CHECKLIST for ADMINISTRATIVE INJECTION APPLICATIONS

Operator: J.K. EDWARDS ASSOC., INC. Well: BENGAL A NO. 1

Contact: (RICK) RICHARD LEWIS Title: LANDMAN Phone: 303-298-1400

DATE IN 3-15-95 RELEASE DATE 3-27-95 DATE OUT 3-28-95

Proposed Injection Application is for: __ WATERFLOOD __ Expansion __ Initial

Original Order: R- _____ __ Secondary Recovery __ Pressure Maintenance

SENSITIVE AREAS X SALT WATER DISPOSAL

__ WIPP __ Capitan Reef __ Commercial Operation

Data is complete for proposed well(s)? YES Additional Data _____

AREA of REVIEW WELLS

0 Total # of AOR 0 # of Plugged Wells

N/A Tabulation Complete N/A Schematics of P & A's

N/A Cement Tops Adequate __ AOR Repair Required

INJECTION INFORMATION

Injection Formation(s) DAKOTA

Source of Water FRUITLAND (2K-10K PPM) Compatible YES

PROOF OF NOTICE

__ Copy of Legal Notice __ Information Printed Correctly

__ Correct Operators __ Copies of Certified Mail Receipts

__ Objection Received __ Set to Hearing _____ Date

NOTES: _____

_____

APPLICATION QUALIFIES FOR ADMINISTRATIVE APPROVAL YES

COMMUNICATION WITH CONTACT PERSON:

1st Contact: __ Telephoned __ Letter _____ Date Nature of Discussion _____

2nd Contact: __ Telephoned __ Letter _____ Date Nature of Discussion _____

3rd Contact: __ Telephoned __ Letter _____ Date Nature of Discussion _____

3-27-95

582

STATE OF NEW MEXICO
ENERGY, MINERALS and NATURAL
RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
PO BOX 2088
SANTA FE, NM 87504-2088

FORM C-108
Revised 7-1-81

APPLICATION FOR AUTHORIZATION TO INJECT

I. PURPOSE: ____ Secondary Recovery ____ Pressure Maintenance __x__ Disposal ____ Storage
Application qualifies for administrative approval? __Yes __No

II. OPERATOR: J. K. EDWARDS ASSOCIATES, INC.

ADDRESS: 1401 17th Street, Suite 1400, Denver, CO 80202

CONTACT PARTY: J. Keith Edwards PHONE: (303) 298-1400

III. WELL DATA: Complete the data required on the reverse side of this form for each well processed for injection. Additional sheets may be attached if necessary.

IV. Is this an expansion of an existing project: ___ Yes __x__ 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/1 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 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: J. Keith Edwards TITLE: President

SIGNATURE:  DATE: 2-27-95

* 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 circumstance of the earlier submittal. _____

DISTRIBUTION: Original and one copy to Santa Fe with one copy to the appropriate District Office

APPLICATION FOR AUTHORIZATION TO INJECT
Form c-108 Supplemental Data
Bengal A #1

I. Water Disposal

II. J. K. Edwards Associates, Inc.
1401 17th Street, Suite 1400
Denver, CO 80202
Contact: Keith Edwards (303) 298-1400

III. Well data is attached.

IV. This is not an expansion of an existing project.

V. Map with area of review is attached.

VI. There are no wells within the area of review that penetrate the proposed Basin Dakota injection zone.

VII. Data on proposed injection operations:

1. Average injection rate - 500 bwpd
Maximum injection rate - 1000 bwpd

2. Closed system. Water would be trucked or piped into tanks on location.

3. Average injection pressure - 750 psi
Maximum injection pressure - 1100 psi

4. Produced Fruitland Coal water with TDS of 2000 to 10000 ppm will be injected into the Basin Dakota zone in the Bengal Bengal A #1 well. Analyses of coal water in the area are attached.

5. Chemical analysis of water in the Basin Dakota zone will be submitted after deepening the well from its current TD of 5252' in the Gallegos Gallup zone.

VIII. Geologic and Lithologic data on injection zone.

1. Injection zone - Basin Dakota at approximately 5990' - 6175' (logs will be submitted after deepening of the well).

2. Lithology - Dakota sands.

3. Overlying aquifer - Point Lookout
4. Underlying aquifer - Morrison

IX. Perforate and acidize prior to injection operations.

X. Logs traversing the Gallegos Gallup zone have been submitted previously; logs for the Basin Dakota zone will be submitted after deepening the well into said zone.

XI. No known sources of potable water exist in the immediate area of the well.

XII. Geologic studies of the area do not indicate fault communication between the proposed injection zone and any underground potential sources of drinking water.

XIII. Proof of notice is attached.

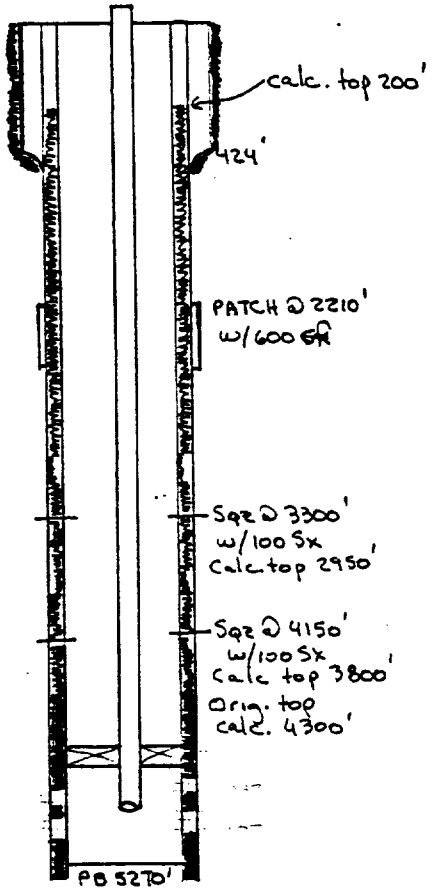
XIV. Certification is signed.

INJECTION WELL DATA SHEET

J. K. EDWARDS ASSOCIATES, INC. (OPERATOR) NM 16470 (LEASE)

Bengal A #1	1980 FSL, 1980 FWL	1	26N	12W
WELL NO.	FOOTAGE LOCATION	SECTION	TOWNSHIP	RANGE

Schematic



Tabular Data

Surface Casing

Size 10 3/4" Cemented with 440 sx.

TOC Surface feet determined by Circulated

Hole size 15"

Intermediate Casing - CASING PATCH OVER ORIGINAL STUB 600 cubic ft

Size 5 1/2" Cemented with 150 (60/40) 100 class C

TOC 200' feet determined by Calculation

Hole size 8 3/4"

Long string

Size 5 1/2" Cemented with 250 sx.

TOC 4200 feet determined by calculated

Hole size 8 3/4" Squeezed from 4100'-3200' w/200sx Class B

Total depth 5313'

Injection interval

4993 perf feet to 5174 perf feet

(perforated or open-hole, indicate which)

Tubing size 2 3/8" lined with Plastic coated (material) set in a

Baker Set Down (brand and model) packer at 4950 feet.

(or describe any other casing-tubing seal).

Other Data

1. Name of the injection formation **BASIN DAKOTA**

2. Name of Field or Pool (if applicable) Gallegos Gallup

3. Is this a new well drilled for injection? [ ] Yes [X] No

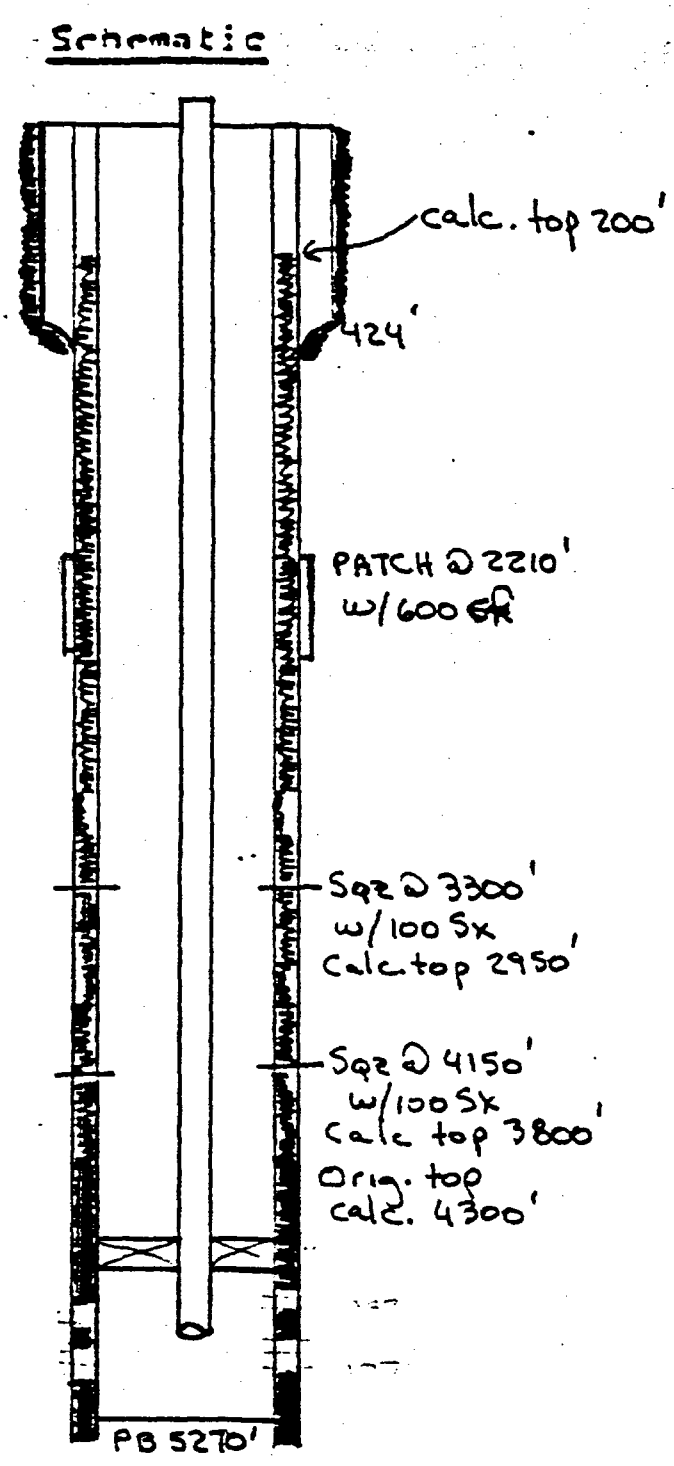
If no, for what purpose was the well originally drilled? Oil & Gas Producer/Gallup

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)

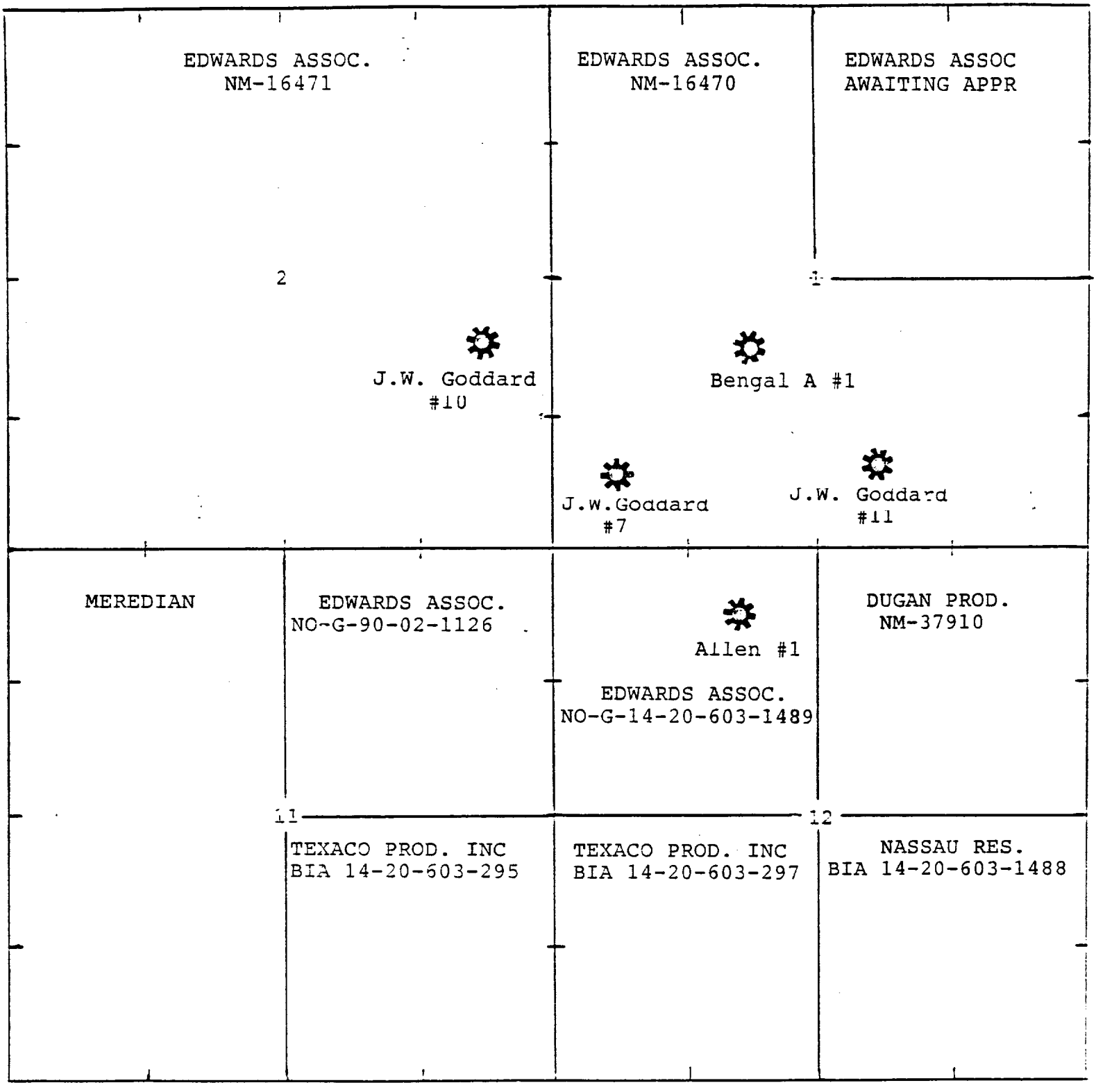
All perforating carried out in the Gallup zone

5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. Pictured Cliffs/Fruitland/Fruitland Coal and Dakota

BENGAL A #1 well



WILL DEEPEN THROUGH DAKOTA WITH 4 3/4" HOLE AND RUN AND SET 4" OR 3 1/2" CASING CEMENTED BACK TO EXISTING CASING STRING.



APPLICATION FOR AUTHORIZATION TO INJECT
FORM C-108 AREA OF REVIEW PROXIMITY MAP

BENGAL A #1 WELL
1980' FSL, 1980'FWL, SECTION 1-T26N-R12W
SAN JUAN COUNTY, NEW MEXICO

AFFIDAVIT OF PUBLICATION

No. 34358

STATE OF NEW MEXICO
County of San Juan:

VICKI SHORTER being duly sworn says: That he 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 on the following day(s):

TUESDAY, FEBRUARY 14, 1995

and the cost of publication was: $18.37

Vicki Shorter

On 2/15/95 VICKI SHORTER appeared before me, whom I know personally to be the person who signed the above document.

Mary G. Snead

My Commission Expires March 21, 1998.

COPY OF PUBLICATION

Legals

NOTICE

J.K. Edwards Associates, Inc., 1401 17th Street, Suite 1400, Denver, CO 80202 (303) 298-1400 whose agent is Keith Edwards, hereby notifies all interested parties that the following well is to be deepened and converted to a water disposal well. Injection will be into the Basin Dakota interval at approximately 5900' - 6175'. Maximum well rate will be 1000 Bwpd at less than 1100 psi. Any requests for information or any objections should be filed with the Oil Conservation Division, State Land Office Building, P.O. Box 2088, Santa Fe, NM 87501 within 15 days of this notice.

Gallegos Gallup Field, Bengal A #1, NE/4, SW/4 Section 1, T26N-R12W, San Juan County, New Mexico.

Legal No. 34358 published in The Daily Times, Farmington, New Mexico, Tuesday, February 14, 1995.

J.K. EDWARDS ASSOCIATES, INC.

OIL & GAS PROPERTIES

1401 17TH STREET / SUITE 1400

DENVER, COLORADO 80202

303/298-1400 FAX 303/298-0757

CERTIFIED MAIL-RETURN RECEIPT

February 9, 1995

DUGAN PRODUCTION COMPANY
Attn: Land Department
P.O. Box 420
Farmington, NM 87499

Re: Application to Inject
Bengal A #1 Well
SW/4 Section 1-T26N-R12W
San Juan County, NM

Gentlemen and Ladies:

Pursuant to the regulations of the NMOCD, you are advised of JKEAI's intention to deepen the referenced well to the Basin Dakota formation and use it as a salt water disposal well. I am enclosing a copy of the application for your reference.

Any request for information or any objections should be filed with the Oil Conservation Division, State Land Office Building, P.O. Box 2088, Santa Fe, NM 87501 within 15 days of publication in the Farmington Daily Times.

Very truly yours,

Richard L. Lewis
Contract Landman

RLL:ll
encls.

-P 879 671 588

Certified Mail Receipt

No Insurance Coverage Provided
Do not use for International Mail
(See Reverse)

UNITED STATES POSTAL SERVICE

Sent to Dugan Prod. Co	
Street & No. Land Dept PO Box 420	
P.O., State & ZIP Code Farmington NM 87499	
Postage	$ 1.24
Certified Fee	1.10
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to Whom & Date Delivered	1.10
Return Receipt Showing to Whom, Date, & Address of Delivery	
TOTAL Postage & Fees	$3.44
Postmark or Date	2-10-95 NC

PS Form **3800**, June 1990

Is your RETURN ADDRESS completed on the reverse side?

SENDER:
- Complete items 1 and/or 2 for additional services.
- Complete items 3, and 4a & b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write "Return Receipt Requested" on the mailpiece below the article number.
- The Return Receipt will show to whom the article was delivered and the date delivered.

I also wish to receive the following services (for an extra fee):
1. ☐ Addressee's Address
2. ☐ Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:
DUGAN PRODUCTION COMPANY
ATTN: LAND DEPARTMENT
PO BOX 420
FARMINGTON NM 87499

4a. Article Number
P 879 671 588

4b. Service Type
☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail ☐ Return Receipt for Merchandise

7. Date of Delivery
2/13

5. Signature (Addressee)

8. Addressee's Address (Only if requested and fee is paid)

6. Signature (Agent)

Thank you for using Return Receipt Service.

PS Form **3811**, December 1991 *U.S. GPO: 1993—352-714 **DOMESTIC RETURN RECEIPT**

J.K. EDWARDS ASSOCIATES, INC.
OIL & GAS PROPERTIES
1401 17TH STREET / SUITE 1400
DENVER, COLORADO 80202
303/298-1400 FAX 303/298-0757

CERTIFIED MAIL-RETURN RECEIPT

February 9, 1995

N. I. I. P.
304 North Auburn, #B
Farmington, NM 87401

Re: Application to Inject
Bengal A #1 Well
SW/4 Section 1-T26N-R12W
San Juan County, NM

Gentlemen and Ladies:

Pursuant to the regulations of the NMOCD, you are advised of JKEAI's intention to deepen the referenced well to the Basin Dakota formation and use it as a salt water disposal well. I am enclosing a copy of the application for your reference.

Any request for information or any objections should be filed with the Oil Conservation Division, State Land Office Building, P.O. Box 2088, Santa Fe, NM 87501 within 15 days of publication in the Farmington Daily Times.

Very truly yours,

Richard L. Lewis
Contract Landman

RLL:ll
encls.

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SENDER:
- Complete items 1 and/or 2 for additional services.
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- Write "Return Receipt Requested" on the mailpiece below the article number.
- The Return Receipt will show to whom the article was delivered and the date delivered.

I also wish to receive the following services (for an extra fee):

1. ☐ Addressee's Address
2. ☐ Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:
N.I.I.P.
304 NORTH AUBURN #B
FARMINGTON NM 87401

4a. Article Number
P 879 671 514

4b. Service Type
☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail ☐ Return Receipt for Merchandise

7. Date of Delivery
2-13-95 M Martinez

5. Signature (Addressee)

8. Addressee's Address (Only if requested and fee is paid)

6. Signature (Agent)
[signature]

PS Form 3811, December 1991 ★U.S. GPO: 1993—352-714 DOMESTIC RETURN RECEIPT

Thank you for using Return Receipt Service.

P 879 671 514

Certified Mail Receipt
No Insurance Coverage Provided
Do not use for International Mail
(See Reverse)

UNITED STATES POSTAL SERVICE

Sent to	NIIP
Street & No.	304 North Auburn #B
P.O., State & ZIP Code	Farmington NM 87401
Postage	$ 1.24
Certified Fee	1.10
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to Whom & Date Delivered	1.10
Return Receipt Showing to Whom, Date, & Address of Delivery	
TOTAL Postage & Fees	$ 3.44
Postmark or Date	2/9/95 VL

PS Form 3800, June 1990

7. Methods for Handl _ Waste Disposal

A. Waste materials will be contained/disposed of as follows:

1) Cuttings: Reserve pit.
2) Drilling fluids: Reserve pit.
3) Produced fluids (oil, water): Reserve pit.
4) Sewage: Drilling contractor will provide facilities.
5) Garbage and other waste material: Operator will provide a trash pit suitable to prevent wind scattering trash before being burned or buried; any materail to be buried will be at least 24 inches under the surface.
6) Operator will be responsible for proper cleanup when the rig is moved.
7) Reserve pits will be fenced on three sides during the drilling operations and on four sides when the rig is moved from location.

8. Ancillary facilites

No permanent camp is planned; a trailer house will be used on location while drilling. No airstrip is planned.

9. Well site layout is shown on Exhibit C.

Pits are to be lined.

10. Plans for restoration of surface upon completion of operations:

If the well is productive, areas not used in production will be contoured and seeded with stipulated seed mixture. Production equipment will be painted the color designated by the surface managing agency.
When the well is abandoned, the location and access road will be cleaned and restored to the original topographical contours as much as possible. The area will be reseeded with the appropriate seed mixture.

11. Surface Ownership Navajo Indian Irrigation Project Attn: Leo Soukup
3539 E. 30th St. Northwest Energy Bldg., Rm 103
Farmington, N.M. 87401

NIIP is using surrounding fields for growing products, but our proposed well site is not located in their fields.

12. Other Information

Refer to the archaeological report for a description of the topography, flora, fauna, soil characteristics, dwellings, historical and cultural sites.

Proximity of:
1) Water - 3 miles
2) Occupied dwellings - 2 miles
3) Archeological - See archeological report.
4) Historical or cultural sites - See archeological report.

13. Lessee's or Operator's Representative

James S. Hazen
Nassau Resources, Inc.
P O Box 809
Farmington, NM 87499-0809

Gary Johnson
Nassau Resources, Inc.
650 Cherry St. # 1225
Denver, CO 80222

NASSAU RESOURCES, INC.
Cowsaround 1 #11
Exhibit A

ANALYSIS NO. 53-35-91

FIELD RECEIPT NO. _____

PI FORM 45-1

API WATER ANALYSIS REPORT FORM

Company		Sample No.	Date Sampled
Giant E&P			08-07-91
Field	**Legal Description**	**County or Parish**	**State**
Lease or Unit	**Well**	**Depth**	**Formation**
Bisti Coal 3	#1		Fruitland
Type of Water (Produced, Supply, etc.)	**Sampling Point**		**Sampled By**
Produced			

ISSOLVED SOLIDS

ATIONS	mg/l	me/l
dium, Na (calc.)	5473	237.95
lcium, Ca	140	7.00
agnesium, Mg	61	5.00
rium, Ba	—	—
otassium, K	98	2.51

NIONS		
loride, Cl	8010	225.96
lfate, SO_4	0	0
rbonate, CO_3	0	0
carbonate, HCO_3	1617	26.50
ydroxide, OH	0	0
		1

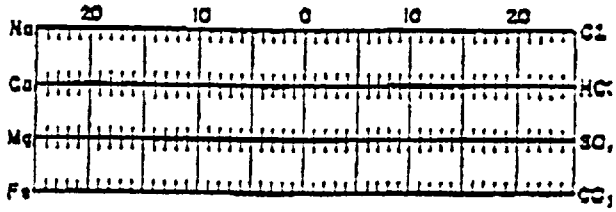
tal Dissolved Solids (calc.)	15399
n. Fe (total)	25 ppm
lfide, as H_2S	neg

OTHER PROPERTIES

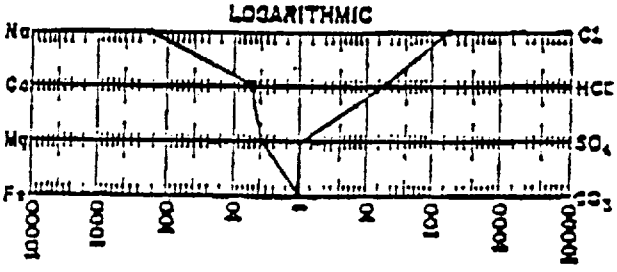
pH	7.25
Specific Gravity, 60/60 F.	1.010
Resistivity (ohm-meters) 74 F.	.44
Total Hardness	600

WATER PATTERNS — me/l

STANDARD



LOGARITHMIC



MARKS & RECOMMENDATIONS:

ANALYST: Lee

EASE REFER ANY QUESTIONS TO:

E WESTERN CO. OF NORTH AMERICA
RMINGTON, N.M.
LAN AULT-District Engineer
505) 327-6222

Table 3. Chemical analyses of produced Fruitland coalbed waters.

Sample Number	1	2	3	4	5	6	7	8	9	10
Well	Perry Land GU B 1	Shoemaker 1-34	Southern Ute 12U-1	Mayfield-Melton GU 1	NEBU 432	NEBU 218	Ealum Gas Com C 1R	Elliott Gas Com Y 1	Bisti Coal 36-1	Rick Wells 1
Location	30 35N 6W	34 35N 8W	12 34N 9W	1 33N 9W	7 30N 7W	16 31N 7W	33 32N 10W	9 30N 9W	36 25N 12W	8 26N 13W
Production interval	1,304-1,480	1,896-2,026	2,400-2,478	2,530-2,747	3,004-3,216 (OH)	3,200-3,346 (OH)	2,777-2,813	2,790-2,944	1,074-1,092	1,383-1,427
Source	wellhead	wellhead	wellhead	separator[a]	separator[a]	wellhead	wellhead	wellhead	wellhead	wellhead
TDS	5,820	1,360	2,650	6,220	21,970	13,030	20,110	28,210	14,330	16,190
Na	1,600	349	698	1,670	6,160	3,560	5,820	8,140	5,290	5,750
K	9.9	4.3	5.8	5.4	19.5	13.2	33.3	53.1	22.5	27.5
Ca	28.8	6.5	5.8	15.1	37.7	24.4	23.6	28.1	128	246
Mg	6.2	1.2	1.2	4.2	27.4	17.3	15.5	15.1	36.4	57.7
Sr	4.3	0.6	0.7	5.0	17.7	13.2	12.3	19.4	6.9	12.3
Ba	6.5	0.7	1.1	6.1	62.9	21.1	36.2	51.5	8.4	7.6
Fe	0.12	0.80	0.04	0.05	0.64	0.72	1.24	0.59	0.57	2.37
Mn	0.06	0.03	0.03	0.01[b]	0.01	0.01	0.03	0.01	0.49	0.15
Li	0.88	0.34	0.94	1.54	1.39	1.11	0.58	1.13	0.50	0.53
B	1.08	0.21	0.63	1.55	2.15	0.98	8.54	9.17	1.18	1.09
SiO_2	21.0	22.8	26.1	31.5	26.6	27.1	24.7	26.1	12.5	15.0
Field alkalinity (as HCO_3^-)	3,943	956	1,854	4,333	14,601	8,940	12,883	17,295	722	468
Organic acids (as CH_3COOH)	270	220	210	330	330	210	210	220	120	160
NH_3	2.53	1.50	1.11	4.47	11.3	8.57	9.13	16.2	4.99	6.20
organic-N	0.39	0.78	0.85	1.04	1.45	1.59	0.85	1.50	0.60	0.48
Cl	199	16	56	138	1,000	396	1,240	2,550	8,090	9,590
SO_4	<5[c]	<5	<5	<5	<5	<5	<5	<5	<5	10.4
Br	0.85	0.14	0.50	0.76	4.65	3.49	3.99	6.19	7.64	8.68
I	0.38	0.10	0.33	1.13	0.41	0.11	0.52	0.87	0.60	0.56
Field pH	7.65	8.21	8.23	7.73	7.62	7.89	8.06	8.02	7.39	7.33
$\delta^{18}O$[d]	−14.0	−14.6	−14.6	−14.1	−7.4	−7.9	−7.7	−7.6	−10.8	−10.5
δD	−85	−98	−102	−85	−32	−43	−28	−36	−81	−80
$\delta^{13}C$[e]	+23.5	+17.5	+16.7	+24.0	+25.6	+24.7	+26.0	+24.9	+19.7	+19.5
Σ cations (meq/L)	71.94	15.73	30.92	74.03	273.71	158.30	257.14	359.07	240.27	268.10
Σ anions (meq/L)	70.28	16.13	31.98	74.95	267.66	157.78	246.25	355.55	239.98	278.33

[a] flowing well; [b] near detection limit of 0.01 mg/L; [c] detection limit 5 mg/L; [d] $\delta^{18}O$ and δD in per mil relative to SMOW; [e] $\delta^{13}C$ of total dissolved carbonate species in per mil relative to PDB.

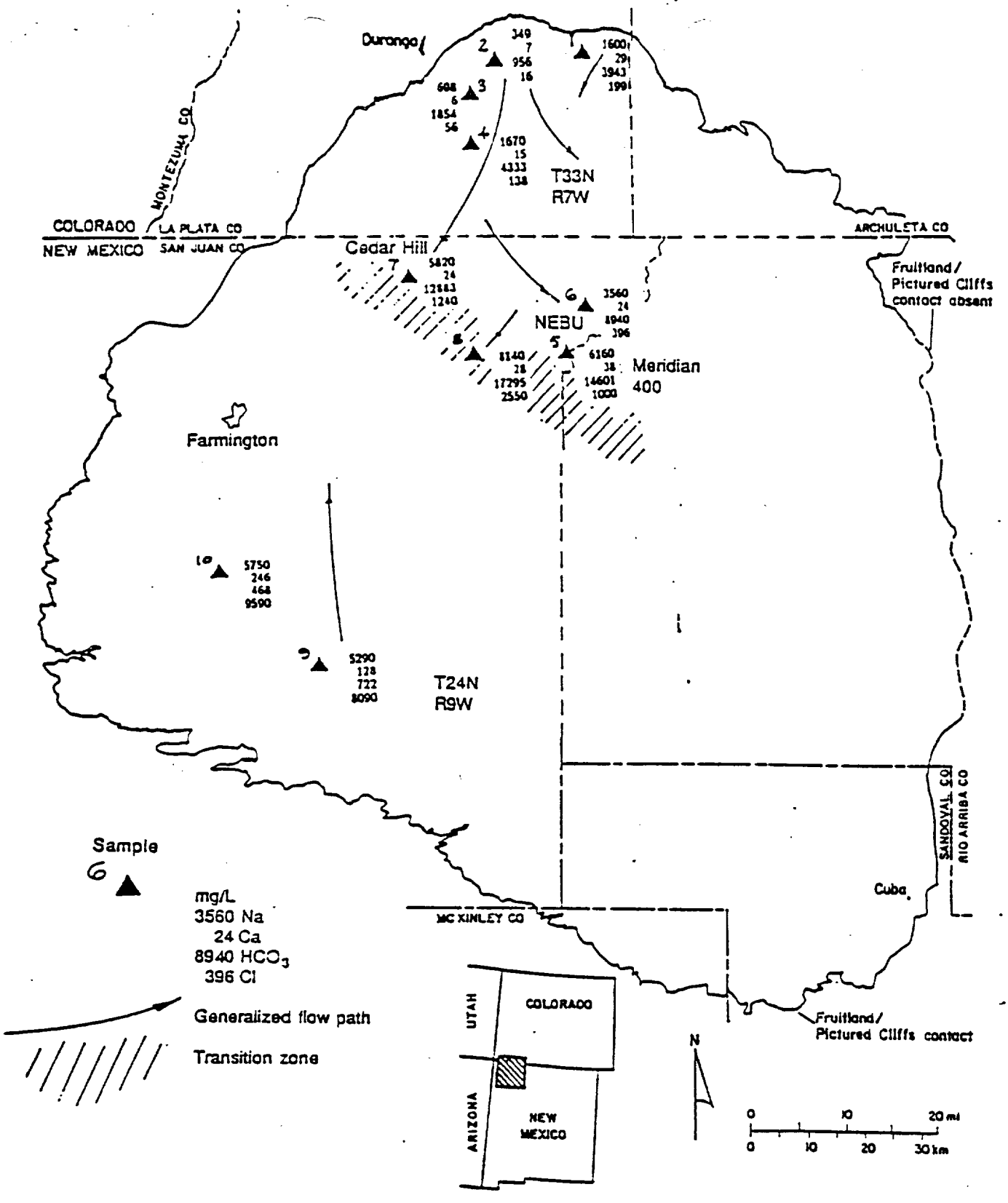


Figure 16. Location of GRI/BEG Fruitland coalbed water samples. In the north-central part of the basin, Na^+ and HCO_3^- increase down flow path, reaching their highest concentration in the transition zone. Southern waters are enriched in Cl- and Ca^{2+}. The transition zone is a regional facies, potentiometric, pressure, and hydrochemical boundary. Complete chemical analyses in table 3.

CLI-12A

CHEMICAL & GEOLOGICAL LABORATORIES

Casper Farmington Glendive Sterling

WATER ANALYSIS REPORT

Field Bisti, New Mexico Well No. CBU No. 29

Operator Sunray Mid-Continent Oil Company Location NE SE 8-25N-12W

Sampled by Date

Formation Gallup Depths 4750 - 4800 How sampled From Treater

Other pertinent data Sample No. 2

Analyzed by DM & DS Date October 2, 1959 Lab. No. 14747-2

CONSTITUENTS	PPM	MEQ.	MEQ.%
Sodium	18,064	785.37	47.15
Calcium	646	32.24	1.94
Magnesium	185	15.21	0.91
Sulfate	10	0.21	0.01
Chloride	29,000	817.80	49.10
Carbonate	-	-	-
Bicarbonate	903	14.81	0.89
Hydroxide	-	-	-

TOTAL SOLIDS IN PARTS PER MILLION:

By evaporation	49,490
After ignition	48,400
Calculated	48,350

PROPERTIES OF REACTION IN PERCENT:

Primary salinity	94.30
Secondary salinity	3.92
Primary alkalinity	0.00
Secondary alkalinity	1.78
Chloride salinity	99.98
Sulfate salinity	0.02

Observed pH 7.2 Resistivity @ 68°F. ohms/meter³ 0.165

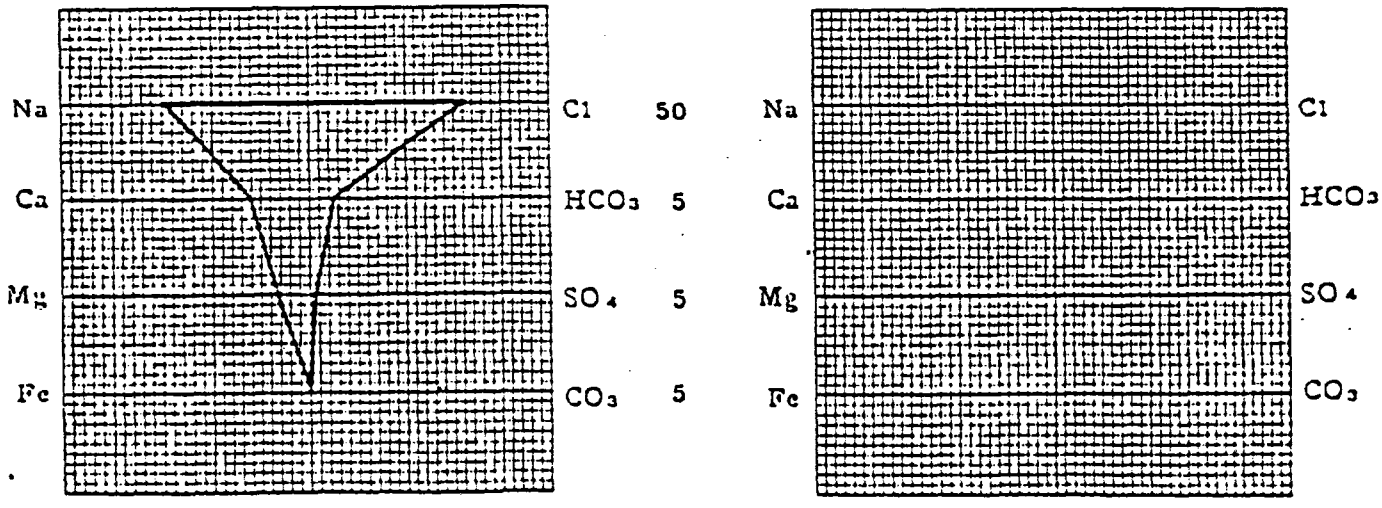
Remarks Correlates with Gallup water from this area and with water from CBU No. 28 sampled as known Gallup water.

Note: PPM=Milligrams per liter (1 PPM is equivalent to 0.0001% by weight). MEQ=Milliequivalents per liter. MEQ%=Milliequlivalents per liter in percent.

WATER ANALYSIS PATTERN

Sample above described

Scale MEQ per Unit



CLI-12A

CHEMICAL & GEOLOGICAL LABORATORIES

Casper Farmington Glendive Sterling

WATER ANALYSIS REPORT

Field Bisti, New Mexico Well No. CBU No. 28

Operator Sunray Mid-Continent Oil Company Location NW SW 9-25N-12W

Sampled by Date

Formation Gallup Depths 4750 - 4800 How sampled From treater

Other pertinent data Sample No. 1

Analyzed by DM & DS Date October 2, 1959 Lab. No. 14747-1

CONSTITUENTS	PPM	MEQ.	MEQ.%
Sodium	16,789	729.95	47.18
Calcium	608	30.34	1.96
Magnesium	162	13.32	0.86
Sulfate	10	0.21	0.01
Chloride	27,000	761.40	49.21
Carbonate	-	-	-
Bicarbonate	732	12.00	0.78
Hydroxide	-	-	-

TOTAL SOLIDS IN PARTS PER MILLION:

By evaporation	46,030
After ignition	44,560
Calculated	44,929

PROPERTIES OF REACTION IN PERCENT:

Primary salinity	94.36
Secondary salinity	4.08
Primary alkalinity	0.00
Secondary alkalinity	1.56
Chloride salinity	99.98
Sulfate salinity	0.02

Observed pH. 7.6 Resistivity @ 68°F. ohms/meter³ 0.190

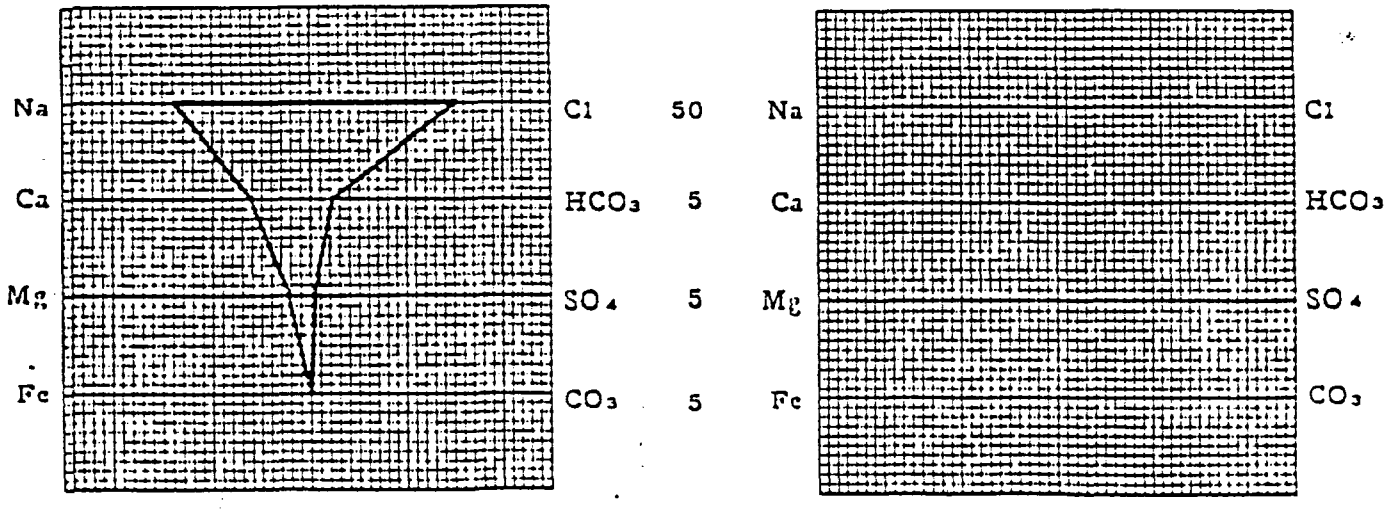
Remarks Sampled as known Gallup water.

Note: PPM=Milligrams per liter (1 PPM is equivalent to 0.0001% by weight). MEQ=Milliequivalents per liter. MEQ%=Milliequlivalents per liter in percent.

WATER ANALYSIS PATTERN

Sample above described

Scale MEQ per Unit



C NE SW 1-26N-12W

LOG NO. 18353 IE — Distributed by Petroleum Information

P.I.
DENVER · CASPER
BILLINGS · BISMARCK
LOS ANGELES

COMPANY: Skelly Oil Company
WELL: #2 J.W. Goddard
FIELD: Unnamed
LOC (P.I.): C NE SW
1 26N 12W
San Juan, New Mexico

LOG NO 18353 IE
1 26N 12W

SCHLUMBERGER WELL SURVEYING CORPORATION

COUNTY: SAN JUAN, N.M.
FIELD or LOCATION: GALLEGOS-GALLUP
WELL: J. W. GODDARD #2
COMPANY: SKELLY OIL COMPANY

COMPANY: SKELLY OIL COMPANY
WELL: J. W. GODDARD #2
FIELD: GALLEGOS-GALLUP
LOCATION: SEC. 1-26N-12W
COUNTY: SAN JUAN
STATE: NEW MEXICO

Other Surveys: ML
Location of Well: 1980' FR S/L, 1980' FR W/L, SEC. 1-26N-12W
Elevation: D.F. 6007', K.B. 6008', or G.L. 5995'
FILING No.

RUN No.	ONE
Date	10-9-58
First Reading	
Last Reading	
Feet Measured	
Csg. Schlum.	
Csg. Driller	
Depth Reached	
Bottom Driller	
Depth Datum	K.B.
Mud Nat.	GEL
Dens. | Visc.	
Mud Resist.	
Res. BHT	
Rmf	
Rmc	
pH	
Wtr. Loss	CC 30 min.
Bit Size	7 7/8"
Spcgs.—AM	16"
Spcgs.—IND.	40"
Opr. Rig Time	2 HRS
Truck No.	
Recorded By	MONTGOMERY
Witness	RITTER & CLAUSEN

REMARKS: MUD FROM FLOW LINE C.D. USED S.D. = 1 1/2"

Cartridge No. C-155
Panel No. B-41
Sonde No. C-83

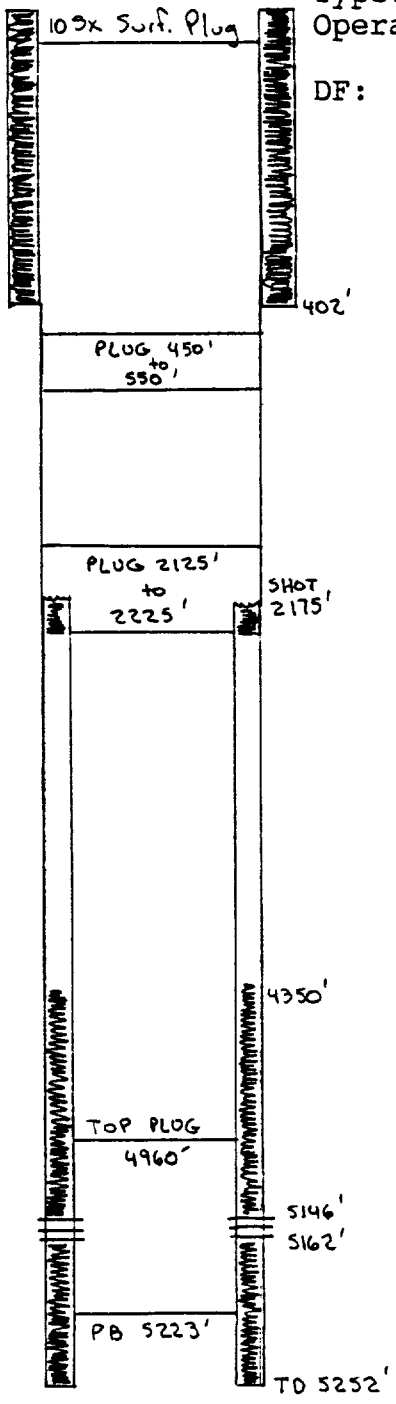
SPONTANEOUS-POTENTIAL millivolts	DEPTHS	CONDUCTIVITY millimhos/m = 1000/ohms. m²/m
− 10 mV +	2" = 100'	INDUCTION: 400 — 200 — 0; 600 — 400
	CSG. 423'	RESISTIVITY -ohms. m²/m — 16" NORMAL: 0 — 100; 0 — 1000

Well Name: J.W. Goodard #7

Location: 660'FSL & 660 FWL, Section 1, T26N, R12W NMPM
County: San Juan
State: New Mexico
Lease: SF-078953
Type: Federal
Operator: Skelly Oil

DF: 5965'

SURFACE CASING
Hole Size: 15"
Casing: 10 3/4"
CSA: 402'
Cement: 450 sks, 2% CaCl circ to surface



FORMATION TOPS

Fruitland:	1050'
Pic Cliffs:	1277'
Lewis:	1395'
Cliffhouse:	2814'
PT. Lookout:	3791'
Mancos:	4039'
L.Gallup:	5132'

TOP CEMENT: SURF
Top Cement: 4350'
Calculated

surface

PREFORATIONS
5146'- 5162'
4SPF

PBD: 5223'

PRODUCTION CASING
Hole Size: 8 3/4"
Size: 5 1/2"
WT & GR 14# J-55
GSA: 5252'
TD: 5252'

WELL DATA
Spud: 8/24/58
Zone: L. Gallup
Frac'd w/ 30,000 #20/40 27,700 gas oil

CEMENTING RECORD
5 1/2" w/125sx regular 2% gel, 125sx stratacrete.L.

PLUGGING RECORD
SQZ 5146-5162' w/20sx, 3% gel. Top @ 4960'. Shot 5 1/2" casing @ 2175'. Spot 20sx 2125'- 2225'
Spot sx 450-550'
Spot 10sx in

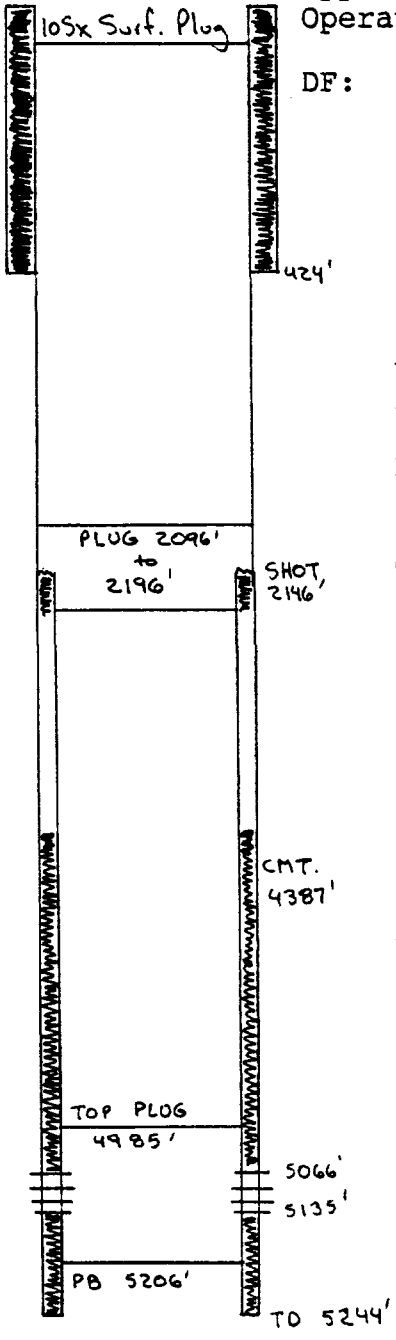
P&A 2/19/68

Well Name: J.W. Goodard #10

Location: 1980' FSL & 660' FEL, Section 2, T26N, R12W NMPM
County: San Juan
State: New Mexico
Lease: SF-078953
Type: Federal
Operator: Skelly Oil

DF: 5940'

SURFACE CASING
Hole Size: 15"
Casing: 10 3/4"
CSA: 424'
Cement: 475 sks, 2% CaCl circ to surface



FORMATION TOPS

Fruitland:	1050'
Pic Cliffs:	1266'
Lewis:	1379'
Cliffhouse:	
Lookout:	3786'
Mancos:	4023'
L.Gallup:	5114'
M. Gallup:	4971'

TOP CEMENT: SURF
Top Cement: 4387'
Temp Survey

PREFORATIONS
5066'-5084'
5091-5098'
5116-5135'

PBD: 5206'

PRODUCTION CASING

Hole Size:	8 3/4"
Size:	5 1/2"
WT & GR	14# J-55
GSA:	5244'
TD:	5244'

WELL DATA
Spud: 11/1/58
Zone: L&M Gallup
Frac'd w/ 40,000 #20/40 42,000 gas oil
P T .

CEMENTING RECORD
5 1/2" w/125sx regular 114sx stratacrete.L.

PLUGGING RECORD
SQZ 5066-5135' w/15sx, 3% gel. Top @ 4985'. Shot 5 1/2" casing @ 2146'. Spot 20sx 2096'-2196'

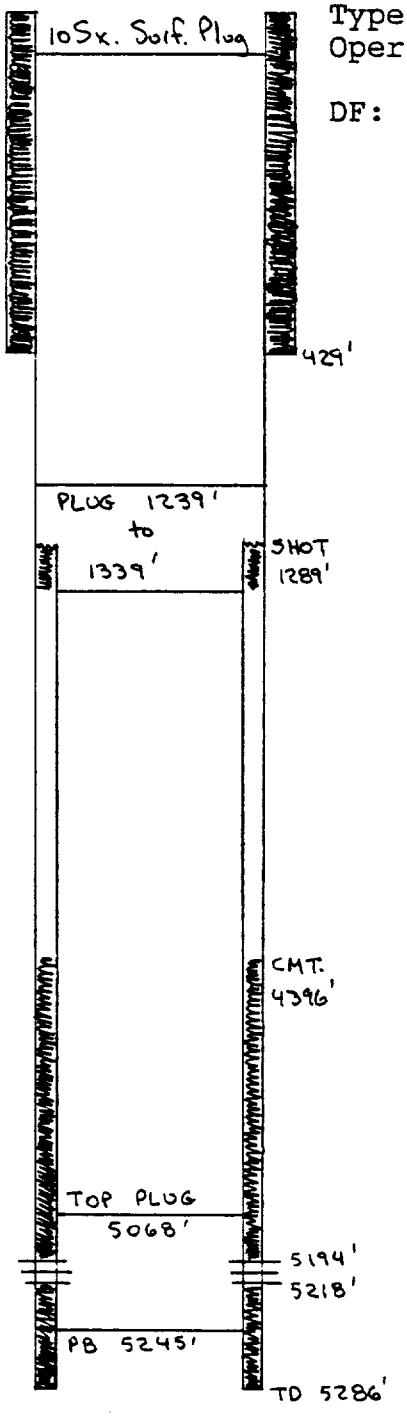
P&A 4/5/68

Well Name: J.W. Goodard #11

Location: 740' FSL & 2030' FEL, Section 1, T26N, R12W NMPM
County: San Juan
State: New Mexico
Lease: SF-078953
Type: Federal
Operator: Skelly Oil

DF: 6004'

SURFACE CASING
Hole Size: 15"
Casing: 10 3/4"
CSA: 429'
Cement: 475 sks, 2% CaCl circ to surface



FORMATION TOPS

Fruitland:	1100'
Pic Cliffs:	1340'
Lewis:	1455'
Cliffhouse:	2876'
PT. Lookout:	3878'
Mancos:	4099'
L.Gallup:	5191'

TOP CEMENT: SURF
Top Cement: 4396'
Temp Survey

PREFORATIONS
51940-5128'
4SPF

PBD: 5245'

PRODUCTION CASING

Hole Size:	8 3/4"
Size:	5 1/2"
WT & GR	14# J-55
CSA:	5282'
TD:	5286'

WELL DATA
Spud: 11/6/58
Zone: Lower Gallup
Frac'd w/ 40,000 #20/40 35,000 gas oil

CEMENTING RECORD
5 1/2" w/125sx regular 114sx stratacrete.L.

PLUGGING RECORD
SQZ 5194-5214 w/15sx, 3% gel. Top @ 5068. Shot 5 1/2" casing @ 1289'. Spot 20sx 1239-1339

Well Name: J.K. Edwards Allen #1
(Navajo F #1) (Skelly)

Location: 660'FNL, 1980' FWL, Section 12, T26N, R12W NMPM
County: San Juan State: New Mexico
Lease: 14-20-603-296 Type: Navajo Allottee

DF: 5987'

SURFACE CASING
Hole Size: 15"
Casing: 10 3/4"
CSA: 404'
Cement: 400 SX
Circ to Surface

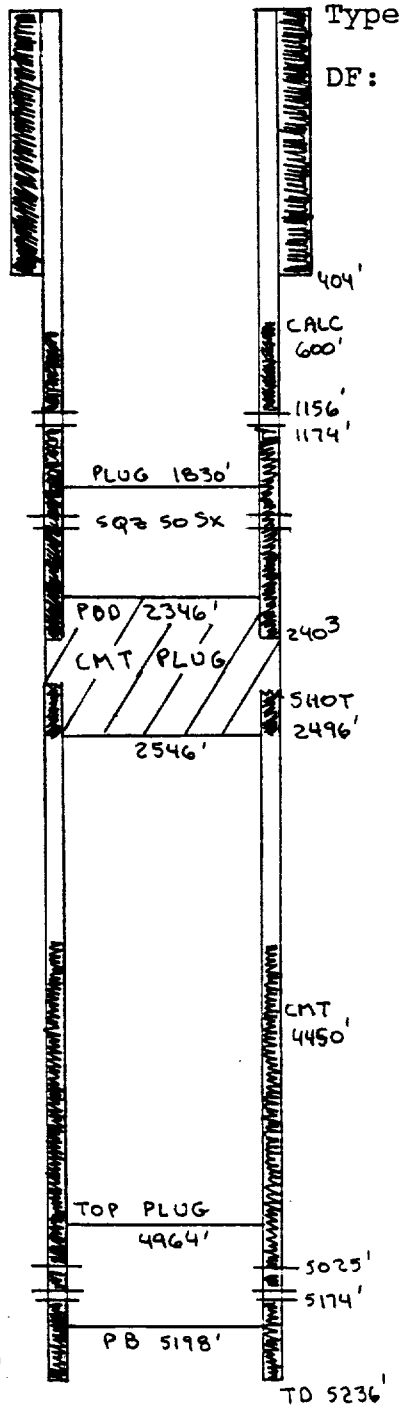
FORMATION TOPS
Fruitland: 1050'
Pic Cliffs: 1292'
Lewis: 1410'

Cliffhouse: 3500'
PT. Lookout: 3808'
Mancos: 4045'
M.Gallup: 5000'
L. Gallup: 5139'

TOP CEMENT: SURF
Top Cement: 4450'
Calculated

PREFORATIONS
5173'-5174' SQZ
5025'-5056'
5154'-5174'
4SPF
PBD: 5198'

PRODUCTION CASING
Hole Size: 8 3/4"
Size: 5 1/2"
WT & GR 14# J-55
CSA: 5234'
TD: 5236'



WELL DATA
Spud: 11/3/57
Zone: M&L Gallup
Frac'd w/ 40,000 #20/40 40,000 gas oil

CEMENTING RECORD
5 1/2" w/125 sx pozmix
125 sx reg.
SQZ 5173-74' w/150 sx regular cement

PLUGGING RECORD
20sx 5025'-5174'. Top plug @ 4964. Shot 5 1/2" @ 2496'. Spot 20sx 2446'-2546'

REENTRY
PBDT: 2346'
Run 5 1/2 " to 2403
Cement to 1400'w/150sx Class C 7 1/2% salt.
2nd stage 1400' to surface 100 sx Class A, 150 sx Class C 7 1/2% salt.
calculated to 600'
Perf: 2183-2189, 2206-10, 2212-20', 2232'-40.
SQZW/50sx Class C, 2% CaCl
Perf: 1156-1174',
Frac. IP: 2000 MCF

ILLEGIBLE

Santa Fe 057521

4—1070-R

The United States of America,

To all to whom these presents shall come, Greeting:

WHEREAS, a schedule of allotments approved by the Secretary of the Interior has been deposited in the General Land Office, whereby it appears that Nod Yazzie, a Navajo Indian,

has been allotted the following-described land:

The southwest quarter of Section one in Township twenty-six north of Range twelve west of the New Mexico Meridian, New Mexico, containing one hundred sixty acres:

NOW KNOW YE, That the UNITED STATES OF AMERICA, in consideration of the premises, has allotted, and by these presents does allot, unto the said Indian the Land above described, and hereby declares that it does and will hold the Land thus allotted (subject to all statutory provisions and restrictions) for the period of twenty-five years, in trust for the sole use and benefit of the said Indian and at the expiration of said period the United States will, convey the same by patent to said Indian in fee, discharged of said trust and free from all charge and incumbrance whatsoever; but in the event said Indian dies before the expiration of said trust period, the Secretary of the Interior shall ascertain the legal heirs of said Indian and either issue to them in their names a patent in fee for said Land, or cause said Land to be sold for the benefit of said heirs as provided by law; and there is reserved from the lands hereby allotted, a right of way thereon for ditches or canals constructed by the authority of the United States; reserving, also, to the United States all coal in the lands so granted, and to it, or persons authorized by it, the right to prospect for, mine, and remove coal from the same upon compliance with the conditions of and subject to the limitations of the Act of June 22, 1910 (36 Stat. 583), Excepting and reserving, also, to the United States all the oil and gas in the lands so allotted, and to it, or persons authorized by it, the right to prospect for, mine, and remove such deposits from the same upon compliance with the conditions and subject to the provisions and limitations of the Act of July 17, 1914 (38 Stat.509).

IN TESTIMONY WHEREOF, I, Herbert Hoover,

President of the United States of America, have caused these letters to be made Patent; and the Seal of the General Land Office to be hereunto affixed.

GIVEN under my hand, in the District of Columbia, the TENTH

(SEAL) day of JUNE in the year of our Lord one thousand nine hundred and TWENTY-NINE and of the Independence of the United States the one hundred and FIFTY-THIRD

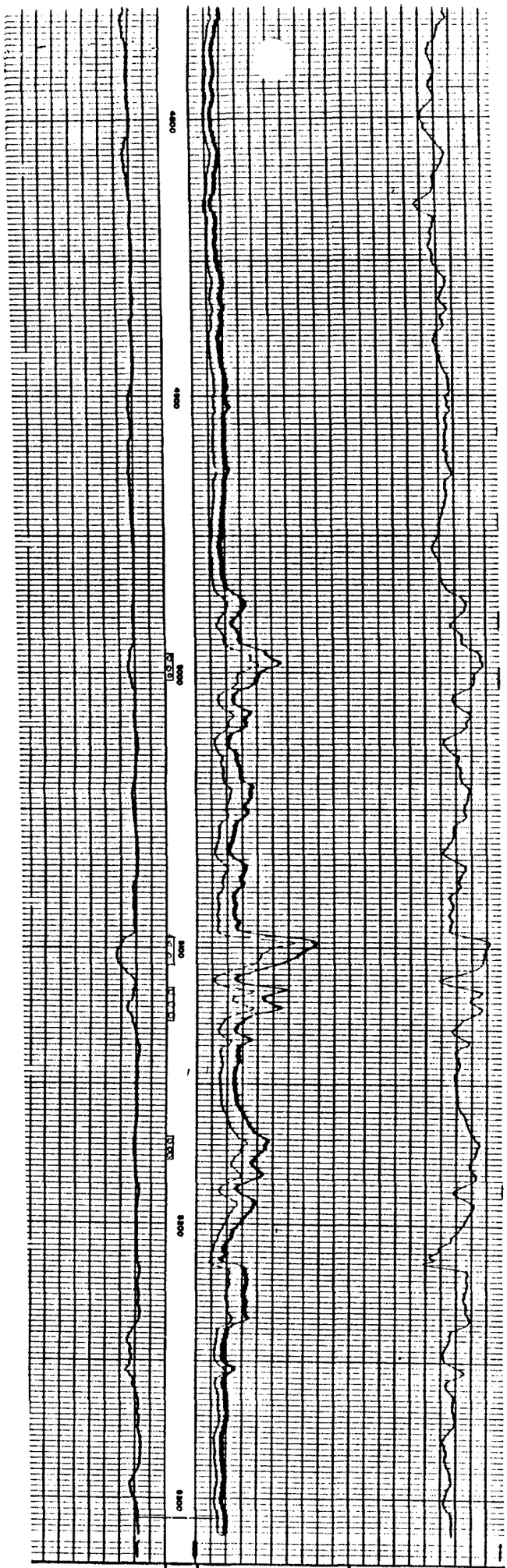
By the President: Herbert Hoover

By Dana B. Bugh, Secretary,

M. P. LeRoy

Recorder of the General Land Office

RECORD OF PATENTS: Patent Number 1028346



16" NORMAL
0 100
0 1000

INDUCTION
0 100
0 1000

RESISTIVITY
ohms. m²/m

INDUCTION
400 200 0
600 400

10
−|⇐|+
mv

SPONTANEOUS-POTENTIAL
millivolts

CONDUCTIVITY
millimhos/m = $\frac{1000}{\text{ohms} \cdot m^2/m}$

COMPANY SHELLY OIL COMPANY
WELL J. V. GODDARD #2
FIELD GALLEGOS-GALLUP

SWSC FR 5307'
SWSC TD 5313'
DRLR TD 5312'
Elev:
KB 6008'