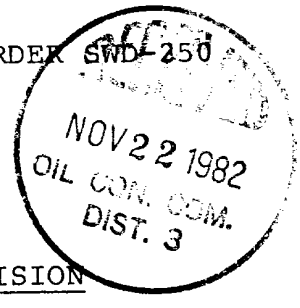
ORDER SWD-250



THE APPLICATION OF PETROLEUM ENERGY, INC. FOR A SALT WATER DISPOSAL WELL.

ADMINISTRATIVE ORDER
OF THE OIL CONSERVATION DIVISION

Under the provisions of Rule 701(B), Petroleum Energy, Inc. made application to the New Mexico Oil Conservation Division on September 29, 1982, for permission to complete for salt water disposal its Barbara Kay Well No. 3 located in Unit B of Section 19, Township 27 North, Range 19 West, NMPM, San Juan County, New Mexico.

The Division Director finds:

(1) That application has been duly filed under the provisions of Rule 701(B) of the Division Rules and Regulations;

(2) That satisfactory information has been provided that all offset operators and surface owners have been duly notified; and

(3) That the applicant has presented satisfactory evidence that all requirements prescribed in Rule 701 will be met.

(4) That no objections have been received within the waiting period prescribed by said rule.

IT IS THEREFORE ORDERED:

That the applicant herein, Petroleum Energy, Inc. is hereby authorized to complete its Barbara Kay Well No. 3, located in Unit B of Section 19, Township 27 North, Range 19 West, NMPM, San Juan County, New Mexico, in such a manner as to permit the injection of salt water for disposal purposes into the Barker Creek-Penn formation at approximately 5882 feet to approximately 5916 feet through 2 3/8 inch plastic lined tubing set in a packer located at approximately 5850 feet.

IT IS FURTHER ORDERED:

That the operator shall take all steps necessary to ensure that the injected water enters only the proposed injection interval and is not permitted to escape to other formations or onto the surface.

That the casing-tubing annulus shall be loaded with an inert fluid and equipped with a pressure gauge at the surface or left open to the atmosphere to facilitate detection of leakage in the casing, tubing, or packer.

That the injection well or system shall be equipped with a pressure limiting device which will limit the wellhead pressure on the injection well to no more than 1175 psi.

That the Director of the Division may authorize an increase in injection pressure upon a proper showing by the operator of said well that such higher pressure will not result in migration of the injected fluid from the Barker Creek-Penn formation.

That the operator shall notify the supervisor of the Aztec district office of the Division of the date and time of the installation of disposal equipment so that the same may be inspected.

That the operator shall immediately notify the supervisor of the Division's Aztec district office of the failure of the tubing, casing, or packer, in said well or the leakage of water from or around said well and shall take such steps as may be timely and necessary to correct such failure or leakage.

PROVIDED FURTHER, That jurisdiction of this cause is hereby retained by the Division for such further order or orders as may seem necessary or convenient for the prevention of waste and/or protection of correlative rights; upon failure of applicant to comply with any requirement of this order after notice and hearing, the Division may terminate the authority hereby granted in the interest of conservation. That applicant shall submit monthly reports of the disposal operations in accordance with Rule 706 and 1120 of the Division Rules and Regulations.

Approved at Santa Fe, New Mexico, on this 15th day of November, 1982.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

JOE D. RAMEY,
Division Director

S E A L

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

OIL CONSERVATION DIVISION
POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501

FORM C-108
Revised 7-1-81

RECEIVED
SEP 28 1982
OIL CON. DIV.
DIST. 3

APPLICATION FOR AUTHORIZATION TO INJECT

I. Purpose: ☐ Secondary Recovery ☐ Pressure Maintenance ☒ Disposal ☐ Storage
Application qualifies for administrative approval? ☒ yes ☐ no

II. Operator: PETROLEUM ENERGY, INC.

Address: P.O. BOX 2121 DURANGO, COLORADO 81301

Contact party: MR. JAY D. MAGNESS Phone: 303-259-3238

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 _____.

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 geological data on the injection zone including appropriate lithologic detail, geological 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 source 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 source of drinking water.

XIII. Applicants must complete the "Proof of Notice" section on the reverse side of this form.
See Affidavit of Publication, Affidavit of Mailing, both attached hereto and incorporated herein by reference.

XIV. Certification
See letter dated Sept. 15, 1982, from Navajo Nation Operating Agreement, attached to application.
I hereby certify that the information submitted with this application is true and correct to the best of my knowledge and belief.

Name: _____ Title Agent for PETROLEUM ENERGY, INC.

Signature: _____ Date: SEPTEMBER 23, 1982

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

AFFIDAVIT OF PUBLICATION

No. 12081

STATE OF NEW MEXICO,
County of San Juan:

Deborah Walker being duly sworn, says: That he is the Sec. to the Publisher of THE FARMINGTON 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 FARMINGTON 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 One ~~consecutive~~ (day~~s~~) (~~weeks~~) on the same day as follows:

First Publication ~~Saturday~~ Mon., September 20, 1982

Second Publication ______

Third Publication ______

Fourth Publication ______

and that payment therefor in the amount of $ 9.57 has been made.

Deborah Walker

Subscribed and sworn to before me this 20th day of September, 1982.

Tamara M. A. Bumby
NOTARY PUBLIC, SAN JUAN COUNTY, NEW MEXICO

My Commission expires: 10/20/84

Copy of Publication

[illegible] NOTICE
PETROLEUM ENERGY [illegible]
La Posta Road [illegible]
[illegible]
Durango, Colorado 81301 [illegible]
[illegible] is Jay D. Magness, telephone number is (303) 259-3232), proposes to [illegible] the following described well as a [illegible] disposal injection well:

The well is Barbara Kay Well 3, located on the Navajo Reservation, 990 feet from the North line and 2225 feet from the East line of Section 19, Township 27 North, Range 19 West, County of San Juan, State of New Mexico. The name of the injection formation is the Barker Creek Formation at a depth of 5806 feet to 5930 feet. The expected maximum injection rate is 500 barrels of water per day. The expected maximum injection pressure is 2000 psi.

Interested parties must file objections or requests for hearing with the state of New Mexico Oil Conservation Division, P.O. Box 2088, Santa Fe, New Mexico 87501, within fifteen (15) days from the date of publication of this notice.

Legal No 12081 published in the Farmington Daily Times, Farmington, New Mexico on Monday, September 20, 1982.

RECEIVED
SEP 28 1982
OIL CON. COM.
DIST. 3

APPLICATION FOR AUTHORITY TO INJECT

PETROLEUM ENERGY, INC.

BARBARA KAY-3 WELL

AFFIDAVIT OF MAILING

STATE OF COLORADO
COUNTY OF LA PLATA

Larry L. Sweringen, being of lawful age and being first duly sworn upon oath, deposes and says, that he personally deposited in the United States Mail, Return Receipt Requested, a true copy of the within Application for Authorization to Inject, addressed to each of the following persons at their last known addresses shown below:

State of New Mexico Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico 87501

Mr. Frank Chavez
Oil and Gas Conservation
1000 Rio Brazos Road
Aztec, New Mexico 87401

The Navajo Tribe of Indians
Minerals Department
P. O. Box 146
Window Rock, Arizona 86515

on the 27th day of Septemeber, 1982

Larry L. Sweringen

Subscribed and sworn before me this 27th day of September, 1982.

My commission expires: May 6, 1986.

PATRICIA J. REBER
NOTARY PUBLIC
STATE OF COLORADO

Notary Public

Address

City and State

THE NAVAJO NATION
WINDOW ROCK, NAVAJO NATION (ARIZONA) 86515

PETER MACDONALD
CHAIRMAN, NAVAJO TRIBAL COUNCIL

FRANK E. PAUL
VICE CHAIRMAN, NAVAJO TRIBAL COUNCIL

15 September 1982

Mr. Jay D. Magness
Petroleum Energy, Inc.
P. O. Box 2121
Durango, CO 81301

SUBJECT: Operating Committee Meeting W/Petroleum Energy, Inc.

Dear Mr. Magness:

A meeting of the Operating Committee was held in the office of the Minerals Department at Window Rock, Arizona on September 15, 1982. The Operating Committee reviewed recommendations and proposals of Petroleum Energy, Inc. and by this letter directs the Petroleum Energy, Inc. to proceed in an expeditious manner to do the following:

1) Recomplete Well 1-20 as a Barker Creek oil well and as a Mississippian gas and oil well. The Committee approves an exception to the well location requirements and of non-standard locations for the Mississippian gas wells 1-20 and Barbara Kay-1.

2) Subject to any other necessary approvals, approval is granted for 320 acre spacing for the S/2 of Section 20, T27N, R19W, N.M.P.M., San Juan County, New Mexico, with the Barker Creek and Mississippian productions from Well 1-20 and Barbara Kay-1 well allocated to the S/2 of Section 20.

3) Petroleum Energy, Inc. shall test oil and gas production rates from the Barker Creek and Mississippian formations to determine a reasonable basis for allocating the commingled production to the respective formations.

4) A ninety (90) day extension of time to dispose of salt water produced from existing Petroleum Energy, Inc. wells into the existing surface pits is granted, subject to the approval of Minerals Management Services.

5) Petroleum Energy, Inc. shall file an application for conversion of the Barbara Kay-3 well into a salt water disposal well with all appropriate agencies for their consideration and approval.

6) Petroleum Energy, Inc. will file an application for pipeline rights-of-way and gathering system from Well 1-20 to the

Barbara Kay-3 well and from Section 6, as shown on the attached plat and shall secure all necessary approvals of rights-of-way across the Operating Agreement Service Area Lands for the water disposal pressure maintenance and low pressure gas collection pipeline system. Petroleum Energy, Inc. shall follow all normal and usual rights-of-way acquisition procedures.

If you have any questions, please advise.

Sincerely,

OPERATING COMMITTEE

Al Henderson, Chairman

Khaled Ferfera, Member

Ram Das, Member

PETROLEUM ENERGY, INC.

By _____
Jay D. Magness, Agent

PETROLEUM ENERGY, INC.

APPLICATION FOR AUTHORIZATION TO USE BARBARA KAY-3

WELL AS A WATER DISPOSAL WELL

1. OPERATOR:

PETROLEUM ENERGY, INC.
P.O. BOX 2121
DURANGO, COLORADO 81301
CONTACT PARTY: Jay D. Magness TELEPHONE: (303)-259-3232

2. SUMMARY OF WATER DISPOSAL PLAN:

(A) PETROLEUM ENERGY, INC., proposes to install a closed salt water disposal system that will service the Operating Agreement Lands, Navajo Lease NOO-C-14-20-4157 and Navajo Lease NOO-C-14-20-4158. The system will consist of the following elements:

(1) Holding tanks near the well head for temporary storage and measurement.
(2) A pressurized pipeline system to convey the salt water from the tanks to the disposal well.
(3) A holding tank at the disposal well to temporarily hold the water for injection.
(4) An injection well located on the Navajo Business Lease Site at Well Barbara Kay-3.

(B) The proposed location of the elements of the disposal system are set forth on the map attached hereto as Exhibit "A".

(C) The system will consist of a pipeline from Well 1-5 (farthest South well) to Well Barbara Kay-3. The Barbara Kay-3 well will be recompleted as a disposal well. The Barker Creek Zone of the Barbara Kay-3 well will be used for disposal purposes because it contains water of such poor quality that there is no practical use for it. The Barbara Kay-3 Well is down dip from the producing Barker Creek oil zone and the injection of the water should assist in maximizing production by pressure maintenance from the Barker Creek oil wells.

3. DISPOSAL WELL DATA:

(A) Navajo - Petroleum Energy, Inc., Operating Agreement formerly within Navajo Lease NOO-C-14-20-2976. A copy of the original Completion Report is attached hereto as Exhibit "B".

(B) Well Number: Barbara Kay-3

(C) Well Location: 990' from North line and 2225' from East line, Section 19, T27N, R19W, County of San Juan, State of New Mexico.

(D) Casing String:

(1) Casing String 4½"/10.5# J-55 Quality Casing will be set at total depth (est. 6299') with 300 sacks of 50/50 Pos. cement. Temperature survey or bond log will be used to determine cement top.

(E) Tubing to be used:

(1) Size: 2 3/8"
(2) Lining material: Plastic lined
(3) Setting depth: 5832 will be the Packer
(4) Corrosion inhibitor fluid to be placed in the tubing casing annulus: Corrosion inhibitor fluid will be placed in the tubing-casing annulus.

(F) Packer:

(1)	Name:	Barker
(2)	Model:	R-3 Production Packer
(3)	Setting Depth:	5850'

4. INJECTION INFORMATION:

(A) Name of injection formation: Barker Creek
(B) Field or pool name: Beautiful Mountain-Barker Creek
(C) Injection Interval: 5882' to 5916'
Perforated or open hole: Perforated 2 shots per foot
(D) Original purpose of well: Oil Well
(E) Depths of any other perforated intervals: None
(F) Depth to and name of next higher and next lower oil or gas zone in the area of the well: Next higher oil or gas zone is the Organ Rock gas zone at a depth of 3847' (top). Next lower oil or gas zone is the Mississippian gas zone located approximately at 6168' (top).

5. DATA ON PROPOSED NEW LOCATION:

(A) Proposed average and maximum daily rate and volume of fluids to be injected are as follows:

Daily Average:	200 BWPD
Maximum Rate:	500 BWPD

(B) The system will be a closed system.
(C) The proposed average and maximum injection pressures are as follows:

Average:	1000
Maximum:	2000

(D) The sources and analysis of the injection fluid and compatibility with the receiving formation are as follows:

(1) The initial sources of injection fluid are as follows:

Leases:

NOO-C-14-20-4157: Navajo 1-5
2035' from the West line and 1650' from the North line of Section 5, T26N, R19W, N.M.P.M., San Juan County, New Mexico.

NOO-C-14-20-4158: Navajo 1-32
660' from the South line and 2150' from the East line of Section 32, T27N, R19W, N.M.P.M., San Juan County, New Mexico.

Navajo 2-32
1050' from the North line and 1610' from the East line of Section 32, T27N, R19W, N.M.P.M., San Juan County, New Mexico.

Operating Agreement:

Navajo 2-29
1980' from the North line and 660' from the East line of Section 29, T27N, R19W, N.M.P.M., San Juan County, New Mexico.

Navajo 3-29
2230' from the South line and 1780' from the East line of Section 29, T27N, R19W, N.M.P.M., San Juan County, New Mexico.

Navajo 1-20
1190' from the South line and 2510' from the East line of Section 20, T27N, R19W, N.M.P.M., San Juan County, New Mexico.

(2) Water analysis report forms for the above wells are attached hereto as Exhibits "C", "D", "E", "F", "G" and "H" respectively.

(3) An analysis will be made of the water from the Barker Creek zone of Disposal Well Barbara Kay-3 as soon as the Barker Creek zone is reopened. It is anticipated that the quality of the Barker Creek water in the disposal well will be similar to the quality of the water in the source wells, all being of such poor quality as to eliminate any practical use thereof.

6. PROPOSED STIMULATION PROGRAM:

To be determined after Barker Creek zone is reopened.

7. GEOLOGICAL DATA ON INJECTION ZONE:

(A) Geological name: Lower Barker Creek Zone; Paradox formation, Pennsylvaninan Age

(B) Thickness: Overall 34'; effective 20'

(C) Depth: 5846' to 5930'; effective 5882' to 5886' and 5900' to 5916'

8. GEOLOGICAL DATA ON UNDERGROUND DRINKING WATER:

(A) Underground sources of drinking water overlying the proposed injection zones:
Geological name and Depth to bottom:

Entrada 1546' to 1592'
DeChelly 3205' to 3307'

(B) Sources immediately underlying injection zone: None

(C) No known fresh water wells, springs or reservoirs are located within one mile of the injection or disposal well. A chemical analysis of fresh water from one producing fresh water well and one fresh water reservoir, both located within two miles of the injection or disposal well are attached hereto as Exhibits "I" and "J".

(D) Applicant states that he has examined available geological and engineering data and has found no evidence of open faults or any other hydrological connection between the disposal zone and any underground source of drinking water.

9. MONITORING SYSTEM AND SHUT-IN MEASURES:

(A) Monitoring System: The system will consist of a pressure gauge at the well-head that will show any change of pressure in the tubing-casing annulus.

(B) Shut-in Measures: If it becomes necessary to shut-in the disposal system, the following measures will be taken:

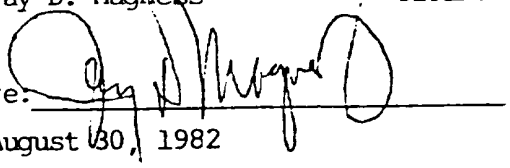
(1) Shut down injection pumps.
(2) Check tanks to see if adequate storage space is available.
(3) Shut down wells if storage is not available.

10. SCHEMATIC DIAGRAM OF BARBARA KAY-3 WELL: Attached hereto as Exhibit "K".

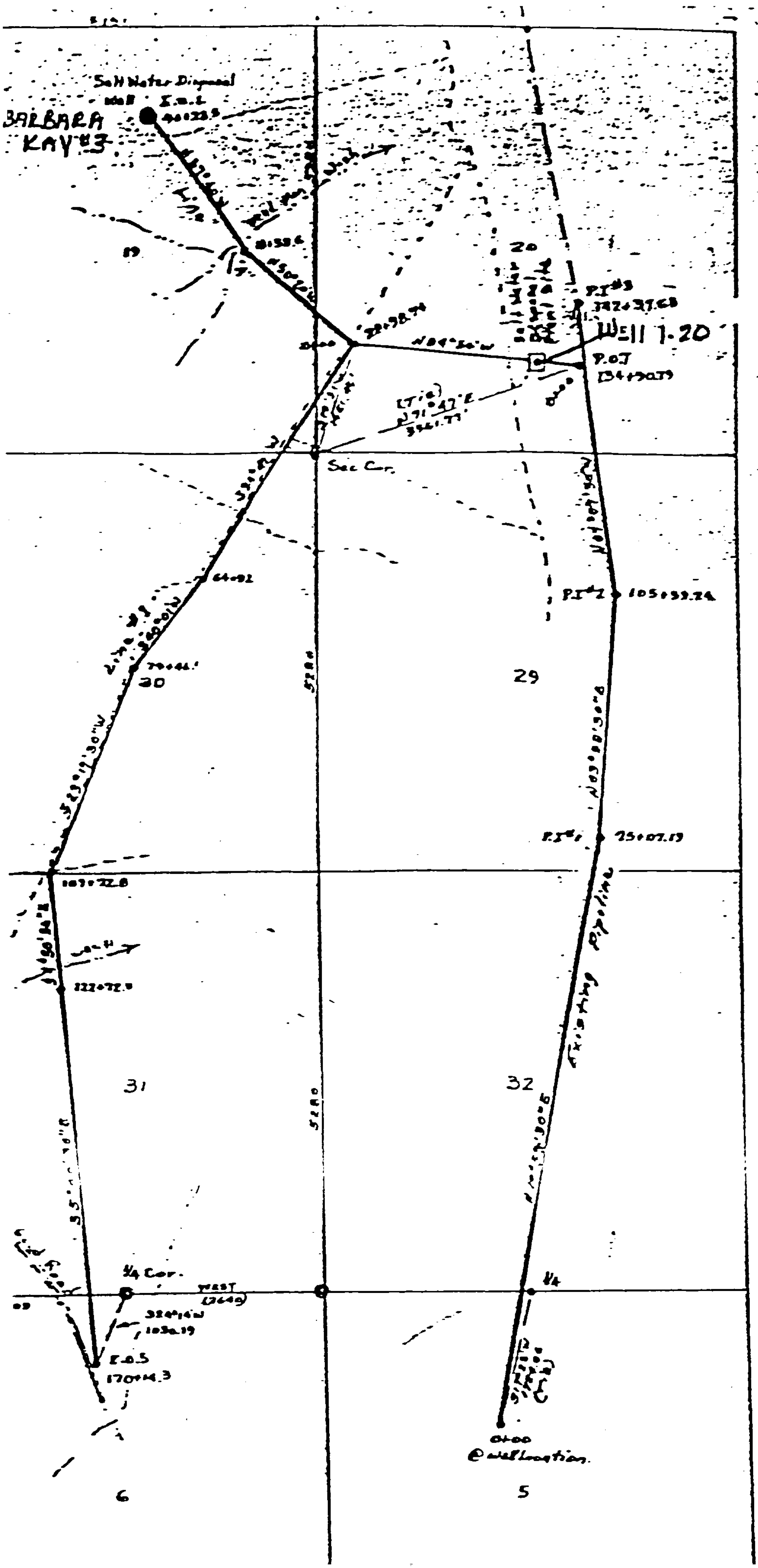
11. CERTIFICATION:

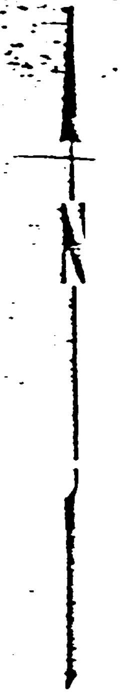
I hereby certify that the information submitted with this application is true and correct to the best of my knowledge and belief.

NAME: Jay D. Magness TITLE: Agent for PETROLEUM ENERGY, INC.

Signature: 

Date: August 30, 1982





Scale: 1"=2000

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thence [illegible]
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thence S29°19'30"W, 2[illegible]
thence S02°50'30"E, 1599.5' to
thence S35°00'30"E, 1712.0' to

EXHIBIT "A"
MAP OF SYSTEM

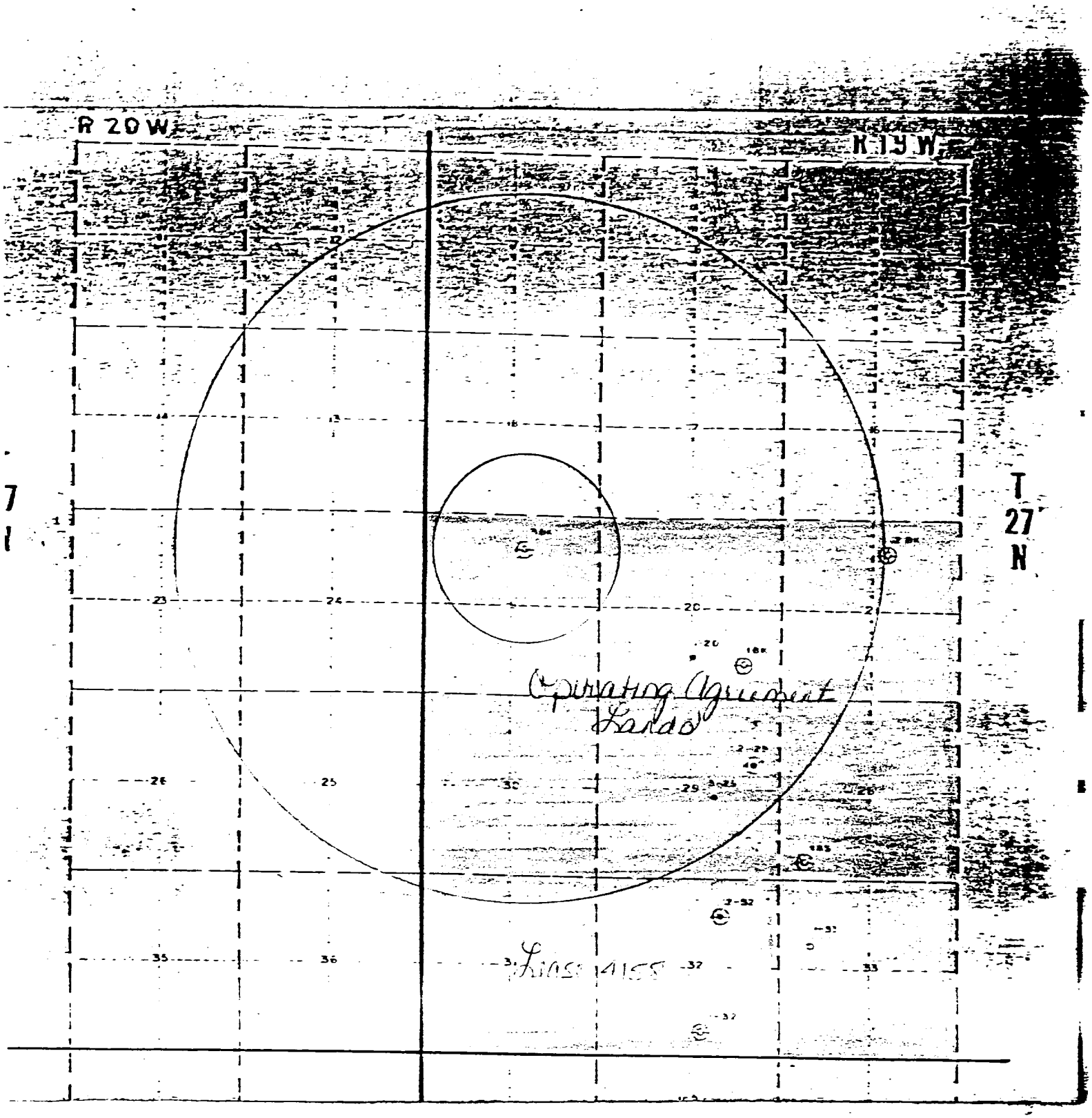


EXHIBIT "A-1"
EXISTING WELLS AND AREA OF REVIEW

DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

WELL COMPLETION OR RECOMPLETION REPORT AND LOG*

5. LEASE DESIGNATION AND SERIAL NO.	NOO-C-4-20-2976
6. IF INDIAN, ALLOTTEE OR TRIBE NAME	Navajo
7. UNIT AGREEMENT NAME	
8. FARM OR LEASE NAME	Barbara Kay
9. WELL NO.	3
10. FIELD AND POOL, OR WILDCAT	Wildcat
11. SEC., T., R., M., OR BLOCK AND SURVEY OR AREA	Sec. 19, T27N, R19W
12. COUNTY OR PARISH	San Juan
13. STATE	N.M.

1a. TYPE OF WELL: OIL WELL [X] GAS WELL [ ] DRY [ ] Other

1b. TYPE OF COMPLETION: NEW WELL [X] WORK OVER [ ] DEEP-EN [ ] PLUG BACK [ ] DIFF. RESVR. [ ] Other

2. NAME OF OPERATOR: Northwest Pipeline Corporation

3. ADDRESS OF OPERATOR: P.O. Box 90 Farmington, New Mexico 87401

4. LOCATION OF WELL (*Report location clearly and in accordance with any State requirements*)*
At surface: 990' FNL and 2225' FEL
At top prod. interval reported below
At total depth: As Above

14. PERMIT NO.	DATE ISSUED

15. DATE SPUDDED	16. DATE T.D. REACHED	17. DATE COMPL. (*Ready to prod.*)	18. ELEVATIONS (DF, RKB, RT, GR, ETC.)*	19. ELEV. CASINGHEAD
10-19-75	11-13-75	P&A	5762' GR	

20. TOTAL DEPTH, MD & TVD	21. PLUG, BACK T.D., MD & TVD	22. IF MULTIPLE COMPL., HOW MANY*	23. INTERVALS DRILLED BY	ROTARY TOOLS	CABLE TOOLS
6299'			→	All	

24. PRODUCING INTERVAL(S), OF THIS COMPLETION—TOP, BOTTOM, NAME (MD AND TVD)*

25. WAS DIRECTIONAL SURVEY MADE: No

26. TYPE ELECTRIC AND OTHER LOGS RUN: Dil, Sonic-Gamma Ray Caliper and Density

27. WAS WELL CORED: Yes

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

CASING SIZE	WEIGHT, LB./FT.	DEPTH SET (MD)	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
13 3/8"	48	156'	17 1/4"	140 sks.	
8 5/8"	24	1379'	12 1/4"	625 sks.	

29. LINER RECORD

SIZE	TOP (MD)	BOTTOM (MD)	SACKS CEMENT*	SCREEN (MD)

30. TUBING RECORD

SIZE	DEPTH SET (MD)	PACKER SET (MD)

31. PERFORATION RECORD (*Interval, size and number*)

32. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC.

DEPTH INTERVAL (MD)	AMOUNT AND KIND OF MATERIAL USED

PRODUCTION

DATE FIRST PRODUCTION	PRODUCTION METHOD (*Flowing, gas lift, pumping—size and type of pump*)	WELL STATUS (*Producing or shut-in*)

DATE OF TEST	HOURS TESTED	CHOKE SIZE	PROD'N. FOR TEST PERIOD →	OIL—BBL.	GAS—MCF.	WATER—BBL.	GAS-OIL RATIO

FLOW. TUBING PRESS.	CASING PRESSURE	CALCULATED 24-HOUR RATE →	OIL—BBL.	GAS—MCF.	WATER—BBL.	OIL GRAVITY-API (CORR.)

34. DISPOSITION OF GAS (*Sold, used for fuel, vented, etc.*)

TEST WITNESSED BY

35. LIST OF ATTACHMENTS

36. I hereby certify that the foregoing and attached information is complete and correct as determined from all available records

SIGNED D. H. Maroncelli D.H. Maroncelli TITLE Production Engineer DATE 5/20/76

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

COMPLETION REPORT

DWL-481-2-A

DOWELL DIVISION OF THE DOW CHEMICAL COMPANY

DENVER REGION
API WATER ANALYSIS REPORT FORM

LABORATORY LOCATION: CASPER

DATE: March 16, 1982

LAB NO.: CL 10325-5

Company: Petroleum Energy			Sample No.: 58456	Date Sampled:
Field	Legal Description		County or Parish: San Juan	State: N. Mex.
Lease or Unit	Well: 1-5	Depth	Formation	Water, B/D
Type of Water (Produced, Supply, etc.)	Sampling Point			Sampled By

DISSOLVED SOLIDS

CATIONS	mg/l	me/l
Sodium, Na (calc.)	63227	2782.0
Calcium, Ca	19000	950
Magnesium, Mg	0	
Barium, Ba		

ANIONS		
Chloride, Cl	130000	3640.0
Sulfate, SO_4	1000	20.0
Carbonate, CO_3	4500	720
Bicarbonate, HCO_3		

Total Dissolved Solids (calc.): 217727

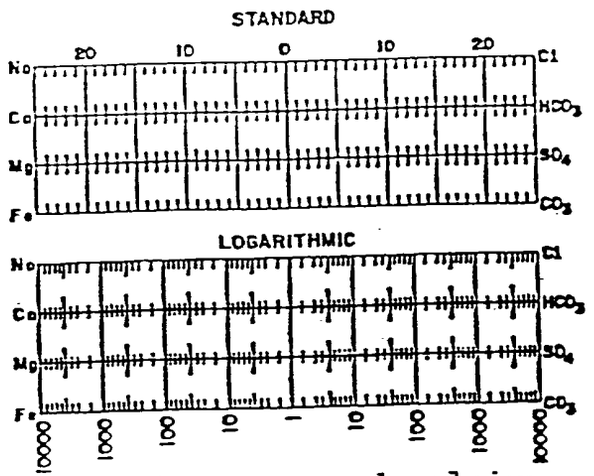
Iron, Fe (total): 300

Sulfide, as H_2S:

OTHER PROPERTIES

pH	5.8
Specific Gravity, 60/60 F.	1.086
Resistivity (ohm-meters) ____ F.	

WATER PATTERNS — me/l



REMARKS & RECOMMENDATIONS: Calculations indicate a tendency toward calcium carbonate deposition; however, no calcium sulfate deposition is indicated.

EXHIBIT "D"

DWL-4851-2-A

DO WELL DIVISION OF THE DOW CHEMICAL COMPANY

DENVER REGION

LABORATORY LOCATION: CASPER

API WATER ANALYSIS REPORT FORM

DATE: March 16, 1982

LAB NO.: CL 10325-4

Company	Sample No.	Date Sampled
Petroleum Energy	58456	

Field	Legal Description	County or Parish	State
		San Juan	N. Mex.

Lease or Unit	Well	Depth	Formation	Water, B/D
	1-32			

Type of Water (Produced, Supply, etc.)	Sampling Point	Sampled By

DISSOLVED SOLIDS

CATIONS	mg/l	me/l
Sodium, Na (calc.)	55102	2424.5
Calcium, Ca	18000	900.0
Magnesium, Mg	1200	96.0
Barium, Ba		

ANIONS	mg/l	me/l
Chloride, Cl	12000	3360.0
Sulfate, SO_4	625	12.5
Carbonate, CO_3	0	
Bicarbonate, HCO_3	3000	48.0

Total Dissolved Solids (calc.) 181727

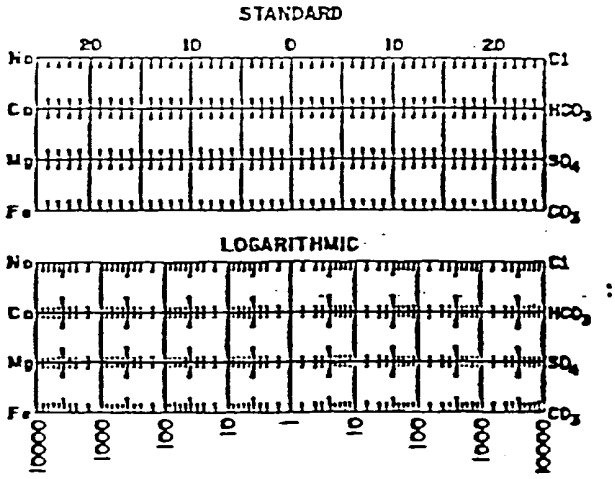
Iron, Fe (total) 500

Sulfide, as H_2S

OTHER PROPERTIES

pH	5.2
Specific Gravity, 60/60 F.	1.084
Resistivity (ohm-meters) F.	

WATER PATTERNS — me/l



REMARKS & RECOMMENDATIONS: Calculations indicate a tendency toward calcium carbonate deposition; however, no calcium sulfate deposition is indicated.

EXHIBIT "D"

EXHIBIT "E"

WL-481-2-A

DOWELL DIVISION OF THE DOW CHEMICAL COMPANY

DENVER REGION

API WATER ANALYSIS REPORT FORM

LABORATORY LOCATION: CASPER

DATE: March 16, 1982

LAB NO.: CL 10325-3

Company: Petroleum Energy			Sample No.: 58456	Date Sampled:
Field:	Legal Description:		County or Parish: San Juan	State: N. Mex.
Lease or Unit:	Well: 2-32	Depth:	Formation:	Water, B/D:
Type of Water (Produced, Supply, etc.):	Sampling Point:			Sampled By:

DISSOLVED SOLIDS

CATIONS	*mg/l*	*me/l*
Sodium, Na (calc.)	25005	1100.2
Calcium, Ca	1900	95.0
Magnesium, Mg	510	40.8
Barium, Ba		

ANIONS		
Chloride, Cl	36000	1008.0
Sulfate, SO_4	5000	100.0
Carbonate, CO_3	0	
Bicarbonate, HCO_3	800	12.8

Total Dissolved Solids (calc.): 61215

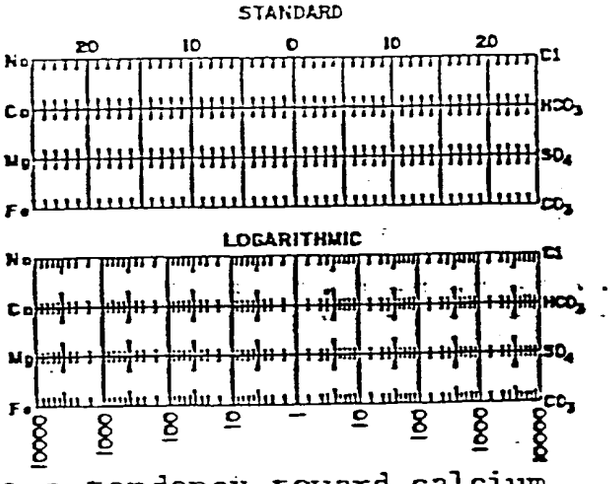
Iron, Fe (total): 150

Sulfide, as H_2S:

OTHER PROPERTIES

pH	6.8
Specific Gravity, 60/60 F.	1.042
Resistivity (ohm-meters)____F.	

WATER PATTERNS — *me/l*



REMARKS & RECOMMENDATIONS: Calculations indicate a tendency toward calcium carbonate deposition; however, no calcium sulfate deposition is indicated.

EXHIBIT "F"

DWL-481-2-A

DOWELL DIVISION OF THE DOW CHEMICAL COMPANY

DENVER REGION

API WATER ANALYSIS REPORT FORM

LABORATORY LOCATION: CASPER

DATE: March 16, 1982

LAB NO.: CL 10325

Company: Petroleum Energy		Sample No.: 58456	Date Sampled:
Field:	Legal Description:	County or Parish: San Juan	State: N. Mex.
Lease or Unit:	Well: 2-29	Depth:	Formation: Barker Ck.
Water, B/D:			
Type of Water (Produced, Supply, etc.):	Sampling Point:	Sampled By:	

DISSOLVED SOLIDS

CATIONS	mg/l	me/l
Sodium, Na (calc.)	31095	1368.2
Calcium, Ca	3200	160.2
Magnesium, Mg	540	43.2
Barium, Ba		

ANIONS	mg/l	me/l
Chloride, Cl	54000	1512.0
Sulfate, SO_4	2500	50.0
Carbonate, CO_3	0	
Bicarbonate, HCO_3	600	9.6

Total Dissolved Solids (calc.): 91935

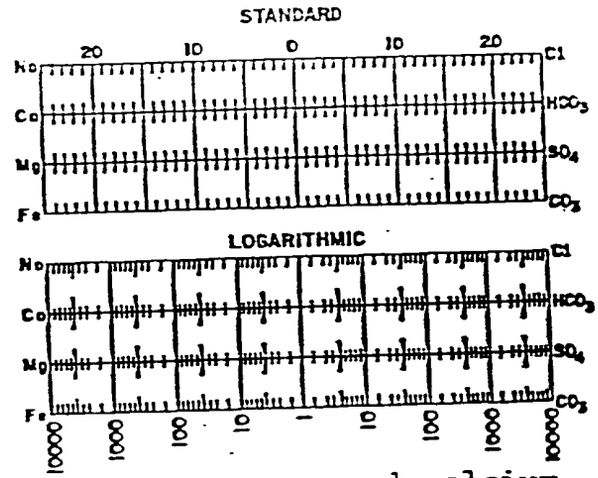
Iron, Fe (total): 150

Sulfide, as H_2S:

OTHER PROPERTIES

pH	6.4
Specific Gravity, 60/60 F.	1.058
Resistivity (ohm-meters) ____ F.	

WATER PATTERNS — me/l



REMARKS & RECOMMENDATIONS: Calculations indicate a tendency toward calcium carbonate deposition; however, no calcium sulfate deposition is indicated.

A. R. Geiselman/ml

R. G. Lawson
D15 - Denver Regional Office
Sales - Casper Office File
Tulsa - T. Niles

DWL-4931-2-A

DOWELL DIVISION OF THE DOW CHEMICAL COMPANY

DENVER REGION

API WATER ANALYSIS REPORT FORM

LABORATORY LOCATION: CASPER

DATE: March 16, 1982

LAB NO.: CL 10325-2

Company	Sample No.	Date Sampled
Petroleum Energy	58456	

Field	Legal Description	County or Parish	State
		San Juan	N. Mex.

Lease or Unit	Well	Depth	Formation	Water, B/D
	3-29			

Type of Water (Produced, Supply, etc.)	Sampling Point	Sampled By

DISSOLVED SOLIDS

CATIONS	mg/l	me/l
Sodium, Na (calc.)	29145	1282.4
Calcium, Ca	3200	160.0
Magnesium, Mg	780	62.4
Barium, Ba		

ANIONS		
Chloride, Cl	51500	1442.0
Sulfate, SO_4	2500	50.0
Carbonate, CO_3	0	
Bicarbonate, HCO_3	800	12.8

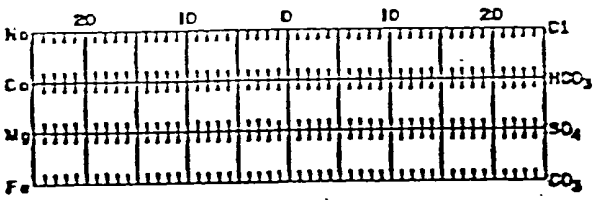
Total Dissolved Solids (calc.)	87925
Iron, Fe (total)	500
Sulfide, as H_2S	

OTHER PROPERTIES

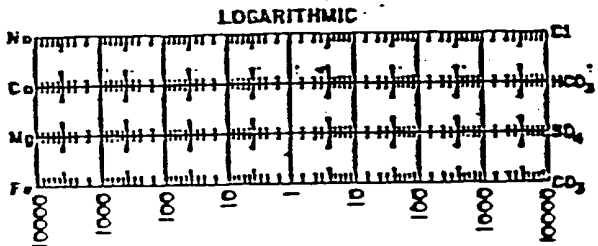
pH	6.6
Specific Gravity, 60/60 F.	1.057
Resistivity (ohm-meters) ____ F.	

WATER PATTERNS — me/l

STANDARD



LOGARITHMIC



REMARKS & RECOMMENDATIONS: Calculations indicate a tendency toward calcium carbonate deposition; however, no calcium sulfate deposition is indicated.

EXHIBIT "B-1"

DOWELL DIVISION OF DOW CHEMICAL U.S.A.

WATER ANALYSIS REPORT FORM

To : J Hughes

Petroleum Energy

Date 8-6-82

Notice: This information is presented in good faith, but no warranty is given and Dowell assumes no liability for advice or recommendations made concerning results to be obtained from the use of this analysis.

Sample #	pH	Specific Gravity	Temp °F	Iron mg/L	Sulfate mg/L	Calcium mg/L	Chloride mg/L	Cond.
A Darker Sample	7.5	1.06	65°	.05	6	23,000	22,000	
B lighter Sample	8	1.07	65	Trace	6	23,500	46,700	

Company Petroleum Energy Submitted By Bob Lawson

Well # Navajo 1-20 Depth _____ Formation _____

Location _____

Date Received _____ Analized by _____

Remarks & Recommendations

Sample A : dissolved gases present also some two phase behavior present.

Sample B : solids present

BARKER CREEK

A

Division of Smith International, Inc.

RESEARCH AND DEVELOPMENT

		Report No:	1
		Date:	Oct. 8, 1980
Company:	Petroleum Energy C/O Hicks - Enco	County:	San Juan, N.M.
Address:	P.O. Box 174	Field:	Beautiful Mountain
	Farmington, N.M.	Formation:	Organ Rock
Attention:	Mike Hicks	Lease:	Navajo 1
Date Sampled:	10/7/80	Well:	#20

WATER ANALYSIS

Specific Gravity:	1.009	pH:	6.75
Chloride:	6000 ppm	Calcium:	842 ppm
Bicarbonate:	91.5 ppm	Magnesium:	549 ppm
Sulfate:	2800 ppm	Total Iron:	84 ppm
Sulfide:	None	Sodium:	320 ppm
Total Hardness: (as $CaCO_3$)	3100 ppm	Total Dissolved Solids:	10,686.5 ppm
Resistivity:	.64	Ohm Meters @:	60°F

Sample Source: From after frac clean up swab

Remarks: Potassium - None

Analyst: Mathews - Diede

Smith Representative: Mathews - Diede

EXHIBIT "I"

DWL-481-2-A

DOWELL DIVISION OF THE DOW CHEMICAL COMPANY

DENVER REGION

API WATER ANALYSIS REPORT FORM

LABORATORY LOCATION: CASPER

DATE: March 16, 1982

LAB NO.: CL 10325-7

Company	Sample No.	Date Sampled
Petroleum Energy	58456	

Field	Legal Description	County or Parish	State
		San Juan	N. Mex.

Lease or Unit	Well	Depth	Formation	Water, B/D

Type of Water (Produced, Supply, etc.)	Sampling Point	Sampled By
Water Well		

DISSOLVED SOLIDS

CATIONS	mg/l	me/l
Sodium, Na (calc.)	220	9.7
Calcium, Ca	10	0.5
Magnesium, Mg	3	.2
Barium, Ba		

ANIONS		
Chloride, Cl	150	4.2
Sulfate, SO_4	20	.4
Carbonate, CO_3	102	3.4
Bicarbonate, HCO_3	150	2.4

Total Dissolved Solids (calc.) 655

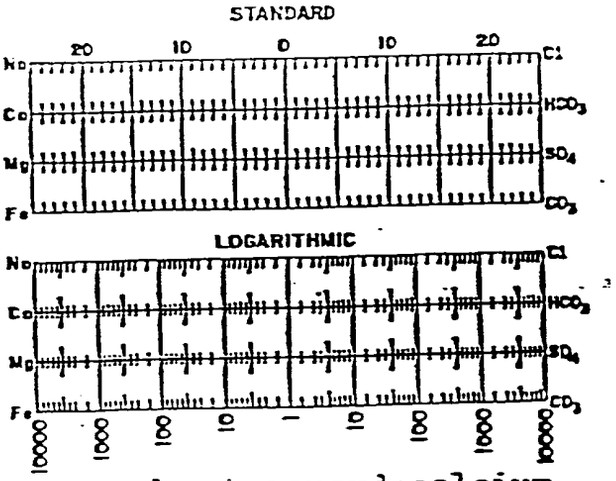
Iron, Fe (total) 15

Sulfide, as H_2S

OTHER PROPERTIES

pH	9.1
Specific Gravity, 60/60 F.	1.000
Resistivity (ohm-meters) ____ F.	

WATER PATTERNS — me/l



REMARKS & RECOMMENDATIONS: Calculations indicate a tendency toward calcium carbonate deposition; however, no calcium sulfate deposition is indicated.

EXHIBIT "I"
WELL WATER

EXHIBIT "J"

DOWELL DIVISION OF THE DOW CHEMICAL COMPANY

DENVER REGION

API WATER ANALYSIS REPORT FORM

LABORATORY LOCATION: CASPER

DATE: March 16, 1982

LAB NO.: CL 10325-6

Company	Sample No.	Date Sampled
Petroleum Energy	58456	

Field	Legal Description	County or Parish	State
		San Juan	N. Mex.

Lease or Unit	Well	Depth	Formation	Water, B/D

Type of Water (Produced, Supply, etc.)	Sampling Point	Sampled By
Reservoir		

DISSOLVED SOLIDS

CATIONS	*mg/l*	*me/l*
Sodium, Na (calc.)	435	20 0
Calcium, Ca	113	5 6
Magnesium, Mg	23	1 8
Barium, Ba		

ANIONS		
Chloride, Cl	150	4 2
Sulfate, SO_4	1000	20 0
Carbonate, CO_3	0	
Bicarbonate, HCO_3	200	3 2

Total Dissolved Solids (calc.): 1918

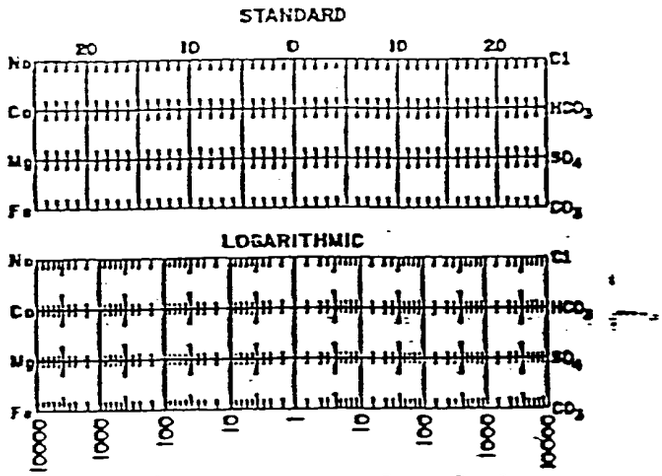
Iron, Fe (total): 20

Sulfide, as H_2S:

OTHER PROPERTIES

pH	8.3
Specific Gravity, 60/60 F.	1.000
Resistivity (ohm-meters) ____ F.	

WATER PATTERNS — *me/l*



REMARKS & RECOMMENDATIONS: Calculations indicate a tendency toward calcium carbonate deposition; however, no calcium sulfate deposition is indicated.

BARBARA KAY-3
NW¼NE¼ Section 19, T27N, R19W
NAVAJO OPERATING AGREEMENT
PETROLEUM ENERGY, INC., OPERATOR