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 YES Disposal _____Storage
Application qualifies for administrative approval? _____Yes XXX No

II. OPERATOR: ROSETTA RESOURCES OPERATING LP

ADDRESS: 1200 17TH ST., SUITE 770, DENVER, CO 80202

CONTACT PARTY: BRIAN WOOD (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? XXX Yes _____No
If yes, give the Division order number authorizing the project: SWD-1053 & SWD-1053-A

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: BRIAN WOOD TITLE: CONSULTANT

SIGNATURE: B. Wood DATE: NOVEMBER 26, 2008

E-MAIL ADDRESS: brian@permitswest.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

Oil Conservation Division
Case No. 2
Exhibit No. _____
Rosetta

Side 2

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.

INJECTION WELL DATA SHEET

Tubing Size: 2-7/8" 6.5# J-55 Lining Material: PLASTIC

Type of Packer: 5-1/2" x 2-7/8" COMPRESSION SET WITH ON/OFF TOOL

Packer Setting Depth: WITHIN 50' OF THE HIGHEST PERFORATION

Other Type of Tubing/Casing Seal (if applicable): _____

Additional Data

1. Is this a new well drilled for injection? XXX Yes _____ No

   If no, for what purpose was the well originally drilled? _____

   _____

2. Name of the Injection Formation: CLIFF HOUSE

3. Name of Field or Pool (if applicable): SWD; MESA VERDE

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. _____

   PERFORATED @ 4,193' – 4,381' IN POINT LOOKOUT & 3,378' – 4,134' IN MENEFEE. PACKER NOW @ 3,133'

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

   OVER: FRUITLAND (1,650') & PICTURED CLIFFS (1,750')

   UNDER: GALLUP (5,150') & DAKOTA (6,175')

   _____

Side 1

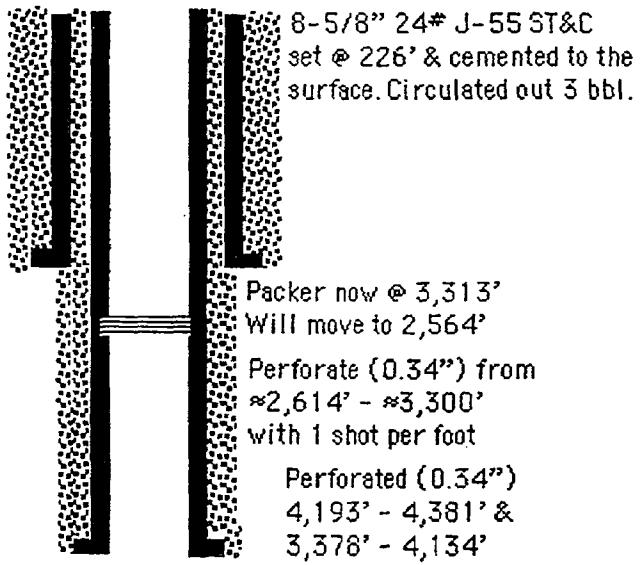
INJECTION WELL DATA SHEET

OPERATOR: ROSETTA RESOURCES OPERATING LP

WELL NAME & NUMBER: TSAH TAH SWD #36

WELL LOCATION:	1800' FNL & 1360' FWL	F	36	25 N	10 W
	FOOTAGE LOCATION	UNIT LETTER	SECTION	TOWNSHIP	RANGE

WELLBORE SCHEMATIC



WELL CONSTRUCTION DATA

Surface Casing

Hole Size: 12-1/4" Casing Size: 8-5/8" 24# J-55 ST&C

Cemented with: 200 sacks *or* 236 ft^3

Top of Cement: SURFACE Method Determine: VISUAL

Intermediate Casing

Hole Size: Casing Size:

Cemented with: _____ sacks *or* _____ ft^3

Top of Cement: _____ Method Determined: _____

Production Casing

Hole Size: 7-7/8" Casing Size: 5-1/2" 15.5# J-55 LT&C

Cemented with: 880 sacks *or* 1,571 ft^3

Top of Cement: SURFACE *Method Determine:* VISUAL

Total Depth: 4,495'

Injection Interval

From ≈2,614 feet To ≈3,300 feet

(Perforated or Open Hole; indicate which)

5

ROSETTA RESOURCES OPERATING LP
TSAH TAH SWD #36
1800' FNL & 1360' FWL
SEC. 36, T. 25 N., R. 10 W.
SAN JUAN COUNTY, NM

CLIFF HOUSE ZONE

I. Purpose is to add one more zone (Cliff House) for additional water disposal capacity. Disposal has already been approved in this well and is underway into the Point Lookout (SWD-1053) and Menefee (SWD-1053-A).

II. Operator: Rosetta Resources Operating LP
Operator phone number: (720) 359-9144
Operator address: 1200 17th St., Suite 770
Denver, CO 80202
Contact: Brian Wood (Permits West, Inc.)
Phone: (505) 466-8120

III. A. (1) Lease: State lease VO-6298-0000
Lease Size: 280.00 acres
Lease Area: NW4, SW4NE4, & S2SE4 Sec. 36, t. 25 N., R. 10 W.
Closest Lease Line: 840'
Well Name & Number: Tsah Tah SWD #36 (API # 30-045-33942)
Well Location: 1800' FNL and 1360' FWL Sec. 36, T. 25 N., R. 10 W.
(see Exhibit A)

A. (2) Surface casing (8-5/8", 24#, J-55, S T & C) was set at 226' KB in a 12-1/4" hole. Cemented to the surface with 200 sacks (236 cubic feet) Class G + 1/4 pound per sack cello flake + 2% $CaCl_2$ + 1/4 pound per sack cello flake. Circulated out 3 barrels.

Production casing (5-1/2", 15.5#, J-55, L T & C) landed at 4,490' KB in a 7-7/8" hole. Float collar is at 4,446' KB. Top of the marker joint is at 3,666' KB. Top of the stage tool is at 1,875' KB.

Cemented first stage with 410 sacks (775 cubic feet) of Type 5 65:35 poz + 6% gel + 5 pounds per sack gilsonite + 1/8 pound per sack poly flake. Tailed with 100 sacks (132 cubic feet) of Type 5 50:50 poz + 2% gel + 5 pounds per sack gilsonite + 1/8 pound per

sack poly flake. Circulated 40 barrels mud cut cement to surface.

Cemented second stage 320 sacks (605 cubic feet) Type 5 65:35 poz + 6% gel + 5 pounds per sack gilsonite + 1/8 pound per sack poly flake. Tailed with 50 sacks (59 cubic feet) Type 5 50:50 poz + 2% $CaCl_2$ + 5 pounds per sack gilsonite + 1/8 pound per sack poly flake. Circulated 25 barrels cement to the surface.

A. (3) Tubing is 2-7/8" 6.5# J-55 EUE 8rd plastic lined injection string. It will be set at ≈2,564' KB. (Cliff House disposal interval will be ≈2,614' to ≈3,300'.)

A. (4) A 5-1/2" x 2-7/8" nickel coated packer with an on/off tool or its equivalent will be set within ≈50' of the highest perforation. Thus, packer will be set at ≈2,564' which will be ≈50' above the top perforation of ≈2,614'.

B. (1) Initial disposal zones were the Point Lookout and Menefee sandstones. Rosetta plans to add the Cliff House to the disposal interval. All three zones are in the Mesa Verde Formation (Pool 96160). Fracture gradient is expected to be a normal ≈0.433 psi per foot.

B. (2) The Point Lookout has been perforated (4,193' - 4,381') with one 0.34" shot per foot. The Menefee has been perforated (3,378' - 4,134') with one 0.34" shot per foot. Upon approval, additional similar perforations will be shot in the Cliff House (≈2,614' to ≈3,300') interval.

B. (3) Well has been drilled. It has been and will be for Rosetta's exclusive use and for the sole purpose of water disposal from present and future Rosetta wells. Water analyses from three Rosetta Basin Fruitland coal gas wells within a three mile radius are attached.

B. (4) The Point Lookout has been perforated from 4,193' to 4,381' (total 376 holes). The Menefee has been perforated from 3,378' to 4,134' (total 51 holes). Upon approval, additional similar perforations will be shot in the Cliff House (≈2,614' to ≈3,300'). Currently there is a Weatherford nickel coated Arrow Set 1-X packer at 3,313' KB. It was set with 16,000 pounds compression. That packer will be moved up hole to a point ≈50' above the highest Cliff House perforation. There are no other perforations now in the well.

B. (5) Top of the Cliff House is at 2,614'. Bottom of the closest overlying potentially productive zone (Pictured Cliffs) is at ≈1,950'. There will be a ≈664' interval between the bottom of the Pictured Cliffs and the highest injection perforation.

Bottom of the Cliff House is at 3,304'. Top of the closest underlying potentially productive zone (Gallup) is at ≈5,170'. There will be a ≈1,866' interval between the bottom of the Cliff House and the top of the Gallup. Within this ≈1,866' interval are the Point Lookout and Menefee zones which are currently being used for water disposal in this same well. There is no record of oil or gas production from the Cliff House in New Mexico.

IV. This is not an expansion of an existing injection project. It is an expansion (one more zone) of an existing water disposal project.

V. A map (Exhibit B) showing the 4 existing wells (all Rosetta Tsah Tah gas wells) within a half mile radius is attached. A map (Exhibit C) showing all 67 wells (34 P & A + 28 oil or gas producers + 4 water + 1 disposal) within a two mile radius is attached. Details on the wells within a half mile are:

WELL	API #	T. 25 N., R. 10 W.	ZONE	TD	DISTANCE
Tsah Tah 36 #2	30-045-33753	SWNW Sec. 36	Fruitland coal	1,905'	430'
Tsah Tah 36 #3	30-045-34239	NESW Sec. 36	Fruitland coal	1,905'	1,950'
Tsah Tah 36 #1	30-045-34240	SWNE Sec. 36	Fruitland coal	1,941'	2,406'
Tsah Tah 35 #1	30-045-33766	SENE Sec. 35	Fruitland coal	1,908'	2,599's

Exhibit D shows all leases (all T. 25 N., R. 10 W.) within a half mile radius. Details are:

AREA	LESSOR	LEASE #	LESSEE(S)
S2 Sec. 25	BLM	NMNM- 120923	J Bar Cane
SE4 Sec. 26	Navajo Allottees	NO-G-0503-1735	XTO
NE4 Sec. 35	BLM	NMNM-112957	Rosetta
SE4 Sec. 35	BLM	NMNM-114377	Rosetta
NW4, SWNE, & S2SE4 Sec. 36	SLO	VO-6298-0000	Rosetta & Yates
SENE, NWSE, & SESW Sec. 36	SLO	EO-6644-0021	Rosetta & Kaiser-Francis
N2NE4, W2SW4, NESW, & NESE Sec. 36	SLO	EO-3148-0010	Rosetta & Speer

A map (Exhibit E) showing all lessors within a two mile radius is attached. Most leases are BLM. The remainder are Navajo allotted (FIMO) or NM State Land Office (SLO).

VI. None of the four wells which are within a 1/2 mile radius penetrate the proposed injection zone. The deepest (Rosetta's Tsah Tah 36 #1) of the three wells has a total depth of 1,941'. There will be a ≈673' interval between the bottom of that gas well and the highest proposed perforation (≈2,614').

VII.
1. Average injection rate will be ≈2,000 bwpd.
   Maximum injection rate will be ≈3,000 bwpd.
2. System is closed. (Rosetta laid water pipelines with its gas pipelines). Facilities include a tank battery with skimmer and settling tanks, filters, meter, and an injection pump.
3. Average injection pressure will be ≈550 psi
   Maximum injection pressure will be ≈552 psi (≤0.2 psi x depth of top perforation)
4. Water source will be existing and future Rosetta wells in the San Juan

Basin. Rosetta has 40 Fruitland coal gas wells in Townships 24 and 25 North, Range 10 West as of November 26, 2008. The closest (430') is the Tsah Tah 36 #2.

A water analysis from the Cliff House (Exhibit F) is attached. The Cliff House was sampled in Rosetta's Tsah Tah SWD 11 well which is ≈2-1/2 miles southwest. Produced water analyses from three Basin Fruitland coal gas wells (Exhibit G) with a 3 mile radius are also attached. A summary of the 4 analyses follows. All are Rosetta Tsah Tah wells.

Well:	2 #4	33 #2	34 #4	SWD #11
Where:	2-24n-10w	33-25n-10w	34-25n-10w	11-24n-11w
Zone Analyzed:	Fruitland	Fruitland	Fruitland	Cliff House
Parameter				
Barium	2.44	3.19	2.26	Not Analyzed
Bicarbonate	518.5	786.9	549.0	486
Calcium	800	400	960	56
Chloride	19,000	18,000	16,000	9,552
Iron	27.62	46.22	21.77	0.10
Magnesium	344.04	245.22	149.33	48
pH	7.3	6.8	7.0	8.5
Sodium	10,906	10,980	9,166	6,240
Sulfate	zero	zero	2.0	23
TDS	31,599	30,462	26,851	16,443

5. The Cliff House is not productive within two miles of the well. Searches of NMOCD and Go-Tech web sites did not find any records of oil or gas production from the Cliff House in New Mexico. Stone et al in Hydrogeology and water resources of San Juan Basin, New Mexico wrote that the Cliff House in the deeper parts of the basin probably has a specific conductance exceeding 30,000 micro mhos. This would be considered very saline.

VIII. The Cliff house is a Late Cretaceous coastal marine sandstone. The Cliff

House is ≈690' thick in this well. Top is at 2,614'. Bottom is at 3,304'. Formation tops in this well are:

Nacimiento: 0'
Ojo Alamo Sandstone: 850'
Kirtland-Fruitland Formation: 1,430'
Pictured Cliffs Sandstone: 1,752'
Cliff House Sandstone: 2,614'
Menefee: 3,304'
Point Lookout Sandstone: 4,193'
Plugged Back Total Depth: 4,446'
Total Depth: 4,496'

There are four water wells within a two mile radius (see Exhibit C). All are over 1-3/4 miles away. The maximum depth of the four water wells is 1,100'.

No existing underground drinking water sources are below the Cliff House within a two mile radius. There will be ≈1,184' of vertical separation between the bottom of the lowest existing underground water source (Ojo Alamo) and the top of the Cliff House.

IX. The Cliff House will be stimulated with 15% HCl and ≈100,000 pounds 20/40 Brady sand.

X. Gas spectrum and cased hole neutron- gamma ray logs were run. Copies were provided to the NMOCD by Blue Jet.

XI. There are no water wells within a one mile radius.

XII. Rosetta is not aware of any geologic or engineering data which may indicate the Cliff House is in hydrologic connection with any underground sources of water. There will be 1,614' of vertical separation between the top

(2,614') of the Cliff House and the bottom (1,100') of the deepest water well within ≈1-3/4 miles. This interval includes two shale zones (Kirtland and Lewis).

XIII. Notice (this application) will be sent to the surface owner (New Mexico State Land Office), operators of all wells, and lessees or lease operating right holders within a half mile.

DISTRICT I
1625 N. French Dr., Hobbs, N.M. 88240

DISTRICT II
811 South First, Artesia, N.M. 88210

DISTRICT III
1000 Rio Brazos Rd., Aztec, N.M. 87410

DISTRICT IV
2040 South Pacheco, Santa Fe, NM 87505

State of New Mexico
Energy, Minerals & Natural Resources Department

OIL CONSERVATION DIVISION
2040 South Pacheco
Santa Fe, NM 87505

Form C-102
Revised August 15, 2000

Submit to Appropriate District Office
State Lease – 4 Copies
Fee Lease – 3 Copies

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

[1] API Number	[2] Pool Code	[3] Pool Name
30-045-33942	96160	SWD; MESA VERDE

[4] Property Code	[5] Property Name	[6] Well Number
35715	TSAH TAH SWD	36

[7] OGRID No.	[8] Operator Name	[9] Elevation
239235	ROSETTA RESOURCES OPERATING LP	6745'

[10] Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
F	36	25N	10W		1800'	NORTH	1360'	WEST	SAN JUAN

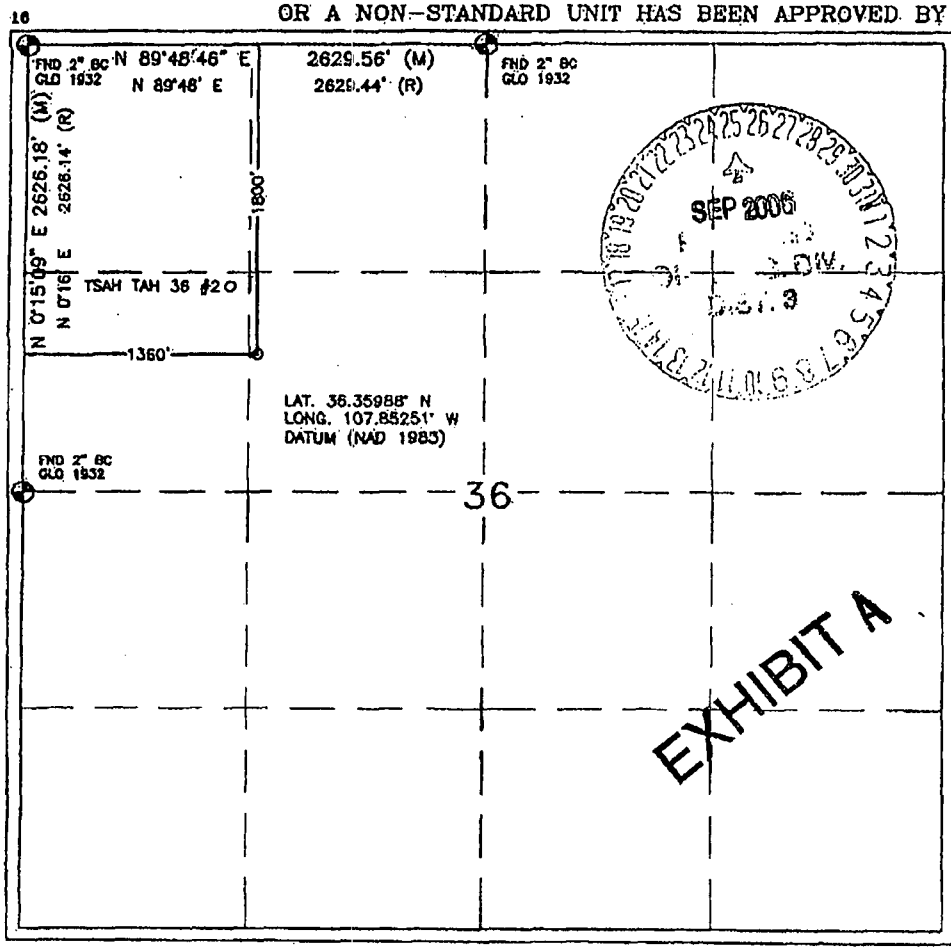
[11] Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No.

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

16



[17] OPERATOR CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief

Signature

BRIAN WOOD
Printed Name

CONSULTANT
Title

SEPT. 23, 2006
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.

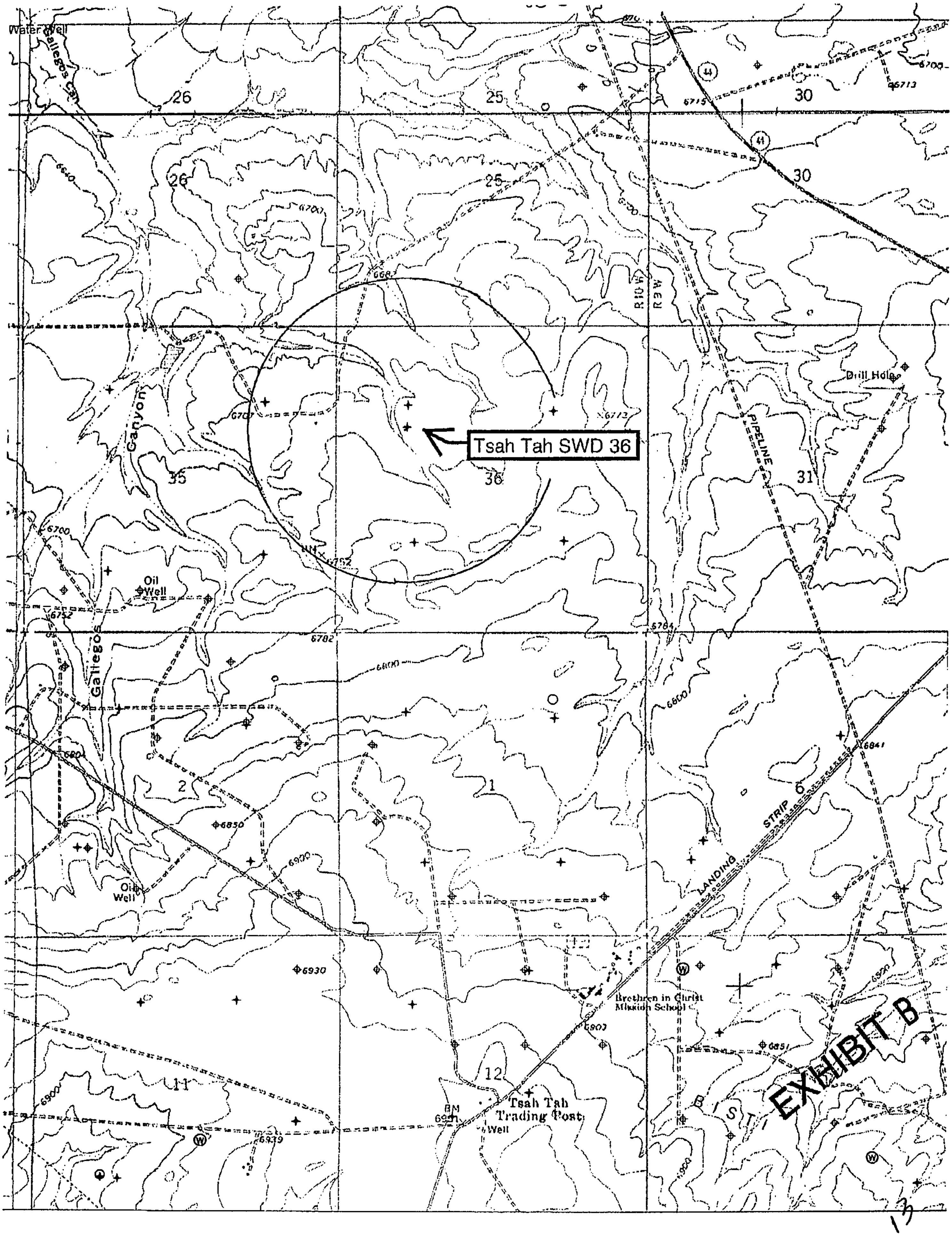
JUNE 26, 2006
Date of Survey

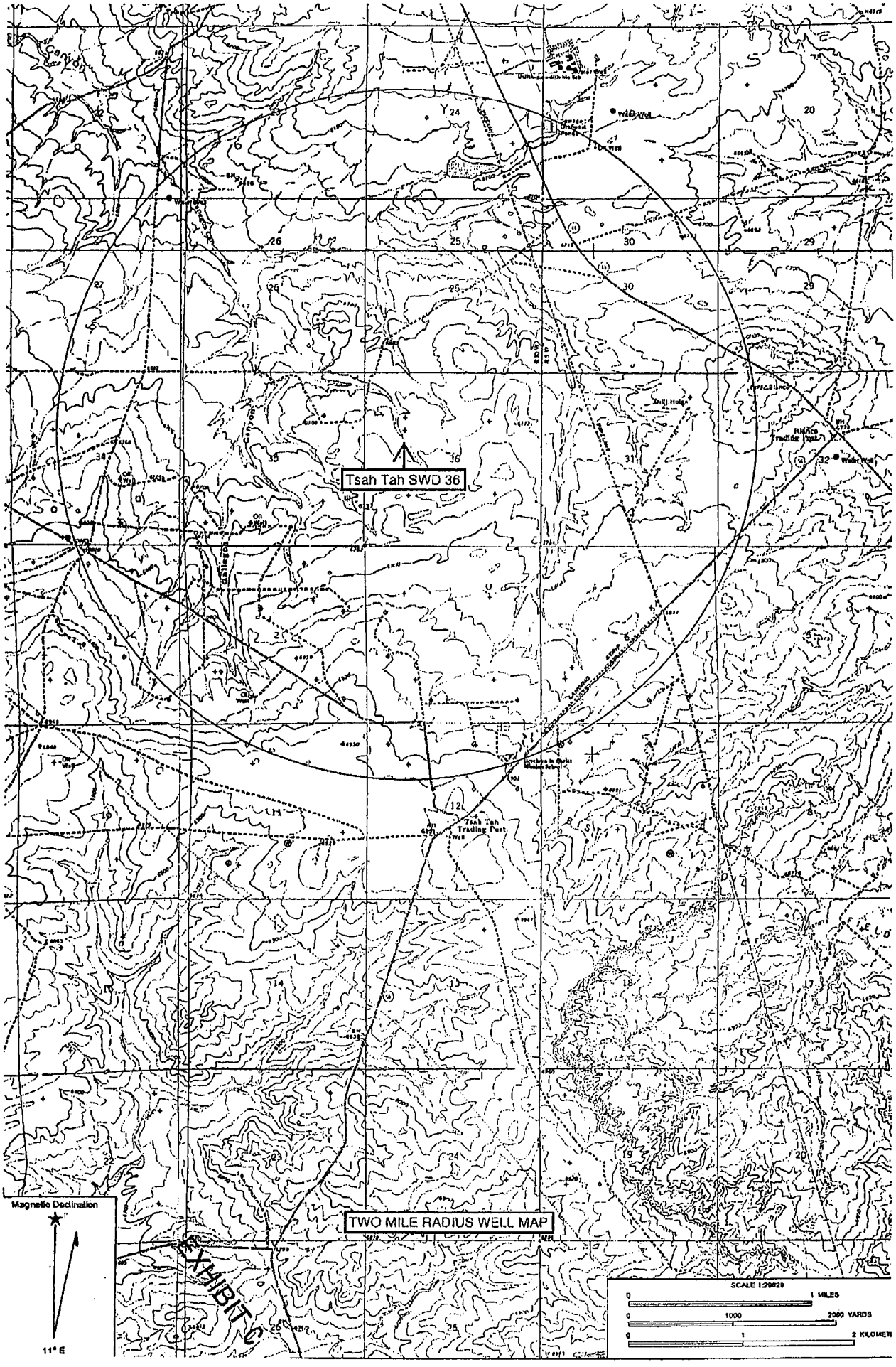
Signature and Seal of Professional Surveyor:

DAVID RUSSELL, NEW MEXICO, 10201, REGISTERED PROFESSIONAL LAND SURVEYOR

DAVID RUSSELL
Certificate Number 10201

12

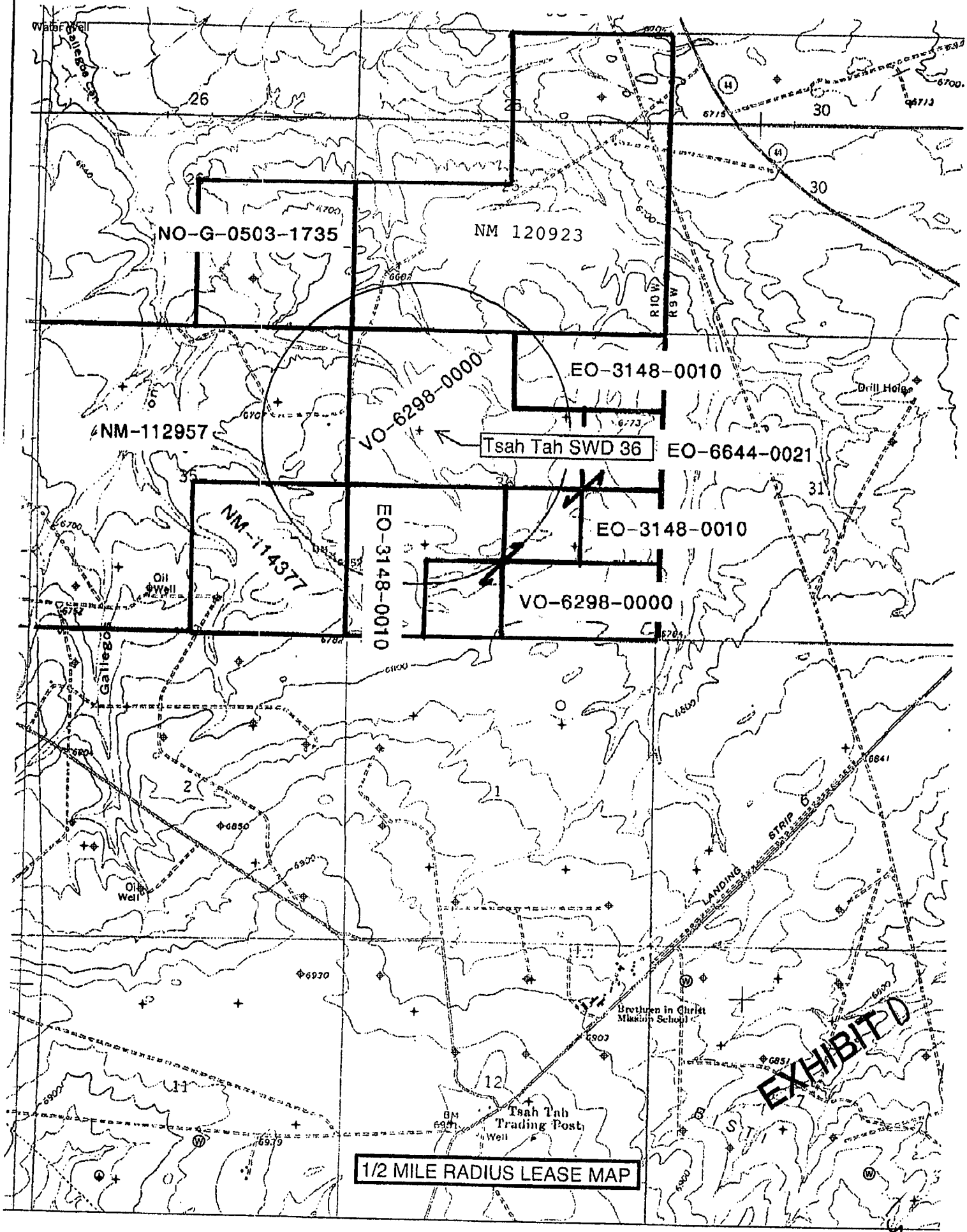

Water Well
Gallegos Can
Canyon
Gallegos
26
25
30
35
36
31
2
1
6
11
12
Tsah Tah SWD 36
R10W
R9W
PIPELINE
LANDING STRIP
Drill Hole
Oil Well
Brethren in Christ Mission School
Tsah Tah Trading Post
Well
BM
BISTI
EXHIBIT B



TWO MILE RADIUS WELL MAP

EXHIBIT C

14



1/2 MILE RADIUS LEASE MAP

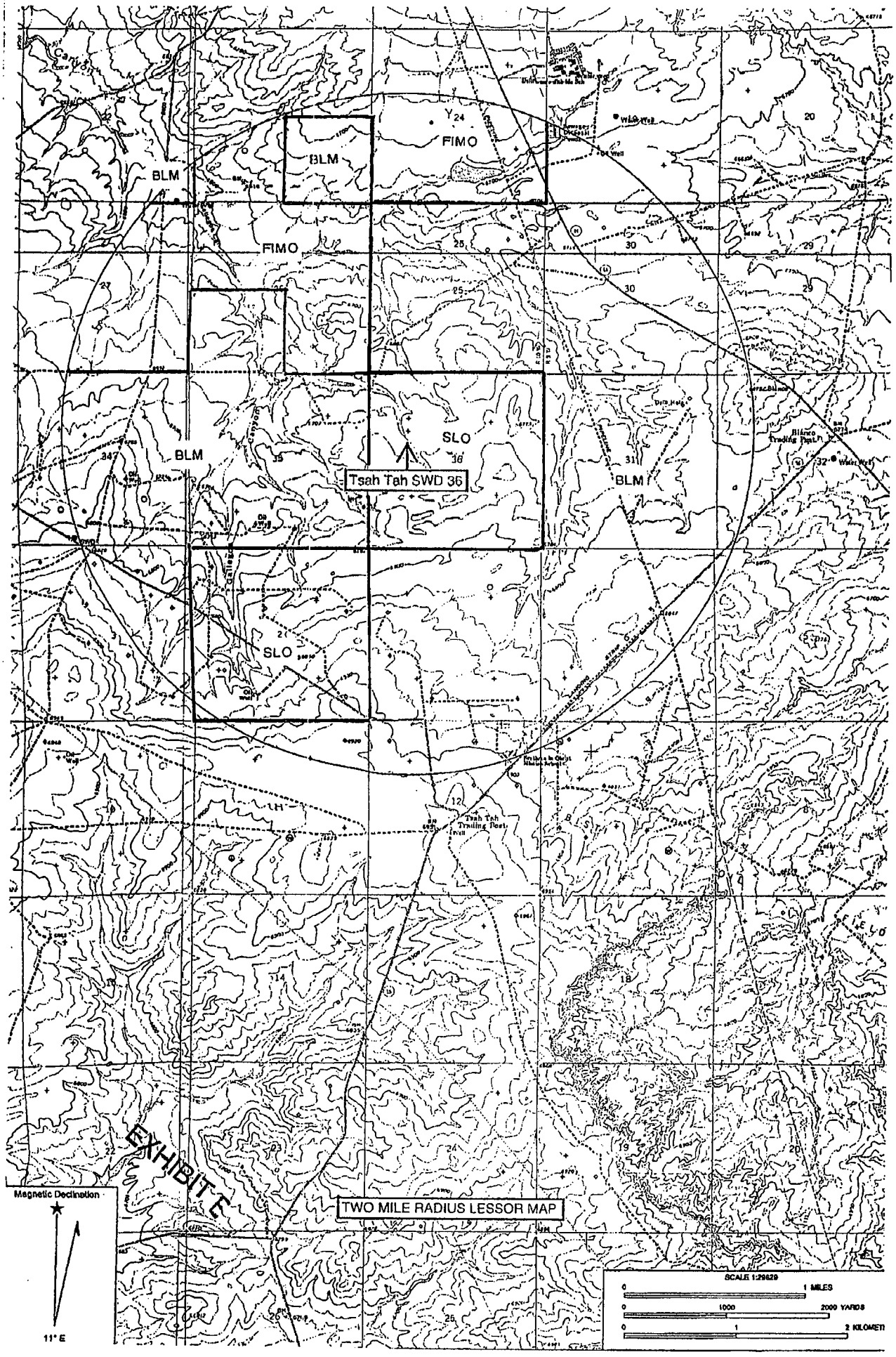


EXHIBIT E

TWO MILE RADIUS LESSOR MAP

16

Key Pressure Pumping Services

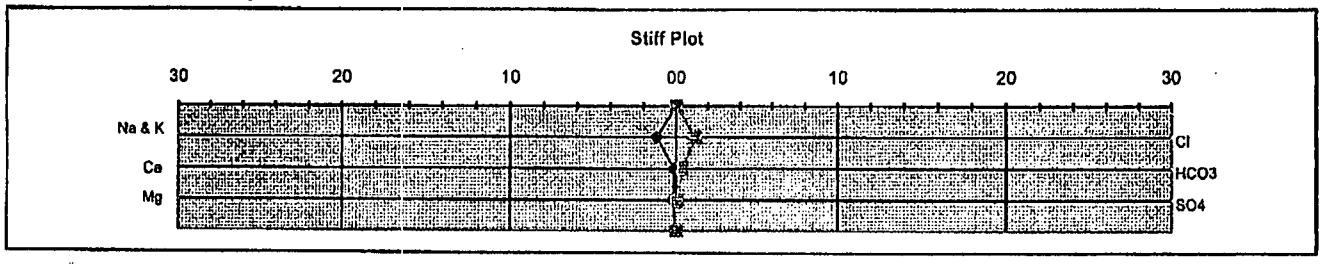
Water Analysis Result Form
Farmington, NM.
708 S. Tucker
Phone:(505)325-4192
Fax:(505)564-3524
Zip:87401

Operator:	Rosetta Resources	**Sample Date:**	March 15, 2007
		Analysis Date:	March 17, 2007
Well	Tsah Tah SWD # 11	**District:**	Farmington
Formation:	CLIFFHOUSE	**Requested By:**	RUSS McQUITTY
County:	SAN JUAN N.M.	**Technician:**	BEN BARELA
Depth:	2469	**Source:**	Swab Run #1

P H Y S I C A L A N D C H E M I C A L D E T E R M I N A T I O N

SPECIFIC GRAVITY:	1.005	59	(°F)	**S.G. (Corrected):**	1.005
pH:	8.50			**MAGNESIUM:**	48 ppm
RESISTIVITY:	0.70	ohm/meter		**CALCIUM:**	56 ppm
IRON:	0.10	ppm		**BICARBONATES:**	486 ppm
H2S:	0	ppm		**CHLORIDES:**	9552 ppm
POTASSIUM:	38	ppm		**SODIUM :**	6240 ppm
SULFATES:	23	ppm		**TDS:**	16443 ppm

CaCO3 Scale Tendency = Remote
CaSO4 Scale Tendency = Remote



Data contained in this document is based on the best information & most current test procedures and materials available. No liability is expressed or implied.

EXHIBIT F

17

Water Analysis

Analysis #: 1058

Company: Rosetta Resources

Lease: .

Location: Farmington, New Mexico

Date: January 16, 2007

Attention: Bryan Enns

Description:

Well: Tsah Tah 2 #4

Sample Point: 2 #4

MULTI-CHEM PRODUCTION CHEMICALS

DISSOLVED SOLIDS

CATIONS	mg/l	meq/l
Sodium, Na (calc)	10,906.14	474.18
Calcium, Ca	800.00	39.80
Magnesium, Mg	344.04	28.20
Barium, Ba	2.44	0.04
Iron, Fe	27.62	1.48

ANIONS	mg/l	meq/l
Hydroxyl, OH		
Carbonate, CO3		
Bicarbonate, HCO3	518.50	8.49
Sulfate, SO4	0.00	0.00
Chloride, Cl	19,000.00	535.21
Sulfide, S		

OTHER PROPERTIES

pH	7.30
Specific Gravity	1.014
Dissolved Oxygen, (Mg/l)	
Dissolved Carbon Dioxide	19.80
Sulfide as H2S, (ppm)	0.00
Sample Temp	F. 72 C. 22
CO2 In Gas Phase (Mg/l)	
H2S In Gas Phase (Mg/l)	
Total Hardness (Me/l)	68.00

Total Dissolved Solids (Mg/l)	31,599
Total Ionic Strength	0.5784
Maximum CaSO4, (calc.)	0.00
Maximum BaSO4, (calc.)	0.00
Total SRB (colonies/cc)	
Total APB (colonies/cc)	
Total Aerobic (colonies/cc)	
Manganese (Mg/l):	0.84

Conclusion:

Calcium Carbonate scaling index is positive above 9 degrees Centigrade.
Calcium Sulfate scale is not indicated from 0 to 100 degrees Centigrade.
Barium Sulfate scale is not indicated from 0 to 100 degrees Centigrade.

Remarks:

EXHIBIT G

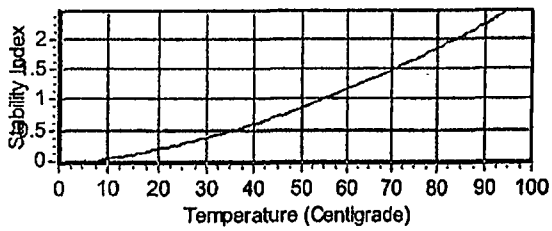
Fahrenheit Degrees: 32 85 122 167 212

(C X 1.8) + 32

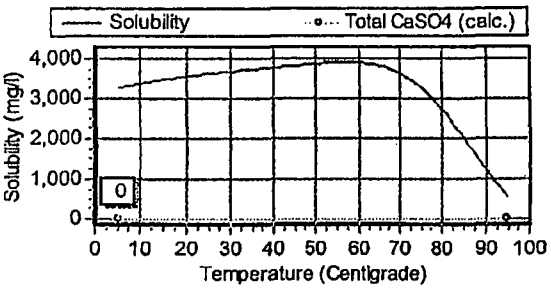
Centigrade Degrees: 0 25 50 75 100

Scaling Indices vs. Temperature

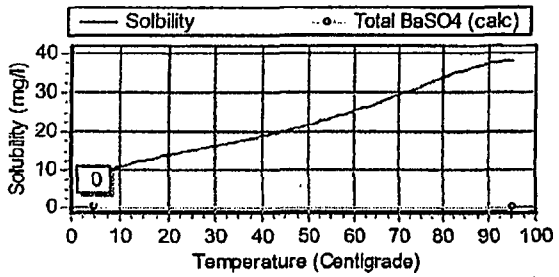
Calcium Carbonate Saturation Index



Calcium Sulfate Solubility



Barium Sulfate Solubility



Scale Trak version 2.0

18

Water Analysis

Analysis #: 1059

Date: January 16, 2007

Company: Rosetta Resources

Attention: Bryan Enns

Lease:

Description:

Location: Farmington, New Mexico

Well: Tsah Tah 33 #2

Sample Point: 33 #2

MULTI-CHEM PRODUCTION CHEMICALS

DISSOLVED SOLIDS

CATIONS	mg/l	meq/l
Sodium, Na (calc)	10,979.97	477.39
Calcium, Ca	400.00	19.90
Magnesium, Mg	245.22	20.10
Barium, Ba	3.19	0.05
Iron, Fe	46.22	2.48

ANIONS	mg/l	meq/l
Hydroxyl, OH		
Carbonate, CO3		
Bicarbonate, HCO3	786.90	12.88
Sulfate, SO4	0.00	0.00
Chloride, Cl	18,000.00	507.04
Sulfide, S		

OTHER PROPERTIES

pH	6.80
Specific Gravity	1.014
Dissolved Oxygen, (Mg/l)	
Dissolved Carbon Dioxide	7.90
Sulfide as H2S, (ppm)	0.00
Sample Temp	F. 72 C. 22
CO2 in Gas Phase (Mg/l)	
H2S in Gas Phase (Mg/l)	
Total Hardness (Me/l)	40.00

Total Dissolved Solids (Mg/l)	30,462
Total Ionic Strength	0.5402
Maximum CaSO4, (calc.)	0.00
Maximum BaSO4, (calc.)	0.00
Total SRB (colonies/cc)	
Total APB (colonies/cc)	
Total Aerobic (colonies/cc)	
Manganese (Mg/l):	0.43

Conclusion:

Calcium Carbonate scaling index is positive above 41 degrees Centigrade.
Calcium Sulfate scale is not indicated from 0 to 100 degrees Centigrade.
Barium Sulfate scale is not indicated from 0 to 100 degrees Centigrade.

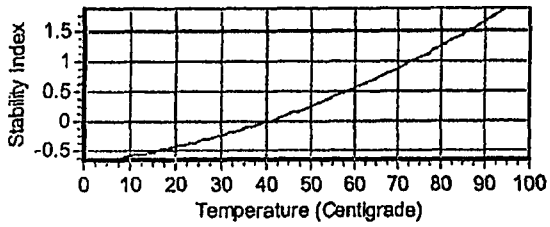
Remarks:

EXHIBIT G

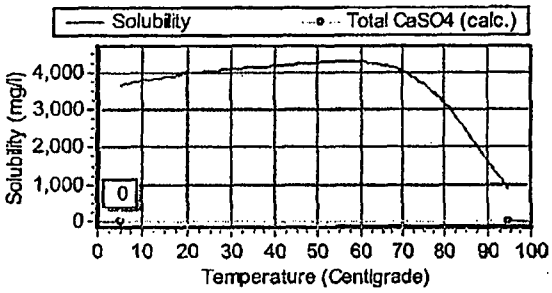
Fahrenheit Degrees 32 85 122 167 212
(C X 1.8) + 32
Centigrade Degrees 0 25 50 75 100

Scaling Indices vs. Temperature

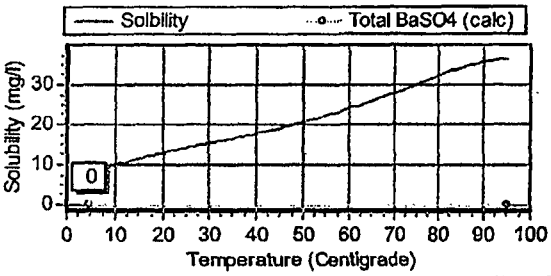
Calcium Carbonate Saturation Index



Calcium Sulfate Solubility



Barium Sulfate Solubility



Water Analysis

Analysis #: 1060

Date: January 16, 2007

Company: Rosetta Resources

Attention: Bryan Enns

Lease:

Description:

Location: Farmington, New Mexico

Well: Tsah Tah 34 #4

Sample Point: 34 #4

MULTI-CHEM PRODUCTION CHEMICALS

DISSOLVED SOLIDS

CATIONS	mg/l	meq/l
Sodium, Na (calc)	9,166.19	398.53
Calcium, Ca	960.00	47.76
Magnesium, Mg	149.33	12.24
Barium, Ba	2.26	0.03
Iron, Fe	21.77	1.17

ANIONS	mg/l	meq/l
Hydroxyl, OH		
Carbonate, CO3		
Bicarbonate, HCO3	549.00	8.99
Sulfate, SO4	2.00	0.04
Chloride, Cl	16,000.00	450.70
Sulfide, S		

OTHER PROPERTIES

pH	7.00
Specific Gravity	1.014
Dissolved Oxygen, (Mg/l)	
Dissolved Carbon Dioxide	11.90
Sulfide as H2S, (ppm)	0.00
Sample Temp	F. 72 C. 22
CO2 In Gas Phase (Mg/l)	
H2S In Gas Phase (Mg/l)	
Total Hardness (Me/l)	60.00

Total Dissolved Solids (Mg/l)	26,851
Total Ionic Strength	0.4905
Maximum CaSO4, (calc.)	2.85
Maximum BaSO4, (calc.)	3.87
Total SRB (colonies/cc)	
Total APB (colonies/cc)	
Total Aerobic (colonies/cc)	
Manganese (Mg/l):	0.26

Conclusion:

Calcium Carbonate scaling index is positive above 19 degrees Centigrade.
Calcium Sulfate scale is not indicated from 0 to 100 degrees Centigrade.
Barium Sulfate scale is indicated below 5 degrees Centigrade.

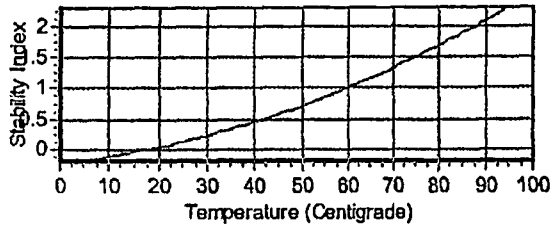
Remarks:

EXHIBIT 6

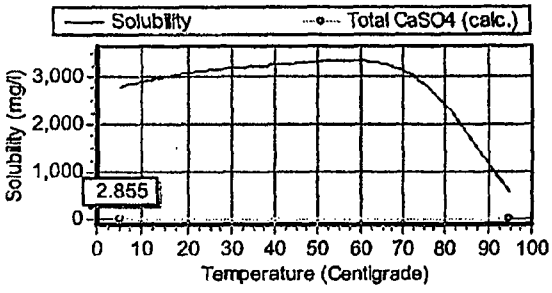
Fahrenheit Degrees: 32 85 122 167 212
(C X 1.8) + 32
Centigrade Degrees: 0 25 50 75 100

Scaling Indices vs. Temperature

Calcium Carbonate Saturation Index



Calcium Sulfate Solubility



Barium Sulfate Solubility