W  
 TEAS (DELAWARE) FIELD  
 LEA COUNTY, NEW MEXICO

## Attachment C



GL Burleson  
 12-19-00



Attachment D

BTA Oil Producers – Gem 8705 JV-P No. 3  
Wells within 1/2 mile and 2 mile radius

**LARGE FORMAT  
EXHIBIT HAS  
BEEN REMOVED  
AND IS LOCATED  
IN THE NEXT FILE**

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

FORM APPROVED  
Budget Bureau No. 1004-0135  
Expires: March 31, 1993

**SUNDRY NOTICES AND REPORTS ON WELLS**

Do not use this form for proposals to drill or to deepen or reentry to a different reservoir.  
Use "APPLICATION FOR PERMIT—" for such proposals

**SUBMIT IN TRIPLICATE**

1. Type of Well  
 Oil Well     Gas Well     Other

2. Name of Operator  
Devon Energy Corporation (Nevada)

3. Address and Telephone No.  
20 North Broadway, Suite 1500, OKC, OK 73102-8260 (405) 235-3611

4. Location of Well (Footage, Sec., T., R., M., or Survey Description)  
2250' FSL & 2014' FWL, Section 11-20S-33E *Unit K*

5. Lease Designation and Serial No.  
NM 13280

6. If Indian, Allotment or Trust Name  
NA

7. If Unit or CA, Agreement Designation  
NA

8. Well Name and No.  
Smith Ranch "11" Fed #2

9. API Well No.  
30-025-31683

10. Field and Prod. or Exploratory Area  
Teas Bone Springs

11. County or Parish, State  
Lea County, NM

12. CHECK APPROPRIATE BOX(es) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION
<input type="checkbox"/> Notice of Intent	<input type="checkbox"/> Abandonment
<input checked="" type="checkbox"/> Subsequent Report	<input type="checkbox"/> Recompletion
<input type="checkbox"/> Final Abandonment Notice	<input type="checkbox"/> Plugging Back
	<input type="checkbox"/> Cement Repair
	<input type="checkbox"/> Altering Casing
	<input checked="" type="checkbox"/> Other <u>intermediate casing</u>
	<input type="checkbox"/> Change of Plans
	<input type="checkbox"/> New Construction
	<input type="checkbox"/> Non-Routine Fracturing
	<input type="checkbox"/> Water Shut-Off
	<input type="checkbox"/> Conversion to Injection
	<input type="checkbox"/> Dispose Water

(Note: Report results of multiple completions on Well Completion or Recompletion Report and Log form.)

13. Describe Proposed or Completed Operations (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all sections and zones pertinent to this work.)

Drilled 12 1/4" hole to 5077'.

08-18-93 Ran 8 5/8" csg as follows.

23 jts 8 5/8" 32# S80 8rd (1035')

97 jts 8 5/8" 32# J55 8rd (4030')

ECP & DV tool (12')

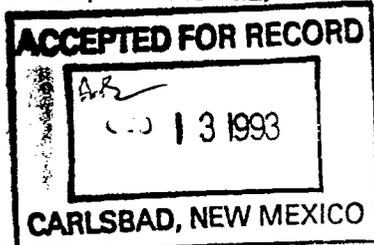
Float shoe at 5077', float collar at 4983.6', ECP at 3649', DV tool at 3605'.

08-18-93 Cemented 8 5/8" csg as follows.

1st stage: 510 sx Class C 65/35/6 (w/15#/sx salt, 1/4#/sx Celloflakes); mixed at 13.1 ppg= 1.91 yield. Tailed w/200 sx Class C (w/1/4#/sx Celloflakes, 2% CaCl<sub>2</sub>); mixed at 14.8 ppg= 1.32 yield. Circ'd 130 sx cement to pit.

2nd stage: 1700 sx Class C 65/35/6 (w/15#/sx salt, 1/4#/sx Celloflakes); mixed at 13.1 ppg= 1.91 yield. Tailed w/200 sx Class C (w/1/4#/sx Celloflakes, 2% CaCl<sub>2</sub>); mixed at 14.8 ppg= 1.32 yield. Circ'd 293 sx cement to pit.

Job complete at 2400 hrs 08-18-93.



RECEIVED  
AUG 27 11 26 AM '93  
CIVIL ENGINEERING

14. I hereby certify that the foregoing is true and correct

Signed E.L. Buttross, Jr.

Title E.L. Buttross, Jr.

District Engineer

Date 08/24/93

(This space for Federal or State office use)

Approved by \_\_\_\_\_

Title \_\_\_\_\_

Date \_\_\_\_\_

Conditions of approval, if any:

VI. AOR Well Data

Well Name	Operator	Location	Type of Well	Spud Date	Completion Date	TD PBTD	Completion Interval	Producing Formation	Casing Program		TOC	
									Casing Depth	Amt Cmt		
Gem 8705 #6	BTA Oil Producers	1980' FSL & 1980' FWL 2-20S-33E	Gas	08/05/1991	10/29/1991	13,640 13,400	13,116-13,126 13,246-13,316	Morrow	20"	1385	2200	Circ
									13-3/8"	3116	2200	Circ
									8-5/8"	5490	1700	4090'
Gem 8705 #5	BTA Oil Producers	660' FSL & 810' FWL 2-20S-33E	Oil	06/05/1991	09/07/1991	10,340 7,962	6,540-6,560	Delaware	5-1/2"	13640	2600	Circ
									20"	1400	2200	Circ
									13-3/8"	3100	2100	Circ
Gem 8705 #4	BTA Oil Producers	510' FSL & 1980' FWL 2-20S-33E	Oil	04/12/1991	06/01/1991	10,297 10,206	9,367-9,418 6,583-6,591	Delaware Bone Spring (commingled)	5-1/2"	10340	1500	5310'
									20"	1370	2100	Circ
									13-3/8"	3310	2200	Circ
Gem 8705 #1	BTA Oil Producers	660' FNL & 1980' FEL 2-20S-33E	Oil	06/07/1987	01/01/1991	13,700 10,230 RBP @ 6875'	6,592-6,599	Delaware	5-1/2"	10293	1500	Circ
									20"	1350	2200	Circ
									13-3/8"	3085	2150	Circ
Smith Ranch 11 Fed #2	Devon Energy	2250 FSL & 2014 FWL 11-20S-33E	Oil	07/29/1993	11/08/1993	9,520	9,410-9,474	Bone Spring	8-5/8"	4015	640	4300'
									5-1/2"	13700	3500	5800'
									13-3/8"	1400	Not	Not
State YS#1 *	Aztec Oil & Gas	660' FSL & 1980' FWL 2-20S-33E	P&A	10/28/1971	11/12/1971	3,562	3,460-3,562	Seven Rivers	8-5/8"	5077	Reported	Reported
									5-1/2"	9520		
									9-5/8"	1396	650	Surf*
									7"	3150	100	2291*

\*Note: This wellbore did not penetrate the proposed injection formation.

\* BTA calculated

**UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT**

SUBMIT IN DUPLICATE\*

(See other instructions on reverse side)

FOR APPROVED  
OMB NO. 1004-0137  
Expires: December 31, 1991

LEASE DESIGNATION AND SERIAL NO.

NM 13430

IF INDIAN ALLOTTEE OR TRIBE NAME

SHEPHERD UNIT 8 33

UNIT AGREEMENT NAME

8. FARM OR LEASE NAME, WELL NO.

Smith Ranch "11" Federal

9. APIWELLNO.

30-025-31683

10. FIELD AND POOL OR WILDCAT

Teas Bone Spring

11. SEC., T., R., M., OR BLOCK AND SURVEY OR AREA

Sec. 11-T20S-R33E

12. COUNTY OR PARISH  
Lea

13. STATE  
New Mexico

**WELL COMPLETION OR RECOMPLETION REPORT AND LOG\***

1. TYPE OF WELL: OIL WELL  GAS WELL  DRY  Other: None

2. TYPE OF COMPLETION: NEW WELL  WORK OVER  DEEP-EN  PLUG BACK  DIFF. CENVR  Other: None

3. NAME OF OPERATOR: Devon Energy Corporation (Nevada) *Copy logs received*

4. ADDRESS AND TELEPHONE NO.: 20 N. Broadway, Suite 1500, OKC, OK 73102-8260 405/235-3611

5. LOCATION OF WELL (Report location clearly and in accordance with any State requirements)\*

At surface 2250' FSL & 2014' FWL, Sec. 11-20S-33E, Unit X

At top prod. interval reported below

At total depth

14. PERMIT NO. DATE ISSUED

15. DATE SPUDDED: 07-29-93 16. DATE T.D. REACHED: 09-05-93 17. DATE COMPL. (Ready to prod.): 10-28-93 18. ELEVATIONS (DF, RNB, RT, GR, ETC.):\* GL 3582' 19. ELEV. CASINGHEAD

20. TOTAL DEPTH, MD & TVD: TD 9520' 21. PLUG. BACK T.D., MD & TVD: 9501' 22. IF MULTIPLE COMPL., HOW MANY? 23. INTERVALS DRILLED BY: ROTARY TOOLS: X CABLE TOOLS

24. PRODUCING INTERVAL(S) OF THIS COMPLETION—TOP, BOTTOM, NAME (MD AND TVD)\*: Bone Spring 9410-9474' 25. WAS DIRECTIONAL SURVEY MADE: no

26. TYPE ELECTRIC AND OTHER LOGS RUN: Compensated Neutron, Litho-Density/GR and Dual Laterlog/Micro SFL 27. WAS WELL CORRED: no

28. CASING RECORD (Report all strings set in well)

CASING SIZE GRADE	WEIGHT, LB./FT.	DEPTH SET (MD)	HOLE SIZE	TOP OF CEMENT, CEMENTING RECORD	AMOUNT PULLED
13 3/8"	54.5#	1400'	17 1/2"	surface	
8 5/8"	32#	5077'	12 1/4"	surface	
5 1/2"	17#	9520'	7 7/8"	1876'	

29. LINER RECORD					30. TUBING RECORD		
SIZE	TOP (MD)	BOTTOM (MD)	BACKS CEMENT*	SCREEN (MD)	SIZE	DEPTH SET (MD)	PACKER SET (MD)
					2 7/8"		9261'

31. PERFORATION RECORD (Interval, size and number)	32. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC.						
9410-9474' with 19 holes (.40")	<table border="1"> <thead> <tr> <th>DEPTH INTERVAL (MD)</th> <th>AMOUNT AND KIND OF MATERIAL USED</th> </tr> </thead> <tbody> <tr> <td>9410-9474'</td> <td>2000 gals 7 1/2% NeFe acid + 38 ball sealers</td> </tr> <tr> <td>9410-9474'</td> <td>50,000 gals 500 CO<sub>2</sub> foam + 40,000# 20/40 Interprop +</td> </tr> </tbody> </table>	DEPTH INTERVAL (MD)	AMOUNT AND KIND OF MATERIAL USED	9410-9474'	2000 gals 7 1/2% NeFe acid + 38 ball sealers	9410-9474'	50,000 gals 500 CO <sub>2</sub> foam + 40,000# 20/40 Interprop +
DEPTH INTERVAL (MD)	AMOUNT AND KIND OF MATERIAL USED						
9410-9474'	2000 gals 7 1/2% NeFe acid + 38 ball sealers						
9410-9474'	50,000 gals 500 CO <sub>2</sub> foam + 40,000# 20/40 Interprop +						

33. PRODUCTION 20,000# 20/40 StrataFlex RC sand

DATE FIRST PRODUCTION	PRODUCTION METHOD (Flowing, gas lift, pumping—size and type of pump)	WELL STATUS (Producing or shut-in)					
09-20-93	Flowing	Producing					
DATE OF TEST	HOURS TESTED	CHOKED SIZE	PROD'N FOR TEST PERIOD	OIL—BSL.	GAS—MCF.	WATER—BSL.	GAS-OIL RATIO
11-08-93	24	1"		101	150	33 BLW	1485/1
FLOW. TUBING PRESS.	CASING PRESSURE	CALCULATED 24-HOUR RATE	OIL—BSL.	GAS—MCF.	WATER—BSL.	OIL GRAVITY-API (CORR.)	
35			101	150	33 BLW	42°	

34. DISPOSITION OF GAS (Bald, used for fuel, vented, etc.): vented pending connection to pipeline TEST WITNESSED BY: *E.L. Buttress Jr.* Tube Handley

35. LIST OF ATTACHMENTS: Deviation Survey and logs

36. I hereby certify that the foregoing and attached information is complete and correct as determined from all available records  
SIGNED: *E.L. Buttress Jr.* TITLE: District Engineer DATE: 11-10-93

\*(See Instructions and Spaces for Additional Data on Reverse Side)

RECEIVED  
SEP 17 11 53 AM '93

UNITED STATES DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
N. M. OIL & GAS COMMISSION  
P. O. BOX 1900  
HOBBS, NEW MEXICO 88240

FORM APPROVED  
Budget Bureau No. 1004-0135  
Expires: March 31, 1993

**SUNDRY NOTICES AND REPORTS ON WELLS**

Do not use this form for proposals to drill or to deepen or reentry to a different reservoir.  
Use "APPLICATION FOR PERMIT—" for such proposals

**SUBMIT IN TRIPLICATE**

1. Type of Well

Oil Well  Gas Well  Other

2. Name of Operator

Devon Energy Corporation (Nevada)

3. Address and Telephone No.

20 N. Broadway, Suite 1500, OKC, OK 73102-8260 (405) 235-3611

4. Location of Well (Fence, Sec., T., R., M., or Survey Description)

2250' FSL & 2014' FWL, Section 11-20S-33E

5. Lease Designation and Serial No.

NM 13280

6. If Interm. Allottee or Trust Name

NA

7. If Unit or CA, Agreement Designation

NA

8. Well Name and No.

Smith Ranch "1" Fed. #2

9. API Well No.

30-025-31683

10. Field and Pool, or Exploratory Area

Teas Bone Springs

11. County or Parish, State

Lea County, NM

12. CHECK APPROPRIATE BOX(S) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION

Notice of Lease  
 Subsequent Report  
 Final Abandonment Notice

TYPE OF ACTION

Abandonment  
 Reoperation  
 Plugging Back  
 Casing Repair  
 Altering Casing  
 Other running production casing

Change of Plans  
 New Construction  
 Non-Routine Fracturing  
 Water Shut-Off  
 Conversion to Injection  
 Dispose Water

(Note: Report results of multiple completions on Well Completion or Abandonment Report and Log forms.)

13. Describe Proposed or Completed Operations (Clearly state all pertinent details, and give pertinent data, including estimated date of completion of operations, if well is discontinuously drilled, give subsurface locations and amount and true vertical depths for all intervals and zones pertinent to the work.)

TD 7 7/8" hole at 9520' on 09-05-93.

Ran 5 1/2" csg on 09-06-93 as follows.  
230 jts 5 1/2" 17# N80 8rd LT&C R3 csg (9545')  
float shoe at 9520', float collar at 9441', Weatherford ECP at 9359-9368', DV tool at 9027';

Cemented 5 1/2" csg on 09-07-93 as follows.  
1st stage: 140 sx Class H (w/1% FL62, 1% BA58, 2% A9, .2% CD32, .2% SMS, 1/4#/sx Celloflakes); mixed at 16.2 ppg (batch mixed)= 1.12 yield  
2nd stage: 225 sx Class H (w/22#/sx BA91, 4#/sx Fly ash, 1/4#/sx Celloflakes); mixed at 12.1 ppg= 2.01 yield  
tailed: 700 sx Class H (w/10#/sx BA91, .3% CD32, .6% FL-62, .2% SMS) + 2% KCl; mixed at 13.6 ppg= 1.82 yield

ACCEPTED FOR RECORD  
J. Lara  
OCT 12 1993  
CARLSBAD, NEW MEXICO

14. I hereby certify that the foregoing is true and correct

Signed E.L. Buttross, Jr.

Title District Engineer

Date 09-13-93 /cg

(This space for Federal or State office use)

Approved by \_\_\_\_\_  
Comments of approved, if any:

Title \_\_\_\_\_

Date \_\_\_\_\_

BTA Oil Producers  
Gem 8705 JV-P No. 3  
660' FSL & 1980' FEL  
Section 2, T20S, R33E  
Lea County, New Mexico

## VII. Operation Data

1. Proposed average daily injection volume: 750 BWPD  
Proposed maximum daily injection volume: 2,000 BWPD
2. This will be a closed system.
3. Proposed average daily injection pressure: 1000 psi  
Proposed maximum daily injection pressure: 1500 psi
4. Sources of injection water will be produced water from area Delaware and Bone Springs producers that have been drilled on the Gem 8705 JV-P lease (see list of source wells, Attachment G). A water analysis from each Delaware and Bone Springs production (see Attachment H1, H2, & H3) is attached.

BTA Oil Producers  
Gem 8705 JV-P No. 3  
660' FSL & 1980' FEL  
Section 2, T20S, R33E  
Lea County, New Mexico

Attachment G

VII. Item 4.

List of Produced Water Source Wells:

Gem 9805 JV-P Lease: Section 2, T20S, R33E, Lea County, New Mexico  
Wells No. 1, 2, 4, 5, 6, 7, 8, 9 and any future wells drilled in this section.

# Pro-Kem, Inc.

## WATER ANALYSIS REPORT

### SAMPLE

Oil Co. : BTA Oil Producers  
 Lease : Gem  
 Well No. : # 1  
 Lab No. : F:\ANALYSES\Nov2900.001

Sample Loc. :  
 Date Analyzed: 29-November-2000  
 Date Sampled : 15-November-2000

### ANALYSIS

1. pH 5.840
2. Specific Gravity 60/60 F. 1.188
3. CaCO<sub>3</sub> Saturation Index @ 80 F. +1.767  
 @ 140 F. +3.017

#### Dissolved Gasses

	MG/L	EQ. WT.	*MEQ/L
4. Hydrogen Sulfide	0		
5. Carbon Dioxide	170		
6. Dissolved Oxygen	Not Determined		

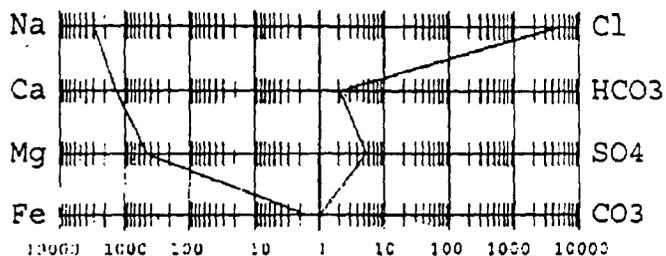
#### Cations

7. Calcium (Ca <sup>++</sup> )	26,731	/ 20.1 =	1,329.90
8. Magnesium (Mg <sup>++</sup> )	5,246	/ 12.2 =	430.00
9. Sodium (Na <sup>+</sup> ) (Calculated)	66,548	/ 23.0 =	2,893.39
10. Barium (Ba <sup>++</sup> )	Below 10		

#### Anions

11. Hydroxyl (OH <sup>-</sup> )	0	/ 17.0 =	0.00
12. Carbonate (CO <sub>3</sub> <sup>=</sup> )	0	/ 30.0 =	0.00
13. Bicarbonate (HCO <sub>3</sub> <sup>-</sup> )	122	/ 61.1 =	2.00
14. Sulfate (SO <sub>4</sub> <sup>=</sup> )	245	/ 48.8 =	5.02
15. Chloride (Cl <sup>-</sup> )	164,963	/ 35.5 =	4,646.85
16. Total Dissolved Solids	263,855		
17. Total Iron (Fe)	26	/ 18.2 =	1.43
18. Total Hardness As CaCO <sub>3</sub>	88,351		
19. Resistivity @ 75 F. (Calculated)	0.001 /cm.		

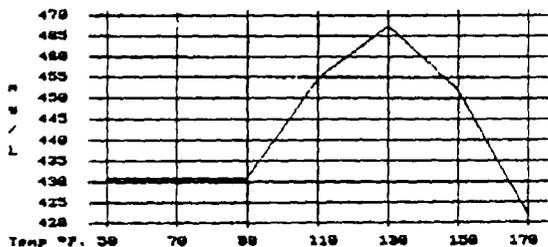
#### LOGARITHMIC WATER PATTERN \*meq/L.



#### PROBABLE MINERAL COMPOSITION COMPOUND EQ. WT. X \*meq/L = mg/L.

Ca(HCO <sub>3</sub> ) <sub>2</sub>	81.04	2.00	162
CaSO <sub>4</sub>	68.07	5.02	342
CaCl <sub>2</sub>	55.50	1,322.88	73,420
Mg(HCO <sub>3</sub> ) <sub>2</sub>	73.17	0.00	0
MgSO <sub>4</sub>	60.19	0.00	0
MgCl <sub>2</sub>	47.62	430.00	20,477
NaHCO <sub>3</sub>	84.00	0.00	0
NaSO <sub>4</sub>	71.03	0.00	0
NaCl	58.46	2,893.96	169,181

#### Calcium Sulfate Solubility Profile



This water is somewhat corrosive due to the pH observed on analysis. The corrosivity is increased by the content of mineral salts, and the presence of CO<sub>2</sub> in solution.

# Pro-Kem, Inc.

## WATER ANALYSIS REPORT

### SAMPLE

Oil Co. : BTA Oil Producers  
 Lease : Gem  
 Well No. : # 2  
 Lab No. : F:\ANALYSES\Nov2900.001

Sample Loc. :  
 Date Analyzed: 29-November-2000  
 Date Sampled : 15-November-2000

### ANALYSIS

1. pH 6.370
2. Specific Gravity 60/60 F. 1.101
3. CaCO<sub>3</sub> Saturation Index @ 80 F. -0.152  
 @ 140 F. +0.738

#### Dissolved Gasses

	MG/L	EQ. WT.	*MEQ/L
4. Hydrogen Sulfide	0		
5. Carbon Dioxide	190		
6. Dissolved Oxygen	Not Determined		

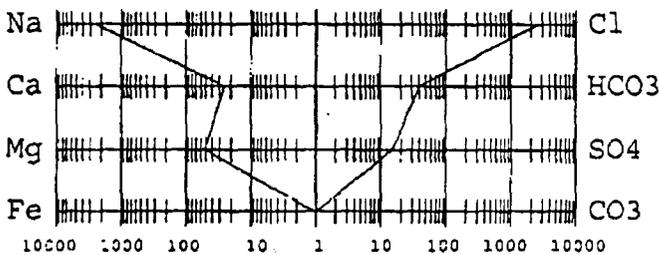
#### Cations

7. Calcium (Ca <sup>++</sup> )	491	/ 20.1 =	24.43
8. Magnesium (Mg <sup>++</sup> )	596	/ 12.2 =	48.85
9. Sodium (Na <sup>+</sup> ) (Calculated)	54,607	/ 23.0 =	2,374.22
10. Barium (Ba <sup>++</sup> )	Not Determined		

#### Anions

11. Hydroxyl (OH <sup>-</sup> )	0	/ 17.0 =	0.00
12. Carbonate (CO <sub>3</sub> <sup>=</sup> )	0	/ 30.0 =	0.00
13. Bicarbonate (HCO <sub>3</sub> <sup>-</sup> )	2,270	/ 61.1 =	37.15
14. Sulfate (SO <sub>4</sub> <sup>=</sup> )	700	/ 48.8 =	14.34
15. Chloride (Cl <sup>-</sup> )	84,981	/ 35.5 =	2,393.83
16. Total Dissolved Solids	143,645		
17. Total Iron (Fe)	19	/ 18.2 =	1.02
18. Total Hardness As CaCO <sub>3</sub>	3,681		
19. Resistivity @ 75 F. (Calculated)	0.045	/cm.	

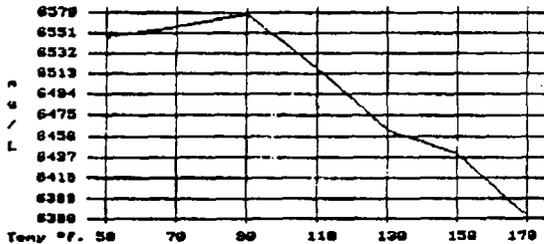
#### LOGARITHMIC WATER PATTERN \*meq/L.



#### PROBABLE MINERAL COMPOSITION COMPOUND EQ. WT. X \*meq/L = mg/L.

Ca (HCO <sub>3</sub> ) <sub>2</sub>	81.04	24.43	1,980
CaSO <sub>4</sub>	68.07	0.00	0
CaCl <sub>2</sub>	55.50	0.00	0
Mg (HCO <sub>3</sub> ) <sub>2</sub>	73.17	12.72	931
MgSO <sub>4</sub>	60.19	14.34	863
MgCl <sub>2</sub>	47.62	21.78	1,037
NaHCO <sub>3</sub>	84.00	0.00	0
NaSO <sub>4</sub>	71.03	0.00	0
NaCl	58.46	2,372.05	138,670

#### Calcium Sulfate Solubility Profile



\*Milli Equivalents per Liter

This water is slightly corrosive due to the pH observed on analysis. The corrosivity is increased by the content of mineral salts, and the presence of, CO<sub>2</sub> in solution.

# Pro-Kem, Inc.

## WATER ANALYSIS REPORT

### SAMPLE

Oil Co. : BTA Oil Producers  
 Lease : Gem  
 Well No. : # 4  
 Lab No. : F:\ANALYSES\Nov2900.001

Sample Loc. :  
 Date Analyzed: 29-November-2000  
 Date Sampled : 15-November-2000

### ANALYSIS

- 1. pH 5.710
- 2. Specific Gravity 60/60 F. 1.188
- 3. CaCO<sub>3</sub> Saturation Index @ 80 F. +1.681  
 @ 140 F. +3.061

#### Dissolved Gasses

	MG/L	EQ. WT.	*MEQ/L
4. Hydrogen Sulfide	0		
5. Carbon Dioxide	280		
6. Dissolved Oxygen	Not Determined		

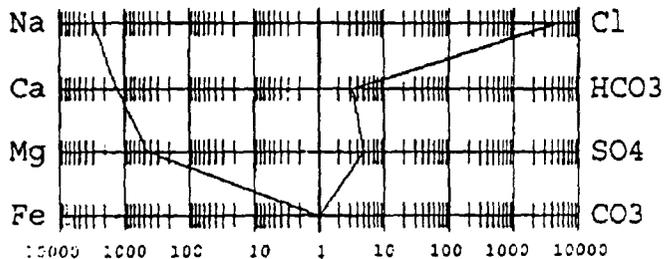
#### Cations

7. Calcium (Ca <sup>++</sup> )	25,060	20.0 =	1,245.77
8. Magnesium (Mg <sup>++</sup> )	5,057	12.2 =	415.33
9. Sodium (Na <sup>+</sup> ) (Calculated)	66,876	23.0 =	2,907.65
10. Barium (Ba <sup>++</sup> )	Below 10		

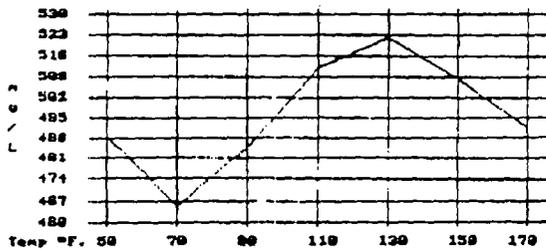
#### Anions

11. Hydroxyl (OH <sup>-</sup> )	0	17.0 =	0.00
12. Carbonate (CO <sub>3</sub> <sup>=</sup> )	0	30.0 =	0.00
13. Bicarbonate (HCO <sub>3</sub> <sup>-</sup> )	195	61.1 =	3.19
14. Sulfate (SO <sub>4</sub> <sup>=</sup> )	225	48.8 =	4.61
15. Chloride (Cl <sup>-</sup> )	161,963	35.5 =	4,562.34
16. Total Dissolved Solids	259,386		
17. Total Iron (Fe)	8	18.2 =	0.44
18. Total Hardness As CaCO <sub>3</sub>	83,442		
19. Resistivity @ 75 F. (Calculated)	0.001/cm.		

#### LOGARITHMIC WATER PATTERN \*meq/L.



#### Calcium Sulfate Solubility Profile



#### PROBABLE MINERAL COMPOSITION COMPOUND EQ. WT. X \*meq/L = mg/L.

Ca (HCO <sub>3</sub> ) <sub>2</sub>	81.04	3.19	259
CaSO <sub>4</sub>	68.07	4.61	314
CaCl <sub>2</sub>	55.50	1,238.96	68,763
Mg (HCO <sub>3</sub> ) <sub>2</sub>	73.17	0.00	0
MgSO <sub>4</sub>	60.19	0.00	0
MgCl <sub>2</sub>	47.62	415.33	19,778
NaHCO <sub>3</sub>	84.00	0.00	0
NaSO <sub>4</sub>	71.03	0.00	0
NaCl	58.46	2,908.05	170,004

\*Milli Equivalents per Liter

This water is somewhat corrosive due to the pH observed on analysis. The corrosivity is increased by the content of mineral salts, and the presence of CO<sub>2</sub> in solution.

# Pro-Kem, Inc.

## WATER ANALYSIS REPORT

### SAMPLE

Oil Co. : BTA Oil Producers  
 Lease : Gem  
 Well No. : # 5  
 Lab No. : F:\ANALYSES\Nov2900.001

Sample Loc. :  
 Date Analyzed: 29-November-2000  
 Date Sampled : 15-November-2000

### ANALYSIS

1. pH 6.070
2. Specific Gravity 60/60 F. 1.193
3. CaCO<sub>3</sub> Saturation Index @ 80 F. +1.781  
 @ 140 F. +3.031

#### Dissolved Gasses

	MG/L	EQ. WT.	*MEQ/L
4. Hydrogen Sulfide	0		
5. Carbon Dioxide	370		
6. Dissolved Oxygen	Not Determined		

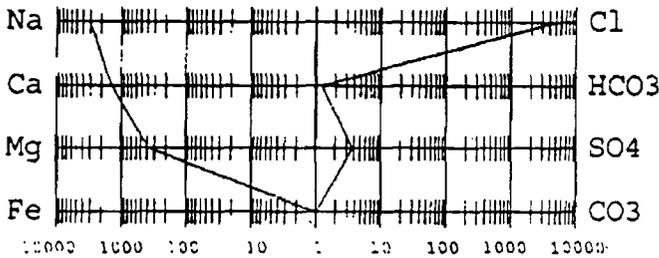
#### Cations

7. Calcium (Ca <sup>++</sup> )	27,026	/ 20.1 =	1,344.58
8. Magnesium (Mg <sup>++</sup> )	4,471	/ 12.2 =	366.48
9. Sodium (Na <sup>+</sup> ) (Calculated)	67,623	/ 23.0 =	2,940.13
10. Barium (Ba <sup>++</sup> )	Below 10		

#### Anions

11. Hydroxyl (OH <sup>-</sup> )	0	/ 17.0 =	0.00
12. Carbonate (CO <sub>3</sub> <sup>=</sup> )	0	/ 30.0 =	0.00
13. Bicarbonate (HCO <sub>3</sub> <sup>-</sup> )	73	/ 61.1 =	1.19
14. Sulfate (SO <sub>4</sub> <sup>=</sup> )	175	/ 48.8 =	3.59
15. Chloride (Cl <sup>-</sup> )	164,963	/ 35.5 =	4,646.85
16. Total Dissolved Solids	264,331		
17. Total Iron (Fe)	17	/ 18.2 =	0.93
18. Total Hardness As CaCO <sub>3</sub>	85,897		
19. Resistivity @ 75 F. (Calculated)	0.001 /cm.		

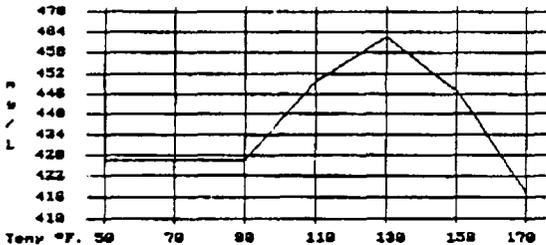
#### LOGARITHMIC WATER PATTERN \*meq/L.



#### PROBABLE MINERAL COMPOSITION COMPOUND EQ. WT. X \*meq/L = mg/L.

Ca(HCO <sub>3</sub> ) <sub>2</sub>	81.04	1.19	97
CaSO <sub>4</sub>	68.07	3.59	244
CaCl <sub>2</sub>	55.50	1,339.80	74,359
Mg(HCO <sub>3</sub> ) <sub>2</sub>	73.17	0.00	0
MgSO <sub>4</sub>	60.19	0.00	0
MgCl <sub>2</sub>	47.62	366.48	17,452
NaHCO <sub>3</sub>	84.00	0.00	0
NaSO <sub>4</sub>	71.03	0.00	0
NaCl	58.46	2,940.57	171,906

#### Calcium Sulfate Solubility Profile



\*Milli Equivalents per Liter

This water is slightly corrosive due to the pH observed on analysis. The corrosivity is increased by the content of mineral salts, and the presence of, CO<sub>2</sub> in solution.

# Pro-Kem, Inc.

## WATER ANALYSIS REPORT

### SAMPLE

Oil Co. : BTA Oil Producers  
 Lease : Gem  
 Well No. : # 7  
 Lab No. : F:\ANALYSES\Nov2900.002

Sample Loc. :  
 Date Analyzed: 29-November-2000  
 Date Sampled : 15-November-2000

### ANALYSIS

1. pH 6.070
2. Specific Gravity 60/60 F. 1.188
3. CaCO<sub>3</sub> Saturation Index @ 80 F. +1.423  
 @ 140 F. +2.673

#### Dissolved Gasses

	MG/L	EQ. WT.	*MEQ/L
4. Hydrogen Sulfide	0		
5. Carbon Dioxide	140		
6. Dissolved Oxygen	Not Determined		

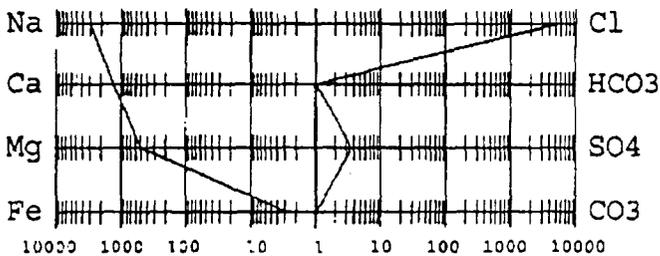
#### Cations

7. Calcium (Ca <sup>++</sup> )	25,060	/ 20.1 =	1,246.77
8. Magnesium (Mg <sup>++</sup> )	5,663	/ 12.2 =	464.18
9. Sodium (Na <sup>+</sup> ) (Calculated)	67,605	/ 23.0 =	2,939.35
10. Barium (Ba <sup>++</sup> )	10	/ 68.7 =	0.15

#### Anions

11. Hydroxyl (OH <sup>-</sup> )	0	/ 17.0 =	0.00
12. Carbonate (CO <sub>3</sub> <sup>=</sup> )	0	/ 30.0 =	0.00
13. Bicarbonate (HCO <sub>3</sub> <sup>-</sup> )	34	/ 61.1 =	0.56
14. Sulfate (SO <sub>4</sub> <sup>=</sup> )	165	/ 48.8 =	3.38
15. Chloride (Cl <sup>-</sup> )	164,963	/ 35.5 =	4,646.85
16. Total Dissolved Solids	263,500		
17. Total Iron (Fe)	45	/ 18.2 =	2.47
18. Total Hardness As CaCO <sub>3</sub>	85,897		
19. Resistivity @ 75 F. (Calculated)	0.001 /cm.		

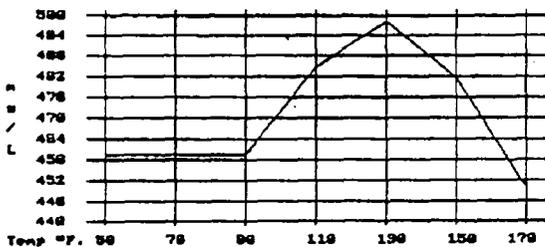
#### LOGARITHMIC WATER PATTERN



#### PROBABLE MINERAL COMPOSITION

COMPOUND	EQ. WT.	X	*meq/L = mg/L.
Ca(HCO <sub>3</sub> ) <sub>2</sub>	81.04	0.56	45
CaSO <sub>4</sub>	68.07	3.24	220
CaCl <sub>2</sub>	55.50	1,242.97	68,985
Mg(HCO <sub>3</sub> ) <sub>2</sub>	73.17	0.00	0
MgSO <sub>4</sub>	60.19	0.00	0
MgCl <sub>2</sub>	47.62	464.18	22,104
NaHCO <sub>3</sub>	84.00	0.00	0
NaSO <sub>4</sub>	71.03	0.00	0
NaCl	58.46	2,939.69	171,854

#### Calcium Sulfate Solubility Profile



\*Milli Equivalents per Liter

This water is slightly corrosive due to the pH observed on analysis. The corrosivity is increased by the content of mineral salts, and the presence of, CO<sub>2</sub> in solution.

# Pro-Kem, Inc.

## WATER ANALYSIS REPORT

### SAMPLE

Oil Co. : BTA Oil Producers  
 Lease : Gem  
 Well No. : # 8  
 Lab No. : F:\ANALYSES\Nov2900.002

Sample Loc. :  
 Date Analyzed: 29-November-2000  
 Date Sampled : 15-November-2000

### ANALYSIS

1. pH 6.030
2. Specific Gravity 60/60 F. 1.153
3. CaCO<sub>3</sub> Saturation Index @ 80 F. +1.280  
 @ 140 F. +2.890

#### Dissolved Gasses

	MG/L	EQ. WT.	*MEQ/L
4. Hydrogen Sulfide	0		
5. Carbon Dioxide	360		
6. Dissolved Oxygen	Not Determined		

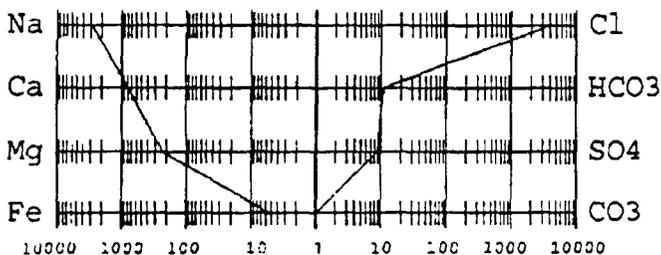
#### Cations

7. Calcium (Ca <sup>++</sup> )	15,724	/ 20.1 =	782.29
8. Magnesium (Mg <sup>++</sup> )	2,683	/ 12.2 =	219.92
9. Sodium (Na <sup>+</sup> ) (Calculated)	64,840	/ 23.0 =	2,819.13
10. Barium (Ba <sup>++</sup> )	Not Determined		

#### Anions

11. Hydroxyl (OH <sup>-</sup> )	0	/ 17.0 =	0.00
12. Carbonate (CO <sub>3</sub> <sup>=</sup> )	0	/ 30.0 =	0.00
13. Bicarbonate (HCO <sub>3</sub> <sup>-</sup> )	635	/ 61.1 =	10.39
14. Sulfate (SO <sub>4</sub> <sup>=</sup> )	400	/ 48.8 =	8.20
15. Chloride (Cl <sup>-</sup> )	134,970	/ 35.5 =	3,801.97
16. Total Dissolved Solids	219,252		
17. Total Iron (Fe)	93	/ 18.2 =	5.11
18. Total Hardness As CaCO <sub>3</sub>	50,311		
19. Resistivity @ 75 F. (Calculated)	0.001 /cm.		

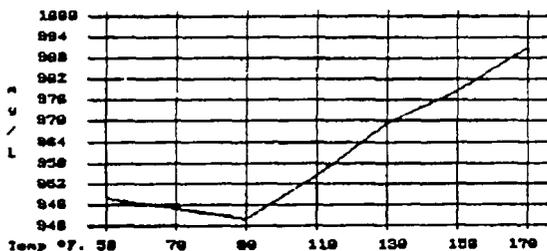
#### LOGARITHMIC WATER PATTERN \*meq/L.



#### PROBABLE MINERAL COMPOSITION COMPOUND EQ. WT. X \*meq/L = mg/L.

Ca (HCO <sub>3</sub> ) <sub>2</sub>	81.04	10.39	842
CaSO <sub>4</sub>	68.07	8.20	558
CaCl <sub>2</sub>	55.50	763.70	42,385
Mg (HCO <sub>3</sub> ) <sub>2</sub>	73.17	0.00	0
MgSO <sub>4</sub>	60.19	0.00	0
MgCl <sub>2</sub>	47.62	219.92	10,472
NaHCO <sub>3</sub>	84.00	0.00	0
NaSO <sub>4</sub>	71.03	0.00	0
NaCl	58.46	2,818.35	164,761

#### Calcium Sulfate Solubility Profile



\*Milli Equivalents per Liter

water is slightly corrosive due to the pH observed on analysis.  
 Corrosivity is increased by the content of mineral salts, and the presence  
 of CO<sub>2</sub> in solution.

# Pro-Kem, Inc.

## WATER ANALYSIS REPORT

### SAMPLE

Oil Co. : BTA Oil Producers  
 Lease : Gem  
 Well No. : # 9  
 Lab No. : F:\ANALYSES\Nov2900.002

Sample Loc. :  
 Date Analyzed: 29-November-2000  
 Date Sampled : 15-November-2000

### ANALYSIS

1. pH 6.570
2. Specific Gravity 60/60 F. 1.093
3. CaCO<sub>3</sub> Saturation Index @ 80 F. +0.201  
 @ 140 F. +1.091

#### Dissolved Gasses

	MG/L	EQ. WT.	*MEQ/L
4. Hydrogen Sulfide	0		
5. Carbon Dioxide	600		
6. Dissolved Oxygen	Not Determined		

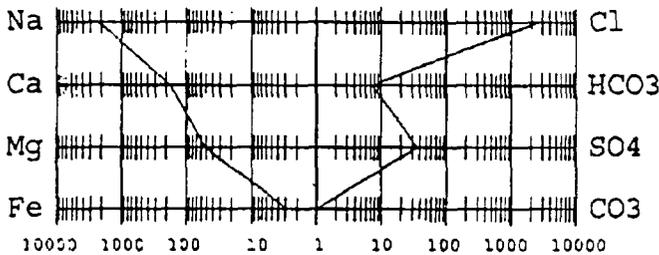
#### Cations

7. Calcium (Ca <sup>++</sup> )	3,440	/ 20.1 =	171.14
8. Magnesium (Mg <sup>++</sup> )	596	/ 12.2 =	48.85
9. Sodium (Na <sup>+</sup> ) (Calculated)	50,985	/ 23.0 =	2,216.74
10. Barium (Ba <sup>++</sup> )	Not Determined		

#### Anions

11. Hydroxyl (OH <sup>-</sup> )	0	/ 17.0 =	0.00
12. Carbonate (CO <sub>3</sub> <sup>=</sup> )	0	/ 30.0 =	0.00
13. Bicarbonate (HCO <sub>3</sub> <sup>-</sup> )	430	/ 61.1 =	7.04
14. Sulfate (SO <sub>4</sub> <sup>=</sup> )	1,650	/ 48.8 =	33.81
15. Chloride (Cl <sup>-</sup> )	84,981	/ 35.5 =	2,393.83
16. Total Dissolved Solids	142,082		
17. Total Iron (Fe)	50	/ 18.2 =	2.75
18. Total Hardness As CaCO <sub>3</sub>	11,044		
19. Resistivity @ 75 F. (Calculated)	0.046 /cm.		

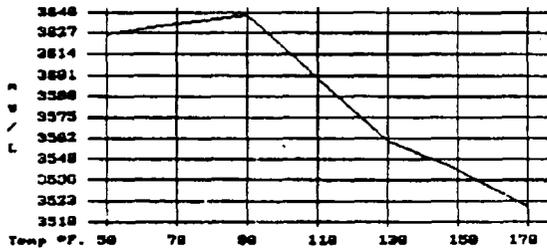
#### LOGARITHMIC WATER PATTERN \*meq/L.



#### PROBABLE MINERAL COMPOSITION COMPOUND EQ. WT. X \*meq/L = mg/L.

Ca (HCO <sub>3</sub> ) <sub>2</sub>	81.04	7.04	570
CaSO <sub>4</sub>	68.07	33.81	2,302
CaCl <sub>2</sub>	55.50	130.30	7,231
Mg (HCO <sub>3</sub> ) <sub>2</sub>	73.17	0.00	0
MgSO <sub>4</sub>	60.19	0.00	0
MgCL <sub>2</sub>	47.62	48.85	2,326
NaHCO <sub>3</sub>	84.00	0.00	0
NaSO <sub>4</sub>	71.03	0.00	0
NaCl	58.46	2,214.68	129,470

#### Calcium Sulfate Solubility Profile



\*Milli Equivalents per Liter

This water is slightly corrosive due to the pH observed on analysis. The corrosivity is increased by the content of mineral salts, and the presence of, CO<sub>2</sub> in solution.

Comparison Between Two Waters

19-May-2000

TO: Pro-Kem, Inc.

Company : BTA Oil Producers

**Sample # 1**

Gem # 3 (Bone Springs Wtr)

**Sample # 2**

Gem # 4 (Delaware Wtr)

Percent of #1 & #2	pH	TDS mg/L	SpGr	Saturation Index @80°F.	Saturation Index @140°F.	Calcium Sulfate Scaling Potential
100 - 0	6.690	143203	1.100	+0.352	+1.176	Nil
95 - 5	6.654	148865	1.104	+0.704	+1.537	Nil
90 - 10	6.618	154528	1.109	+0.884	+1.727	Nil
85 - 15	6.582	160190	1.113	+1.002	+1.855	Nil
80 - 20	6.546	165852	1.118	+1.087	+1.949	Nil
75 - 25	6.510	171515	1.122	+1.151	+2.023	Nil
70 - 30	6.474	177177	1.126	+1.200	+2.082	Nil
65 - 35	6.438	182839	1.131	+1.237	+2.129	Marginal
60 - 40	6.402	188502	1.135	+1.266	+2.168	Marginal
55 - 45	6.366	194164	1.140	+1.287	+2.198	Marginal
50 - 50	6.330	199827	1.144	+1.300	+2.222	Marginal
45 - 55	6.294	205489	1.148	+1.308	+2.239	Marginal
40 - 60	6.258	211151	1.153	+1.308	+2.249	Marginal
35 - 65	6.222	216814	1.157	+1.302	+2.252	Marginal
30 - 70	6.186	222476	1.162	+1.288	+2.248	Marginal
25 - 75	6.150	228138	1.166	+1.266	+2.236	Nil
20 - 80	6.114	233801	1.170	+1.234	+2.214	Nil
15 - 85	6.078	239463	1.175	+1.189	+2.178	Nil
10 - 90	6.042	245125	1.179	+1.126	+2.126	Nil
5 - 95	6.006	250788	1.184	+1.038	+2.048	Nil
0 - 100	5.970	256450	1.188	+0.907	+1.926	Nil

Proposed Disposal Source Water for the Gem 8705 JV-P No. 3

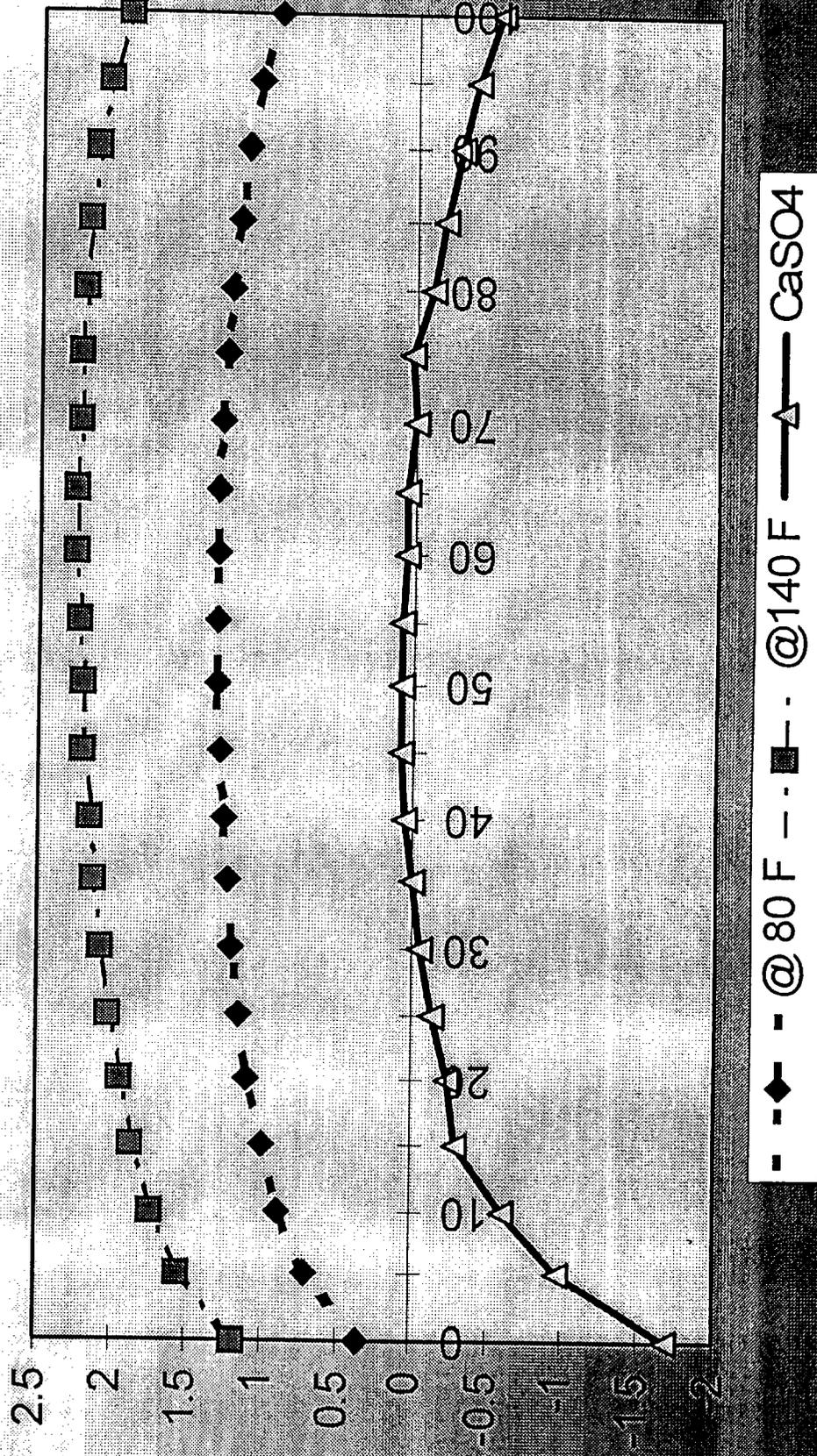
Bone Springs Water - average 100 BWPD, from wells Nos. 2, 8 & 9

Delaware Water - average 300 BWPD, from well Nos. 1, 4, 5 & 7

Morrow Water - average 3 BWPD, from well No. 6

Total - 25% Bone Springs and 75% Delaware ; Scaling tendencies are "Nil"

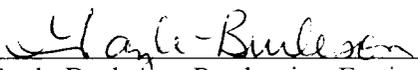
# Comparison Between Two Waters



## VII. ITEM 5. DISPOSAL ZONE FORMATION WATER

Injection into the Gem No. 3 is for disposal purposes. The zone identified for disposal is not productive of oil or gas in this well or within one mile of the Gem No. 3. Offset producers within 1 mile of the proposed disposal well produce from the Delaware formation, but from a sand over 1000' higher structurally. (See Cross-section, Attachment G.) The proposed disposal interval was perforated and swab tested, 100% water. A detailed chemical analysis was not obtained, however a sample was taken and a chlorides content was determined to be 112,000 ppm, which is very similar to the productive Delaware sand 1000' higher in offset wells.

It is inferred that the disposal zone has very similar water to the Delaware water produced from 1000' higher. (See Water Analysis from offset Delaware producers, example Gem No. 5, Attachment H4, or Gem No. 7, Attachment H6).

  
\_\_\_\_\_  
Gayle Burleson, Production Engineer for BTA Oil Producers

BTA Oil Producers  
Gem 8705 JV-P No. 3  
660' FSL & 1980' FEL  
Section 2, T20S, R33E  
Lea County, New Mexico

## VIII. Geologic Data

### Gem No. 3 Geological Discussion Regarding Proposed Disposal Interval

#### A. Disposal Zone

The Delaware Mountain Group has a total thickness in excess of 3,100 feet within this locality. It is comprised of alternating units of siltstone, sandstone and limestone with minor units of shale. Oil production occurs from a sandstone located near the top of the Brushy Canyon Formation within the Delaware Mountain Group. The proposed disposal interval lies with the Lower Brushy Canyon Formation, nearly 1,200 feet below the producing interval.

The Delaware Mountain Group was deposited within a deep marine basin. The cleaner sandstone units represent submarine channel/fan sequences deposited down dip of the shelf margin under turbiditic conditions triggered by tectonic activity, gravity slumping or sea levels changes. The siltstone, limestone and/or shale units represent the normal deposition that occurs within a marine basin between the catastrophic interruptions of turbiditic events.

#### B. Fresh Water Sources:

Ogallala Aquifer which occurs between 200 and 300 feet from the surface.

## XI. FRESH WATER ANALYSIS

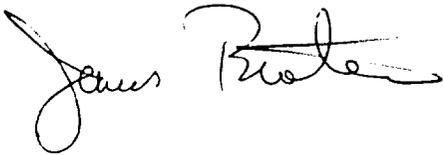
To the best of my knowledge, there are no fresh water wells located within one mile of the Gem 8705 JV-P Well No. 3, the proposed disposal well.

  
\_\_\_\_\_  
Gayle Burleson, Production Engineer for BTA Oil Producers

XII. Geological Statement

I have examined all geologic and engineering data available for the Teas (Delaware) field and find no evidence of open faults and other hydrologic connection between the disposal zone and any underground drinking water sources.

James Broten, Certified Petroleum Geologist # 5397

A handwritten signature in black ink, appearing to read "James Broten". The signature is written in a cursive style with a large initial "J" and a long horizontal stroke at the end.

Attachment J

**XIII NOTICE OF OFFSET OPERATORS WITHIN ¼ MILE**

**BTA OIL PRODUCERS**

**Application for Authorization to Inject  
Gem, 8705 JV-P #3  
660' FSL & 1980' FEL  
Section 2, T20S, R33E  
Lea County, NM**

I hereby certify that BTA Oil Producers holds 100% Working Interest in this well.

Surface Owner is The State of New Mexico

**OFFSET OPERATOR LIST**

Nearburg Exploration Company, L. L. C.  
3300 North "A" Street, Bldg. 2, Suite 120  
Midland, TX 79705

Gene Shumate, et ux Carol  
and Thunderbolt Petroleum  
P. O. Box 2473  
Midland, TX 79702

Samson Resources Company  
Samson Plaza  
Two West Second Street  
Tulsa, OK 74103

Ray Westall  
P. O. Box 4  
Loco Hills, NM 88255

Matador Petroleum Corporation  
Suite 158, Pecan Creek  
8340 Meadow Road  
Dallas, TX 75231-3751

Devon Energy Corporation  
20 N. Broadway, Suite 1500  
Oklahoma City, OK 73102-8260

I hereby certify that notification of BTA's application was mailed via certified mail on this 21<sup>st</sup> day of December, 2000 to the above listed Offset Operators.

Signed: \_\_\_\_\_

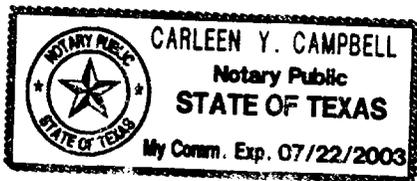
Pam Inskeep

STATE OF TEXAS

COUNTY OF MIDLAND

BEFORE ME, the undersigned authority on this day personally appeared Pam Inskip, a Regulatory Administrator with BTA Oil Producers, who being by me duly sworn, deposes and states that the persons listed on the foregoing attached list have been sent a copy on December 21, 2000, of the New Mexico Oil Conservation Division Form C-108, "Application for Authorization to Inject" for the 8705 JV-P Gem #3, located in Section 2, T20S, R33E, Lea County, New Mexico.

SUBSCRIBED AND SWORN TO before me on this 21<sup>st</sup> day of December, 2000, to certify which witness my hand and seal of office.



*Carleen Y. Campbell*  
Carleen Y. Campbell  
Notary Public, State of Texas