STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

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

MAR - 3 1989

OIL CONSERVATION DIVISION
SANTA FE

FORM C-108
Revised 7-1-81

APPLICATION FOR AUTHORIZATION TO INJECT — Northeast Blanco Unit No. 502

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

II. Operator: Blackwood & Nichols Co., Ltd.

Address: P. O. Box 1237, Durango, CO 81302-1237

Contact party: William F. Clark Phone: (303) 247-0728

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.

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: William F. Clark Title Operations Manager

Signature: William F Clark Date: February 27, 1989

* 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. _____

DISTRIBUTION: Original and one copy to Santa Fe with one copy to the appropriate Division district office.

III. WELL DATA

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

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

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

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

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

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

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

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

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

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

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

(5) Give the depth to and 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, P. O. Box 2088, Santa Fe, New Mexico 87501 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.

Blackwood & Nichols Co., Ltd.
Northeast Blanco Unit No. 502
1650' FNL, 1480' FEL
Section 32, T~~30N~~, R7W 31N
San Juan County, New Mexico
E-178-1

Mineral Owner: State of New Mexico
Surface Owner: State of New Mexico
Surface Leasee: Reginaldo Espinoza
P. O. Box 206
Espanola, New Mexico 87532
Phones: Espanola (505) 753-2006
Santa Fe (505) 983-8388

Estimated Formation Tops

Surface -	San Jose	300'	Menefee	5310'	
	Animas	1220'	Pt. Lookout	5570'	
	Ojo Alamo	2200'	Mancos	5948'	
	Kirtland	2290'	Dakota	7855'	
	Fruitland	2960'	Burro Canyon	8005'	
	Pictured Cliffs	3272'	Morrison	8100'	
	Lewis	3400'	Entrada	8950'	
	Cliff House	4900'	Total Depth - Chinle		9180'

Surface owner was sued. Agreement on surface damages was negotiated as per Bill Clark 3-28-84

INJECTION WELL DATA SHEET

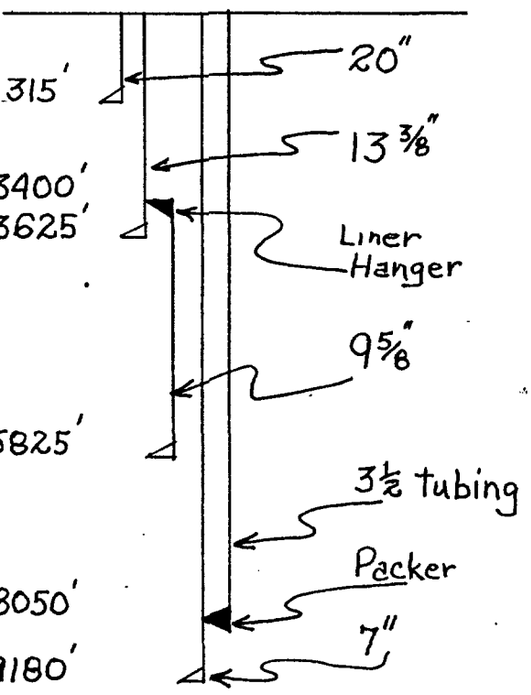
III

Blackwood & Nichols Co., Ltd. (OPERATOR) Northeast Blanco Unit (LEASE)

502 (WELL NO.) 1650' FNL, 1480' FEL (FOOTAGE LOCATION) 32 (SECTION) 31 North (TOWNSHIP) 7 West (RANGE)

San Juan County, New Mexico

Schematic



Tabular Data

Surface Casing

Size 20" Cemented with 825 sx.

TOC Surface feet determined by circulation

Hole size 26"

Intermediate Casing

Size 13 3/8" Cemented with 1780 (2 stage) sx.

TOC Surface feet determined by Temperature survey and circulation

Hole size 17 1/2"

Long string

Size 7" Cemented with 800 sx.

TOC 5500 feet determined by bond log

Hole size 8 3/4"

Total depth 9180'

Injection interval (will perforate selected intervals)

8100 feet to 9100 feet

(perforated ~~or open hole;~~ indicate which)

Liner

Size 9 5/8" Cemented with 565 sx.

TOC 3400 feet determined by circulation

Hole size 12 1/4"

Total depth 3400' - 5825'

Tubing size 9.3#, 3 1/2" EUE lined with ICO Spincote (material) set in a Baker Mod AL-2 plastic lined (or equivalent) (brand and model) packer at 8050 (approx.) feet

(or describe any other casing-tubing seal).

Other Data

1. Name of the injection formation Entrada

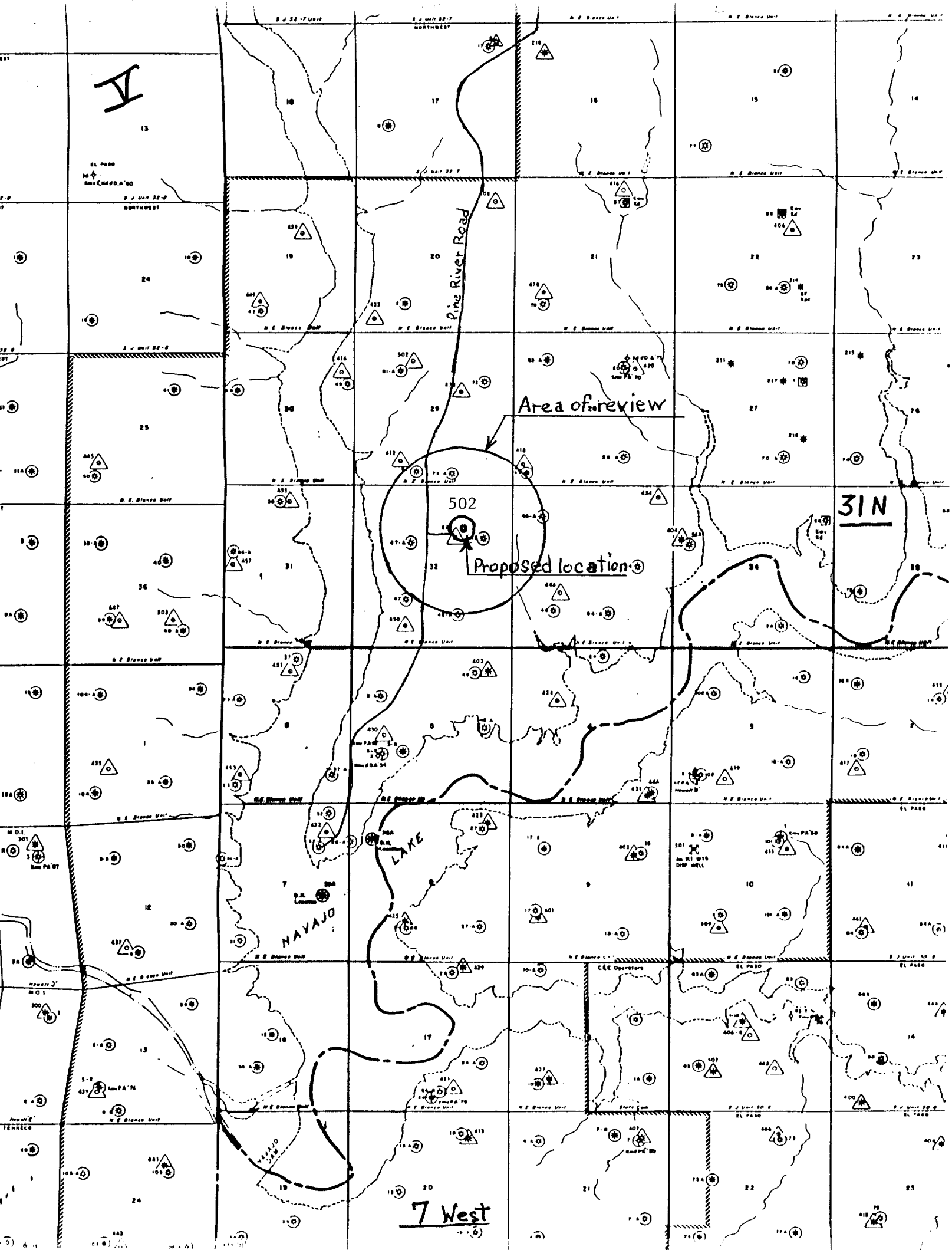
2. Name of Field or Pool (if applicable) N/A

3. Is this a new well drilled for injection? /X/ Yes /_/ No

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

4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) No.

5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. 3000' Fruitland, 3300' Pictured CLiffs, 4900' Mesaverde, 7860' Dakota


I
Pine River Road
Area of review
502
Proposed location
31N
LAKE
NAVAJO
7 West

III. Well Data

A. See Injection Well Data Sheet

B. 1. Name of injection formation Entrada. (No field or pool name for this formation.)

2. 8100'-9100' injection intervals will be selected from logs run at total depth. Intervals will be perforated.

3. This well will be drilled for the purpose of injection for water disposal.

4. None anticipated.

5. The Dakota formation, top 7855', is the next higher formation known to produce gas in this area; there is no known lower oil or gas producing formation.

VI. No wells within the area of review penetrate the proposed injection zone.

VII. 1. Rate of disposal will be determined by a step rate injection test. primary use of the facility will be disposal of produced water from Fruitland coal development wells. The amount of water to be injected will depend on this development.

2. The proposed injection system will be designed as a closed system.

3. Maximum injection pressure will be determined by a step rate injection test. Average injection pressure will be kept below this maximum pressure.

4. Fruitland Coal Wells

	Na	Ca	Mg	K	Cl	HCO3	SO4	CO3	TDS
NEBU 400	3545	24	24	-	639	8540	0	0	12800
NEBU 404	4562	32	39	-	1349	10126	-	240	16400
NEBU 406	3829	88	54	-	568	9760	0	0	14300
NEBU 211	4859	32	39	-	2024	9760	0	0	16700
NEBU 212	3480	31.5	21.8	14.8	600	8010	<100	516	9120
NEBU 218	3625	24	39	-	391	9252	0	0	13300

Water from Fruitland coal gas wells with similar analysis has not demonstrated incompatibility when injected into the Entrada formation of the Northeast Blanco Unit #501.

VII. 5. Analysis from Meridian Oil, Inc., San Juan 30-6 Unit #112Y approximately 10 miles southeast of the proposed location should be on file with the NMOCD. Attached are analyses of water samples from the NEBU #501, NW 1/4, Section 20, T30N, R7W, Rio Arriba County, New Mexico.

VIII. The closest overlying aquifers are the Ojo Alamo, Animas, San Jose, and Nacimiento. The Ojo Alamo should be encountered in this well from 2200' to 2290'. There are no known aquifers below the Entrada.

The proposed injection zones are the sandy and porous portions of the Morrison, Bluff, and Entrada formations. At the proposed NEBU #502 location the zones could be described as follows:

Morrison - light gray to gray, fine grained to medium grained, well rounded and slightly calcareous sandstones. Individual sandstone bodies are expected to be 10-50' thick separated by shales and siltstones. Some sandstones may be slightly arkosic, but generally are quartzitic with some friable sands. Overall depth would be estimated at 8100-8500' with overlying unit being Burro Canyon and the underlying unit being the Bluff member. A possible thickness of 200' sand is anticipated.

Bluff - light red to pink to gray, fine grained to medium grained sandstones. Clean, slightly friable, sorted. Individual sandstones are expected to be 10-20' thick and separated by shales and siltstones. Overall depth of zone would be estimated at 8500-8800' with approximately 80' of porous sandstone. Rests on top of Todilto.

Entrada - gray to white, hard, fine to medium grained sandstone. Well sorted and well-rounded. Depth of zone is estimated at 8950-9150' with the upper 100' being estimated as porous sandstone. Rests on Chinle.

IX. Stimulation will consist of perforating selected porous intervals in the Morrison and Entrada and stimulating using a sand water frac treatment. Details will be provided to the District NMOCD office prior to stimulation.

X. Test information and logs will be provided to the District NMOCD office as available.

XI. There are no known wells producing fresh water within one mile of the proposed injection well.

Northeast Blanco Unit 502

UTILE STREET
OX 2605
NGO, CO 81302
) 247-4220

ATTEN: L CLARK
PO BOX 1237
DURANGO, CO 81302
(303) 247-0728

DATE SAMPLED: 8/1/88
WELL NAME: NEBU UNIT 501
LOCATION:
FORMATION: ENTRADA WATER
SAMPLED FROM:
WELL ON/Off:

ID #: 1119

TITUENT		ppm	epm
un	Na +	4760	207.1
ssium	K +	169	4.3
ium	Ca ++	1310	65.4
esium	Mg ++	29.4	2.4
Total	Fe++ & Fe+++	164	8.8
TIVE SUB-TOTAL		6432.4	287.9799
ride	Cl -	8280	233.5
onate	CO3 =	0	0.0
rbonate	HCO3-	152	2.5
oxide	OH -	0	0.0
ate	SO4 =	2100	43.7
TIVE SUB-TOTAL		10532	279.70928

Item 2A
SWD-339

l Dissolved Solids	19000 ppm
	5.07 units
ific Gravity	1.01 @ 73 F.
stivity	45 ohm-m

OVED BY: Joe Bowden

DR. JOE BOWDEN, DIRECTOR

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

SWD-339

API WATER ANALYSIS REPORT FORM

Company	Sample No.	Date Sampled
Blackwood Nichols		8/2/88

Field	Legal Description	County or Parish	State

Lease or Unit	Well	Depth	Formation	Water, B/D
	# 501			

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

DISSOLVED SOLIDS

CATIONS	mg/l	me/l
Sodium, Na (calc.)	4237	183.0
Calcium, Ca	1162	58.0
Magnesium, Mg	247	22.0
Barium, Ba		

ANIONS	mg/l	me/l
Chloride, Cl	8165	230.0
Sulfate, SO_4	1400	29.3
Carbonate, CO_3	0	0
Bicarbonate, HCO_3	100	1.7

Total Dissolved Solids (calc.) 15,500

Iron, Fe (total) Too 500+

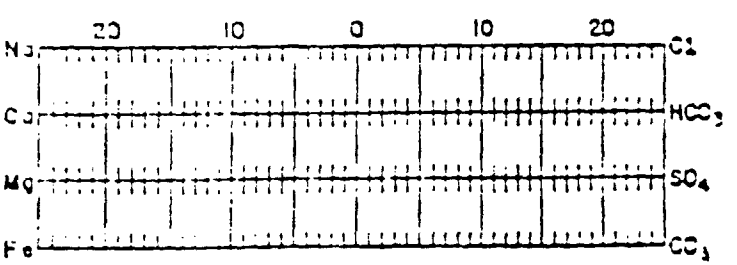
Sulfide, as H_2S neg

OTHER PROPERTIES

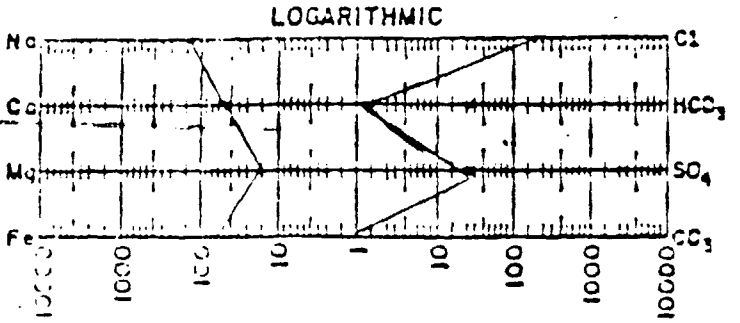
pH	5.35
Specific Gravity, 60/60 F. 73° F.	1.007
Resistivity (ohm-meters)	.50

WATER PATTERNS — me/l

STANDARD



LOGARITHMIC



REMARKS & RECOMMENDATIONS:

Contact Bill Clark.

303-247-0728

Northeast Blanco Unit 502

Item 5b
SWD-339

API WATER ANALYSIS REPORT FORM

Company	Sample No.	Date Sampled
Blackwood & Nichols		8/31/70

Field	Legal Description	County or Parish	State

Lease or Unit	Well	Depth	Formation	Water, B/D
NE Ell	501 SWD		Morrison	

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

DISSOLVED SOLIDS

CATIONS	mg/l	me/l
Sodium, Na (calc.)	11621	505.2
Calcium, Ca	400	20.0
Magnesium, Mg	84	7.0
Barium, Ba		

ANIONS	mg/l	me/l
Chloride, Cl	17750	500.0
Sulfate, SO_4	1200	25.0
Carbonate, CO_3	0	0
Bicarbonate, HCO_3	732	12.0

Total Dissolved Solids (calc.) 32,600

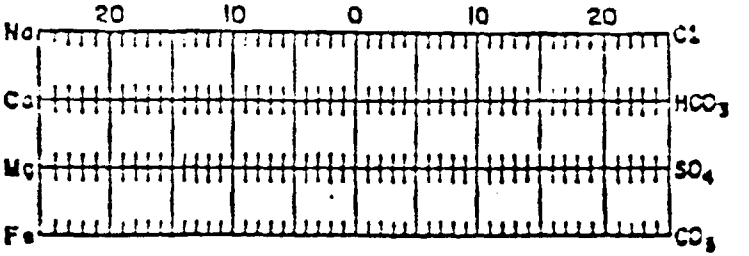
Iron, Fe (total)
Sulfide, as H_2S 0

OTHER PROPERTIES

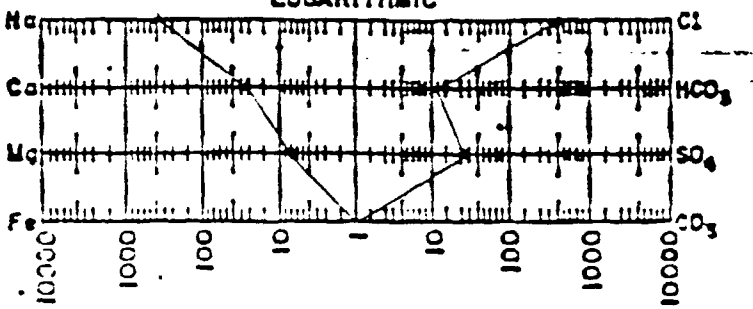
pH	6.27
Specific Gravity, 60/60 F.	1.024
Resistivity (ohm-meters) 59° F.	.227

WATER PATTERNS — me/l

STANDARD



LOGARITHMIC



REMARKS & RECOMMENDATIONS:

Northeast Blanco Unit 502

SUITLE STREET
BOX 2605
RANGO, CO 81302
03) 247-4220

ATTEN: L CLARK
PO BOX 1237
DURANGO, CO 81302
(303) 247-0728

DATE SAMPLED: 8/X/88
WELL NAME: NEBU UNIT 501
LOCATION:
FORMATION: MORRISON PERFS.
SAMPLED FROM:
WELL ON/OFF:

Northeast Blanco Unit 502

S ID #: 1120

Item 3A
SWD-339

NSTITUENT		ppm	epm
dium	Na +	10600	461.1
tassium	K +	1810	46.3
lcium	Ca ++	685	34.2
gnesium	Mg ++	65.9	5.4
on Total	Fe++ & Fe+++	230	12.4
SITIVE SUB-TOTAL		13390.9	559.3565
loride	Cl -	18200	513.2
rbonate	CO3 =	0	0.0
carbonate	HCO3-	537	8.8
droxide	OH -	0	0.0
lfate	SO4 =	1750	36.4
GATIVE SUB-TOTAL		20487	558.47643

tal Dissolved Solids	35100 ppm
	6.71 units
ecific Gravity	1.023 @ 73 F.
sistivity	24 ohm-m

PROVED BY: Joe Bowden

DR. JOE BOWDEN, DIRECTOR

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

VII. 5. Analysis from Meridian Oil, Inc., San Juan 30-6 Unit #112Y approximately 10 miles southeast of the proposed location should be on file with the NMOCD. Attached are analyses of water samples from the NEBU #501, NW 1/4, Section 20, T30N, R7W, Rio Arriba County, New Mexico.

VIII. The closest overlying aquifers are the Ojo Alamo, Animas, San Jose, and Nacimiento. The Ojo Alamo should be encountered in this well from 2200' to 2290'. There are no known aquifers below the Entrada.

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IX. Stimulation will consist of perforating selected porous intervals in the Morrison and Entrada and stimulating using a sand water frac treatment. Details will be provided to the District NMOCD office prior to stimulation.

X. Test information and logs will be provided to the District NMOCD office as available.

XI. There are no known wells producing fresh water within one mile of the proposed injection well.

Northeast Blanco Unit No. 502

XII. I hereby certify that I have examined available geologic and engineering data and can find no evidence of connection between the disposal zone and underground drinking water sources.

XIII. Proof of Notice

AFFIDAVIT OF PUBLICATION

No. 22996

STATE OF NEW MEXICO,
County of San Juan:

Betty Shipp being duly

sworn, says: That he is the National Ad Manager 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 Three consecutive (days) ~~(weeks)~~ on the same day as follows:

First Publication Wednesday February 15, 1989

Second Publication Thursday February 16, 1989

Third Publication Friday February 17, 1989

Fourth Publication

and that payment therefor in the amount of $ 23.17

has been made.

Betty Shipp

Subscribed and sworn to before me this 17th day

of February, 19 89.

NOTARY PUBLIC, SAN JUAN COUNTY, NEW MEXICO

My Commission expires: June 23, 1990

Copy of Publication

NOTICE

Intent to Dispose of water in the subsurface Blackwood & Nichols Co., Ltd. proposes to dispose of produced water in the Entrada and Morrison formations. The injection well will be the Northeast Blanco Unit No. 502, located 1650' FNL & 1480' FEL of Section 32, T31N, R7W, San Juan Co., New Mexico. Water will be injected in intervals from 8100' to 9100'. Maximum rate and pressure are to be determined by step rate testing.

Questions should be addressed to Mr. Bill Clark, c/o Blackwood & Nichols Co., Ltd., P. O. Box 1237, Durango, Colorado, 81302-1237, or call 303-247-0728. Objections or requests for hearing by interested parties must be filed with the New Mexico Oil Conservation Division, P. O. Box 2088, Santa Fe, New Mexico 87501, within 15 days.

Legal No. 22996 published in the Farmington Daily Times, Farmington, New Mexico on Wednesday, Thursday and Friday, February 15, 16 and 17, 1989.

5235

#502 210

#502

SWD-365

Surface Damage Agreement

The undersigned, MR. REGINALDO ESPINOZA (Grantor), who currently holds grazing lease number GM-1305 from the State of New Mexico which includes the N 1/2 of Section ~~10~~ 32, Township 31 North, Range 7 West, N.M.P.M., San Juan County, New Mexico, for valuable consideration, the receipt of which is hereby acknowledged, hereby grants, bargains, sells, and conveys unto BLACKWOOD & NICHOLS CO., LTD., a Limited Partnership (Grantee), a release for surface damages from said land leased by them for the purpose of drilling a well, NEBU No. 502, for the production of liquid hydrocarbons and natural gas and the products herefrom or water disposal, the site for said well to contain an area of land approximately 500 feet by 500 feet containing 5.74 acres more or less from a point around 1650' FNL, 1480' FEL, Section 32, Township 31 North, Range 7 West, together with ingress and egress hereto over, along and across from the existing road to the individual well's location.

It is understood that Grantee is to maintain the area described above in a clean, orderly manner, with any open pits on said locations to be properly fenced or filled as is deemed necessary. Grantee, its heirs, executors, administrators, and assigns, shall have the right of ingress and egress to the location area and the right to enter upon, explore, drill, develop, complete, operate, maintain, and occupy such easement area for the production of liquid hydrocarbons and gas for the storing, transporting, and marketing of same, including the right to lay, maintain, and operate pipelines for the transportation of liquid hydrocarbons and natural gas, water or all of them, produced from said lands or to inject produced water for disposal purposes.

Grantee shall have the right to remove, at any time, any and all property and improvements placed or erected on said land by Grantee or its assigns, including the right to pull and remove all casing. All such rights shall be exercised by Grantee in such a manner as not to interfere with any of Grantor's improvements on the lands, and upon such removal, Grantee shall leave the lands in good and orderly condition, and shall plant the area so granted herein in Bureau of Land Management seed mixture Number 2.

IN WITNESS WHEREOF, I have hereunto set my hands this 28th day of FEB., 1989.

Reginaldo Espinoza

Reginaldo Espinoza

State of New Mexico)

County of San Juan)

The foregoing instrument was acknowledged before me this 28th day of FEB., 1989 by _____.

Susan Kennessy

Notary Public

My Commission Expires:

01/31/92

FILED OR RECORDED
BOOK 1100 PAGE 210
SAN JUAN COUNTY, NEW MEXICO

MAR 09 1989

AT 11:46 O'CLOCK A M
Carol Baudy
COUNTY CLERK
Kay Kindlemon
DEPUTY
Rec # 014689 Fee $5.00

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
AZTEC DISTRICT OFFICE

1000 RIO BRAZOS ROAD
AZTEC, NEW MEXICO 87410
(505) 334-6178

OIL CONSERVATION DIVISION
BOX 2088
SANTA FE, NEW MEXICO 87501

DATE 3-2-89

RE: Proposed MC _____
Proposed DHC _____
Proposed NSL _____
Proposed SWD X
Proposed WFX _____
Proposed PMX _____

RECEIVED
MAR - 6 1989

Gentlemen:

I have examined the application dated 3-1-89

for the Blackwood & Nichols Co. Navajo #502 G-36-31N-7W
Operator Lease and Well No. Unit, S-T-R

and my recommendations are as follows:

Approves - The location of the well is actually 31N instead of 30N. as stated on the second page -

Yours truly,