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NEW MEXICO OIL CONSERVATION DIVISION
- Engineering Bureau

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

ABOVE THIS LINE FOR DIVISION USE ONLY

#### 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:	
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[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]

**OLS** 

**OLM** 

**CTB** 

DHC

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

PC

**PLC** 

Energen's Tiffany SWD #1

	[D]	Other: Specify
[2]	NOTIFICAT [A]	ION REQUIRED TO: - Check Those Which Apply, or _ Does Not Apply Working, Royalty or Overriding Royalty Interest Owners
	(B)	Offset Operators, Leaseholders or Surface Owner
	(D)	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

[F] Waivers are Attached

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

For all of the above, Proof of Notification or Publication is Attached, and/or,

[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.

Print or Type Name

BRIAN WOOD (505) 466-8120 FAX 466-9682 Signature

Title

Date

CONSULTANT

3-22-04

e-mail Address

brian@permitswest.com

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 4-1-98

#### **APPLICATION FOR AUTHORIZATION TO INJECT**

I.	PURPOSE:Secondary RecoveryPressure Maintenance XXXDisposalStorage Application qualifies for administrative approval? XXXYesNo
II.	OPERATOR: ENERGEN RESOURCES CORPORATION
	ADDRESS: 2198 BLOOMFIELD HIGHWAY, FARMINGTON, NM 87401
	CONTACT PARTY: BRIAN WOOD c/o PERMITS WEST, INC. PHONE 505 466-8120
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 Yes, give the Division order number authorizing the project: No
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:
	<ol> <li>Proposed average and maximum daily rate and volume of fluids to be injected;</li> <li>Whether the system is open or closed;</li> <li>Proposed average and maximum injection pressure;</li> <li>Sources and an appropriate analysis of injection fluid and compatibility with the receiving formation if other than reinjected produced water; and,</li> <li>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.).</li> </ol>
*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: BRIAN WOOD  SIGNATURE: DATE: MAR. 22, 2004
	SIGNATURE:
*	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

# INJECTION WELL DATA SHEET

ENERGEN RESOURCES CORPORATION

1,163<sub>ft³</sub> 3,403 <sub>ft</sub>³ 826 <sub>ft</sub>³ 5-1/2" TEMP 8,915, TIFFANY SWD #1 Casing Size: 13-3/8" @ 600' **VISUAL** 9-5/8" VISUAL & TEMP SURVEY SURVEY RANGE **≷** 9 Method Determined: WELL CONSTRUCTION DATA Method Determined: Method Determined: TOWNSHIP 32 N Casing Size: Casing Size: Intermediate Casing Production Casing Injection Interval or Surface Casing or ō feet to SX. SX. SX. SECTION 10 SURFACE SURFACE 12-1/4" 17-1/2" 8,415' 5,500 7-7/8" 9,200, 1,460 590 200 Cemented with: Cemented with: Top of Cement: Top of Cement: Cemented with: Top of Cement: Total Depth: UNIT LETTER Hole Size: Hole Size: Hole Size: エ 5-1/2" 17# N-80 set @ 9,200'& cemented to 5,500' with 590 sx (25% excess) to the surface with 700 sx set @ 600° & cemented 13-3/8" 48# H-40 Perforate (.43") from 8,415' to 8,915' with 725' FNL & 325' FEL 9-5/8" 40# N-80 set @ 5,700' & cemented to surface with 1460 sx FOOTAGE LOCATION 1-2 shots per foot (100% excess) (>20% excess) WELLBORE SCHEMATIC WELL NAME & NUMBER: WELL LOCATION: TD 9,200" Packer® 8,380 OPERATOR:

((Perforated/or Open Hole; indicate which)

# INJECTION WELL DATA SHEET

ubing Size: 3-1/2" 9.3# Lining Material: IPC
ype of Packer: — LARGE BORE 5-1/2" BAKER LOCK SET OR ITS EQUIVALENT acker Setting Depth:≈8,380'
Other Type of Tubing/Casing Seal (if applicable):
Additional Data
. Is this a new well drilled for injection?XXX_YesNo
If no, for what purpose was the well originally drilled?
Name of the Injection Formation: SWD; BLUFF & ENTRADA
. Name of Field or Pool (if applicable): WILDCAT
Has the well ever been perforated in any other zone(s)? List all such perforated NO (NEW WELL) intervals and give plugging detail, i.e. sacks of cement or plug(s) used.
Give the name and depths of any oil or gas zones underlying or overlying the proposed injection zone in this area:
NOW PRODUCING OVERLYING: FRUITLAND COAL (2,591' - 2,805')
NOW PRODUCING UNDERLYING: NONE

I. Purpose is water disposal.

II. Operator: Energen Resources Corporation Operator phone number: (505) 325-6800 Operator address: 2198 Bloomfield Highway

Farmington, NM 87401

Contact: Brian Wood (Permits West, Inc.)

Phone: (505) 466-8120

III. A. (1) Lease: fee lease

Lease Size: 240 acres

Lease Area: S2NE4 & SE4 Sec. 10, T. 32 N., R. 6 W.

Closest Lease Line: 127.04' north Well Name & Number: Tiffany SWD #1

Well Location: 725' FNL and 325' FEL Sec. 10, T. 32 N., R. 6 W.

(see Exhibit A)

A. (2) Surface casing (13-3/8", 48#, H-40, S T & C) will be set at ≈600' in a 17-1/2" hole and cemented to the surface. Cement will be ≈700 sacks Class B + 2% CaCl<sub>2</sub> + 1/4 pound per sack Flocele®. This will yield 826 cubic feet (100% excess). W. O. C.= 12 hours. Test casing to 600 psi for 30 minutes. Texas pattern guide shoe will be used on bottom.

Intermediate casing (9-5/8", 40#, N-80, L T & C) will be set at  $\approx$ 5,700' in a 12-1/4" hole and cemented to the surface.

First stage of intermediate casing will be  $\approx$ 290 sacks 50/50 class H Poz with 1/4 pound per sack Flocele® + 5 pounds per sack gilsonite + 0.4% Halad-9 + 0.2% CFR-3 (yield = 317 cubic feet of slurry (or 100% excess) to circulate to packer stage collar at  $\approx$ 5,200'). Set packer stage collar at  $\approx$ 5,200'.

Second stage of intermediate casing will be  $\approx 500$  sacks 65/35 Premium Poz 6% gel + 1/4 pound per sack Flocele® + 5 pounds per sack gilsonite followed by  $\approx 10$  sacks Class H with 1/4



pound per sack Flocele® + 5 pounds per sack gilsonite. Yield = 1,108 cubic feet of slurry ( $\approx$ 70% excess to cover stage collar at  $\approx$ 3,300'). Open stage collar  $\approx$ 3,300'. Circulate for 3 hours to allow cement to set.

Third stage of intermediate casing will be  $\approx 670$  sacks 3% Econolite = 1/2 pound per sack Flocele® + 10 pounds per sack gilsonite followed by  $\approx 100$  sacks Class H + 1/2 pound per sack Flocele® + 10 pounds per sack gilsonite + 2% CaCl<sub>2</sub>. This will yield 2,068 cubic feet (100% excess) which will be circulated to surface.

Cement float shoe on bottom with super seal float collar on top of two joint shoe. One centralizer on every joint on bottom with one below and 12 above third stage packer stage collar placed every third joint. One centralizer below and 12 above third stage collar placed every third joint for a total of 30 centralizers.

Set slips with full string weight.

W. O. C.= 12 hours. If cement does not circulate, run temperature survey in 8 hours to determine top of cement.

Nipple up 11" 3,000 psi double gate BOP in preparation to start air drilling.

Production liner (5-1/2", 17#, N-80, L T & C) will be set at  $\approx$ 9,200' in a 7-7/8" hole and cemented to the surface. Lead with  $\approx$ 300 barrel mud flush. Cement with  $\approx$ 340 sacks 50/50 Premium Poz + 1/4 pound per sack Flocele® + 5 pounds per sack gilsonite + 0.4% Halad-413 + 0.2% SCR-100 + 35% SSA-1. Follow with  $\approx$ 250 sacks Neat + 1/4 pound per sack Flocele® + 5 pounds per sack gilsonite + 0.4% Halad-413 + 0.25 SCR-100 + 35% SSA-1. This will yield 1,163 cubic feet of slurry (=50% excess) to circulate to liner top. Calculate volume based on caliper log + 25% excess. W. O. C. = 12 hours before starting completion operations.

Will install liner float shoe on the bottom with a float collar and landing collar on top of the shoe joint. Place ≈14 bow spring centralizers spaced every third joint on bottom.



Will use hydro test from the surface to the packer for the mechanical integrity test.

- A. (3) Tubing will be plastic coated 3-1/2" 9.3# N-80 injection string. It will be set at  $\approx 8,380$ '.
- A. (4) A 5-1/2" large bore Baker lock set packer or its equivalent will be set at  $\approx 8,380'$  ( $\approx 35'$  above the top perforation at  $\approx 8,415'$ ).
- **B.** (1) Disposal zones will be the Bluff and Entrada sandstones. Fracture gradient is expected to be ≈0.64 psi per foot.
- **B. (2)** Disposal interval will be ≈8,415' to ≈8,915' (well logs will determine exact interval after drilling). Perforations will be ≈0.43". Bluff will have two shots per foot. Entrada will have 1 shot per foot.
- B. (3) Well has not yet been drilled. It will be drilled for the exclusive use by Energen and for the sole purpose of water disposal from present and future Energen wells. Water analyses from Energen wells are attached.
- **B.** (4) Well bore has not yet been perforated since it has not been drilled. It will be perforated from  $\approx 8,415$ ' to  $\approx 8,915$ ' (logs will determine exact interval after drilling).
- B. (5) Top of the Bluff (a member of the Morrison Formation) is at ≈8,411'. Top of the Entrada is at ≈8,686'. Twenty-one other wells in the San Juan Basin are disposing, or have disposed of, water into the Morrison-Bluff-Entrada interval. Oil and gas are produced elsewhere in the San Juan Basin from the Morrison and Entrada. Closest Morrison production is ≈46 miles west at Ute Dome. Closest Entrada production is ≈65 miles south at the Arena Blanca Field. Bottom of the closest overlying productive formation (Dakota) is at ≈7,910'. There will be ≈505' interval between the highest injection perforation and the bottom of the Dakota. Closest underlying potentially productive formation is the Pennsylvanian. Closest Pennsylvanian production is ≈42 miles west at Barker Dome.
- IV. This is not an expansion of an existing injection project.



V. A map (Exhibit B) is attached showing all 8 well bores (1 P & A + 3 gas + 4 water) within a half mile radius. A map is attached (Exhibit C) showing all 28 (8 water + 4 P & A + 15 oil or gas) existing well bores within a two mile radius. (Much of the two mile radius is underwater - Navajo Reservoir.) Details on the wells within a half mile radius are below.

OPERATOR	<u>WELL</u>	LOCATION	ZONE	<u>TD</u>	<u>STATUS</u>	DISTANCE
??	N/A	SENENE Sec. 10	San Jose	??	Water Well	≈500'
Pacific	SJ 32-6	990 FN & 990 FE Sec. 10	Mesa Verde	5660	P & A	687'
BP	Miller 10-1	1380 FN & 1030 FE Sec. 10	Fruitland	2844	Gas Well	963'
Cemetery	N/A	SWNENE Sec. 10	San Jose	280	Water Well	≈1000'
Poma	N/A	SWNENE Sec. 10	San jose	300	Water Well	≈1000 <b>'</b>
BP	Miller 11-1	1130 FN & 760 FW SEC. 11	Fruitland	2900	Gas Well	1158'
Clark	N/A	NWSWSW Sec. 11	San Jose	200	Water Well	≈2000 <b>'</b>
BP	Carnes 11-1	1800 FS & 230 FW Sec. 11	Fruitland	2839	Gas Well	2131'

A map (Exhibit D) showing all leases (1 BLM and remainder fee) within a half mile and all leases within two miles is attached. Except for some BLM leases along the south and east sides, all other leases in the 2 mile radius are fee. Details on the leases within a half mile are:

<u>AREA</u>	TYPE LEASE	LEASE #	LESSEE(S)
Lots 1 & 2 10-32n-6w	BLM	NM-86475	Habbit, Shern, W. Sol
remainder	Fee	N/A	BP, Burlington
			Consolidated, SG

VI. Eight existing wells are within a half mile radius. None penetrated the Bluff or Entrada. In fact, deepest well ended 2,751' above the Bluff top.

- **VII.** 1. Average injection rate = 2,500 bwpd. Maximum = 3,000 bwpd.
  - 2. System will be open (water will be trucked). Facilities will include 8 to 10 ≈400 barrel water tanks, two filtration units, and two injection pumps.
  - **3.** Average injection pressure =1,500 psi Maximum pressure = 1,700 psi



4. Water source will be present and future Energen wells in the San Juan Basin. Three produced water analyses (Exhibit E) are attached. Averages follow. No local sample exists from the Bluff or Entrada.

Bicarbonates (HCO <sub>3</sub> )	6,520 mg/l
Calcium	27 mg/l
Carbonates (CO <sub>3</sub> )	27 mg/l
Chloride	1,703 mg/l
Iron	0 mg/l
Magnesium	20 mg/l
рН	7.5 pH units
Potassium	0 mg/l
Resistivity	1.02 units
Sodium	3,504 mg/l
Specific Gravity	1.012 units
Sulfate	0 mg/l
Total Dissolved Solids	11,800 mg/l

5. The Bluff and Entrada have not been proven productive within two miles of the proposed well. (Energen will attempt to swab back load water after stimulation and take Bluff and Entrada water samples. If successful, then the analyses will be provided to the New Mexico Oil Conservation Division.)

According to Stone et al in <u>Hydrogeology and water resources of San Juan Basin, New Mexico</u>, lower (known variously as the Junction Creek, Cow Springs, or Bluff member of the) Morrison water near the basin fringe has a specific conductance of <2,000  $\mu$ mhos. Morrison water from one deep test of the basin had a specific conductance of 4,300  $\mu$ mhos. Stone et al state, "No wells are known to derive their water exclusively from this aquifer ...." and transmissivity is "relatively low". Stone et al also state, "Generally, however, water from the Entrada is not suitable for drinking, especially in deeper parts of the basin."



Summaries of analyses of Morrison and Entrada water follow (also see Exhibit F).

Well	Simms Fed. 1	NEBU 501
Location	13-30n-4w	10-32n-7w
Distance from Tiffany SWD 1	17 miles Southeast	6 miles West
Zone	Morrison	Entrada
Bicarbonate	180 ppm	152 ppm
Calcium	150 ppm	1,310 ppm
Carbonate	N/A	0 ppm
Chloride	10,479 ppm	8,280 ppm
Hydroxide	N/A	0 ppm
Hydrogen Sulfide	No Trace	N/A
Iron	0 ppm	164 ppm
Magnesium	24 ppm	29 ppm
рН	7.1	5.07
Potassium	15,600 ppm	169 ppm
Resistivity	0.34 ohms @ 71° F	45 ohms
Sodium	N/A	4,760 ppm
Sodium Chloride	17,237 ppm	N/A
Sodium + Potassium	11,485 ppm	N/A
Specific Gravity	1.015 @ 72° F	1.01 @ 73° F
Sulfate	256 ppm	2,100 ppm
Total Dissolved Solids	22,873 ppm	19,000 ppm
Total Hardness	473 ppm	N/A

**VIII.** According to the U. S. Geological Survey (<u>Ground Water Atlas of the United Sates - Arizona, Colorado, New Mexico, Utah - HA 730-C), the middle and lower Morrison is an "... interbedded fine to medium sandstone, siltstone, and mudstone." It produces oil elsewhere in the basin (e. g., XTO's Ute A #30 in 2-31n-14w)). Bluff member of the Morrison Formation is predicted to be  $\approx 234$ ' thick in the planned well bore. Top is  $\approx 8,411$ ' and bottom is  $\approx 8,645$ '.</u>

The Entrada sandstone is a very porous and permeable æolian sandstone. It produces oil elsewhere in the basin (e. g., Eagle Mesa, Leggs, Media, Ojo Encino, Papers Wash, Snake Eyes Fields). Entrada is estimated to be  $\approx 234$ ' thick in the well bore. Top is  $\approx 8,686$ ' and bottom is  $\approx 8,920$ '.

Estimated well bore formation tops are:



> San Jose Sandstone: 0' Ojo Alamo Sandstone: 2,061' Kirtland Shale: 2.166' Fruitland Formation: 2,591' Pictured Cliffs Sandstone: 2,806' Lewis Shale: 3,136' Cliff House Sandstone: 5,116' Menefee Shale: 5,166' Point Lookout Sandstone: 5,371' Gallup Sandstone: 6,071' Greenhorn: 7,476' Graneros: 7,536' Dakota Sandstone: 7,666' Morrison Formation: 7,911' Bluff Sandstone: 8,411' Todilto: 8,646' Entrada Sandstone: 8,686' Chinle Shale: 8,921' Total Depth: 9,200'

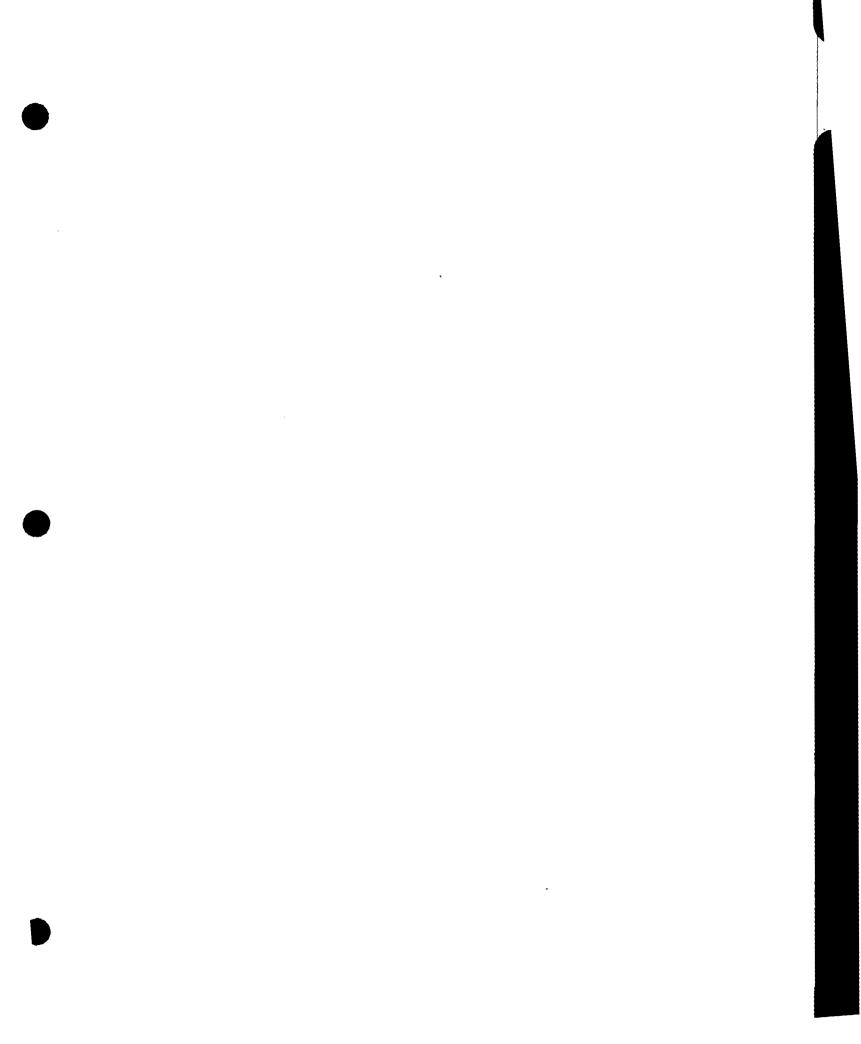
There are eight water wells within a two mile radius. Of the eight water wells, deepest reported depth is 300'. Water bearing strata are 0' to 2,165'. Water well bores are in Quaternary alluvium or the San Jose sandstone. No existing underground drinking water sources are below the Entrada within a two mile radius. There will be  $\approx 8,111$ ' vertical separation between the bottom of the lowest existing underground water source and the top of the Bluff.

- IX. The well will be stimulated with a  $\approx$ 90,000 gallon gelled water frac and  $\approx$ 150,000 pounds of 20/40 sand.
- **X.** Caliper log will be run from surface to intermediate casing TD. GR/TemplHRI: GR/Spec Den/Dual Spaced Neutron and mud logs will be run from the base of the intermediate casing to TD ( $\approx$ 9,200'). Copies will then be provided to the NMOCD.



- XI. There are no water wells within two miles which penetrate the Bluff or Entrada. The deepest reported water well depth within two miles is 300'.
- XII. Energen is not aware of any geologic or engineering data which indicate the Bluff or Entrada are in hydrologic connection with any underground sources of water. There will be  $\approx 8,111$ ' of vertical separation and four shale zones (Kirtland, Lewis, Menefee, and Mancos) between the top (8,411') of the Bluff and the bottom (300') of the deepest water well.
- XIII. Notice (this application) has been sent to the surface owner (Rosa Joint Venture), operators of all wells (only BP), and lease operating right holders (BP, Burlington, Consolidated, Habbit, SG, Shearn, and West Sol III), and lessors (BLM) within a half mile. A legal ad (see Exhibit G) was published on March 15, 2004.





District I PO Box 1980, Hobbs, NM 88241-1980

District II PO Drawer DD, Artesia, NM 88211-0719

District III 1000 Rio Brazos Rd., Aztec, NM 87410

District IV PO Box 2088, Santa Fe, NM 87504-2088

State of New Mexico Energy, Minerals & Natural Resources Department

OIL CONSERVATION DIVISION PO Box 2088 Santa Fe, NM 87504-2088

Form C-102 Revised February 21, 1994 Instructions on pack Submit to Appropriate District Office State Lease - 4 Copies Fee Lease - 3 Copies

AMENDED REPORT

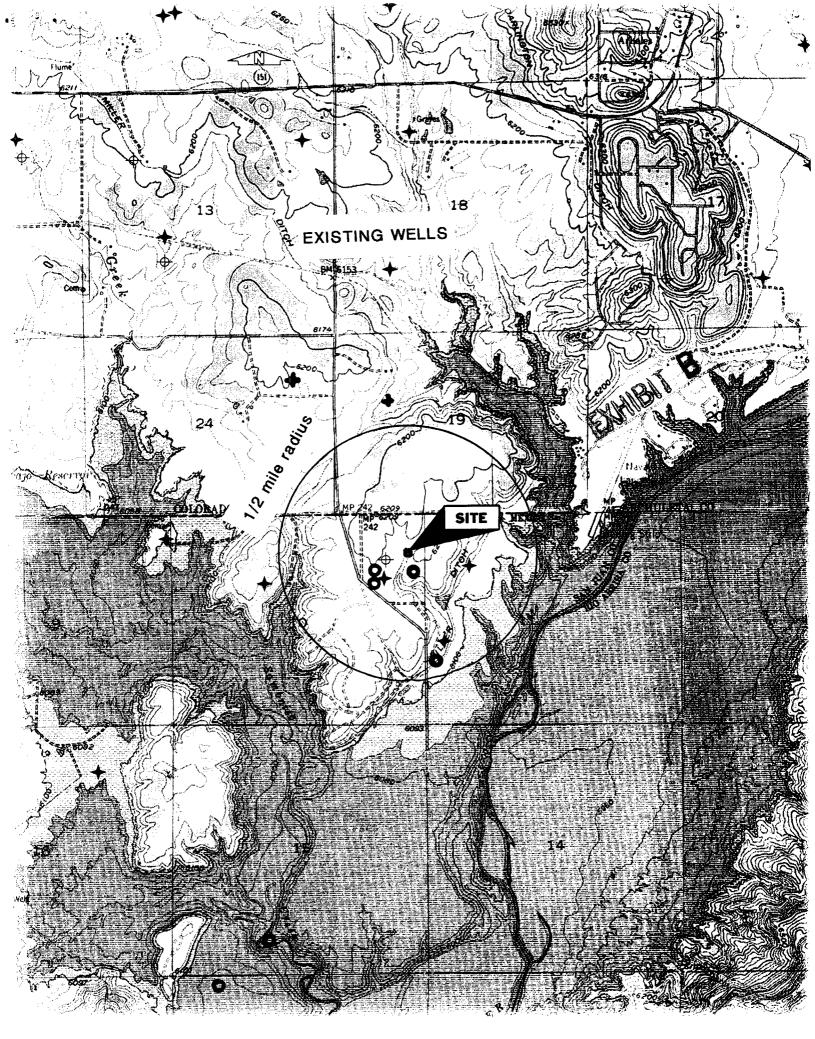
#### WELL LOCATION AND ACREAGE DEDICATION PLAT

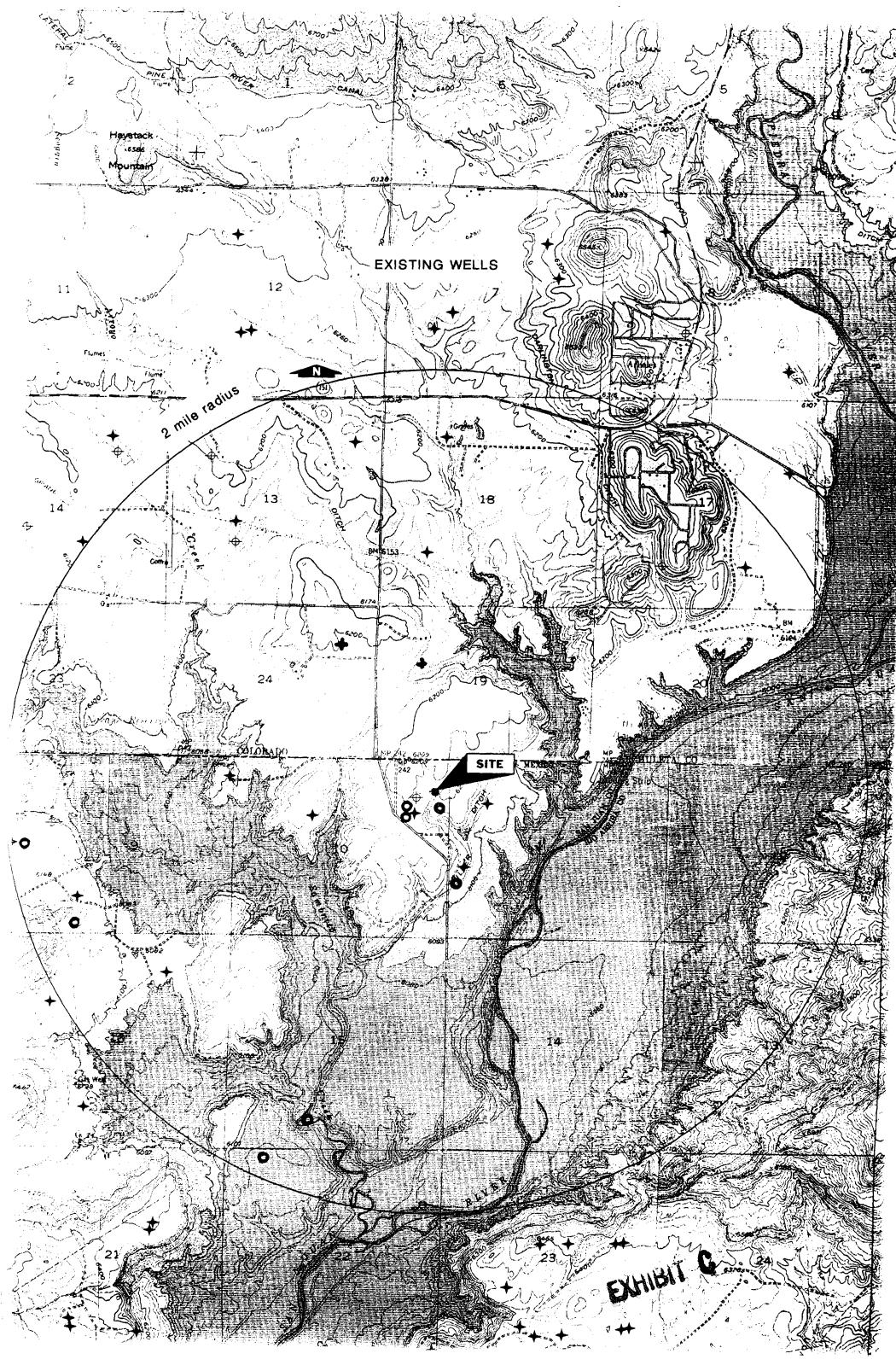
'A	NPI Number	, , , , , ,		*Pool Cod	le	Pool Name				,
*Property	Property Code Property Name TIFFANY SWD						⁵ W∈	ell Number 1		
'0GRID N 16292	ł			ENERGE	*Operator Name *Elevation ENERGEN RESOURCES CORPORATION 5194					
					<sup>10</sup> Surface	Location				
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/We	st line	County
H	10	32N	6W		725	NORTH	325	EA	ST	SAN JUAN
		<sup>11</sup> E	Bottom	Hole L	ocation I	f Different	From Surf	асе		
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/We	est line	County
12 Dedicated Acres		-	1	1	19 Joint or Infill	<sup>14</sup> Consolidation Code	<sup>15</sup> Order No.	1		

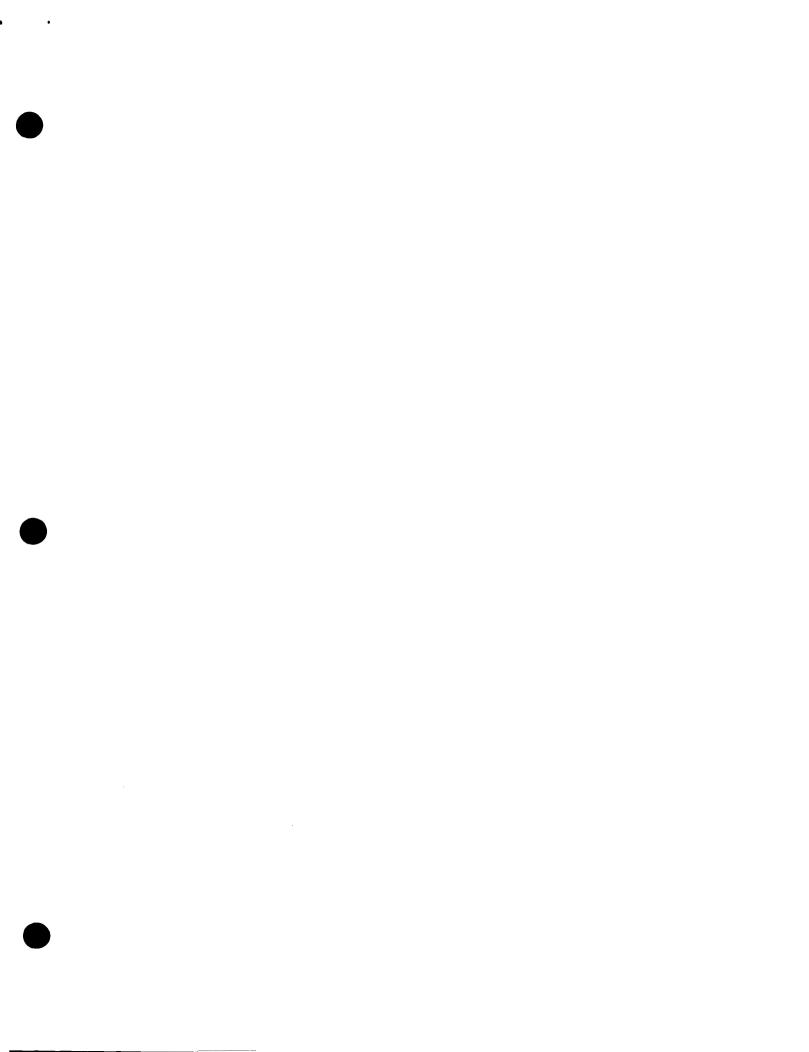
NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

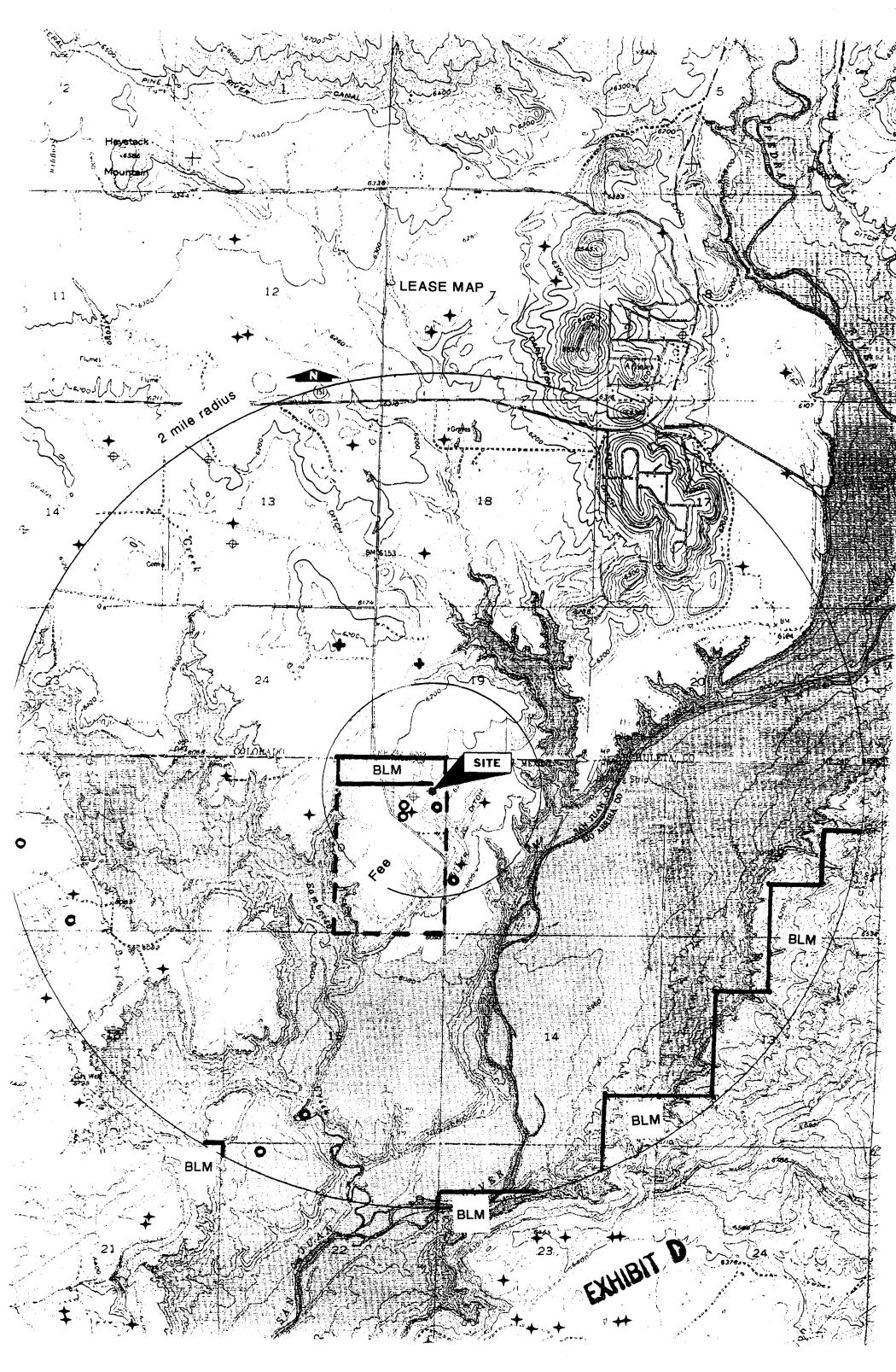
16	COLORADO / N	EW MEXICO 5326	0.92 <b>STA</b>	TE-LINE	17 OPERATOR CERTIFICATION I hereby certify that the information
646.80	LOT 4	LOT 3	LOT 2		contained herein is true and complete to the best of my knowledge and belief  Signature
. 76. 21			! 	i	Printed Name
1292		-1	0		Date  18 SURVEYOR CERTIFICATION
					I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief  Survey Date: DECEMBER 22, 2003
2585.88				·	Signature and Seal of Professional Surveyor  C. EDWARD  MEXICO
25					MEXICO BE 15269 BE ADDRESSIONAL OF THE STORY
	266	9.04	26	61.78	JASON C. EDWARDS Certificate Number 15269

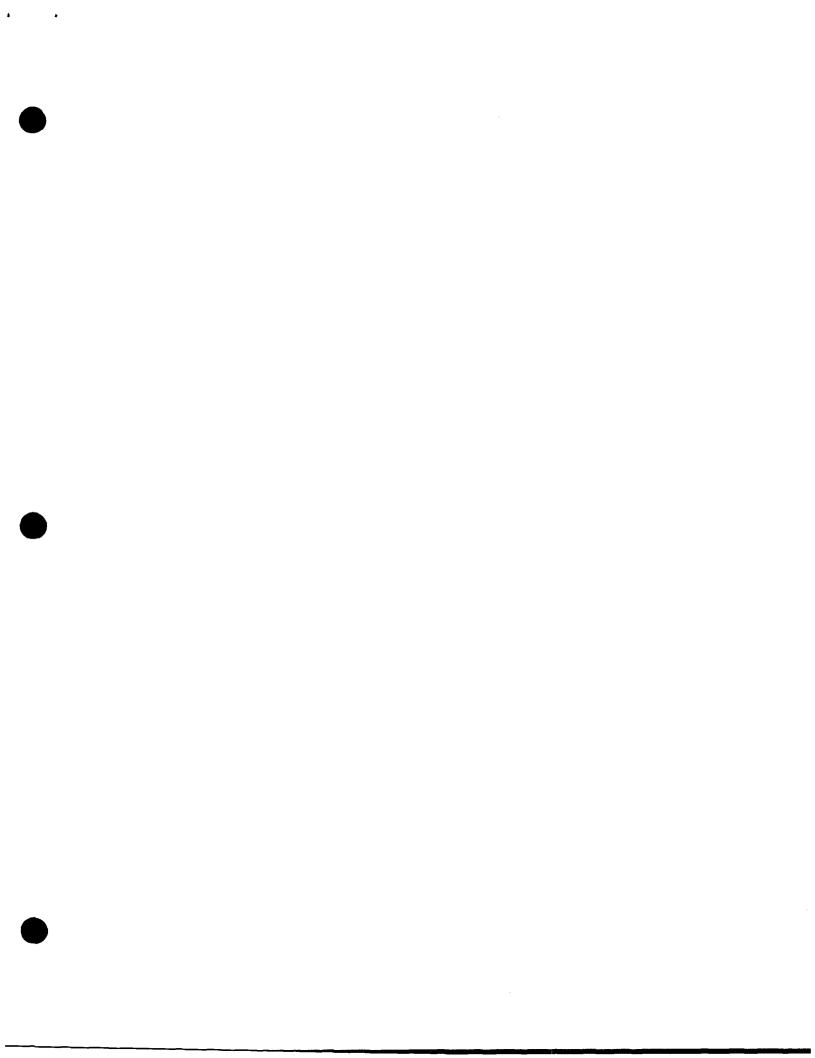












## **HALLIBURTON**

## Water Analysis Report

To: _	Energen Resources	Date:	2/25/2004
Submitted by:	Halliburton Energy Services	Date Rec:	2/23/2004
Attention:	Sam Mohler	Report #:	FLMM4120
Well Name: _	Big Elk 32-6; #5-1	Formation:	Well Head

Specific Gravity	1.012	
pH	7.70	
Resistivity	1.10	@ 70° F
iron (Fe)	0	Mg/L
Potassium (K)	0	Mg / L
Sodium (Na)	3235	Mg/L
Calcium (Ca)	28	Mg/L
Magnesium (Mg)	20	Mg/L
Chlorides (Cl)	960	Mg/L
Sulfates (SO <sub>4</sub> )	0	Mg / L
Carbonates (CO <sub>3</sub> )	0.08	Mg/L
Bicarbonates (HCO <sub>3</sub> )	7035	Mg/L
Total Dissoived Solids	11358	Mg/L

Respectfully: Bill Loughridge

Title: Senior Scientist

Location: Farmington, NM

NOTICE: This report is limited to the described sample tested. Any person using or relying on this report agrees that Halliburton shall not be liable for any loss or damage whether due to act or omission resulting from such report or its use.



## **HALLIBURTON**

## Water Analysis Report

To: Energen Resources Date: 2/25/2004

Submitted by: Halliburton Energy Services Date Rec: 2/23/2004

Attention: Sam Mohler Report #: FLMM4121

Well Name: Dugan 32-5; #5-1 Formation: Well Head

Specific Gravity	1.012	
рН	7.40	
Resistivity	0.85	<b>@</b> 70° F
Iron (Fe)	0	Mg/L
Potassium (K)	0	Mg/L
Sodium (Na)	3696	Mg/L
Calcium (Ca)	24	Mg/L
Magnesium (Mg)	20	Mg / L
Chlorides (CI)	2800	Mg/L
Suffates (SO <sub>4</sub> )	0	Mg / L
Carbonates (CO <sub>3</sub> )	0.0	Mg/L
Bicarbonates (HCO <sub>3</sub> )	5165	Mg / L
Total Dissolved Solids	11705	Mg/L

Respectfully: Bill Loughridge

Title: Senior Scientist

Location: Farmington, NM

NOTICE: This report is limited to the described sample tested. Any person using or relying on this report agrees that Halliburton shall not be liable for any loss or damage whether due to act or omission resulting from such report or its use.



## **HALLIBURTON**

## Water Analysis Report

To: Energen Resources Date: 2/25/2004

Submitted by: Halliburton Energy Services Date Rec: 2/23/2004

Attention: Sam Mohler Report #: FLMM4122

Well Name: Padget 32-6; #5-2 Formation: Well Head

Specific Gravity	1.012	
pH	7.50	
Resistivity	1.10	<b>@</b> 70° F
iron (Fe)	0	Mg/L
Potassium (K)	0	Mg/L
Sodium (Na)	3580	Mg/L
Calcium (Ca)	28	Mg/L
Magnesium (Mg)	20	Mg/L
Chlorides (CI)	1350	Mg/L
Sulfates (SO <sub>4</sub> )	0	Mg/L
Carbonates (CO <sub>3</sub> )	0.0	Mg/L
Bicarbonates (HCO <sub>3</sub> )	7361	Mg/L
Total Dissolved Solids	12338	Mg/L

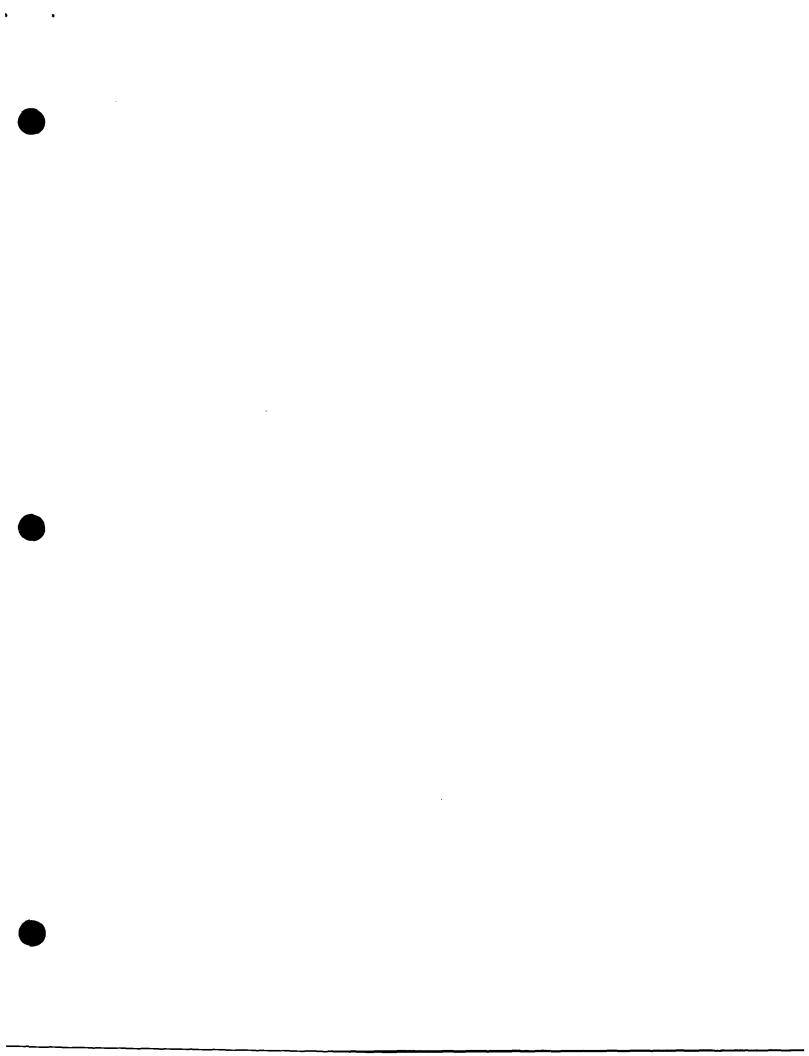
Respectfully: Bill Loughridge

Title: Senior Scientist

Location: Farmington, NM

NOTICE: This report is limited to the described sample tested. Any person using or relying on this report agrees that Halliburton shall not be liable for any loss or damage whether due to act or omission resulting from such report or its use.





#### **BJ SERVICES COMPANY**

#### **WATER ANALYSIS #FW01W718**

#### **FARMINGTON LAB**

#### GENERAL INFORMATION

**OPERATOR:** 

MALLON OIL

WELL:

SIMMS FED. #1

FIELD:

13-30n-4W

SUBMITTED BY: J. ZELLITTI

:D. SHEPHERD WORKED BY

PHONE NUMBER:

DEPTH:

DATE SAMPLED: 11/15/99

DATE RECEIVED:11/15/99

7.10

COUNTY:

STATE:NM

FORMATION: MOLLISON

#### SAMPLE DESCRIPTION

SAMPLE #1

#### PHYSICAL AND CHEMICAL DETERMINATIONS

SPECIFIC GRAVITY:

1.015 72°F PH:

RESISTIVITY (MEASURED ): 0.340 ohms @ 71°F

IRON (FE++):

0 ppm

256 ppm 473 ppm

SULFATE:

CALCIUM:

150 ppm

TOTAL HARDNESS

MAGNESIUM:

24 ppm

BICARBONATE:

180 ppm

CHLORIDE: SODIUM+POTASS: 10,479 ppm

11,485 ppm

SODIUM CHLORIDE (Calc)

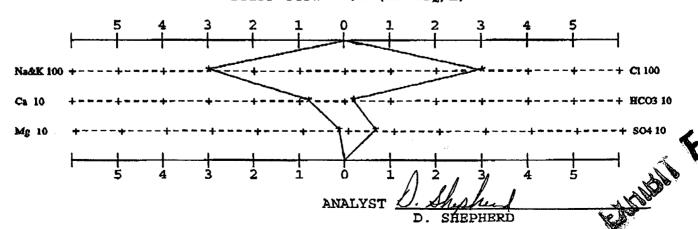
17,237 ppm 22,873 ppm

H2S: NO TRACE

TOT. DISSOLVED SOLIDS: POTASSIUM (PPM): 15,600

#### REMARKS

#### STIFF TYPE PLOT (IN MEQ/L)



آغير 🤏	1	AFTEN, TILL CLAR	K DATE SAME	LED: 8/1/86	
2605	ı	O BOX 1237	WELL NAME	: NEBU UNIT 501	
- DURANGO, CO 81302		DURANGO, CO 8130	2 LUCATION:	10-32N-71	^/
(303) 247-4220	(	(303) 247-0728	FORMATION	: ENTRADA WATER	
			SAMPLED F	ROM:	
CDS ID #: 1119			WELL ON/O	lff:	
CONSTITUENT	ppn		epm		
Sodium Na +	. 4760		207.1		
Potassium K +	169		4.3		Item 2A SWD-339
Calcium Ca ++	1310		65.4		340-339
Magnesium Mg ++	29.4		2.4		
Iron Total Fef+	k Fe+++ 164		8.8		
POSITIVE SUB-TOTAL	6432.4		287.9799		
Chloride Cl -	8280		233.5		
Carbonate CO3 =	0		0.0		
Bicarbonate HCO3-	152		2.5		
Hydroxide OH -	0		0.0		
Sulfate SO4 =	2100		43.7		
HEGATIVE SUB-TOTAL	10532	•	279.70928	•	
Total Dissolved So	lids 19000	ррв			
pH	5.07	units			
Specific Gravity	1.01	e 73 f.			
Resistivity	45	ohe-a			

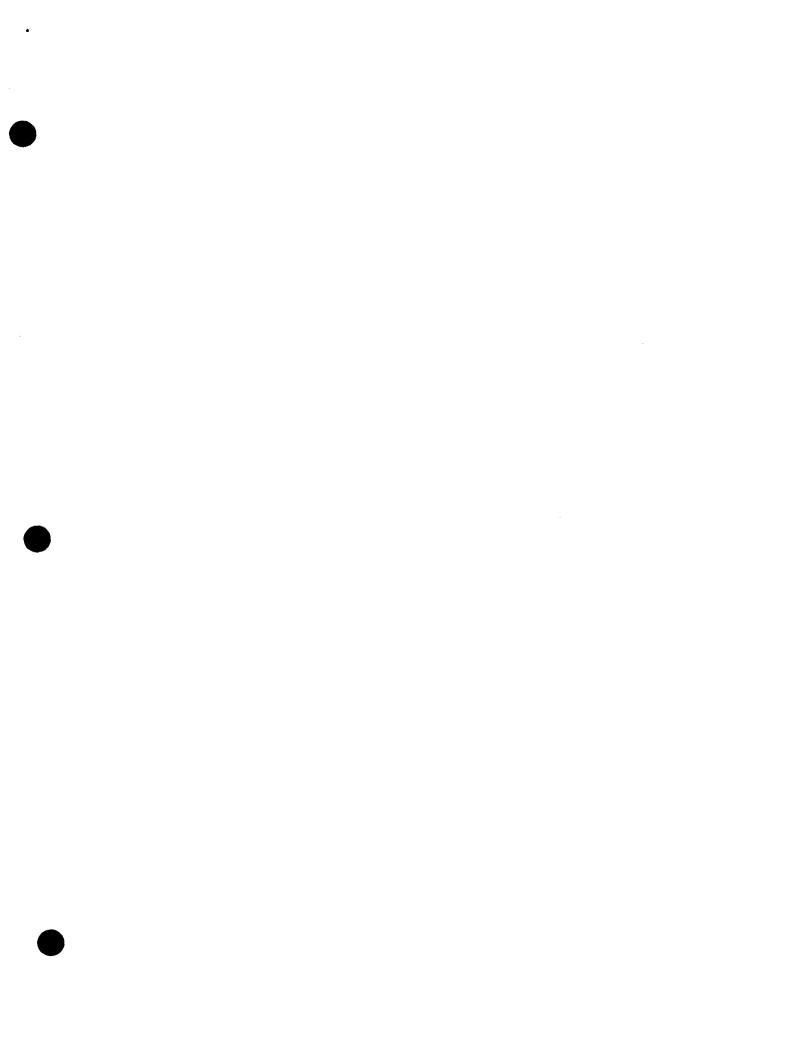
APPROVED BY:

DR. JOE BOWDEN, DIRECTOR

This Laboratory report may not be published or used for advertising or in connection with advertising of any kind without prior written permission from CDS Laboratories.

Results are based on analysis made at the time samples are received at the laboratory.





#### **AFFIDAVIT OF PUBLICATION**

Ad No. 49486

## STATE OF NEW MEXICO County of San Juan:

CONNIE PRUITT, being duly sworn says: That she is the CLASSIFIED MANAGER of THE DAILY TIMES, a daily newspaper of general circulation published in English at Farmington, said county and state, and that the hereto attached Legal Notice was published in a regular and entire issue of the said DAILY TIMES, a daily newspaper duly qualified for the purpose within the meaning of Chapter 167 of the 1937 Session Laws of the State of New Mexico for publication and appeared in the Internet at The Daily Times web site on the following day(s):

Monday, March 15, 2004.

And the cost of the publication is \$31.91.

ON 3-16-09 CONNIE PRUITT appeared before me, whom I know personally to be the person who signed the above document.

My Commission Expires April 2, 2004.

#### **COPY OF PUBLICATION**

Legal

NOTICE

Resources Energen Corporation is applying to drill the Tiffany SWD #1 water disposal well. The Tiffany SWD #1 will be located at 1725' FNL & 325' FEL, Sec. 10, T. 32N., R. 6W., San Juan County, NM. The well will dispose of water produced from oil and gas wells into the Bluff and Entrada Formations at a depth of 8,415' to 8,915' at a maximum rate of 3,000 barrels of water per day and at a maximum pressure of 1,700 psi. Interested parties must file objections or requests for hearing with the NM Oil Conservation Division, 1220 South Saint Francis Dr. Santa Fe, NM 87505 within 15 days. Additional information can be obtained by contacting Brian Wood, Permits West, Inc., 37 Verano Loop, Santa Fe, NM 87508. Phone number is (505) 466-8120.

Legal No. 49486 published in The Daily Times, Farmington, New Mexico on Monday, March 15, 2004.



BLM 1235 LaPlata Highway Farmington, NM 87401

As required by New Mexico Oil Conservation Division Rules, I am notifying you of the following proposed water disposal well. This letter is a notice only. No action is needed unless you have questions or objections.

Energen Resources Corporation is applying (see attached application) to drill its Tiffany SWD #1 well.

Well Name: Tiffany SWD #1

Total Depth: 9,200'

Proposed Disposal Zone: Bluff & Entrada (from ≈8,415' to ≈8,915')

Location: 725' FNL & 325' FEL Sec. 10, T. 32 N., R. 6 W.,

San Juan County, NM on a fee lease

Approximate Location: ≈2 air miles southwest of Arboles, Colorado

Applicant Name: Energen Resources Corporation

Applicant's Address: 2198 Bloomfield Highway, Farmington, NM 87401

<u>Submittal Information:</u> Application for a water disposal well will be filed with the NM Oil Conservation Division. If they determine the application complies with the applicable regulations, then it will be approved. The New Mexico Oil Conservation Division address is 1220 South St. Francis Dr., Santa Fe, NM 87505. Their phone number is (505) 476-3440.

Please call me if you have any questions.

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유구르고

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2470

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Sincerely,



Cherry Hlava BP America Production Company P. O. Box 3092 Houston, Tx. 77253-3092

Dear Cherry,

As required by New Mexico Oil Conservation Division Rules, I am notifying you of the following proposed water disposal well. This letter is a notice only. No action is needed unless you have questions or objections.

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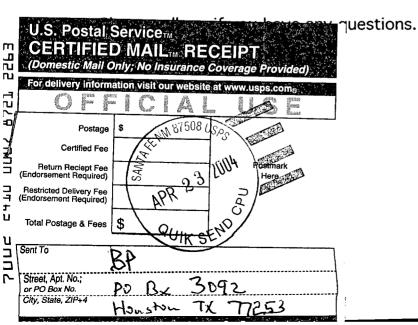
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Sincerely,



John Zent Burlington Resources Oil and Gas Company P. O. Box 4289 Farmington, M 87499

Dear John,

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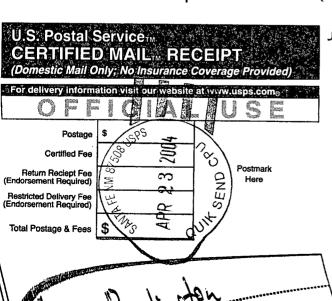
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uestions.

Sincerely,



Consolidated Oil & Gas Inc. 1860 Lincoln St. Denver, CO 80295

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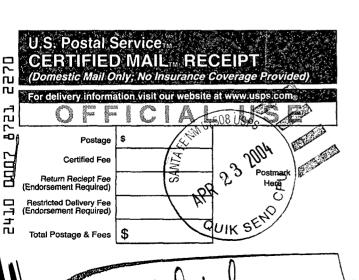
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Sincerely,



Robert Habbit 6006 North Mesa, #400 El Paso, TX 79912

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Sincerely,



Ralph & Cecil Phelps Rosa Joint Venture 3626 County Road 330 Ignacio, CO 81137

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mannaming

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SG Interests I Ltd P. O. Box 2677 Durango, CO 81302

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Sincerely,



Michael Shern & West Sol III P. O. Box 10120 El Paso, TX 79992

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Sincerely,



37 Verano Loop, Santa Fe, New Mexico 87508

(505) 466-8120

March 22, 2004

Michael Shern & West Sol III P. O. Box 10120 El Paso, TX 79995

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