7/1/92

June 11, 1992

RELEASE 6·29·92

State of New Mexico
Oil Conservation Division
P.O. Box 2088
Santa Fe, New Mexico 87504-2088

ATTN: Mr. William J. LeMay

RE: Form C-108, Application for Salt Water Disposal
Bird Creek Resources, Inc.
Proposed Culebra Bluff SWD Well No. 1
Unit E, 1980' FNL, 860' FWL
Section 2 T23S R28E NMPM
Eddy County, New Mexico

Dear Mr. LeMay,

Bird Creek Resources, Inc. respectfully requests administrative approval for the proposed disposal well. The well is currently a marginal oil producer.

Enclosed is Form C-108 and required data, including proof of publication. Copies of this application have been sent to offset operators via return receipt mail. Upon receiving proof of delivery, the receipts will be forwarded to your office.

And Surface Owners.

Yours truly,

BIRD CREEK RESOURCES, INC.

Brad D Burks

Brad D. Burks, PE 16172
Agent, Bird Creek Resources, Inc.

BDB:sw

Attachments

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

APPLICATION FOR AUTHORIZATION TO INJECT

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

II. Operator: Bird Creek Resources, Inc.

Address: 810 South Cincinnati, Suite 110 Tulsa, Oklahoma 74119

Contact party: Brad D. Burks, Operation Manager Phone: 918-582-3855

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: Brad D. Burks, PE 16172 Title Operations Manager

Signature: Brad D. Burks Date: 6-11-92

* 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;

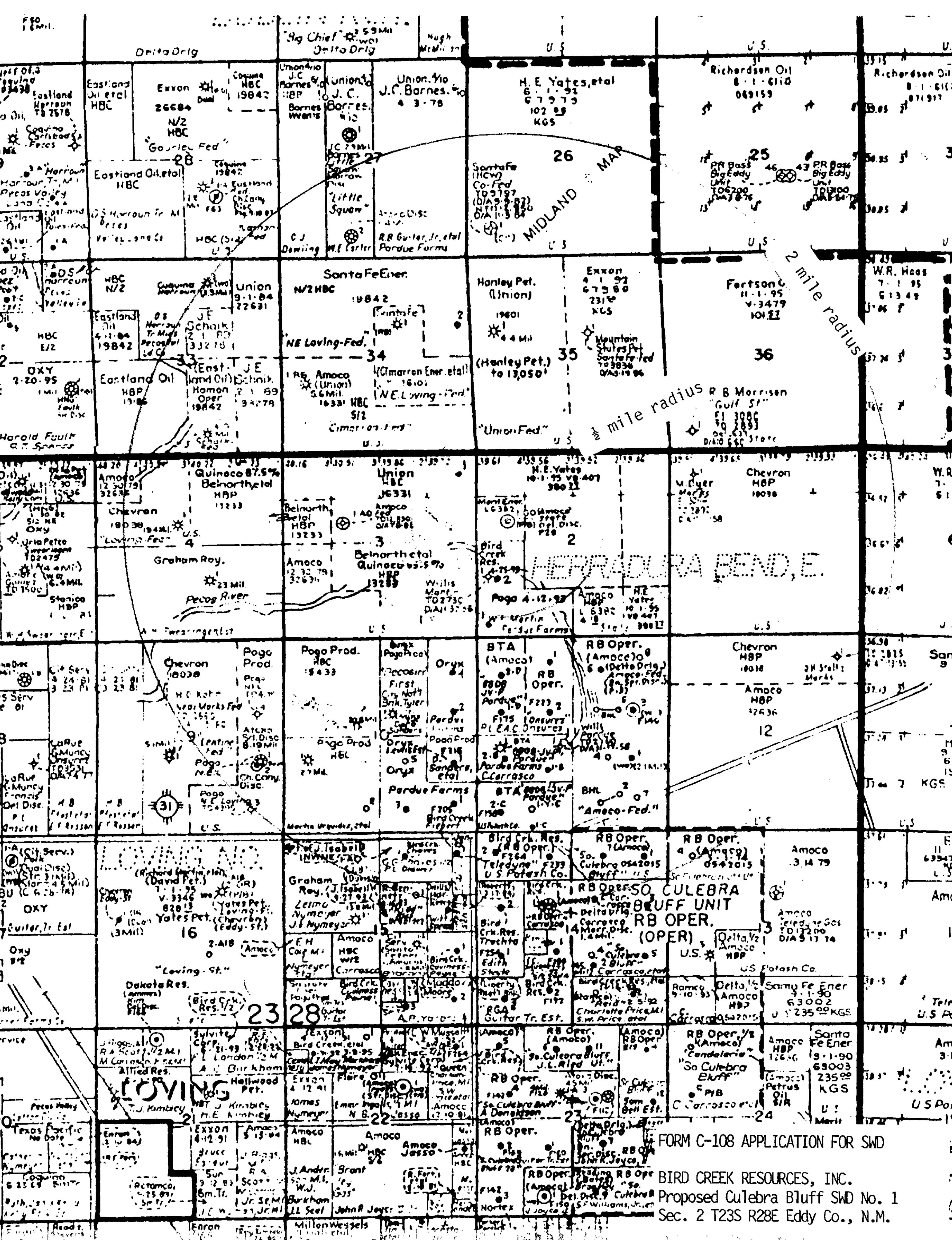
(2) the intended purpose of the injection well; with the exact location of single wells or the section, township, and range location of multiple wells;

(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.

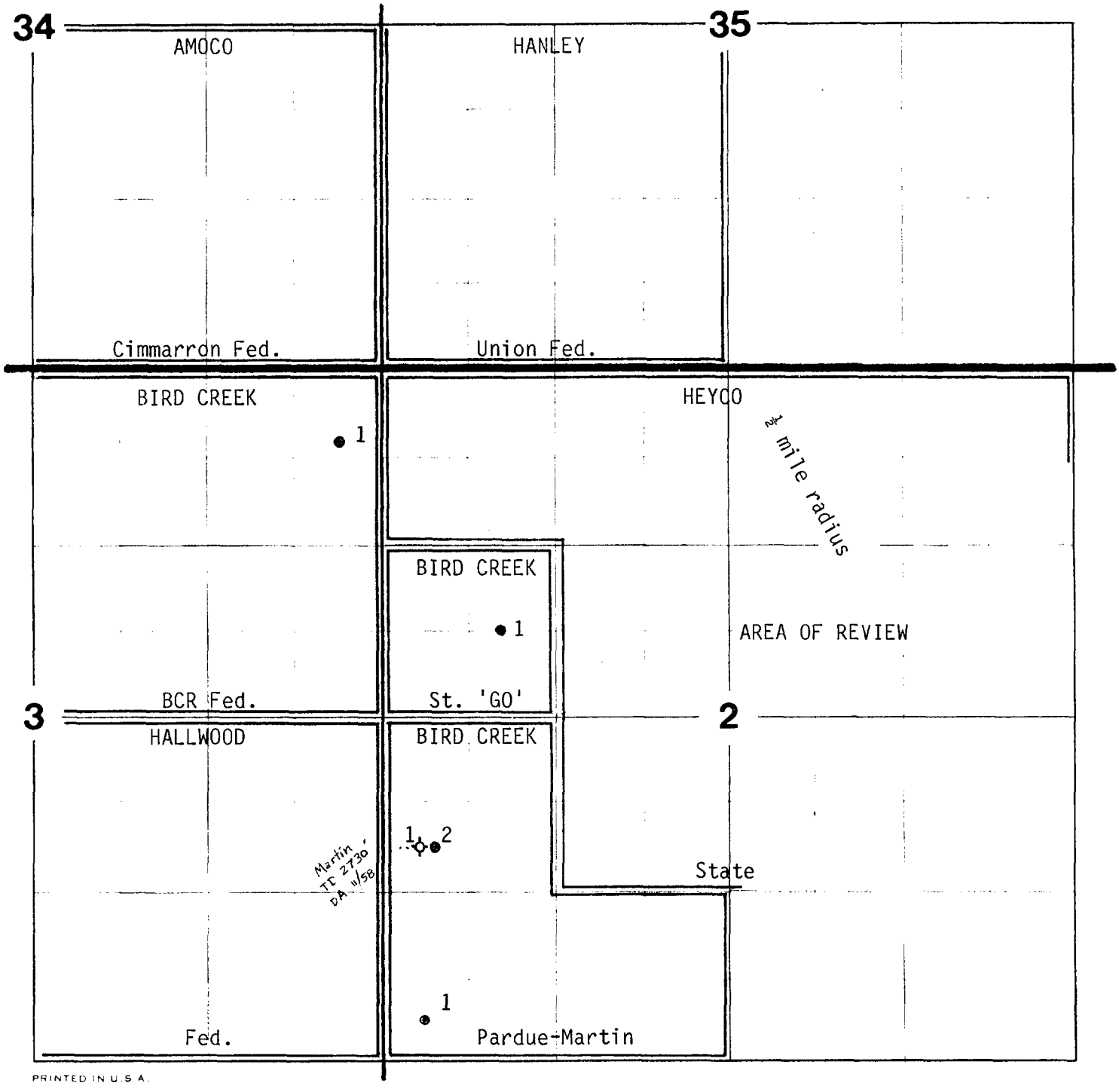
NOTICE: Surface owners or offset operators must file any objections or requests for hearing of administrative applications within 15 days from the date this application was mailed to them.



FORM C-108 APPLICATION FOR SWD

BIRD CREEK RESOURCES, INC.
Proposed Culebra Bluff SWD No. 1
Sec. 2 T23S R28E Eddy Co., N.M.

TOWNSHIP 22-S 23-S RANGE 28-E COUNTY Eddy STATE New Mexico



PRINTED IN U.S.A.

FORM C-108 APPLICATION FOR SWD

BIRD CREEK RESOURCES, INC.
Proposed Culebra Bluff SWD No. 1
Sec. 2 T23S R28E Eddy Co., N.M.

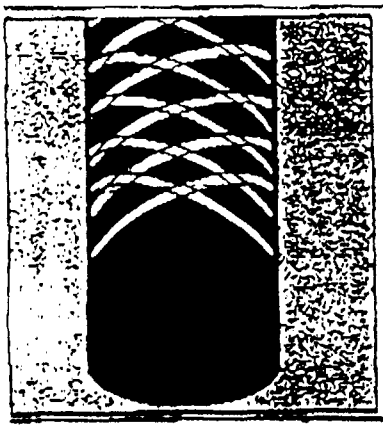
FORM C-108, APPLICATION FOR SWD
WELL DATA

OPERATOR:	Bird Creek Resources, Inc.
CURRENT WELL NAME:	State "GO" Well No. 1
PROPOSED WELL NAME:	Culebra Bluff SWD Well No. 1
LOCATION:	Unit E, 1980' FNL, 860' FWL Section 2, T-23-S, R-28-E, N.M.P.M. Eddy County, New Mexico
CURRENT CASINGS:	16", 65# H-40 STC, csg. @ 0-400' in 20" hole. Cemented w/ 500 sxs "C". Cement circulated to surface, 81 sxs. 10.75", 40.5# K-55 STC, csg. @ 0-2630', in 14.75" hole. Cemented w/ 1800 sxs Lite and "C". Cement circulated to surface, 75 sxs. 7.625", 39#, 33.7# S-95 LTC csg. @ 0-11,450'in 9.5" hole. Cemented w/ 1850 sxs. Lite and "H". TOC @ 1955' by temperature survey. 5", 18# M-80 STC, liner @ 11,115-12,900'. Cemented w/ 285 sxs "C". Cement circulated to liner top.
PROPOSED TUBING:	3.5", 2.45# Smith fiberglass tubing @ 0-4250'. 1500 PSIG WP, 0.26" wall, ID 3.00", un-lined. Specification sheet attached.
PROPOSED PACKER:	Baker 7.625" x 3.5" Loc-Set Packer @ 4250'. Full bore w/ on-off seal tool. Internally and externally plastic coated.
INJECTION FORMATION:	Delaware (Cherry Canyon Sands). East Loving Delaware and East Herradura Bend Delaware fields. Perforations, 2 spf @ 4300-4800', chosen from current logs. Well to be converted from a Delaware producer (perfs @ 6050-6250') to SWD with CIBP and cement @ 5950-6000'.
OVERLYING ZONES:	Delaware (Cherry Canyon Sands) @ 3650-70'. Loving Cherry Canyon Field; oil production. Only one well within 2 mile radius area. Pogo's NEL Well No. 2. Unit I, NE/SE/4. Section 9 T-23-S R-28-E.

UNDERLYING ZONES: Delaware (Brushy Canyon Sands) @ 6000-6200'.
East Loving Delaware and East Herradura Bend fields; oil production.
Numerous wells within 2 mile radius area.
Secs. 2, 3, 9, 10, 11, 13, 14, 15
T-23-S R-28-E.

PROPOSED STIMULATION: Perforations shot from current logs.
All perfs will be acidized w/50 gallons per ft.
Perfs will be sand fractured.

LOGS: Copies of logs were submitted to the Commission on initial completion. A copy of the injection interval on open hole logs and the 7.625" temperature survey is attached.



Smith
Fiberglass
Products

Product Data

SDT™ 1510HP Downhole Tubing

Description

Downhole Tubing (SDT) 1510HP is a high performance fiberglass reinforced tubing. It is manufactured from anhydride cured epoxy resin and is filament wound using a balanced dual angle design. It comes standard with conventional API 8 round EUE long form (short form on 7" product) threaded and coupled end connections. Though it is normally unlined, SDT 1510HP can be lined to suit specifications.
SDT 1510HP is rated for pressures up to 1,500 psig and for use in temperatures up to 200°F (93°C). It is available in random lengths of 30 feet.

Dimensions & Weights

Size	Nominal I.D.		Nominal O.D.		Nominal Wall Thickness		Make-Up Length		Nominal Coupling O.D.		Weight		Fill Capacity	
	in	mm	in	mm	in	mm	in	mm	in	mm	lb/ft	kg/m	bbl/1,000 ft	liters/m
1½	1.50	38	1.77	45	.14	3.6	2.1	53	2.7	69	0.71	1.06	2.2	1.1
2⅜	2.00	51	2.38	60	.19	4.8	2.6	66	3.3	84	1.22	1.82	3.9	2.0
2⅞	2.43	62	2.89	73	.23	5.8	2.9	74	3.9	99	1.77	2.63	5.7	3.0
3½	3.00	76	3.51	89	.26	6.6	3.1	79	4.6	117	2.45	3.65	8.7	4.5
4½	4.00	102	4.64	118	.32	8.1	3.4	86	5.8	147	3.92	5.83	15.5	8.1
7	5.84	148	6.90	175	.53	13.5	3.1	79	8.2	208	9.38	13.97	33.1	17.3

Pipe Performance Ratings

Size	Pressure Rating		Tensile Rating		Collapse Rating		Ultimate Burst[1]		Ultimate Collapse[1]		Ultimate Tensile[1]	
	psig	bar	lb	kg	psig	bar	psig	bar	psig	bar	lb	kg
1½	1,500	103.4	6,850	3,114	1,100	75.9	4,800	331.0	3,300	227.6	24,000	10,909
2⅜	1,500	103.4	11,700	5,318	1,200	82.8	5,800	400.0	3,600	248.3	41,400	18,818
2⅞	1,500	103.4	15,900	7,227	1,200	82.8	5,500	379.3	3,600	248.3	49,700	22,593
3½	1,500	103.4	23,200	10,545	1,100	75.9	5,500	379.3	3,250	224.1	78,400	35,636
4½	1,500	103.4	33,000	15,000	900	62.1	5,000	344.8	2,700	186.2	103,000	46,818
7	1,500	103.4	55,500	25,227	1,100	75.9	4,600	317.2	3,300	227.6	167,000	75,909

[1]Calculated from random lab tests. All measured across the joint.
If the service temperature exceeds 160°F, use the following percentages of the published ratings.

170°F — 95%
180°F — 84%
190°F — 77%
200°F — 70%

If only the bottom hole temperature exceeds 160°F, it is not necessary to use these percentages along the entire length of the tubing string.

FORM C-108 APPLICATION FOR SWD

BIRD CREEK RESOURCES, INC.
Proposed Culebra Bluff SWD No. 1
Sec. 2 T23S R28E Eddy Co., N.M.

Pup Joints 1½" thru 7"/2' thru 10' lengths

NOTE: Smith Fiberglass Products manufactures a variety of special fittings. Consult fittings section for ratings, details, and more complete listings. Contact a Smith Fiberglass Products representative for your fittings needs.

Typical Mechanical & Physical Properties	Units	Value	Test Method
Density	lb/in³ (gm/cm³)	0.073 (2.02)	ASTM D792
Axial Tensile Modulus	psi (N/m²)	3.25×10^6 (2.25×10^{10})	ASTM D2105
Compressive Strength	psi (N/m²)	1.4×10^4 (9.71×10^7)	ASTM D695
Flow Factor, Hazen-Williams	—	150	Manufacturer
Thermal Conductivity	BTU-in/ft²-hr-°F (cal,gm-cm/hr-cm²-°C)	2.5 (3.10)	ASTM D177
Coefficient of Thermal Expansion	(in/1,000 ft)/°F	0.06	ASTM D696
Rockwell M Hardness	—	90	Manufacturer
Hoop Tensile Modulus	psi (N/m²)	3.50×10^6 (2.42×10^{10})	Manufacturer
Poisson's Ratio (Axial Tension)	—	0.16	Manufacturer

Minimum Bending Radius at 500 psi

Size in	Tensile lb	Minimum Bending Radius ft	Tensile lb	Minimum Bending Radius ft	Tensile lb	Minimum Bending Radius ft	Tensile lb	Minimum Bending Radius ft
1½	1,700	70	3,400	100	5,200	200	6,850	300
2⅜	2,900	80	5,900	120	8,800	240	11,700	360
2⅞	4,000	95	8,000	140	11,900	280	15,900	420
3½	5,800	115	11,600	170	17,400	340	23,200	510
4½	8,300	150	16,500	220	24,800	440	33,000	660
7	13,900	215	27,800	320	41,600	640	55,500	960

Minimum Bending Radius at 1,500 psi

Size in	Tensile lb	Minimum Bending Radius ft	Tensile lb	Minimum Bending Radius ft	Tensile lb	Minimum Bending Radius ft	Tensile lb	Minimum Bending Radius ft
1½	1,700	70	3,400	100	5,200	200	6,850	300
2⅜	2,900	80	5,900	120	8,800	240	11,700	360
2⅞	4,000	95	8,000	140	11,900	280	15,900	420
3½	5,800	115	11,600	170	17,400	340	23,200	510
4½	8,300	150	16,500	220	24,800	440	33,000	660
7	13,900	215	27,800	320	41,600	640	55,500	960

Consult installation guide ("A guide to installation and testing of fiberglass surface pipe, tubing and casing") for proper installation techniques.

IMPORTANT NOTICE: We have prepared this literature as a guide only. Although we believe the information contained herein is accurate and reliable, this information shall not be construed to constitute or extend any representation, warranty or guarantee, whether express or implied, or an inducement of infringement of patent including any warranty. Smith Fiberglass Products reserves the right to update products and/or data as necessary without notice.

SMITH FIBERGLASS

Smith Fiberglass Products Inc.
A Subsidiary of A.O. Smith Corporation
2700 W. 65th Street
Little Rock, AR 72209

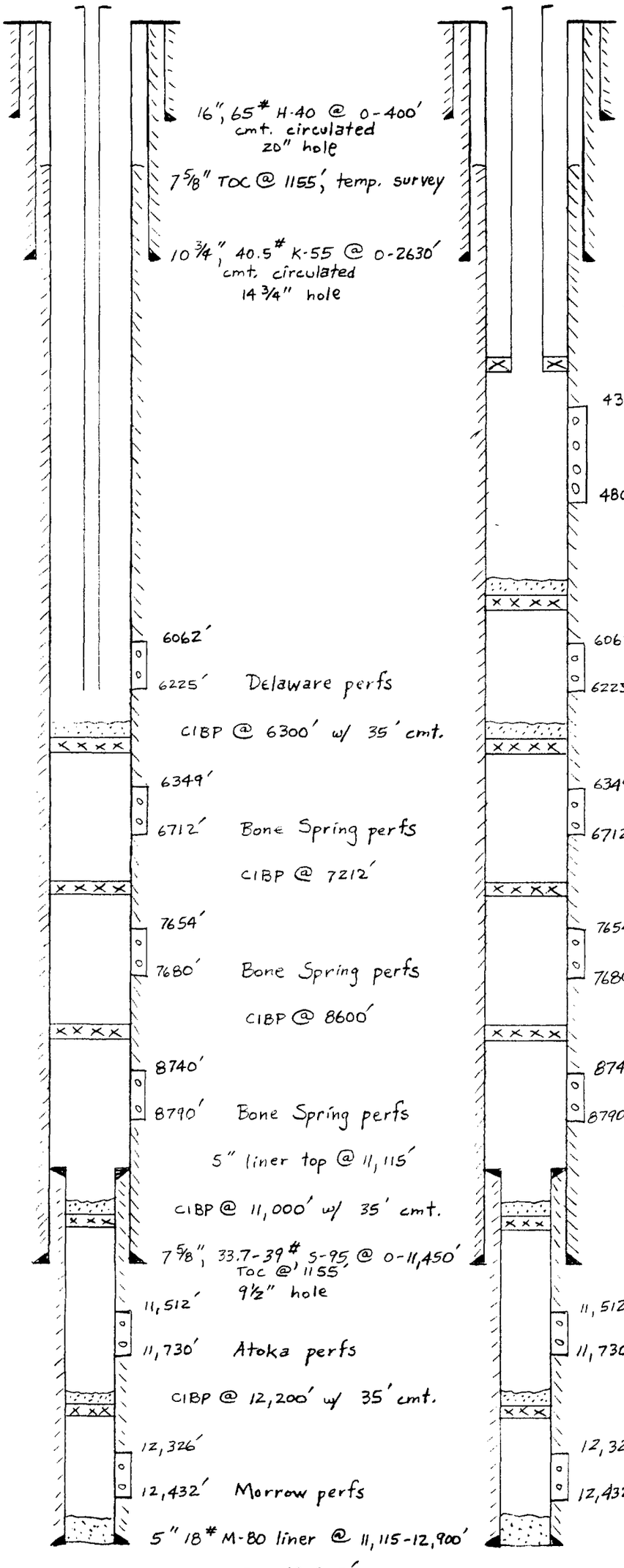
Phone 501-568-4010
TWX 910-722-7377 A O SMITH LR
FAX 501-568-4465

PRESENT

PROPOSED

FORM C-108
APPLICATION FOR SWD

Bird Creek Resources, Inc.
State "60" No. 1
(Proposed Culebra Bluff SWD No. 1)
Un. E Sec. 2 TZ3S R28E
Eddy County, New Mexico



FORMATION	TOP
Alluvium	0'
Salt	290'
Delaware	
- Bell Canyon	2670'
- Cherry Canyon	3980'
- Brushy Canyon	5030'
Bone Spring	6256'
Wolfcamp	10,275'
Strawn	10,992'
Atoka	11,278'
Morrow	12,005'
Barnett	12,776'

TABULATION OF DATA OF WELLS IN AREA OF REVIEW

FORM C-108, APPLICATION FOR SWD
BIRD CREEK RESOURCES, INC.
PROPOSED CULEBRA BLUFF SWD WELL NO. 1
T-23-S, R-28-E, EDDY COUNTY, NEW MEXICO

OPERATOR	WELL NAME AND NO.	LOCATION	TYPE WELL	TD	CURRENT COMPLETION	CONSTRUCTION
Bird Creek	State "GO" #1 (Proposed Culebra Bluff SWD #1)	D-2-23S-28E	Delware Producer	12,900'	6062-6126'	16" @ 400' W/ 500 sxs., circ. 10.75" @ 2630' w/1800 sx., circ. 7.625" @ 11,450' w/1850 sx. TOC @ 1955', temp. survey 5" @ 11,115-12,900' 285 sxs.
Willis	Martin #1	L-2-23S-28E	DA 1958	2730'		8.625" @ 347', 120 sxs., circ.
Bird Creek	Pardue Martin #2	L-2-23S-28E	Delaware Producer	6350'	6007-6158'	8.625" @ 344', 200 sxs., circ. 4.5" @ 6348', 720 sxs., TOC 2700'
Bird Creek	BCR Fed. #1	A-3-23S-28E	Delaware Producer	7750'	6035-6183'	8.625" @ 412', 310 sxs., circ. 4.5" @ 6311', 1407 sxs., circ.

2-23-28

Schlumberger

COMPENSATED NEUTRON-FORMATION DENSITY

COMPANY AMOCO PRODUCTION COMPANY

API #30-015-22754

WELL STATE "GO" GAS COMM. #1

FIELD WILDCAT

COUNTY EDDY STATE NEW MEXICO

COUNTY EDDY | FIELD WILDCAT | LOCATION STATE "GO" GAS COMM. | WELL #1 | COMPANY AMOCO PROD. CO.

LOCATION: 1980'FNL & 800'FWL 660

API SERIAL NO | SEC 2 | TWP 23-S | RANGE 28-E

Other Services: DLL/MSFL BHC CYBERLOOK

Permanent Datum: ★ Elev.: 3009

Log Measured From RDB 19.2 Ft. Above Perm. Datum

Drilling Measured From RDB

Elev.: RDB 3028 D.F. G.L. 3009

Date	1-11-79	2-7-79						
Run No.	ONE	TWO						
Depth-Driller	11450	12900						
Depth-Logger	11445	12893						
Btm. Log Interval	11444	12890						
Top Log Interval	SURF	11440						
Casing-Driller	10 3/4@	7 5/8@ 11450	@		@			
Casing-Logger	2630	11440						
Bit Size	9 1/2	6 1/2						
Type Fluid in Hole	SALT	SALT						
Dens. / Visc.	9.6 / 28	10.1 / 48						
pH / Fluid Loss		9.0 / 18.8ml		ml		ml		
Source of Sample	PIT	FLOWLINE						
Rm @ Meas. Temp.	.06 @ 72 °F	.067 @ 68 °F	@	°F	@	°F		
Rmf @ Meas. Temp.	.06 @ 72 °F	.077 @ 68 °F	@	°F	@	°F		
Rmc @ Meas. Temp.	@ °F	@ °F	@	°F	@	°F		
Source: Rmf / Rmc	M	M						
Rm @ BHT	.023 @ 178 °F	.024 @ 190 °F	@	°F	@	°F		
TIME: Circulation Stopped	0100	0100						
TIME: Logger on Bottom	1400	1600						
Max. Rec. Temp.	178 °F	190 °F		°F		°F		
Equip. / Location	8067 / HOBBS	8040 / MID-OH						
Recorded By	WILSON	MILLNER						
Witnessed By Mr.	DYER	DYER						

The well name, location and borehole reference data were furnished by the customer

FOLD HERE

Reproduced By
Electrical Log Services
MIDLAND, TEXAS 79701

REFERENCE W 8468Z

38 COMPLETION RECORD

SPUD DATE

COMP DATE

DST RECORD

GR (GAPI) 100.0 200.0

CALIPER (IN) 5.000 15.00

GR (GAPI) 0.0 100.0

Run 2

DPHI(S/S/C3) -0.050 0.4500

NPHI(S) 0.3000 -0.100

RHOB(G/C3) 2.000 3.000

DETAIL LOG

5" = 100'

CALIPER DIAM. IN INCHES 6 16

GAMMA RAY API UNITS 0 100 / 100 200

RUN 1

POROSITY INDEX (%) LIME MATRIX

COMPENSATED FORMATION DENSITY POROSITY 30 20 10 0 -10

COMPENSATED NEUTRON POROSITY 30 20 10 0 -10

2600

Casing

Caliper

GR

2-23

Schlumberger

SIMULTANEOUS
DUAL LATEROLOG MICRO-SFL

COMPANY AMOCO PRODUCTION COMPANY

API #30-015-22754

WELL STATE "GO" GAS COMM. #1

FIELD WILDCAT

COUNTY EDDY STATE NEW MEXICO

COUNTY EDDY | FIELD WILDCAT | LOCATION STATE "GO" GAS COMM. | WELL #1 | COMPANY AMOCO PROD. CO.

LOCATION: 1980'FNL & 860'FWL

API SERIAL NO | SEC | TWP | RANGE 5

Other Services: CNL/FDC BHC CYBERLOOK

Permanent Datum: ★ Elev.: 3009

Log Measured From RDB 19.2 Ft. Above Perm. Datum

Drilling Measured From RDB

Elev.: RDB 3028 D.F. G.L. 3009

Date	1-11-79	2-7-79						
Run No.	ONE	TWO						
Depth-Driller	11450	12900						
Depth-Logger (Schl.)	11445	12893						
Btm. Log Interval	11443	12891						
Top Log Interval	2650	11440						
Casing-Driller	10 3/4@ 2660	7 5/8@ 11450	@		@			
Casing-Logger		11444						
Bit Size	9 1/2	6 1/2						
Type Fluid in Hole	SALT	SALT						
Dens. / Visc.	9.6 / 28	11.1 / 48						
pH / Fluid Loss		9.0 / 18.8ml		ml		ml		
Source of Sample	PIT	FLOWLINE						
Rm @ Meas. Temp.	.06 @ 72 °F	.067@ 68 °F	@	°F	@	°F		
Rmf @ Meas. Temp.	.06 @ 72 °F	.077@ 68 °F	@	°F	@	°F		
Rmc @ Meas. Temp.	@ °F	@ °F	@	°F	@	°F		
Source: Rmf / Rmc	M	M						
Rm @ BHT	@ °F	.024@ 190F	@	°F	@	°F		
TIME: Circulation Stopped	0100	0100						
TIME: Logger on Bottom	0800	1200						
Max. Rec. Temp.	°F	190 °F		°F		°F		
Equip. / Location	8067 / HOBBS	8040 / MID-OH						
Recorded By	WILSON	MILLNER						
Witnessed By Mr.	DYER	DYER						

Reproduced By
Electrical Log Services
MIDLAND, TEXAS 79701

REFERENCE W 8469H

36 COMPLETION RECORD

SPUD DATE

COMP DATE

DST RECORD

API NO 30-015-22754

GAMMA RAY API UNITS 0 100 / 100 200

RUN 2

SHALLOW LATEROLOG - LLs 0.2 1.0 10 100

DEEP LATEROLOG - LLd 0.2 1.0 10 100

COMPANY AMOCO PRODUCTION CO. SCHL. FR

WELL STATE "GO" GAS COMM. #1 SCHL. TD DRLR. TD

FIELD WILDCAT Elev.: RDB 3

COUNTY EDDY STATE NEW MEXICO DF GL

DETAIL LOG

5" = 100'

GAMMA RAY API UNITS 0 100 / 100 200

RUN 1

RESISTIVITY OHMS M² M MICRO-SFL 0.2 1.0 10 100

SHALLOW LATEROLOG - LLs 0.2 1.0 10 100

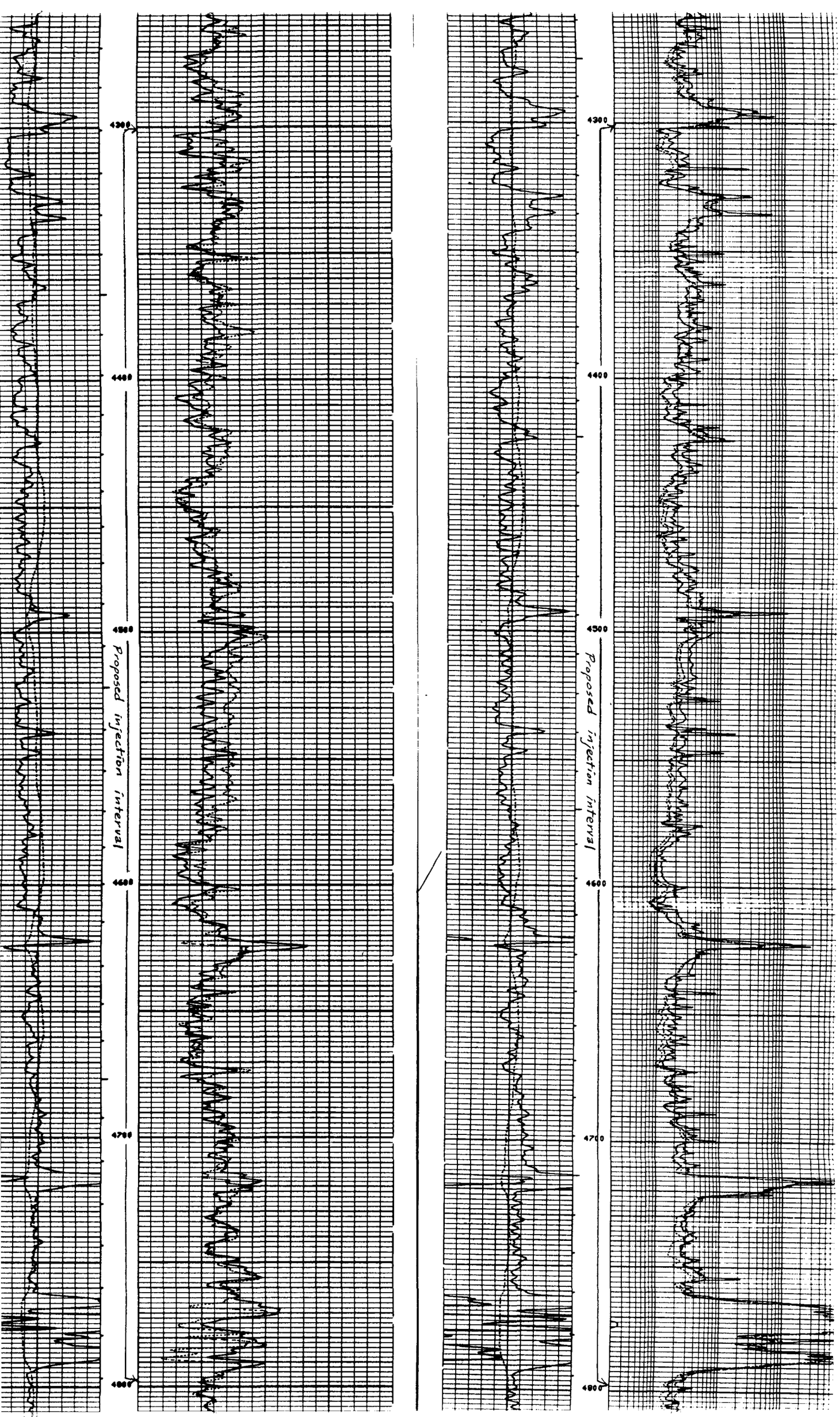
DEEP LATEROLOG - LLd 0.2 1.0 10 100

CALIPER DIAM. IN INCHES 6 16

2700

Caliper

GR


4300
4400
4500
4600
4700
4800
Proposed injection interval
4300
4400
4500
4600
4700
4800
Proposed injection interval

WF

WORTH WELL Surveys

TEMPERATURE SURVEY

COMPANY AMOCO PRODUCTION COMPANY
WELL #1
FIELD STATE GAS
COUNTY EDDY STATE NEW MEXICO

COMPANY AMOCO PRODUCTION COMPANY

WELL #1 60

FIELD STATE A GAS Com

COUNTY EDDY STATE NEW MEXICO

OPERATOR ZERO POINT KELLY BUSHING

W. W. S. ZERO POINT KELLY BUSHING

LOCATION

WELL DATA

CSG. SIZE	10-3/4"	FROM	SURFACE	TO	2600'	BIT SIZE	TO
CSG. SIZE	7-5/8"	FROM	SURFACE	TO	11,450'	BIT SIZE	TO
CSG. SIZE		FROM		TO		BIT SIZE	TO

AMOUNT OF CEMENT	1600	SACKS TYPE	LIGHT WEIGHT	ADMIX.	
	350	SACKS TYPE	CLASS H	ADMIX.	
		SACKS TYPE		ADMIX	
CEMENTING COMPLETED: DATE	1-13-79			TIME	7:00 PM

SURVEY STARTED: DATE	1-14-79	TIME	7:00 AM	DEPTH	SURFACE
COMPLETED: DATE	1-14-79	TIME	8:00 AM	DEPTH	
APPROXIMATE TOP OF CEMENT	1955'			RUN NO.	ONE
OPERATOR	R. WILSON	WITNESSED BY			

REMARKS

Degrees Per Inch

☐ 1°, ☒ 5°, ☐ 10°

Maximum Temperature Recorded 95 °F

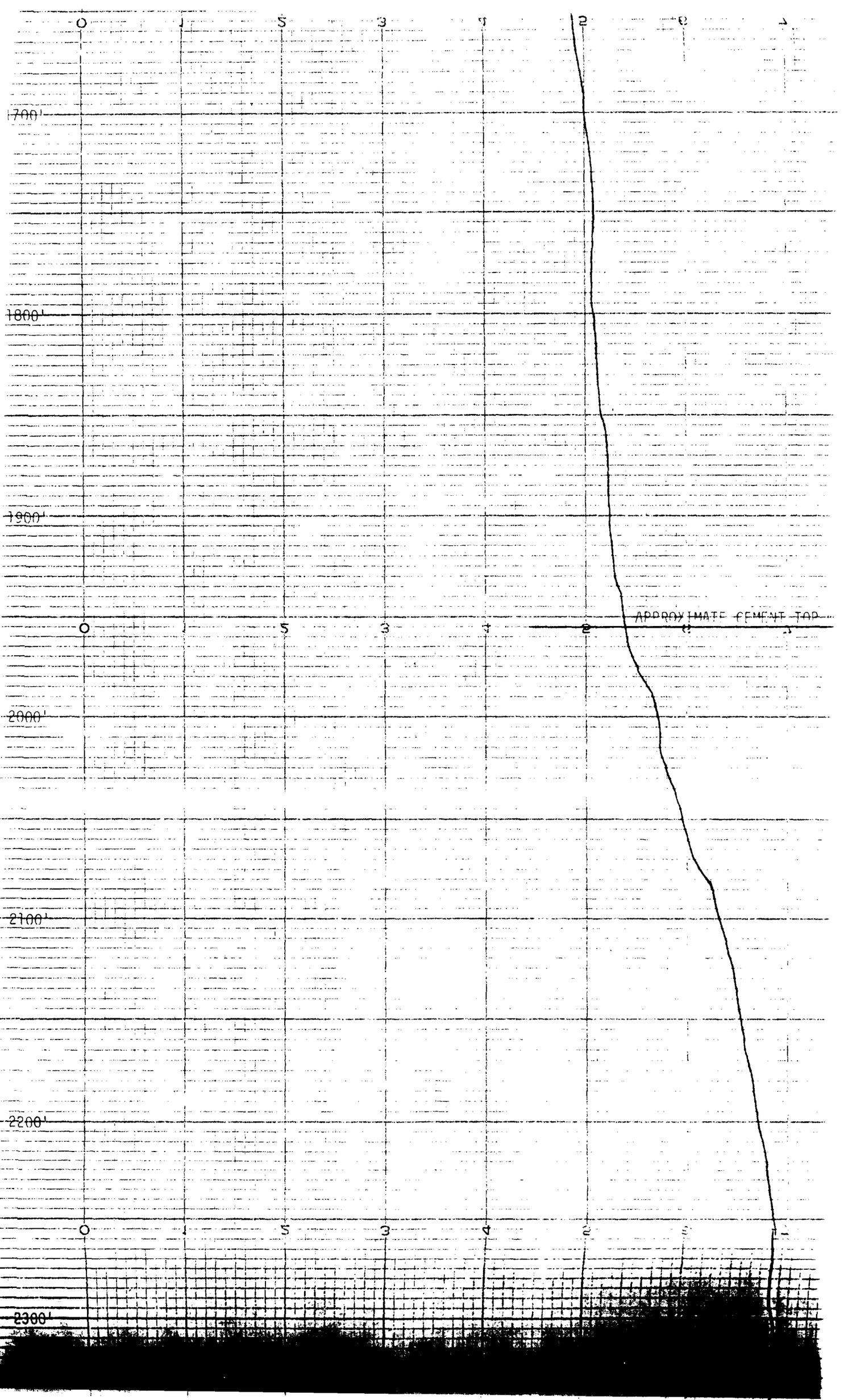
JOB NO. 6604

Invoice No. 6654

Station HOBBS

WELL TEMPERATURE RECORDED IN DEGREE FAHRENHEIT

Form 106


1700'
1800'
1900'
APPROXIMATE CEMENT TOP
2000'
2100'
2200'
2300'

FORM C-108 APPLICATION FOR SWD
PROPOSED OPERATION

AVERAGE INJECTION: 2500 Bbls. produced water per day. Injection pressure 750 PSIG.

MAXIMUM INJECTION: 3500 BWPD @ 860 PSIG.

SYSTEM TYPE: Open system to allow transport vehicles to unload brine water from newly completed wells in this field.

WATER SOURCE: The produced water to be disposed of comes from wells in the East Loving Delaware and East Herradura Bend Delaware fields (Brushy Canyon Sand) @ 6000-6200'. Produced water will originate from Bird Creek's wells in this field, as well as from other non-operated wells in this field. Analysis of the Brushy Canyon water is attached.

No compatibility problems should exist between the produced water (Brushy Canyon Sand) and the receiving zone water (Cherry Canyon Sand). Waters from the Brushy Canyon and Cherry Canyon Sands are characterized by high salinities and high total dissolved solids.

FRESH WATER: Fresh water in the study area exists in alluvial deposits from the surface to no deeper than 250'. Water wells in the area are no deeper than 100'. Since drinking water is available to area residents on the Malaga Water Users System, most water wells are used for stock and crop irrigation needs.

GEOLOGY: The Delaware formation is approximately 3500' thick in this area, and is locally subdivided into three major sand members. These are from top to bottom:

Bell Canyon	2700-4100'
Cherry Canyon	4100-5000'
Brushy Canyon	5000-6200'

All three members are characterized as being composed predominantly of quartz, very fine grained and unconsolidated. Shale, dolomite, and limestone are interbedded in the sands. Formation waters are similar in all three members, highly saline with total dissolved solids approaching 300,000 ppm. No fresh waters appear to exist in the Delaware, and the Delaware is vertically separated from fresh surface water by 2500' of evaporites.

DELAWARE PRODUCED WATER ANALYSIS

THE WESTERN COMPANY OF NORTH AMERICA
WATER ANALYSIS

ANALYSIS NO: 910401D

GENERAL INFORMATION

OPERATOR:	BIRDCREEK RESOURCES		
WELL:	CAVINESS PAINE #4	DEPTH:	
FIELD:		DATE SAMPLED:	4/1/91
FORMATION:	DELAWARE	DATE RECEIVED:	4/1/91
COUNTY:	EDDY	SUBMITTED BY:	REECO
STATE:	NM	WORKED BY:	C. M. SIZEMORE
		PHONE:	505-392-5556

SAMPLE DESCR: 20% EMULSION.

PHYSICAL AND CHEMICAL DETERMINATIONS

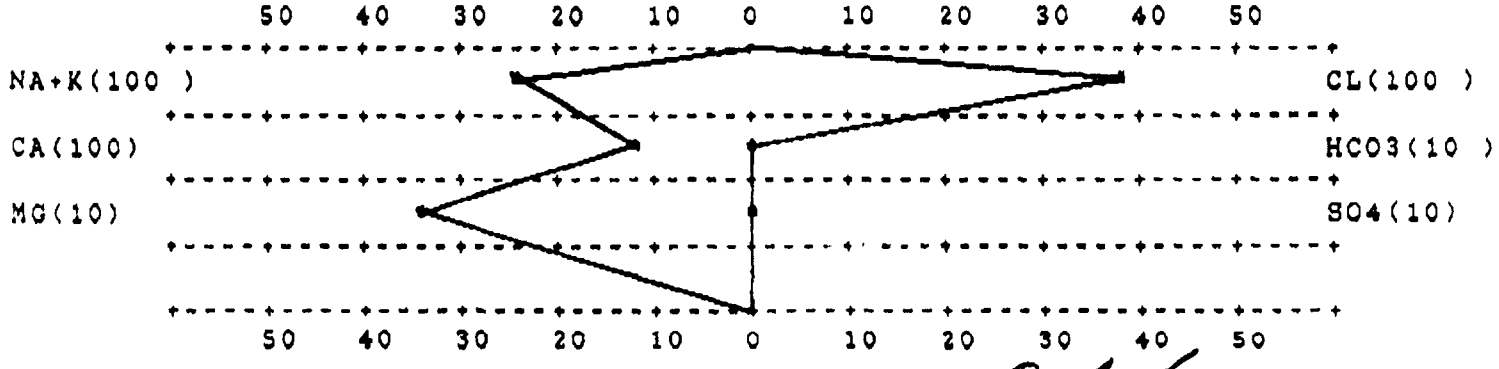
SPECIFIC GRAVITY: 1.185 AT 78 DEG. F PH = 6.00

IRON:	NOT DETERMINED		SULFATE:	371	PPM
FE2+:	100	PPM			
SODIUM+POTASS:	68695	PPM	CHLORIDE:	140896	PPM
			SODIUM CHLORIDE (CALC):	232268	PPM
CALCIUM:	22301	PPM	BICARBONATE:	124	PPM
MAGNESIUM:	3896	PPM	TOT. HARDNESS AS CACO3:	71794	PPM
PHOSPHATE:	NOT DETERMINED		TOT. DISSOLVED SOLIDS:	281881	PPM

RESISTIVITY (CALCULATED): 0.044 OHM/METER @ 75 DEGREES F.

REMARKS:

STIFF TYPE PLOT (IN MEQ/L)



ANALYST C. M. SIZEMORE

FORM C-108 APPLICATION FOR SWD

BIRD CREEK RESOURCES, INC.
Proposed Culebra Bluff SWD No. 1
Sec. 2 T23S R28E Eddy Co., N.M.

DELAWARE PRODUCED WATER ANALYSIS

ALPINE LABS, INC.

PETROLEUM INDUSTRY CHEMICALS

LABORATORY WATER ANALYSIS

COMPANY:	BIRD CREEK RESOURCES	PH:	5.590
WELL NO:	R.G.A.) #2&3 BATTERY	SULFIDE AS H2S:	
COUNTY:		CARBON DIOXIDE:	
STATE:			
DATE SAMPLED:	11-29-90	SPECIFIC GRAVITY:	1.155
TIME SAMPLED:		DISSOLVED OXYGEN:	
SAMPLE LOCATION:		WATER B/D:	
SAMPLED BY:	RAY HARDIN		

CATIONS	Mg/L	ME/L	ANIONS	Mg/L	ME/L
Calcium	23,000	1,150	Bicarbonate	73	1
Magnesium	2,074	170	Sulfate	283	6
Sodium	62,451	2,715	Chloride	143,000	4,028
Total Hardness	66,000				
Barium	0				

Total Dissolved Solids: 230,934 Mg/L

Iron: 53 Mg/L

CaCO3 Scaling Tendency:

Stability index @:	80°F	-0.15
	100°F	0.14
	120°F	0.33
	160°F	1.32

CaSO4 Scaling Tendency:

Ksp Temperature Used: 90 °F

Calculated Saturation: 5.84 ME/L

C a S O 4 I S I N D I C A T F

FORM C-108 APPLICATION FOR SWD

BIRD CREEK RESOURCES, INC.
Proposed Culebra Bluff SWD No. 1
Sec. 2 T23S R28E Eddy Co., N.M.

P. O. BOX 69337 ODESSA, TEXAS 79769 (915) 381-2595

FRESH WATER ANALYSIS

P O BOX 1468
MONAHANS TEXAS 79756
PH 943-3234 OR 563-1040

Martin Water Laboratories, Inc.

709 W INDIANA
MIDLAND TEXAS 79701
PHONE 683-4521

RESULT OF WATER ANALYSES

LABORATORY NO. 291173
SAMPLE RECEIVED 2-20-91
RESULTS REPORTED 2-21-91

COMPANY _____ LEASE _____
FIELD OR POOL Loving, East (Delaware)
SECTION ___ BLOCK ___ SURVEY ___ COUNTY Eddy STATE NM
SOURCE OF SAMPLE AND DATE TAKEN:
NO. 1 Sample #1 - windmill.
NO. 2 Sample #2 - Joe Trachta's house water well.
NO. 3 Sample #3 - irrigation well N. of Tony Onsurez' house. 2-16-91
NO. 4 Sample #3-A - irrigation well N. of Tony Onsurez' house. 2-20-91
REMARKS:

CHEMICAL AND PHYSICAL PROPERTIES	NO. 1	NO. 2	NO. 3	NO. 4
Specific Gravity at 60° F.	1.0111	1.0023	1.0102	1.0070
pH When Sampled				
pH When Received	7.23	7.65	6.61	6.43
Bicarbonate as HCO_3	327	166	22	137
Supersaturation as $CaCO_3$				
Undersaturation as $CaCO_3$				
Total Hardness as $CaCO_3$	3,900	945	3,925	3,275
Calcium as Ca	870	242	890	830
Magnesium as Mg	419	83	413	292
Sodium and/or Potassium	2,435	287	2,058	1,398
Sulfate as SO_4	3,093	560	2,667	2,400
Chloride as Cl	4,048	604	3,977	2,628
Iron as Fe	3.2	1.5	78.8	90.4
Barium as Ba				
Turbidity, Electric				
Color as Pt				
Total Solids, Calculated	11,192	1,942	10,027	7,684
Temperature °F.				
Carbon Dioxide, Calculated				
Dissolved Oxygen,				
Hydrogen Sulfide	0.0	0.0	0.0	0.0
Resistivity, ohms/m at 77° F.	0.580	3.22	0.630	0.840
Suspended Oil				
Filtrable Solids as mg/l				
Volume Filtered, ml				

Results Reported As Milligrams Per Liter

Additional Determinations And Remarks	Legal Description
Sample #1	SE/SW, Sec 14, T-23S, R-28E
Sample #2	NE/SE, Sec 13, T-23S, R-28E
Sample #3	NW/NW, Sec 11, T-23S, R-28E
Sample #3-A	NW/NW, Sec 11, T-23S, R-28E

Form No. 3

By _____

FORM C-108 APPLICATION FOR SWD

BIRD CREEK RESOURCES, INC.
Proposed Culebra Bluff SWD No. 1
Sec. 2 T23S R28E Eddy Co., N.M.

FRESH WATER ANALYSIS

P. O. BOX 1468
MONAHANS, TEXAS 79756
PH 943-3234 OR 563-1040

Martin Water Laboratories, Inc.

709 W. INDIANA
MIDLAND, TEXAS 79701
PHONE 683-4521

RESULT OF WATER ANALYSES

LABORATORY NO. 291173 (Page 2)
SAMPLE RECEIVED 2-20-91
RESULTS REPORTED 2-21-91

COMPANY _____ LEASE _____
FIELD OR POOL Loving, East (Delaware)
SECTION ___ BLOCK ___ SURVEY _____ COUNTY Eddy STATE NM
SOURCE OF SAMPLE AND DATE TAKEN:
NO. 1 Sample #4 - Pecos River.
NO. 2 Sample #5 - windmill @ Frank London's house.
NO. 3 Sample #6 - irrigation well @ Lionel Onsurez' leased farm.
NO. 4 Sample #7 - irrigation well on Lawrence Nymeyer's fee surface.
REMARKS: 4. Surface leased & farmed by Reed Kimbley.

CHEMICAL AND PHYSICAL PROPERTIES	NO. 1	NO. 2	NO. 3	NO. 4
Specific Gravity at 60° F.	1.0050	1.0063	1.0052	1.0062
pH When Sampled				
pH When Received	6.78	6.79	6.69	6.83
Bicarbonate as HCO_3	134	234	327	293
Supersaturation as $CaCO_3$				
Undersaturation as $CaCO_3$				
Total Hardness as $CaCO_3$	1,700	2,650	2,880	3,100
Calcium as Ca	412	768	740	792
Magnesium as Mg	163	177	250	272
Sodium and/or Potassium	554	835	971	905
Sulfate as SO_4	1,387	1,893	2,133	2,187
Chloride as Cl	959	1,633	1,775	1,811
Iron as Fe	0.56	4.1	1.6	0.40
Barium as Ba				
Turbidity, Electric				
Color as Pt				
Total Solids, Calculated	3,608	5,541	6,197	6,260
Temperature °F.				
Carbon Dioxide, Calculated				
Dissolved Oxygen,				
Hydrogen Sulfide	0.0	0.0	0.0	0.0
Resistivity, ohms/m at 77° F.	1.79	1.19	1.08	1.06
Suspended Oil				
Filtrable Solids as mg/l				
Volume Filtered, ml				

Results Reported As Milligrams Per Liter

Additional Determinations And Remarks	Legal Description
Sample #4	SE/NE, Sec 21, T-23S, R-28E
Sample #5	NE/NE, Sec 21, T-23S, R-28E
Sample #6	NE/SW, Sec 15, T-23S, R-28E
Sample #7	SE/NE, Sec 15, T-23S, R-28E

The undersigned certifies the above to be true and correct to the best of his knowledge and belief.

Form No. 3

By _____
Waylan C. Martin, M.A.

FORM C-108, APPLICATION FOR SWD
AFFIDAVIT

The undersigned, as agent for the applicant Bird Creek Resources, Inc., does hereby testify that available geologic and engineering data have been examined and has found no evidence of open faults or any other hydrologic connection between the disposal zone and any known underground source of drinking water.

Brad D. Burks

Brad D. Burks, P.E. 16172
Agent, Bird Creek Resources, Inc.

Date: 6-11-92

FORM C-108
APPLICATION FOR SWD

LAND STATUS

SURFACE OWNER: New Mexico State Land

OPERATORS IN AREA OF REVIEW:

Amoco Production Company
P.O. Box 4072
Odessa, TX 79760

Hallwood Energy Company
P.O. Box 37811
4582 S. Ulster St. Parkway, #1700
Denver, CO 80237

Hanley Petroluem, Inc.
415 W. Wall, Suite 1500
Midland, TX 79701-4473

Harvey E. Yates Company
P.O. Box 1933
One Sunwest Centre
Roswell, NM 88201

№ 14009

Affidavit of Publication

State of New Mexico,
County of Eddy, ss.

E. C. Cantwell, being first duly sworn, on oath says:

That he is publisher of the Carlsbad Current-Argus, a newspaper published daily at the City of Carlsbad, in said county of Eddy, state of New Mexico and of general paid circulation in said county; that the same is a duly qualified newspaper under the laws of the state wherein legal notices and advertisements may be published; that the printed notice attached hereto was published in the regular and entire edition of said newspaper and not in supplement thereof on the date as follows, to wit:

MAY 27 , 19 92

, 19 ____

, 19 ____

, 19 ____

that the cost of publication is $ 6.85 , and that payment thereof has been made and will be assessed as court costs.

E C Cantwell

Subscribed and sworn to before me this

27 day of MAY , 19 92

Donella Taylor

My commission expires 6/01/92

Notary Public

May 27, 1992

Bird Creek Resources, Inc. proposes to recomplete a well for the purpose of disposing produced formation water. The St. "Go" #2, currently a Delaware Oil Producer, is located 1980' FNL, 600' FWL, section 2, T23S, R28E, Eddy County, New Mexico. Water will be disposed of into the Delaware formation at depth of 4900-5000' at maximum rate of 4000 BPD, 900 PSIG. Contact is Brad Burks, 810 S. Cincinnati, #110, Tulsa, Oklahoma 74119, 918-582-3855. Interested parties may file objections or request hearing with New Mexico Oil Conservation Division, Box 2088, Santa Fe, New Mexico 87501, within 15 days.