



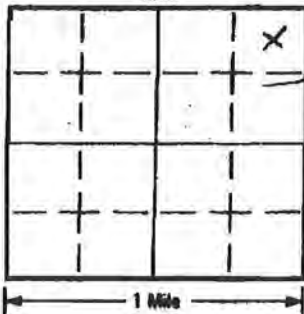
Hydro ID 705

SOUTH DAKOTA WATER WELL COMPLETION REPORT

07-02

Location NE 1/4 NE 1/4 Sec 21 Twp 65 Rg 1E
County Custer North

Please mark well location with an "X"



Well Completion Date

12-5-09

Well Owner: Powertech
Business Name: Powertech USA Inc
Address: P.O. Box 723
Hot Springs S.D. 57747

FORMATION	DEPTH	
	FROM	TO
skull Creek	0	150
Fall River	150	328
Lakota (Fusion & Johnson)	328	480
Morrison	480	550
Darkzona	550	600

LOCATION:
Distance from nearest potential pollution source/isoptic tag, abandoned well, lead lat. etc.)? ft. from NONE PRESENT (Identify source).

PROPOSED USE:
 Domestic/Stock Municipal Business Test Holes
 Irrigation Industrial Institutional Monitoring well

METHOD OF DRILLING: MUD Rotary
SS 2200

STATIC WATER LEVEL 115 Feet
If flowing: closed in pressure PSI
GPM flow through inch pipe
Controlled by Valve Reducers Other
Reduced Flowrate GPM
Can well be completely shut in?

CASING DATA: Steel Plastic Other

If other describe _____

PWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
DR 17 LB/FT	6 IN	0 FT	428 FT	8 3/4 IN
LB/FT	IN	FT	FT	IN
LB/FT	IN	FT	FT	IN

WELL TEST DATA:
 Pumped Describe: Air Lift at 410'
 Bailed 5 GPMs
 Other
Pumping Level Below Land Surface
ft. After Hrs. pumped GPM
ft. After Hrs. pumped GPM
If pump installed, pump rate GPM

GROUTING DATA
Grout Type No. of Sacks Grout Weight From To
CMT 80 15.1 lb./gal 0 ft 428 ft
lb./gal ft ft
Describe grouting procedure PUMP

REMARKS
* Well Was Overdrilled *
* Set CMT plug 460-600 *
DENVER Burdick 9-21-1

SCREEN: Perforated pipe Manufactured
Diameter 31 IN Length 30 FEET
Material NYC
Slot Size .020 Set From 428 Feet to 458 Feet
Other information 10' Blank 418-428

This well was drilled under license # 745
And this report is true and accurate.
Drilling firm Davis Drilling Inc.
Signature of License Representative: Stan Davis

WAS A PACKER OR SEAL USED? YES NO
If so, what material? K-Packer
Describe packer(s) and location? SET AT 418

Signature of Well Owner or Equitable Property Holder: [Signature]
Date: 12/15/09
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DEC 28 2009
WATER RIGHTS PROGRAM

DISINFECTION: Was well disinfected upon completion?
 YES, How: Bleach 1 gallon
 NO, Why Not?

Laboratory sent to for water quality analysis



SOUTH DAKOTA WATER WELL COMPLETION REPORT

11-02

Hydro ID 707

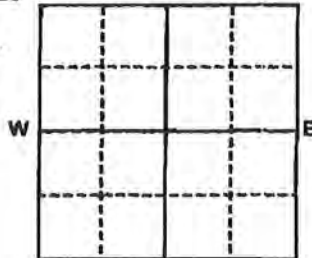
NE

Location 1/4 NW 1/4 Sec 34 Twp 6S Rg 1E

County Custer County

North

Please mark well location with an "X"



Well Completion Date

May 5, 2011

1 Mile

Distance to nearest potential pollution source (septic tank, abandoned well, feed lot, etc.)? ft. from Unknown (Identify source)

PROPOSED USE:

- Domestic/Stock Irrigation, Municipal Industrial, Business Institutional, Test holes Monitoring well

METHOD OF DRILLING:

3.25" HSA to 40.0'

4.25" HSA?

4.25"?

CASING DATA:

Steel Plastic Other

Table with columns: PIPEWEIGHT, DIAMETER, FROM, TO, HOLE DIAMETER

GROUTING DATA:

Table with columns: Grout Type, No. of Sacks, Grout Weight, From, To

Describe grouting procedure

SCREEN:

Perforated pipe Manufactured

Diameter 2.00 inches Length 10.0 Feet

Material Sch 40 PVC

Slot Size 0.010" Set From 30.0 Feet to 40.0 Feet

Other information 12-20 Silica Sand from 28' to 40'

WAS A PACKER OR SEAL USED? Yes No

If so, what material?

Describe packer(s) and location

DISINFECTION: Was well disinfected upon completion?

Yes, How? No, Why Not? Monitoring well only.

Lab to which water quality sample sent for analysis

Well Owner: ...

Business Name: Powertech, Inc.

Address: 145 N Chicago Street

City, State, Zip: Hot Springs SD 57747

WELL LOG:

Table with columns: FORMATION, DEPTH (FROM, TO)

STATIC WATER LEVEL FEET

If flowing: closed in pressure PSI

GPM flow through inch pipe

Controlled by Valve Reducers Other

Reduced flow rate GPM

Can well be completely shut in?

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WELL TEST DATA:

Pumped Describe: NA

Bailed

Other

Pumping Level Below Land Surface

Ft. After Hrs. pumped GPM

Ft. After Hrs. pumped GPM

If pump installed, pump rate: GPM

REMARKS

Monitoring well 11-34-4

This well was drilled under license # 678 and this report is true and accurate.

Drilling firm: American Engineering Testing, Inc.

Signature of License Representative:

Signature

Signature of Well Owner or Equitable Property Holder:

Date:



SOIL BORING AND MONITORING WELL LOG

Hydro ID 707
 JOB NO. 17-124 VERTICAL SCALE 1" = 5' BORING NO. 11-24-4 WELL NO. 2 of 3 MW-11-24-4
 PROJECT power tech

Boring No.	Date	Time
Boring Started	5-5-11	10:55
Boring Completed	11	15:00
Finished		
Pulling Casing	NA	NA
Boring Filled		NA
Depth to Frost		

Method of Advancing Boring

Continuous Sampling From To

 In. Flite-Auger To

3 1/4 In. Hollow Stem Auger to 40

 In. Casing To

 In. Casing To

P. D. or C. D. Tube From To

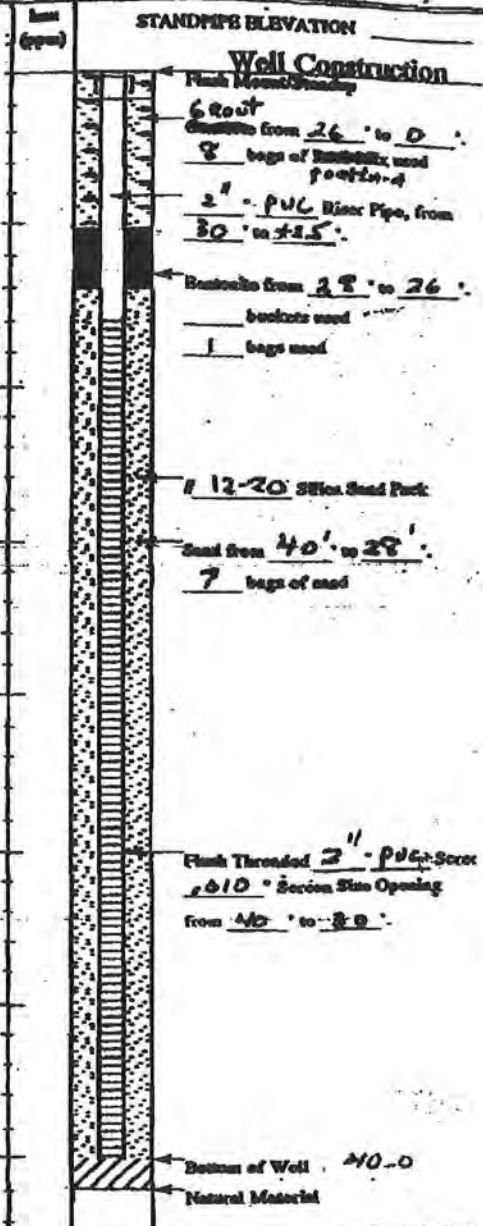
Jet With Water From To

with Drilling Mud From To

Remarks

State Plane NAD 27

441813 1032064



WATER LEVEL MEASUREMENTS						START	COMPLETE
DATE	TIME	SAMPLED DEPTH	CASING DEPTH	WATER LEVEL	WATER ELEVATION		
						10:55	15:00
						METHOD	10
						3 1/4 HSA to 40'	
						CREW CHECK/LOGGER:	

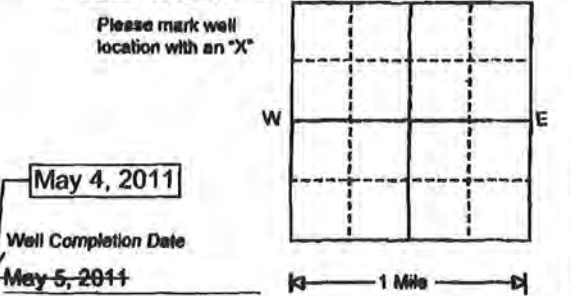


Hydro ID 708
3 7S
SW SOUTH DAKOTA WATER WELL COMPLETION REPORT

Location $\frac{1}{4}$ NW $\frac{1}{4}$ Sec 34 Twp 6S Rg 1E

Fall River
County Custer County

Well Owner: ...
Business Name: Powertech, Inc.
Address: 145 N Chicago Street
City, State, Zip: Hot Springs SD 57747



WELL LOG: FORMATION vs DEPTH (FROM TO)

FORMATION	FROM	TO
Topsoil - Silty Lean Clay with sand, brown, moist (CL)	0	0.5'
Silty Lean Clay with sand, brn (CL)	0.5'	20'
Silty Gravel with sand, brn, wet (GM)	20'	22'

sl silty CLAY, dry, roots 0 - 22'
silty, sandy, clayey, GRAVEL, wet 22-28'
competent SHALE 28-30'

Distance to nearest potential pollution source (septic tank, abandoned well, feed lot, etc.)?
ft. from Unknown (Identify source)

PROPOSED USE:
 Domestic/Stock Irrigation
 Municipal Industrial
 Business Institutional
 Test holes Monitoring well

STATIC WATER LEVEL _____ FEET
If flowing: closed in pressure _____ PSI
GPM flow _____ through _____ Inch pipe
Controlled by Valve Reducers Other _____
Reduced flow rate _____ GPM
Can well be completely shut in?

METHOD OF DRILLING:
4.25" HSA to 22.0' ← 30'

CASING DATA: Steel Plastic Other

PIPEWEIGHT LB/FT	DIAMETER IN	FROM FT	TO FT	HOLE DIAMETER IN
	2.00	0.0	22.0	4.25

WELL TEST DATA:
 Pumped Describe: NA
 Bailed
 Other
Pumping Level Below Land Surface
____ Ft. After ____ Hrs. pumped ____ GPM
____ Ft. After ____ Hrs. pumped ____ GPM
If pump installed, pump rate: ____ GPM

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NOV 09 2011
WATER RIGHTS PROGRAM

GROUTING DATA:

Grout Type	No. of Sacks	Grout Weight Lb/sack	From FT	To FT
Cement	1		0.0	0.0
Bentonite	1		0.0	10.0

Describe grouting procedure: 0 to 15 ft, 15 to 20 ft

SCREEN: Perforated pipe Manufactured
Diameter 2.00 Inches Length 10.0 Feet
Material Sch 40 PVC
Slot Size 0.010" Set From 12.0 Feet to 22.0 Feet ← 20 to 30 Feet
Other information 12-20 Silica Sand from 10' to 22' ← 20 to 30 Feet

REMARKS
Monitoring well 11-3-2 ← 11-3-3
20 to 30 Feet

WAS A PACKER OR SEAL USED? Yes No
If so, what material?
Describe packer(s) and location

This well was drilled under license # 678 and this report is true and accurate.
Drilling firm: American Engineering Testing, Inc.
Signature of License Representative: *[Signature]*

DISINFECTION: Was well disinfected upon completion?
 Yes, How?
 No, Why Not? Monitoring well only.
Lab to which water quality sample sent for analysis

Signature of Well Owner or Equitable Property Holder:
Date: _____

PowerTech (USA) Inc.

DRILLED WITH: AIR WATER HOLE NO. 0311-3-ALLUV-3
 T.D. 30 LOCATION: 434097.55, 1070 582.506 (State Plane NAD27)
 BIT SIZE 4" FA
 SAMPLE LOG BY LE LEASE: (PROJECT) Denny Burdick
 DATE 5/4/11 COUNTY Fall River STATE SD

DEPTH	LITHOLOGY	CALCITE	PYRITE	Alteration % Primary Oxidation	Reduction Secondary Oxidation	SAMPLE DESCRIPTION (Amounts in Percent, %)		T = Trace 1 = Minor 2 = Moderate 3 = Abundant		
						L = Limonite (Lmn) SOX Surf. Oxidation Rd. Reduced Rdt. Reduction P = Pyrite (Pyr) P _T = Pyrite Tarnish	POX = Primary Oxid. SSOX = Base of Surf. Oxid. SOX = Secondary Oxid. Tz = Transition Zone Fid = Feldspar	C = Carbon K = Kaolin	B = Bleached Ch = Chert	
0-22'										
10										
20										
22-28'										
30										
28-30										
40										
50										
60										

Handwritten notes in log:
 0-22' silty CLAY, orange brown, dry, root roots
 22-28' silty, sandy, clayey, GRAVEL, pink/whites/gray, nickel sized angular quartz & cherts, wet
 28-30 competent GRAVELS - gray
 TD @ 28' * drilled out to 8 1/2" w/ 4 1/4" HSA & converted to mm.



POWERTECH (USA) INC.

Hydro ID 709

SD EForm - 1621LD V1

SOUTH DAKOTA WATER WELL COMPLETION REPORT

11-02

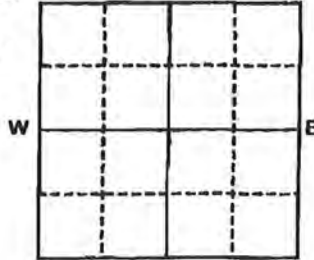
Location $\frac{1}{4}$ NW $\frac{1}{4}$ Sec 34 Twp 66 Rg 1E

Fall River

County Custer County

North

Please mark well location with an "X"



Well Completion Date

May 9, 2011

1 Mile

Distance to nearest potential pollution source (septic tank, abandoned well, feed lot, etc.)? ft. from Unknown (Identify source)

PROPOSED USE:

Domestic/Stock Irrigation
 Municipal Industrial
 Business Institutional
 Test holes
 Monitoring well

METHOD OF DRILLING:

4.25" HSA to 38.0'

CASING DATA:

Steel Plastic Other

If other describe

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
LB/FT	IN	FT	FT	IN
	2.00	0.0	28.0	4.25

GROUTING DATA:

Grout Type	No. of Sacks	Grout Weight	From	To
		Lb/gal	FT	FT
Cement	7		0.0	24.0
Bentonite	1		24.0	28.0

Describe grouting procedure

26 to 28 Ft

SCREEN:

Perforated pipe Manufactured

Diameter 2.00 Inches Length 10.0 Feet

Material Sch 40 PVC

Slot Size 0.010" Set From 28.0 Feet to 38.0 Feet

Other information 12-20 Silica Sand from 28' to 38' ← 28 to 38'

WAS A PACKER OR SEAL USED? Yes No

If so, what material?

Describe packer(s) and location

DISINFECTED: Was well disinfected upon completion?

Yes, How?

Lab to which water quality sample sent for analysis No, Why Not? Monitoring well only.

Well Owner: ...

Business Name: Powertech, Inc.

Address: 145 N Chicago Street

City, State, Zip: Hot Springs SD 57747

WELL LOG:

FORMATION	DEPTH	
	FROM	TO
Topsoil - Silty Lean Clay with sand, brown, moist (CL)	0	0.5'
Silty Lean Clay with sand, bm (CL)	0.5'	35'
Silty Gravel with sand, brn, wet (GM)	35'	38'

STATIC WATER LEVEL _____ FEET

If flowing: closed in pressure _____ PSI

GPM flow _____ through _____ Inch pipe

Controlled by Valve Reducers Other _____

Reduced flow rate _____ GPM

Can well be completely shut in?

WELL TEST DATA:

Pumped Describe: NA

Bailed

Other

Pumping Level Below Land Surface

_____ Ft. After _____ Hrs. pumped _____ GPM

_____ Ft. After _____ Hrs. pumped _____ GPM

If pump installed, pump rate: _____ GPM

REMARKS

Monitoring well 11-15-4

This well was drilled under license # 678 and this report is true and accurate.

Drilling firm: American Engineering Testing, Inc.

Signature of License Representative:

Signature of Well Owner or Equitable Property Holder:

Date:

RECEIVED

NOV 09 2011

WATER RIGHTS PROGRAM



POWERTECH (USA) INC.

SOIL BORING AND MONITORING WELL LOG

NO. 17-211 VERTICAL SCALE 1" = 5' BORING NO. SB- WELL NO. 2 MW-
 SUBJECT Hydro 709 powertech 11-15-4 11-15-4

Boring No.	Date	Time
Boring Started	<u>5-9-71</u>	<u>7:15</u>
Boring Completed	<u>11</u>	
Finished		
Pulling Casing	<u>11</u>	<u>12:30</u>
Boring Filled		
Depth to Frost		

Method of Advancing Boring

Continuous Sampling From To

In. Flite-Auger To

4 1/4 In. Hollow Stem Auger to 38.0

In. Casing To

In. Casing To

P. D. or C. O. Tube From To

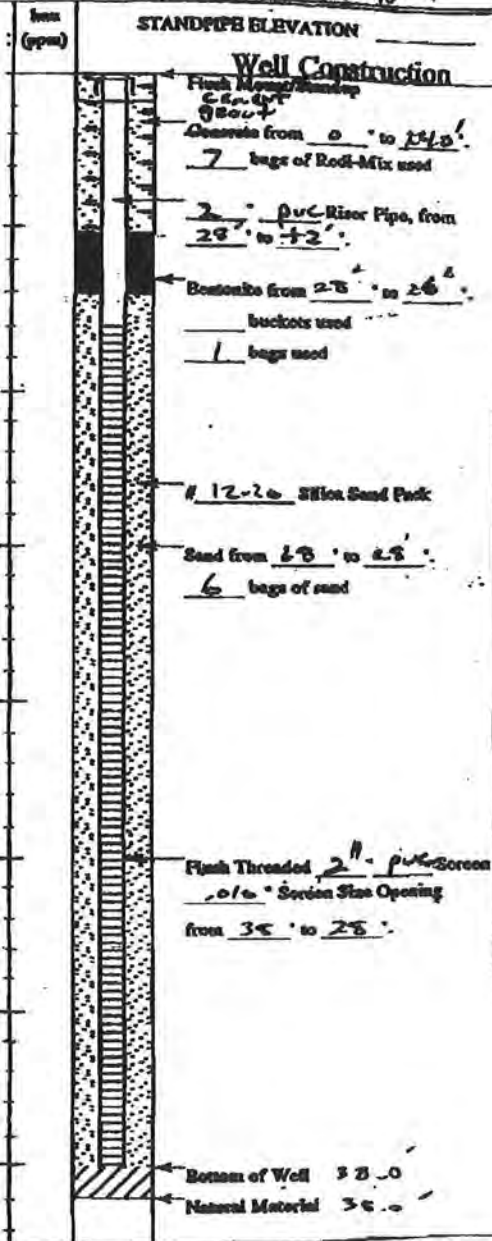
Jet With Water From To

with Drilling Mud From To

Remarks

State Plane NAD 27

N 426 607 E 1029 415



WATER LEVEL MEASUREMENTS						START	COMPLETE
DATE	TIME	SAMPLED DEPTH	CASING DEPTH	WATER LEVEL	WATER ELEVATION		
						METHOD	
						<u>4 1/4 HSA to</u>	
						CRAW CHIEF/LOGGER:	



Hydro ID 709

PowerTech (USA) Inc.

3 of 3

DRILLED WITH: AIR WATER HOLE NO. DA1-15-ALLUV-4

T.D. 40' LOCATION: 426600.639, 102944.805 State Plane NAD27

BIT SIZE 4" FA

SAMPLE LOG BY LE LEASE: (PROJECT) Dowry Bulldock

DATE 5/11/11 COUNTY Fall River STATE SD

DEPTH	LITHOLOGY	Alteration %	SAMPLE DESCRIPTION				T = Trace						
			(Amounts in Percent, %)				1 = Minor	2 = Moderate	3 = Abundant				
			L = Limestone (Lm)	SOX = Surf. Oxidation	POX = Primary Oxid.	SOX = Surf. Oxid.	2OX = Secondary Oxid.	Tz = Transition Zone	Id = Feldspar	C = Carbon	S = Sphered	K = Kaolin	Ch = Chert
0-35'													
10													
20													
30													
35-40'													
40													
50													
60													
70													



Hydro ID 710

380-2

No. _____

**Office of State Engineer
DOCUMENT FILE**

Darrel Hawthorne

Custer

Ground Water Supply

Well No. 2

TW 1/4 NW 1/4 Sec. 17-6 S-1E

Custer County

409-2

No. 380-2

Division No. 2

Fall River District

PERMIT

to appropriate water from _____

Ground Water Supply _____

Custer County, South Dakota.

Name of applicant _____

Darrel Hawthorne

Name of diversion works Golden

Cliff Irrigation Project, s.d. No. 2

Date of first receipt at office of State

Engineer June 29 1951

Returned to applicant for Correction

_____ 19

Corrected application received _____

_____ 19

Date of water right _____

June 29 1951

Recorded in Book 3 *Section 4*

One-fifth of work to be completed

Sept. 12 1952

Whole work to be completed _____

Sept. 12 1953

Final proof of use of water _____

Sept. 12 1953

Approved Sept. 12 1951

DEAR ... LOCKE State Engineer.



NO. 300-2

Water Division No. 2 Fall River (Checks to be filled by the State Engineer.)

RECEIVED District 4: PM JUN 20 1975

APPLICATION FOR PERMIT To Appropriative Water within the State of South Dakota

OFFICE OF STATE ENGINEER S.D.A.K.

(NOTE--Draw a line through items not applicable.)

Jan 12-74

1. Name of applicant Parcel Holdings Harry C. Heller Inc. Postoffice address Starbuck Edgemont 57495 County Faulk State S.D.A.K.

- I. If a corporation (a) Name of name (b) Date and place of incorporation (c) Amount of capital stock (d) Amount paid in (e) Names and address of directors

(NOTE--A certified copy of articles of incorporation must accompany the application.)

II. Method of accomplishing the work and financial resources of the applicant:

- (a) Method of accomplishing work (b) Cash on hand (c) Treasury stock (d) Bonds to be issued (e) Other resources

2. Name of well Golden Cliff Irrigation Project Well No. 2 3. Quantity of water claimed 300 gal. per min. 4. Source of water supply (estimated depth) 375 5. Location of well (subdivision) 1/4, NW 1/4, Sec. 17, T. 6 S., R. 1 E. 6. Annual periods during which water is to be used April 1 to Oct. 1 7. To be used for:

I. Irrigation or domestic use: Gravity, overhead sprinkling or combination system?

- (a) Number of acres to be irrigated 126.49 acres (b) Legal subdivisions to be irrigated Sec. 17 Attached (c) Statement as to domestic use (giving location, etc.)

(NOTE--A list of lands to be irrigated, giving each subdivision and fraction with acreage thereof, should be written here, or may be appended as a part of this application. Same must also be shown on accompanying map.)

II. Stockwatering, mining, milling, power, fish culture, fire protection and public recreation:

- (a) Nature of use (b) Amount of power to be generated horse power (c) Location of plant (d) Method of developing power (e) Point where return water will be diverted to stream



6. Estimated cost of works:

- (a) Head gates, \$.....
- (b) Pumping plant, \$ 2000.00
- (c) Flaming, \$.....
- (d) Canal-earth, \$.....
- Rock, \$.....
- (e) Other structures Pips. 5000..... \$ 4000.00 Total, \$ 1000.00

7. Description of works:

- (a) Head gate: Width feet; height feet; Material
- (b) Log of well:

(To be completed when well is drilled)

FEET TO	FEET FROM	LOG OF WELL
0	40	Shale and Top Soil
40	50	Dakota Sand
50	90	Fuson Formation
90	370	Lakota Sand
370	37	Imprison Formation

- (c) Measuring device Pressure Gauge and Nozzle Size
- (d) Canal: Total lengthmiles.

LOCATION BELOW HEADGATE	DEPTH	BOTTOM WIDTH	WIDTH AT WATER LINE	GRADE PER MILE
At Mile	..... feet	..... feet	..... feet	..... feet
At Mile	..... feet	..... feet	..... feet	..... feet
At Mile	..... feet	..... feet	..... feet	..... feet
At Mile	..... feet	..... feet	..... feet	..... feet
At Mile	..... feet	..... feet	..... feet	..... feet
At Mile	..... feet	..... feet	..... feet	..... feet

(Give dimensions where reductions in size are made.)

- (e) Was water tested for irrigation purpose? Result: Excellent

- 10. Time required for completion of work 2 years.
- 11. Time required for complete application of water to the proposed beneficial use 1 1/2 years.
- 12. Choice of newspaper for publication of notice of intention to appropriate Custor Chronicle, Custor, S.Dak.

STATE OF SOUTH DAKOTA

County of Custor } ss.

I, Derral Hasthorpe, being first duly sworn on my oath depose and say: That my relation to the above described, undertaking is that of owner, that I have read the above and foregoing statement, and examined the map accompanying the same, and that I know of my own personal knowledge that the matters herein stated and shown are true.

Signed Derral Hasthorpe

Subscribed and sworn to before me this 22 day of June 19 31

Edna F. Richardson Notary Public (or other qualified officer.)



Hydrographs by State Engineer:

STATE OF SOUTH DAKOTA

County of Hughes, Pierre, South Dakota, Sept. 12, 1951, 19...

This is to certify that the foregoing application was received at this office at 4:00 o'clock P.M. upon the 22nd day of June, 1951, and that after examination it was found to comply with the South Dakota water laws, was published in accordance with the provisions thereof and consideration given to any and all information presented...

NO PROTESTS WERE RECEIVED.

DEAN W. LOUCKS State Engineer.

Number of permit 380-2 Date of first receipt of application June 29, 1951 Date of return to applicant for correction 19 Date of receipt of corrected application 19 Date from which applicant may claim right June 29, 1951 Approved Sept. 12, 1951, Recorded in Book Page

This is to certify that I have examined the foregoing application for a permit to appropriate water of the State of South Dakota, and I hereby grant the same as stated herein, subject, however, to the following limitations and conditions:

- 1st. The equivalent of at least one-fifth, of the work above specified is to be completed on or before Sept. 12, 1952. 2nd. The whole of said work is to be completed on or before Sept. 12, 1953. 3rd. The limit of time for proof of beneficial use of water appropriated in accordance herewith is Sept. 12, 1953. 4th. The water appropriated shall be used for the purpose of Providing Irrigation. 5th. The prior right of all persons who, by compliance with the laws of the State of South Dakota, have acquired a right to the use of water must not be injuriously affected by this appropriation. 6th. The amount of the appropriation herein granted shall not exceed 300 gallons per minute; neither shall it exceed the capacity of the above described system of diversion works, nor the least amount of water that experience may hereafter indicate as necessary for the production of crops in the exercise of the best husbandry; and further, said appropriation must be limited to not more than one-seventieth (1/70) of one cubic foot of water per second of time for each acre of land to which water is actually and beneficially applied for irrigation on or before Sept. 12, 1953; said water to be used during the following described annual period:

April 1 to October 1, Inclusive

Witness my hand this 12th day of Sept, 1951.

Certificate of Construction issued SEPTEMBER 9, 1951 Water License issued SEPTEMBER 9, 1951 DEAN W. LOUCKS State Engineer.



Location of Lands to be Irrigated by the Golden Cliff Irrigation Well No. 2.

Location	Sec.	Typ.	Rge.	Acres
E 1/4 M 1	17	6 S., 1 E.,		34.40
E 1/4 M 2	17	6 S., 1 E.,		5.07
E 1/4 M 3	17	6 S., 1 E.,		35.25
E 1/4 M 4	17	6 S., 1 E.,		28.30
E 1/4 M 5	18	6 S., 1 E.,		10.46
Total,				116.48

DISCHARGE OF ONE SPINKLER HEAD - TWO NOZZLES - 7/32 & 1/4 "

Pressure in Pounds

Discharge in GPM.

25	14.8
30	16.2
35	17.6
40	18.9
45	20.1
50	21.2
55	22.4
60	23.4



STATE OF SOUTH DAKOTA

WATER LICENSE NO. 330-2

(1) WHEREAS, On the 20th day of June A. D. 19 51 Darrol Hawthorne

made Water Right Application No. 580-2 for a permit to use 1.78 cubic feet per second of the water of artesian ground water County of Custer State of South Dakota, for irrigation purposes; and

(2) WHEREAS, On the 12th day of September A. D. 19 51 Permit No. 380-2 with a date of priority of June 29, 1951 was issued to said applicant for the diversion of said water, and provided for the completion of construction of the water supply system therein described on or before the 12th day of September A. D. 19 53 and for the application to beneficial use of said water on or before the 12th day of September A. D. 19 53

and, whereas, on the 28th day of November, 1975, the Permit was transferred to Henry C. Mollenback

and:

(3) WHEREAS, It is hereby certified that the applicant has complied with the provisions of the laws of the State of South Dakota relating to completion of the construction of the water supply system and is entitled to divert .85 cubic feet per second of water for beneficial use and,

(4) WHEREAS, It is hereby certified that the applicant has complied with the provisions of the laws of the State of South Dakota relating to the application of water to beneficial use of the following extent.

for irrigating 60 acres in the E1/4 NW1/4, Section 17, T66, R1E



Hydro ID 710

(5) NOW, THEREFORE, by the virtue of the authority vested in us by the laws of the State of South Dakota, We hereby grant and confer to

Henry C. Hellenbeck

of

Edgemont

the holder and owner of said permit No. 380-2 a water right, dating from June 29, 1951 to use of .85 cubic feet per second of the water

of artesian ground water in the County of Custer and State of South Dakota, or so much thereof as may be necessary for the purposes hereinbelow mentioned, to be diverted at a point in the center of NW, Section 17, T6S, R1E

and conduct to and upon 60 acres in the E, NW, Section 17, T6S, R1E

for the purpose of Irrigation

Subject to any limitations listed in Water Right Permit No. 380-2 and subject to the laws of the State of South Dakota.

WITNESS, My hand and seal of our office at Pierre, South Dakota

this 9th day of September A. D.

Nineteen Hundred and Seventy-seven
WATER RIGHTS COMMISSION

By:

John Hatch
Chief Engineer, Executive Officer
JOHN HATCH



Form 15.

Permit No. 300-2

Water Diversion No. 2 Fall River Water District

CERTIFICATE OF CONSTRUCTION

This is to Certify, That Henry C. Nollenback

the holder of

Permit No. 300-2, issued upon Application No. 300-2, bearing date of priority of June 29,

1931 authorizing the diversion of 1.78 cu. ft. per second of the waters of

antelope ground water county of Custer, State of South Dakota at

a point in the center of the NW 1/4, Section 17, T86, R1E

for irrigation

purposes, he has complied with the provisions of the laws of the State of South Dakota relating to proof of completion of the works of diversion set out and described in said Permit; that said works are found in satisfactory condition for diverting and conveying to the place of intended use 1.78 cu. ft. per second of water.

Date September 9, 1977

By: **WATER RIGHTS COMMISSION**
John Hatch
JOHN HATCH, Chief Engineer



9--Notice of Intent to appropriate Water

Nos. 379-2 & 390-2

(First Publication _____, 19__)

APPROPRIATION OF WATER

Office of State Engineer,
Pierre, S. Dak., July 10, 1951

Notice is hereby given that Darrel Hawthorne whose postoffice address is Dewey, South Dakota, has made applications in accordance with the provisions of the water laws of South Dakota for permits to appropriate for beneficial use as follows:

1000 gallons of water per minute of time from ground water supply through the Golden Cliff Irrigation Project, Well No. 1, the point of diversion of which is to be located in the NW $\frac{1}{4}$ of the SW $\frac{1}{4}$ of Section 6, Twp. 6S., Range 1E. 800 gallons of water per minute of time from ground water supply through the Golden Cliff Irrigation Project, Well No. 2, the point of diversion of which is to be located in the NW $\frac{1}{4}$ of the NW $\frac{1}{4}$ of Section 17, Twp. 6S., Range 1E. Said water to be used for the purpose of providing irrigation on the following described land: NW $\frac{1}{4}$ Sec. 17, NE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 18, NW $\frac{1}{4}$ Sec. 6, W $\frac{1}{2}$ NE $\frac{1}{4}$ Sec. 6, NW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec 6, E $\frac{1}{2}$ SW $\frac{1}{4}$ Sec. 6, W $\frac{1}{2}$ SE $\frac{1}{4}$ Sec. 6, NE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 17, and NW $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 7. T. 6S., R. 1E.

This application will be taken up by the State Engineer at his office at Pierre for consideration upon the 21st day of August 1951, at 10:00 A.M. All persons who believe that their prior rights would be injuriously affected, or that the allowance of the permit would be detrimental to the public welfare shall file such protest with the State Engineer in writing prior to the above date and may appear on the day above mentioned in person for the purpose of discussing further, the information presented.

Appropriate action will be taken by the State Engineer after suitable time has elapsed for the consideration of any or all information presented.

HCS:mt
Enc.
cc: Richardson

DEAN W. LOUCKS
State Engineer



Permit No. 380-2

Water Division 2 Fall River Water District

REPORT OF EXAMINATION OF WORKS
AND/OR APPLICATION OF WATER TO BENEFICIAL USE

TO: Water Resources Commission, State Office Building No. 2, Pierre, South Dakota 57501

I have this day made a thorough examination of the water use system constructed by Darrel Hawthorne of Custer, SD holder

of Permit No. 380-2, bearing date of priority of June 29, 1951

authorizing the diversion of 1.78 cu. ft. per second of the waters of ground water for irrigation purposes, in Custer County.

I have to report on the condition of the same as follows:

The Water Use System consists of,

A. Works used to divert the water:

376 foot flowing artesian well, steel cased; fill's storage dam, 15 foot high, 30 foot wide at the base and 50 foot in length on the west side and 60 foot in length on the south side.

B. Works used to transport water to place of use,

Approx. 800 feet of natural ditch

C. Works used to apply water to beneficial use.

Flood irrigates by spreading

The system is in the following condition: Fair

The point of diversion is located Center of NW 1/4, Sec. 17, T6S., R1E., B.H.M.

The works are capable of diverting and conveying to the place of use 2 1.78

cu. ft. per second of water which is to be used for irrigation

Water has been put to beneficial use to the maximum extent as follows:

E 1/2 of NW 1/4 of Sec. 17, T6S., R1E., B.H.M.

comprising a total of 60 acres of land.

Henry C. Hollenback
Star Rt.
Edgemont, SD 57735

Date 8-25-75

Thomas A. Gardner
(Signature)

THOMAS A GARDNER
Water Resources Engineer



Form 20.

No. 380-2

NOTICE OF TRANSFER OF WATER PERMIT

TO: **WATER RIGHTS COMMISSION**
State Office Building No. 2
Pierre, South Dakota 57601

Date _____

This is to notify you that title to the lands described as follows:
E 1/2 NW 1/4 of Sec. 17, T6S., R1E., B.H.M.

formerly owned by Darrel Hawthorne

has been transferred to Henry C. Hollenbeck

together with any rights to the beneficial use of water thereon as evidenced by Water Right Permit No. 380-2 as provided for in Section 61.0127 of the 1960 Supplement to the South Dakota Code of 1939.

You are therefore hereby requested to file this "Notice of Transfer of Water Permit" in its appropriate file at the Office of Water Resources, South Dakota, as evidence of the change of ownership.

A fee of one dollar is hereto attached to cover filing fees as required under Section 61.0159 of the 1960 Supplement to the South Dakota Code of 1939.

STATE OF SOUTH DAKOTA

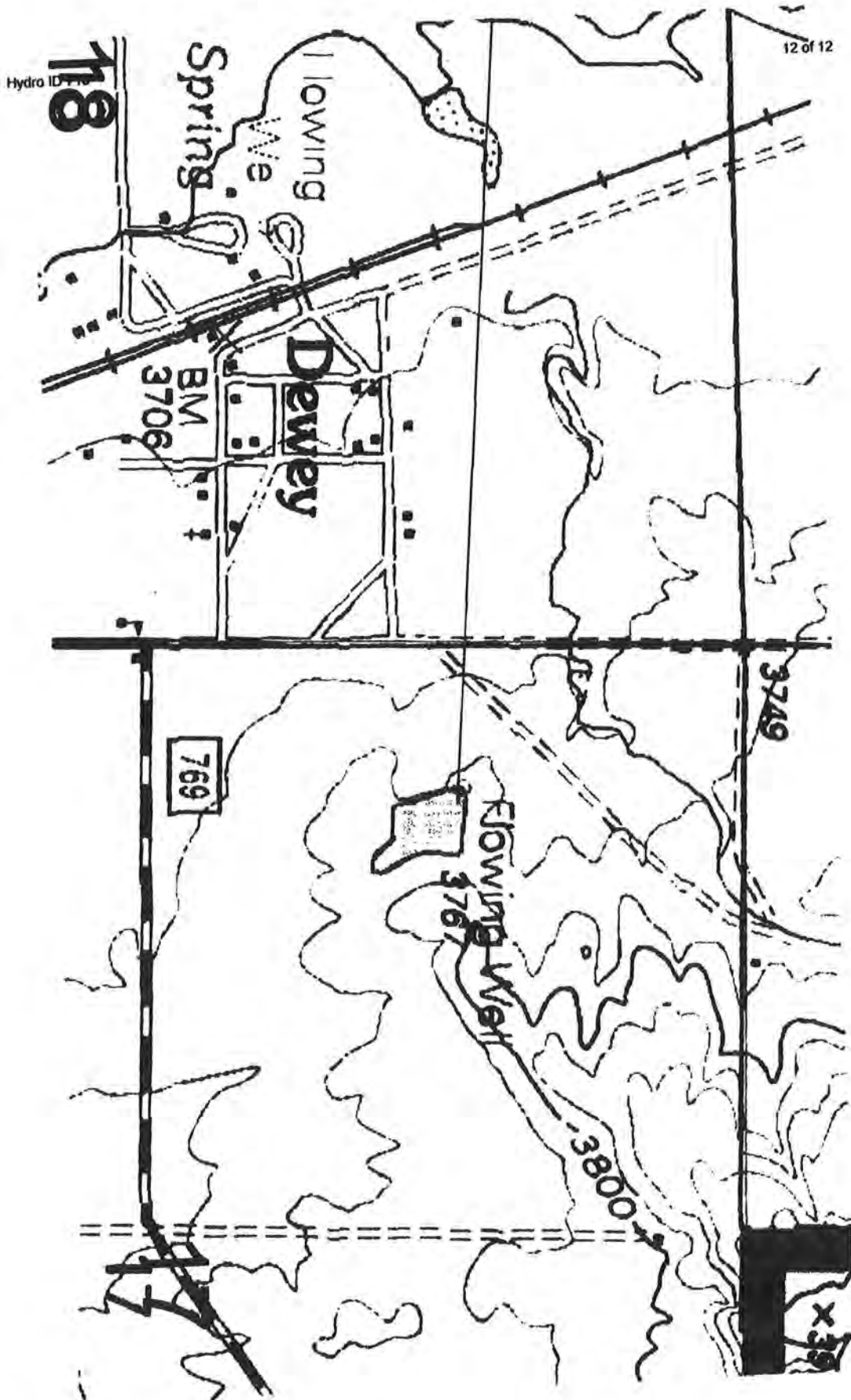
County of _____

I, Henry C. Hollenbeck, being first duly sworn on my oath depose and say: That my relation to the above described undertaking is that of Owner, that I have read the above foregoing statement, and I know of my own personal knowledge that the information herein stated is true.

Henry C. Hollenbeck
(Signed)

Subscribed and sworn to before me this 24th day of Nov, 1975

Ronald B. Beard
(Notary Public)





Hydro ID 3026

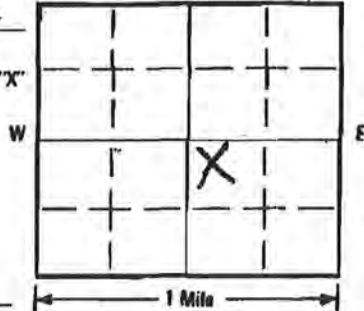
SOUTH DAKOTA WATER WELL COMPLETION REPORT

1 of 1 07-92

4-21-08

Location NW 1/4 56 1/4 Sec 1 Twp 75 Rg 1E
County Fall River North

Please mark well location with an "X"



Well Completion Date

3-26-08

Well Owner: Power Tech
Business Name: Power Tech USA Inc
Address: P.O. Box 723
Hot Springs S.D 57747

FORMATION	DEPTH	
	FROM	TO
Full River	0	55
Fusow	55	80
Lakota	80	166

LOCATION:
Distance from nearest potential pollution source (septic tank, abandoned well, lead lot, etc.): NONE Present (identify source).

PROPOSED USE:
 Domestic/Stock Municipal Business Test Holes
 Irrigation Industrial Institutional Monitoring well

METHOD OF DRILLING:
Mud + Air

CASING DATA: Steel Plastic Other
If other, describe: _____
PIPEWEIGHT LB/FT _____ DIAMETER IN _____ FROM FT _____ TO FT _____ HOLE DIAMETER IN _____
SDR21 LB/FT 6 IN 0 FT 166 FT 8 3/4 IN
LB/FT _____ IN _____ FT _____ FT _____ IN _____
LB/FT _____ IN _____ FT _____ FT _____ IN _____

GROUTING DATA
Grout Type No. of Sacks Grout Weight From To
CMT 34 15.2 lb./gal 0 ft 166 ft
lb./gal _____ ft _____ ft
Describe grouting procedure: Pump

SCREEN: Perforated pipe Manufactured
Diameter 3 IN Length 30 FEET
Material PVC
Slot Size 2070 Set From 166 Feet to 196 Feet
Other information: Set K Packer

WAS A PACKER OR SEAL USED? YES NO
If so, what material? 6" x 3" K Packer
Describe packer(s) and location? Packer set AT 156

DISINFECTION: Was well disinfected upon completion?
YES, How: _____
NO, Why Not? NA
Laboratory sent to for water quality analysis: Respic

STATIC WATER LEVEL 138 Feet
If flowing: closed in pressure _____ PSI
GPM flow _____ through _____ inch pipe
Controlled by Valve Reducers Other _____
Reduced Flowrate _____ GPM
Can well be completely shut in? Yes

WELL TEST DATA:
 Pumped Describe: Air lift AT 150'
 Bailed _____
 Other _____
Pumping Level Below Land Surface _____ ft. After _____ Hrs. pumped _____ GPM
_____ ft. After _____ Hrs. pumped _____ GPM
If pump installed, pump rate _____ GPM

REMARKS
Deway Burdack
8-1-6

This well was drilled under license # 745
And this report is true and accurate.
Drilling firm: Davis Drilling
Signature of License Representative: Steve Davis
Signature of Well-Owner or Responsible Property Holder: _____
Date: 4/22/08

RECEIVED
APR 28 2008
WATER RIGHTS PROGRAM



FORM U.W. 1 Hydro ID 5002
Rev. 7/00
PLANS FEE SCHEDULE
ON REVERSE SIDE

STATE OF WYOMING
OFFICE OF THE STATE ENGINEER
HERSCHLER BLDG., 4-E CHEYENNE, WYOMING 82002
(387) 777-8183

30035081
50.00
6/10/07

APPLICATION FOR PERMIT TO APPROPRIATE GROUND WATER

APPLICATION FOR WELLS AND SPRINGS

Note: Only springs flowing 25 gallons per minute or less, where the proposed use is domestic and for stock watering, will be considered as ground water appropriations.

FOR OFFICE USE ONLY

Temporary Filing No. U.W. 463-211

PERMIT NO. U.W. 183561
WATER DIVISION NO. 2 DISTRICT 1
U.W. DISTRICT Newcastle

NOTE: Do not fold this form. Use typewriter or print neatly with black ink.
ALL ITEMS MUST BE COMPLETED BEFORE APPLICATION IS ACCEPTABLE

NAME AND NUMBER OF WELL or SPRING Putnam 21

1. Name of applicant(s) Putnam & Putnam, LLP Phone: (605) 662-7448

2. Address of applicant(s) 778 Cedar St. Dewey SD 57735
(MAILING ADDRESS) (CITY) (STATE) (ZIP)

3. Name & address of agent to receive correspondence and notices John A. Putnam
778 Cedar St. Dewey SD 57735 Phone: (605) 662-7448
(MAILING ADDRESS) (CITY) (STATE) (ZIP)

4. Use to which the water will be applied:

- Domestic: Use of water in 3 single family dwellings or less, noncommercial watering of lawns and gardens totaling one acre or less. Number of houses served? _____
- Stock Watering: Normal livestock use at four tanks or less within one mile of well or spring. Stockwatering pipelines and commercial feedlots are a miscellaneous use. Number of stock tanks? 1 per call 7/10/07
- Irrigation: Watering of commercially grown crops (large-scale lawn watering of golf courses, cemeteries, recreation areas, etc., is miscellaneous use).
- Municipal: Use of water in incorporated Towns and Cities. Note 1: use of water in unincorporated towns, subdivisions, improvement districts, mobile home parks, etc. is classified as miscellaneous use. Note 2: a permit may be required by the Wyoming Department of Environmental Quality (WDEQ) if the well will be classified as a public water supply under the WDEQ's rules and regulations.
- Industrial: Long term use of water for the manufacture of a product or production of oil/gas or other minerals (of field water food operations, power plant water supply, etc.). (Describe in REMARKS)
- Miscellaneous: Per call 7/10/07
Any use of water not defined under previous definitions such as stock water pipelines, subdivisions, mine dewatering, mineral/oil exploration drilling, potable supplies in offices, etc. Describe in Remarks. Note: a permit may be required by the WDEQ if the well will be classified as a public water supply under the WDEQ's rules and regulations.
- Coalbed Methane: Water produced in the production of coal bed methane gas. Note: wells used in the production coal bed methane will require a permit from the Wyoming Oil and Gas Conservation Commission.
- Monitor, Observation: Note: a WDEQ permit may be required Test Well: (Describe in REMARKS)

5. Location of the well or spring: (NOTE: Quarter-quarter (40 acre subdivision) MUST be shown. EXAMPLE: SE 1/4 NW 1/4 of Sec. 12, Township 14 North, Range 68 West.)
Nebraska County SW 1/4 SW 1/4 of Sec. 28, T. 41 N., R. 60 W. of the 6th P.M. (W.R.M.).
Wyoming: If located in a platted subdivision, also provide Lot/Tract Block of the
Subdivision (or Adm'n) of Resurvey Location: Tract (or Lot)

6. Estimated depth of the well or spring is 600 feet. Estimated production interval is Unknown ft. to ft.

7. (a) MAXIMUM instantaneous flow of water to be developed and beneficially used: 10 gallons per minute.
NOTE: If for domestic and / or stock use, this application will be processed for a maximum of 25 gallons per minute. For a spring, after approval of this application, some type of artificial diversion or improvement must be constructed to qualify for a water right.
(b) MAXIMUM volumetric quantity of water to be developed and beneficially used per calendar year: 15 per call 7/10/07
Circle appropriate units: (Gallons) (Acre Feet) A four person family utilizes approximately one (1) acre-foot of water per year or 325,000 gallons.

8. Mark the point(s) or area(s) of use in the tabulation box below.

TABULATION BOX																	TOTAL				
TWP	RNG	SEC	NE 1/4				NW 1/4				SW 1/4				SE 1/4						
			NE 1/4	NW 1/4	SW 1/4	SE 1/4	NE 1/4	NW 1/4	SW 1/4	SE 1/4	NE 1/4	NW 1/4	SW 1/4	SE 1/4	NE 1/4	NW 1/4	SW 1/4	SE 1/4			
41	60	28																		1 Stock Tank	

Permit No. U.W. 183561 SEE REVERSE SIDE Book No. 1329 Page No. 61



- b. If for irrigation use:
 - a. Describe MAXIMUM acreage to be irrigated in each 40 acre subdivision in the tabulation box above.
 - b. Land will be irrigated from this well only.
 - c. Land is irrigated from existing water right(s) with water from this well to be additional supply. Describe existing water right(s) under REMARKS.

10. If for irrigation use, describe method of irrigation, i.e. center pivot sprinkler, flood, etc.:

11. The well or spring is to be constructed on lands owned by Fuhrman & Fuhrman, LLP
(The granting of a permit does not constitute the granting of right-of-way. If any easement or right-of-way is necessary in connection with this application, it should be understood that the responsibility is the applicant's. A copy of the agreement should accompany this application, if the land is privately owned and the owner is not the co-applicant.)

12. The water is to be used on lands owned by Fuhrman & Fuhrman, LLP
(If the landowner is not the applicant, a copy of the agreement relating to the usage of appropriated water on the land should be submitted to this office. If the landowner is included as co-applicant on the application, this procedure need not be followed.) NOTE: Water rights attach to the area(s) and/or point(s) of use.

REMARKS: Existing well, not currently active
situated in Elliptical dug 1936

Under penalty of perjury, I declare that I have examined this application and to the best of my knowledge and belief it is true, correct and complete.

Robert Fuhrman
Signature of Applicant or Authorized Agent Date 10/16/07

THE LEGALLY REQUIRED FILING FEE MUST ACCOMPANY THIS APPLICATION

DOMESTIC AND/OR STOCK WATERING USES <small>(Domestic use is defined as use of water in 3 single family dwellings or less, noncommercial watering of lawns and gardens totaling one acre or less.)</small>	\$25.00
IRRIGATION, MUNICIPAL, INDUSTRIAL, MISCELLANEOUS, COAL BED METHANE	\$50.00
MONITOR (For water level measurements or chemical quality sampling) or TEST WELL	No Fee

IF WELL WILL SERVE MULTIPLE USES, SUBMIT ONLY ONE (THE HIGHER) FILING FEE.

THIS SECTION IS NOT TO BE FILLED IN BY APPLICANT

THE STATE OF WYOMING)

) ss
STATE ENGINEER'S OFFICE)

This instrument was received and filed for record on the 12th day of June, A.D. 2007, at 9:18 o'clock AM.

Permit No. U.W. 133561
Patrick T. Tyrrell
for State Engineer

THIS IS TO CERTIFY that I have examined the foregoing application and do hereby grant the same subject to the following limitations and conditions:

This application is approved subject to the condition that the proposed use shall not interfere with any existing rights to ground water from the same source of supply and is subject to regulation and correlation with surface water rights, if the ground and surface waters are interconnected. The use of water hereunder is subject to the further provisions of Chapter 169, Session Laws of Wyoming, 1957, and any subsequent amendments thereto.

Granting of a permit does not guarantee the right to have the water level or artesian pressure in the well maintained at any specific level. The well should be constructed to a depth adequate to allow for the maximum development and beneficial use of ground water in the source of supply.

If the well is a flowing artesian well, it shall be so constructed and equipped that the flow may be shut off when not in use without loss of water into sub-surface formations or at the land surface.

Coal Bed Methane wells have Additional Conditions and Limitations on attachment sheet
This permit and accompanying notices serve to register an existing well and establish a valid
water right for the same. Time limit for Completion of Construction and Completion of Beneficial
Use is waived.

~~Approval of this application may be considered as authorization to proceed with construction of the proposed well or spring. A Statement of Completion will be filed within thirty (30) days of completion of construction, including pump installation.~~

~~Completion of construction and completion of the beneficial use of water for the purposes specified in Item 4 of this application will be made by December 31, 2007.~~

The amount of appropriation shall be limited to the quantity to which permittee is entitled as determined at time of proof of application of water to beneficial use.

Witness my hand this 29th day of October, A.D. 2007

Cheryl Verplanche
for PATRICK T. TYRRELL, State Engineer

October 16, 2007 - Statement of Completion on 1936 received.
Beneficial Use assumed as of date of completion.



FORM U.W.8
Rev. 1/07

STATE OF WYOMING
OFFICE OF THE STATE ENGINEER
HERSCHLER BLDG., 4-E
CHEYENNE, WYOMING 82002

(307) 777-8183

STATEMENT OF COMPLETION AND DESCRIPTION OF WELL OR SPRING

NOTE: Do not fold this form. Use typewriter or print neatly with black pen.

PERMIT NO. U.W. 183561 NAME OF WELL/SPRING Putnam 21

1. NAME OF OWNER PUTNAM & PUTNAM, LLP
2. ADDRESS 778 CEDAR ST

City DEWEY State SD Zip Code 57735 Phone No. 605-662-7448

3. USE OF WATER Domestic Stock Watering Irrigation Municipal Industrial Miscellaneous
 Monitor or Test Coal Bed Methane Explain proposed use (Example: One single family dwelling)
1 stock tank

4. LOCATION OF WELL/SPRING SW 1/4 SW 1/4 of Section 28 T. 41 N., R. 60 W., of the 6th P.M. (or W.R.M.)
Subdivision Name _____ Lot _____ Block _____
Resurvey Location Tract _____ or Lot _____ Datum NAD27 NAD83
Geographic Coordinates: Latitude _____ N Longitude _____ W (degrees, minutes, seconds)
UTM: Zone 13 Northing 7816700 Easting 574367 (meters) per
State Plane Coordinates: Zone _____ Northing _____ Easting _____ (feet) cc'd rec'd
Land surface elevation (ft. above mean sea level) _____ Datum NAVD29 NAVD88 1st 2307
Source GPS Map Survey Unknown Other Altimeter (for elevation only)

5. TYPE OF CONSTRUCTION Drilled _____ Dug Driven Other
Describe _____

6. CONSTRUCTION Total depth of well/spring 639 ft.
Depth of static water level -0' FLOWS ft. (below land surface) Casing height 2 ft. above ground

a. Diameter of borehole (bit size) 5 inches inches
b. Casing schedule New Used Joint type Threaded Glued Welded
_____ diameter from _____ ft. to _____ ft. Material _____ Gage _____
_____ diameter from _____ ft. to _____ ft. Material _____ Gage _____
c. Cemented/grouted interval, from _____ ft. to _____ ft.
Amount of cement/grout used _____ type _____ (example: 10 sacks) (example: bentonite pellets)

d. Type of completion Customized perforations Open hole Factory screen
Type of perforator used _____
Size of perforations _____ inches by _____ inches.
Number of perforations and depths where perforated
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.
Open hole from _____ ft. to _____ ft.
Well screen details
Diameter _____ slot size _____ set from _____ ft. to _____ ft.
Diameter _____ slot size _____ set from _____ ft. to _____ ft.

e. Well development method _____ How long was well developed? _____
f. Was a filter/gravel pack installed? Yes No Size of sand/gravel _____
Filter/gravel pack installed from _____ ft. to _____ ft.
g. Was surface casing used? Yes No Was it cemented in place? Yes No
Surface casing installed from _____ ft. to _____ ft.

7. NAME AND ADDRESS OF DRILLING COMPANY Un known

8. DATE OF COMPLETION OF WELL (including pump installation) OR SPRING (first used) 1936

9. PUMP INFORMATION Manufacturer Nose Type _____
Source of power _____ Horsepower _____ Depth of pump setting or intake _____ ft.
Amount of water being pumped _____ gal./min. (For springs or flowing wells, see item 10)
Total volumetric quantity used per calendar year. 5 AELyr per U.W. 5
*If these amounts exceed permitted amount an enlargement is required.

10. FLOWING WELL OR SPRING (Owner is responsible for control of flowing well)
If artesian flow or spring, yield is 5 gal./min. Surface pressure is _____ lb./sq.inch, or _____ feet of water.
The flow is controlled by Valve Cap Plug
Does well leak around casing? Yes No

Permit No. U.W. 183561 Book No. 1329 Page No. 61

SEE REVERSE SIDE



11. IF SPRING, HOW WAS IT CONSTRUCTED? (Some method of artificial diversion, i.e., spring box, cribbing, etc., is necessary to qualify for a water right) _____
12. PUMP TEST Was a pump test conducted? Yes No
 If so, by whom _____
 Yield _____ gal./min. with _____ ft. drawdown after _____ hours
 Yield _____ gal./min. with _____ ft. drawdown after _____ hours
13. LOG OF WELL Total depth drilled 639 ft.
 Depth of completed well _____ ft. Diameter of well _____ inches
 Depth to first water bearing formation _____ ft.
 Depth to principal water bearing formation Top _____ ft. to Bottom _____ ft.

DRILL CUTTINGS DESCRIPTION

From Feet	To Feet	Rock Type or Description	Formation	Water Bearing? (Yes or no)
Surface				
		<i>Not Available</i>		

14. DOES A GEOPHYSICAL LOG ACCOMPANY THIS FORM? Yes No
15. QUALITY OF WATER INFORMATION
 Does a chemical and/or bacteriological water quality analysis accompany this form? Yes No
 It is recommended that chemical and bacteriologic water quality analyses be performed and that the report(s) be filed with the records of this well (contact Department of Agriculture, Analytical Lab Services, Laramie, 742-2984).
 If not, do you consider the water as Good Acceptable Poor Unusable
- REMARKS _____

Under penalties of perjury, I declare that I have examined this form and to the best of my knowledge and belief it is true, correct, and complete

John A. Johnson for Johnson & Johnson LLP _____ Date 10.15.07 20__
 Signature of Owner or Authorized Agent

FOR STATE ENGINEER'S USE ONLY

Permit No. U.W. 193561
 Date of Receipt OCT 19 2007 Date of Approval 10-29 2007
 Date of Priority June 12 2007 Chief Vignone
 for State Engineer



SOUTH DAKOTA WATER WELL COMPLETION REPORT

07-92

Location SW SW 15 Twp 6S Rg 1E
 County Custer
 Please mark well location with an "X"
 Well Completion Date Open 98
 1 Mile

Well Owner: Don Spencer
 Business Name:
 Address: 1122 59 Box 74 Edgemont SD 57735

WELL LOG:

FORMATION	DEPTH	
	FROM	TO
<u>Mowry Shale</u>	<u>0</u>	<u>80</u>
<u>Newcastle Sand</u>	<u>80</u>	<u>140</u>

LOCATION:
 Distance from nearest potential pollution source (septic tank, abandoned well, feed lot, etc.)? None ft. from None (identify source).

PROPOSED USE:
 Domestic/Stock Municipal Business Test Holes
 Irrigation Industrial Institutional Monitoring well

METHOD OF DRILLING:
Air Rotary

CASING DATA: Steel Plastic Other
 If other describe _____
 PIPEWEIGHT DIAMETER FROM TO HOLE DIAMETER
200 LB/FT 5 IN 0 FT 140 FT 7 7/8 IN
 _____ LB/FT _____ IN _____ FT _____ FT _____ IN
 _____ LB/FT _____ IN _____ FT _____ FT _____ IN

GROUTING DATA
 Grout Type Cement No. of Sacks 11 Grout Weight 6gal lb./gal From 0 ft. To 80 ft.
 _____ lb./gal _____ ft. _____ ft.
 Describe grouting procedure pumped

SCREEN: Perforated pipe Manufactured
 Diameter 5 IN Length 60 FEET
 Material PVC
 Slot Size 2.5 Set From 80 Feet to 140 Feet
 Other information _____

WAS A PACKER OR SEAL USED? YES NO
 If so, what material? Rubber packer @ 80ft
 Describe packer(s) and location? _____

DISINFECTION: Was well disinfected upon completion?
 YES, How: Chlorine Tablets
 NO, Why Not? _____
 Laboratory sent to for water quality analysis _____

STATIC WATER LEVEL 90 Feet
 If flowing: closed in pressure _____ PSI
 GPM flow _____ through _____ inch pipe
 Controlled by Valve Reducers Other _____
 Reduced Flowrate _____ GPM
 Can well be completely shut in? _____

WELL TEST DATA:
 Pumped Describe: Air lift 15:20
 Boiled gpm
 Other _____
 Pumping Level Below Land Surface
 _____ ft. After _____ Hrs. pumped _____ GPM
 _____ ft. After _____ Hrs. pumped _____ GPM
 If pump installed, pump rate _____

REMARKS



This well was drilled under license # 6003
 And this report is true and accurate.
 Drilling firm Speckler Drilling
 Signature of License Representative: [Signature]

Signature of Well Owner or Estate Property Holder:
Don Spencer
 Date: January 20, 1999



Considered: _____

WATER PERMIT NO. 1954-2

MAP No. SAME

Name of Applicant Burlington Northern RR

Post Office Address Box 597 Alliance, Neb.

Amount of Water Claimed 0.17 cfs Total Acres N.A.

Source of Water Supply Ground water (one well ≈ 250 ft)

Water to be used for Sanitary purposes in maintenance building County Custer

About 23 miles SW of Custer

PROOF OF PUBLICATION: Received April 14, 1986 Not Received _____

APPLICATION: Approved May 14, 1986 Subject to _____

F.F. & C.L. Adopted _____ Not Approved _____ Deferred _____

PRIORITY : Date Received 1-27-86 Fee \$150.00 Remarks _____

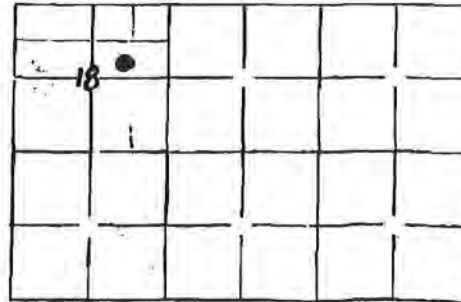
Corrected Application Received _____ Period of Annual Use Jan to Dec-31

WATER QUALITY APPROVAL RECEIVED N.A. APPROVED/CONDITIONAL (Circle one)

WI-1 Description same as Application YES NO REMARKS _____

Diversion Point SW NE4 section 18 T6S-R1E

Land to be Irrigated N.A.



Well Log: Driller Ruby Daly Licensed YES X NO _____

Depth of Well ≈ 250 ft. REMARKS _____

Type of Map Plot PREPARED BY Burlington Northern Reviewed and the Number

assigned on Feb. 4, 1986 By K.C. Larson



NO MATCH SWNE 18-6S-1E BNRR
FORM 2: Application for uses other than irrigation (type or print)

Mail to: Water Rights Div.
DWNR, Foss Bldg.
Pierre, SD 57501
(605) 773-3352

No. 1984-2 Hydrologic Unit 10120107
Map No. Same Basin Upper Cheyenne
Newspaper Custer Co. Chronicle, Box 551, Custer (WY)

Application For Permit To Appropriate Water Within The State Of South Dakota

Check use of water: Industrial Commercial Municipal Other Common Distribution System
Rural Water System Suburban Housing Geothermal Heat Institutional Recreational
Domestic (above 18gpm) Other

Type of Application: Check one or more of the following

New Vested Right Future Use Change Use
 Amend Permit No. _____ with old priority date retained
Change diversion point(s) Add diversion point(s) Other _____
 Application to: Change diversion point(s) Add diversion point(s) on Permit No. _____
 Construction to use water reserved by Future Use Permit No. _____



1. Name of Applicant Burlington Northern R.R. Co. Phone No. (308) 762-6000 Ext: 2238
Post Office Address Box 597, Alliance, State Ne 69301
(Street, RR or Box) Zip Code

2. Amount of water claimed (c.f.s) 75 gpm (0.17 cfs)

3. Source of water supply Ground water

4. Location of point of diversion SW 1/4 NE 1/4 section 18 T6S-R1E

County Custer

5. Counties where water will be used Custer

6. Annual period during which water is to be used January 1 until December 31

7. Give a brief description of proposed project. When available include any preliminary engineering report or other reports or information that will help explain the project. (Attach sheet if more space is needed)
Installing 12' X 48' modular Bldg. at Dewey, S.D. as headquarters for track gangs and signal maintainer. Will include 1-lavatory, 1-water closet with tank and 1-Electric water cooler. Water use will be very minimal

Attachments: Attach Form 2A if diversion from a well or dugout, or if storage of water, is proposed. Attach map (see instruction)

STATE OF SOUTH DAKOTA,
County of _____)

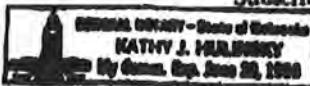
I, Burlington Northern Railroad Co. the applicant, certify that I have read the foregoing application, have examined the attached map and that the matters herein stated are true and that I intend, and am able to complete the necessary construction.

Signed [Signature]

30th day of December 19 85

[Signature]
Notary Public (or other qualified officer)

Subscribed and sworn to before me this





WATER PERMIT

The Water Management Board hereby approves Water Permit Application No. 1954-2

Burlington Northern R.R. Co Box 597, Alliance
(Applicant) (Post Office Address)

NE 59301 With the following qualifications.
(State) (Zip Code)

The well casing shall be pressure grouted with cement (bottom to top) above the water producing formation (Fall River) and construction shall be in compliance with Water Management Board Well Construction Rules, Chapter 74:02:04.

The well approved under this Permit shall be valved and the flow reduced to the amount needed or to a minimum when not being used. The well shall also be equipped with a pressure gauge and a record kept of any pressure fluctuations. Such records shall be available to the Chief Engineer upon request. If this well is abandoned or the Permit cancelled, the well must be plugged in accordance with rules of the Water Management Board.

The well approved under this Permit will be located near domestic wells and other wells which may obtain water from the same aquifer. The well owner, under this Permit shall control his withdrawals so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights.

Date of first receipt of application January 27, 1986.

Date of return to applicant for correction, amendments or changes required January 28, 1986.

Date of receipt of corrected application Feb 3, 1986. Approved May 14, 1986.

The Water Management Board hereby approves this Water Permit No. 1954-2 authorizing the construction of the water use system and the placing of water to beneficial use as stated in the Application and as qualified in the Water Permit approval, subject, however, to the following limitations and conditions:

1. The date from which applicant may claim right is January 27, 1986.
2. The equivalent of at least one-fifth of the specified work is to be completed on or before October 14, 1988.
3. The whole of said work is to be completed on or before May 14, 1991.
4. The limit of time from proof of beneficial use of water appropriated in accordance herewith is May 14, 1991.
5. The water appropriated shall be used for the purpose of sanitary use in a maintenance building.
6. The prior right of all persons who, by compliance with the laws of the State of South Dakota, have acquired a right to the use of water must not be unlawfully impaired by this appropriation.
7. The amount of the appropriation herein granted shall not exceed 17 cubic feet per second; neither shall it exceed the capacity of the above described water supply system nor shall it exceed the amount of water needed for beneficial uses served and to which water is actually and beneficially applied for commercial use on or before May 14, 1995; said water to be used during the following described annual period: Jan 1 - Dec 31

WATER MANAGEMENT BOARD

By: John Hatch
Chief Engineer JOHN HATCH
Division of Water Rights
Dept. of Water and Natural Resources

JUN 20 1986, 1986



Supplemental Information

(type or print in ink)

1. Well Information - Proposed construction

SEE ATTACHED PLAN SHEET

- a) Drill Hole Diameter 8 3/4 Depth 200-250
 - b) Casing Type PVC Diameter 6" ID Thickness SCH 200
 - c) Screen Type PVC Diameter 4" ID Thickness SCH 200
 - d) Gravel Pack Thickness NO Length of Gravel Pack NO
 - e) Depth to Top of Water Bearing Material TOP OF FALL RIVER 60' TOP OF LAKOTA 200-250
 - f) Depth of Water (ground surface to water level) WELL WILL BE ARTESIAN (EXPECTED TO 6 PM FLOW)
 - g) Distance to nearest existing domestic well: 300 FT
- On applicants property BN PROPERTY On property owned by others _____

2. Dugout Information Estimates

- a) Surface Dimensions _____ Depth _____
- b) Depth to water (ground surface to water level) _____

3. Water Storage Dams

If the proposed water use system contains one or more storage dams, please furnish the information requested below. The locations of each dam should be shown on the map submitted with the application.

- a) If a private engineering firm or government agency was involved in the design of this dam please give their name and address

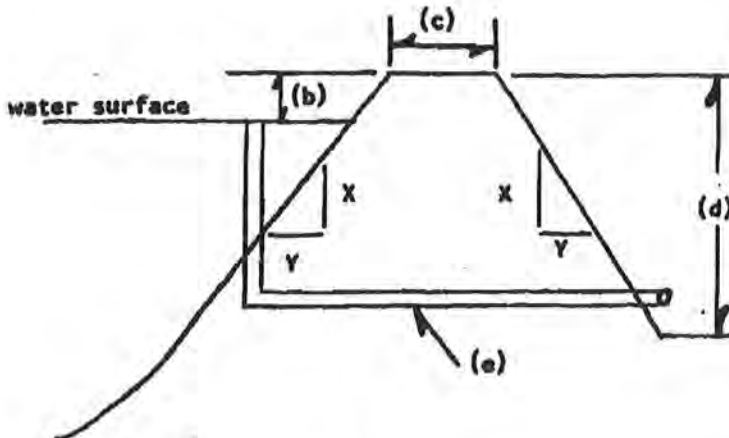
- b) Freeboard _____
- c) Crest Width _____
- Crest Length _____

d) Height _____

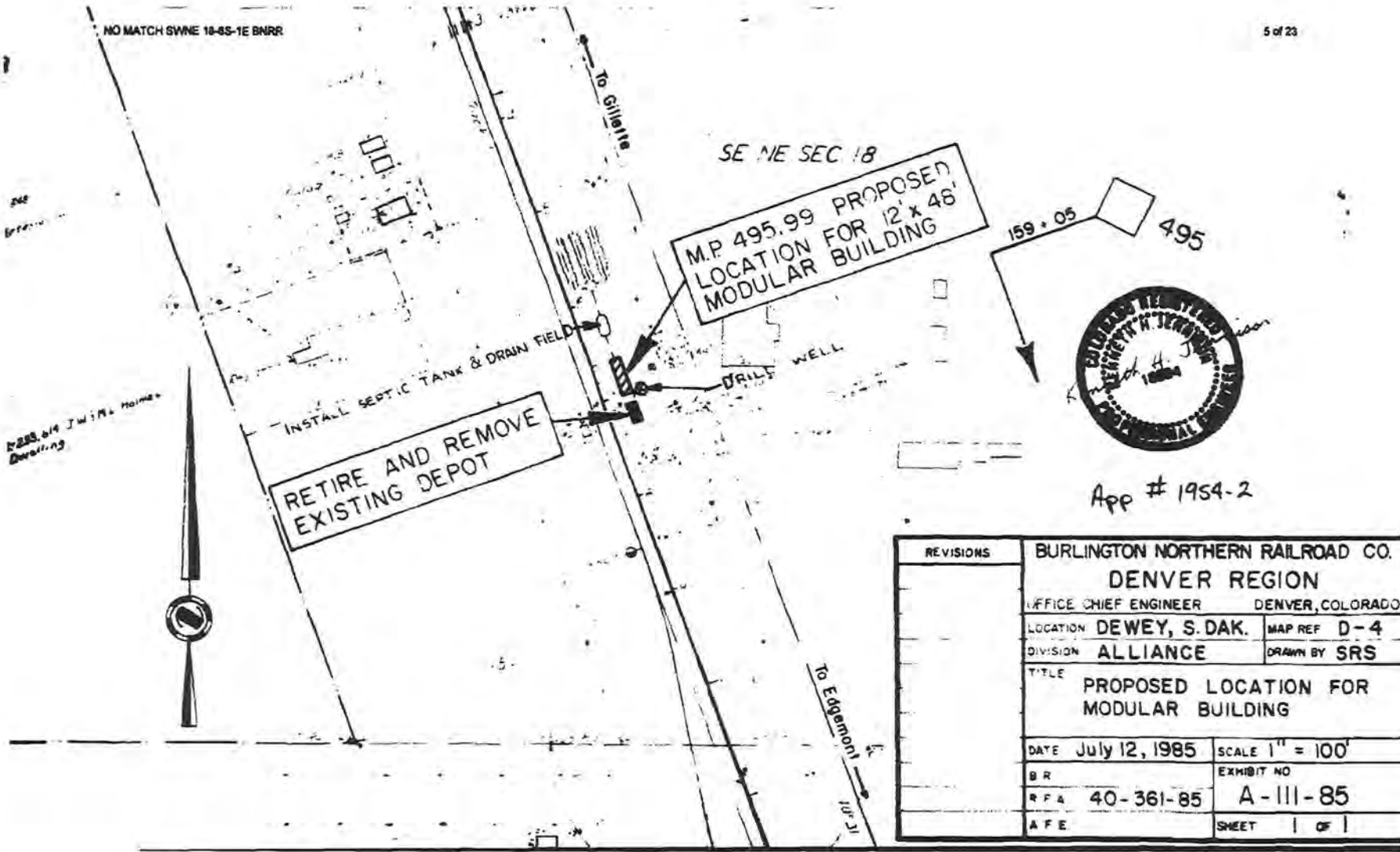
- e) Outlet Dimensions:
Pipe diameter _____
- Spillway width _____

- f) X & Y Slope
Upstream _____
- Downstream _____

Surface Area of Impoundment _____
 Storage _____ acre feet
 Drainage area above dam _____



R. L. Wolsen for B.N. RR.
 Signature of Applicant



App # 1954-2

REVISIONS	BURLINGTON NORTHERN RAILROAD CO.	
	DENVER REGION	
	OFFICE CHIEF ENGINEER	DENVER, COLORADO
	LOCATION DEWEY, S. DAK.	MAP REF D-4
	DIVISION ALLIANCE	DRAWN BY SRS
TITLE PROPOSED LOCATION FOR MODULAR BUILDING		
DATE	July 12, 1985	SCALE 1" = 100'
BR		EXHIBIT NO
RFA	40-361-85	A-111-85
AFE		SHEET | OF |



POWERTECH (USA) INC.

CALL CHROMATOR BUREAU 1845-1E BIRRAU
OR BN WELL AT NEWBY S.D.
JESPER COUNTY
Y RABY DRILLING & EXP
FOYMONT, S.D. DAK.

6" TO 2" SLIP FLANGE ^{8 of 23} / UNCLE
TO CONTROL FLOW
6" SCH 200 WELL CASING (PVC)
SURFACE TO TOP OF (NIP) A JUNK
UNIT

SHULL CREEK

8 3/4" DRILL PIPE

FALL RIVER - FUSON

LEANS UP (WATER) ... STAGE TO
BOTTOM OF 6" WELL CASING

LAKOTA

TOP OF AQUIFER

6" DRILL HOLE THROUGH AQUIFER

4" SLOTTED WIRE SCREEN
+ PA-11-11

NO MATCH SWNE 18-08-1E BNRR

7 of 23

RECEIPT

No 4 10313

Division of Water Rights

South Dakota Department of Water and Natural Resources

Pierre, SD 57501 19__

RECEIVED OF _____

the following amount in fees for services rendered as provided for by law:

Fee for Application for Permit No. 1954-2 to Appropriate Water, to construct works and to put water to beneficial use

Fee for Application for Permit No. _____ to Appropriate Water for Future Use

Fee to retain Future Use Permit No. _____ after period of seven years.

Fee for Inspecting Constructed Works, confirming beneficial use and issuing Water License No. _____

Fee for Filing Transfer Form _____

Fee for Filing Extension Request _____

Fee for Certified Copy of _____

Fee for Print Copy of Map _____

Fee for Certifying _____

Fee for _____ (Any Other Work Provided by Law)

Total

By _____
Chief Engineer





NO MATCH SWNE 18-8S-1E BNRR

8 of 23

South Dakota Department of
Water & Natural Resources

Joe Foss Building
 523 East Capitol
 Pierre, South Dakota 57501-3181

Water Rights Division
 605 773-3352

January 28, 1986

Burlington Northern RR Co.
 ATTN: R.L. Wolzen
 Box 597
 Alliance NE 68301

Mr. Wolzen:

I am in receipt of your water permit application in Custer County.
 Before we can complete processing of your application we will need:

1. The amount of water you plan on utilizing from the well.
2. A filing fee based on water use.

0-45 gpm	\$50.00
45-75 gpm	150.00
75-150 gpm	225.00

When we receive the above information we can continue to process your application. If you have any questions, please contact this office.

Thank you,

KEVIN C LARSON
 Natural Resources Engineer

KCL:ks



RECOMMENDATION OF CHIEF ENGINEER FOR WATER PERMIT

APPLICATION No. 1954-2, Burlington Northern Railroad

Pursuant to SDCL 46-2A-2, the following is the recommendation of the Chief Engineer, Water Rights Division, Department of Water and Natural Resources concerning Water Permit Application No. 1954-2, Burlington Northern Railroad, Box 597, Alliance NE.

The Chief Engineer is recommending APPROVAL of Application No. 1954-2 because 1) there is reasonable probability that there is unappropriated water available for the applicant's proposed use, 2) the proposed diversion can be developed without unlawful impairment of existing rights, 3) the proposed use is a beneficial use and 4) in the public interest with the following qualifications:

1. The well casing shall be pressure grouted with cement (bottom to top) above the water producing formation (Fall River) and construction shall be in compliance with Water Management Board Well Construction Rules, Chapter 74:02:04.
2. The well approved under this Permit shall be valved and the flow reduced to the amount needed or to a minimum when not being used. The well shall also be equipped with a pressure gauge and a record kept of any pressure fluctuations. Such records shall be available to the Chief Engineer upon request. If this well is abandoned or the Permit cancelled, the well must be plugged in accordance with rules of the Water Management Board.
3. The well approved under this Permit will be located near domestic wells and other wells which may obtain water from the same aquifer. The well owner, under this Permit shall control his withdrawals so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights.

See the attached report for additional information.

JOHN HATCH, Chief Engineer
March 10, 1986



REPORT ON APPLICATION NO. 1954-2

BURLINGTON NORTHERN RAILROAD

February 6, 1986

Application No. 1954-2 proposes to appropriate 0.17 cfs from one well approximately 250 feet deep, located in the SW $\frac{1}{4}$ NE $\frac{1}{4}$ Section 18, T6S, R1E. Water will be used for sanitary purposes in a maintenance building.

Aquifer: Fall River Sandstone - Inyan Kara Group

The Fall River Sandstone is the youngest member of the lower Cretaceous aged Inyan Kara Group. The Fall River overlies the Fuson Shale member of the Lakota Formation. The Fuson acts as a leaky aquitard between the Fall River and Lakota aquifers. However, an aquifer test conducted approximately 5 miles south of the applicant's proposed well site suggests a direct hydrologic connection between the Lakota Formation and the Fall River Sandstone. The Lakota is composed of a crossbedded channel-filled sandstone, shale, some localized limestone, and thin conglomerate lenses. The Fall River consists of well-bedded, fine-grained sandstone and less abundant interbedded siltstone and claystone. Conformably overlying the Fall River is the Skull Creek Shale, which acts as a confining bed.

The Inyan Kara underlies approximately 360,960 acres of Custer County and contains an estimated 8,121,600 acre-feet of recoverable water in storage (Allen, 1984). The average annual recharge to the Inyan Kara has not been quantified and the source has not been identified. Possible sources of recharge include: Meteoric water and downward leakage through the overlying shale; water taken in at the outcrop; and upward migration of water from the underlying Paleozoic Limestones, along solution collapses and breccia pipes associated with fractures. The Inyan Kara aquifers are under artesian conditions, and wells completed in the Fall River and Lakota flow in this area.

The Division of Water Rights does not monitor any observation wells in this area, and there are few domestic wells from which information can be obtained.

Review of Existing Permits

<u>Permit</u>	<u>Owner</u>	<u>Location</u>
0181-2	Grand Island & Wyo Cent RR. Co.	Sec 18, T6S, R1E
0182-2	Grand Island & Wyo Cent RR. Co.	Sec 18, T6S, R1E
0183-2	Grand Island & Wyo Cent RR. Co.	Sec 18, T6S, R1E
379-2	Henry C Hollenbeck	Sec 6, T6S, R1E
380-2	Darrel Hawthorne	Sec 17, T6S, R1E

Conclusions

1. Water is available for appropriation from the Inyan Kara in the area of the proposed well.
2. Because the amount of water requested is minimal, there will be no significant impacts on the water levels in the aquifer.



Application No. 1954-2

Page 2

3. The well should be constructed according to the Well Construction Standards of South Dakota, Chapter 74:02:04.
4. The three permits held by Grand Island and Wyoming Central Rail Road divert water from three springs located near the applicant's proposed well site. Review of the geologic map of the area indicates the source of the springs may be the Inyan Kara (Brobst, 1961). If the specific capacity of the well is low and the springs are located high on the potentiometric surface, interference could be a problem.

KENT BUHLER

Natural Resources Engineer

References

- Allen, J.C., Iles, D.L., Petres, A.K., 1984, Analysis of Groundwater and Stream-flow Data, Western Dakotas Region of South Dakota, Tasks 3 & 4: Groundwater Resources Inventory, U.S. Army Corps of Engineers, DWNR, Division of Geologic Survey, Vermillion, SD, Contract DAWC 45-82-C-0151.
- Brobst, D.A., 1961, "Geology of the Dewey Quadrangle, Wyoming-South Dakota", Geology of Uranium Deposits in South Black Hills, Geological Survey Bulletin 1063-B.



Instruction to Newspaper - Publish first publication of the following Notice on or before March 26, 1986 with 2nd publication 1 week later. The applicant is responsible for payment.

No. 1954-2

NOTICE OF HEARING on Application No. 1954-2 to Appropriate Water and/or to Amend Water Permit or Water Right No. _____

Notice is hereby given that Burlington Northern R.R. whose mailing address is Box 597, Alliance, Nebraska, ~~South Dakota~~ has made an application for a permit

to appropriate 0.17 cubic feet per second from one well approximately 250 feet deep (Fall River Sandstone - Inyan Kara Group) located in the ~~SWNE~~ Section 18-T6S-R1E. Water will be used for sanitary purposes in a maintenance building.

Pursuant to SDCL 46-2A-2 the Chief Engineer of the Water Rights Division recommends **APPROVAL** of Application No. 1954-2 because 1) unappropriated water is available, 2) will be no unlawful impairment of existing rights, 3) is beneficial use of water and 4) is in the public interest.

This application will be considered by the Water Management Board at ~~Room 216, Joe Foss Building, 523 E. Capitol, Pierre, South Dakota, May 14~~ 1986 at 10:00 am.

The recommendation of the Chief Engineer is not final or binding upon the Board and the Board is authorized to 1) approve, 2) approve with qualifications, 3) defer, or 4) deny this application after it reaches a conclusion based upon facts presented at the public hearing. Any interested person who may be affected by a Board decision and who intends to participate in the hearing before the Board and present evidence or cross-examine witnesses according to ~~SDCL 46-2A-2~~ SDCL 46-2A-2 must file a written petition with BOTH the applicant and the Chief Engineer by May 2, 1986. The petition may be informal, but it must include a statement describing the petitioner's interest in the application, the reasons for the petitioner's opposition to or support of the application, and the signature and mailing address of the petitioner or his legal counsel if legal counsel is obtained. The applicant need not file a petition.

This application is made pursuant to the provisions of SDCL 46-1-1 thru 46-1-9, 46-1-12 thru 46-1-15; 46-2-3.1, 46-2-9, 46-2-11, 46-2-13, 46-2-17; 46-2A-1 thru 46-2A-10, 46-2A-12, 46-2A-14, 46-2A-15; 46-5-1 thru 46-5-11, 46-5-13 thru 46-5-15, 46-5-24, 46-5-25, 46-5-30.2, 46-5-30.4, 46-5-31; ~~(ground)~~ 46-6-3, 46-6-3.1, 46-6-6.1, 46-6-10, 46-6-13, 46-6-14; ~~(future use)~~ 46-5-38 thru 46-5-40; ~~(transfer lands)~~ 46-5-30.4, 46-5-33 thru 46-5-35; ~~(10,000 AFA)~~ 46-5-30.1, 46-5-31; and Board Rules ARSD 74:02:01:01 thru 74:02:01:15; ~~(future use)~~ 74:02:01:24 thru 74:02:01:25; ~~(10,000 AFA)~~ 74:02:01:15:02 thru 74:02:01:15:05.

This hearing is an adversary proceeding. The applicant or any person, after filing a petition, has the right to be present or to be represented by a lawyer. These and other due process rights will be forfeited if they are not exercised. Decisions of the Board may be appealed to the Circuit Court and the State Supreme Court as provided by law.

Any person wishing a copy of the Chief Engineer's recommendation, further information on this application or to assure access to the hearing by the handicapped can contact the Water Rights Division, DWRN, Joe Foss Bldg, Pierre SD (605 773-3352) for assistance prior to the hearing date. The time of the hearing will be automatically extended for at least twenty days upon written request of the applicant or any person who has filed a petition to oppose or support the application. The request for extension must be filed with the Chief Engineer by May 2, 1986.



Department of Water & Natural Resources

1954-2

Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501

Water Rights Division
605 773-3352

JUN 20 1986

Burlington Northern Railroad Company
Box 597
Alliance, Nebraska 59301

Dear Sir:

Enclosed herewith is your Water Permit No. 1954-2 as approved by the Water Management Board authorizing you to construct your water diversion system and the water to beneficial use, not exceeding the limits as specified in said Water Permit No. 1954-2.

Also enclosed is Form 10, Notice of Completion of Works and Application of Water to Beneficial Use, which you are to complete and submit to the Chief Engineer when you have completed the system and/or have put the water to beneficial use. An inspection can then be scheduled so that your Water License may be issued to you, thus completing your acquisition of a Water Right.

Very truly yours,

JOHN HATCH, Chief Engineer
Water Rights Division

JH:MS

enclosure

PLEASE NOTE: Certain changes can be made in your permit within the five year construction period, usually without affecting the priority date provided an application to amend your permit is made within the five year period-i.e. changes in location or number of diversion points (wells) or location of land to be irrigated. Well locations for wells into the same aquifer can be moved up to 660 feet without application.

Applications to amend a permit after the five year construction period will be assigned a new priority date. Applications to change water sources, to add lands or increase original diversion rates, if approved will usually receive the date of the new application as a priority date regardless of the five year construction period.

WNR-809-5/83



NOTICE OF COMPLETION OF WORKS AND/OR APPLICATION OF WATER TO BENEFICIAL USE

Post Office ALLIANCE, NE.

Date July 2, 1986

TO: Water Rights
Joe Foss Building
Pierre, South Dakota 57501

Dear Sirs:

This is to inform you that I have completed the construction of the water diversion system and/or that I have put the water to beneficial use to maximum extent it is going to be used, not exceeding the amounts as specified in Water Right No. 1954-2.

Water Right Permit No. 1954-2 states that the diversion system is to be constructed by 1-30-86, and that the water is put to beneficial use by 2-30-86.

The diversion system was completed on 1-22-86. Applying the water to beneficial use was completed on 3-15-86.

You may schedule an inspection so that the Certificate of Construction and/or the Water License may be issued, thus completing my acquisition of a water right.

R. J. Wojan - Burlington Northern RR.
(Signature)

WNR-810-7/79
Notice of Completion of Works and/or
Application of Water to Beneficial Use

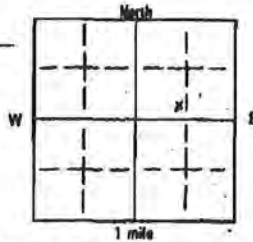


SOUTH DAKOTA WATER WELL COMPLETION REPORT

18-85

Location SW 1/4 NE 1/4 Sec 18 Twp 6S Rg 1E

County CUSTER



Please mark well location with an 'X'

Well Completion Date Sep 10-86

PROPOSED USE:

- Domestic, Municipal, Test Holes, Irrigation, Industrial, Stock

Method of Drilling:

ROTARY MUD

CASING DATA:

- Steel, Plastic, Other

If other describe

Table with columns: PIPEWEIGHT, DIAMETER, FROM, TO, HOLE DIAMETER. Rows for SCH 200 and SCH 300 pipes.

Well Owner:

Name BN RAIL ROAD (ATTN) RL WOLZEN

Address Box 97 Alliance NEB 69301

Well Log:

Table with columns: Formation, From, To. Lists geological layers like Skull Creek Shale, Fall River, Puzos, etc.

STATIC WATER LEVEL 267' RUNNING Feet

If flowing, closed in pressure 8.68 PSI

GPM flow 16 through 6" inch pipe

Controlled by Valve, Reducers, Other

If other, specify

Can well be completely shut-in? YES, SCREEN SYSTEM

GROUT:

Was the well grouted? YES NO

To what depth? 340 FEET

What is grouting material? TYPE II CEMENT MIX

If cement, number of sacks? 40

Describe grouting procedure MIXED CEMENT SAND TO 1 BAG CEMENT 4 1/2 GAL PUMPER

CEMENT THROUGH CASING & UP OUTSIDE

What was grout weight? 94 LBS 10.5 GAL LB/GAL

SCREEN: Perforated pipe, Manufactured

Diameter 4 IN Length 100 FEET

Material SCH 300 PVC

Slot Size .064 Set From 340 Feet To 340 Feet

Slot Size Set From Feet To Feet

Slot Size Set From Feet To Feet

Other information PACKERS ON SCREEN 200 260 300

Was it packed or sand used? YES NO

If so, what material? NEARBY

Describe packer(s) and location? PACKERS ON SCREEN

ASSY FOR CENTRALIZERS AND POSSIBLE SAND SCREEN

SAND SCREEN

Was well disinfected upon completion? YES NO

Explain Z GAL COLOR MIXED WITH LAST BATCH

Bacteriological analysis YES NO

Laboratory sent in

WELL TEST DATA:

Pumped

Bailed Describe:

Other

Pumping Level Below Land Surface

ft. After Hrs. pumped GPM

ft. After Hrs. pumped GPM

ft. After Hrs. pumped GPM

REMARKS:



This well was drilled under license # 413

And this report is true and accurate.

Drilling firm RABY DRILLING

Signature of License Representative:

Richard P. Raby

Signature of Well Owner: REPRESENTATIVE

Richard L. Wolzen BNRR

Date Oct 1-86



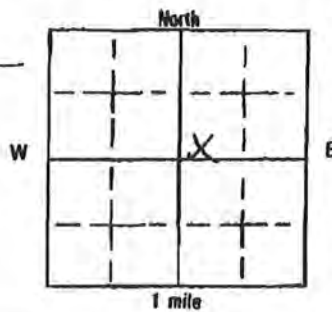
SOUTH DAKOTA WELL AND TEST HOLE PLUGGING REPORT

10-85

Location SW 1/4 NE 1/4 Sec 18 Twp 65 Rg 1E

County Custer

Please mark well location with an "X"



Well Owner:

Name Burlington Northern Santa Fee Railway

Address 80-44th Ave NE, Minneapolis, MN 55421

Plugging completion Date 7-31-98

CHECK APPROPRIATE BOX

EXISTING WELL

TEST HOLE

Well depth 340 ft.

Casing material steel

Casing size(s) 8 5/8" O.D.

Casing condition good

Hole depth

Hole size

Describe plugging procedure: pressure grouted through tremie line. Filled with cement grout bottom to top w/ 120 sacks well is in a pit, top of casing at -4 ft. pit filled in with native material.

Describe grout or plugging material: cement grout type I/II 6 gal. water / bag

Type of non-slip plug: none

This well or test hole was plugged under license # 331 And this report is true and accurate.

Drilling firm Taylor Drilling

Signature of Licensed Representative [Signature]

Signature of Well Owner

Date



TRANSMITTAL LETTER

TO: Mr. Don Stroup
Water Rights Section
SD DEN 12

DATE: June 1, 2001
PROJECT NO _____
FROM: John Humble

Cordilleran Environmental Consultants, Inc.
7230 W. Ellsworth Ave.
Lakewood, CO 80226 (303) 274-5583
FAX (303) 274-9542

PROJECT NAME Well Abandonment - Dewey, SD
RESPONSE REQUIRE YES
 NO

WE ARE SENDING YOU VIA:

EXPRESS COURIER MESSENGER SERV.
 U.S. EXPRESS MAIL HAND DELIVERY
 REGULAR MAIL OTHER

THE FOLLOWING:

ITEM NO.	NO. OF COPIES	DESCRIPTION
1	1	SD well and test hole plugging report

FOR YOUR APPROVAL AS REQUESTED
 FOR YOUR INFORMATION FOR REVIEW AND COMMENT

OTHER _____
REMARKS _____



translet.wk1



CORDILLERAN ENVIRONMENTAL CONSULTANTS, INC.



POWERTECH (USA) INC.

NO MATCH SWNE 18-6S-1E BNRR



19 of 23

**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

**JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182**

www.state.sd.us/denr

June 11, 2001

MEMO

To: File
Donald E. Stroup
From: Donald E. Stroup, DENR Natural Resources Project Engineer
Subject: Permit # 1954-2

I spoke with Burlington Northern Santa Fe Railway personnel at Alliance, NE and Edgemont, SD concerning the use of the well at their Dewey, SD depot. I was advised by the Train Master, Kenny White, at Edgemont that the depot was closed and the well was plugged. I requested and received the attached SD Well and Test Hole Plugging Report from Cordilleran Environmental Consultants. This permit can be cancelled.



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

October 22, 2001

NOTICE OF CANCELLATION

TO: R L Wolzen, Burlington Northern Railroad Company
PO Box 597, Alliance, NE 69301

FROM: Ron Duvall, Natural Resources Engineer
for Garland Erbele, Chief Engineer
Water Rights Program

SUBJECT: Cancellation of Water Permit No. 1954-2

Water Permit No. 1954-2 authorizes diversion of ground water for sanitary purposes in the maintenance building at the Dewey, South Dakota railroad depot. On June 11, 2001, Don Stroup, a staff engineer with our program, met with railroad personnel from Alliance, NE and Edgemont, SD concerning the use of the well at the depot. Don was advised by Kenny White at Edgemont that the depot was closed and the well had been plugged. The Chief Engineer of the Water Rights Program is recommending cancellation of Water Permit No. 1954-2, due to abandonment and/or forfeiture.

The Water Management Board will consider cancellation of Water Permit No. 1954-2 at 10:00 am, December 5, 2001, in the Floyd Matthew Training Center, Joe Foss Building, 523 E Capitol, Pierre, SD.

The recommendation of the Chief Engineer is not final or binding upon the Board. The Board is authorized to 1) cancel, 2) cancel portions of, 3) delay action on, or 4) take no action on Water Permit No. 1954-2 based upon facts presented at the public hearing. Our records show you to be the owner of property covered by this water permit. If you wish to oppose the cancellation and if you intend to participate in the hearing before the Board and present evidence or cross-examine witnesses according to SDCL 1-26, you must file a written petition with the Chief Engineer by November 26, 2001. The petition may be informal, but it must include a statement describing the reasons for your opposition to the cancellation, and your signature and mailing address or your legal counsel if legal counsel is obtained. The Board may consider any abandoned or forfeited water to be available for appropriation subject to the provisions of SDCL 46-1, 46-2, 46-2A and 46-5.

The hearing(s) will be conducted pursuant to the provisions of SDCL 46-1-1 thru 46-1-10, 46-1-14 thru 46-1-15; 46-2-3.1, 46-2-9, 46-2-11, 46-2-17; 46-5-36, 46-5-37, 46-5-37.1; 46-2A-1 thru 46-2A-7; and Board Rules ARSD 74:02:01:36 thru 74:02:01:41. These are contested cases pursuant to procedures contained in SDCL 1-26.



October 22, 2001
Burlington Northern Railroad Co
Page 2

These hearings are adversary proceedings. Any party has the right to be present or to be represented by a lawyer. These and other due process rights will be forfeited if they are not exercised. Decisions of the Board may be appealed to the Circuit Court and State Supreme Court as provided by law.

The time of the hearing will be automatically extended for at least twenty days upon your written request to the Chief Engineer after a petition has been filed to oppose the cancellation. If an extension is requested, *the hearing on the cancellation will be continued until the next regular Board Meeting.* Any request for extension must be filed with the Chief Engineer by November 26, 2001.

Prior to November 26, 2001, contact the Water Rights Program, Joe Foss Building, 523 E Capitol, Pierre, SD (605-773-3352) if assistance is needed with the following: 1) further information on the proposed cancellation; 2) to assure access to the meeting room for the handicapped; or 3) to obtain an interpreter for the hearing impaired.



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

RECOMMENDATION OF CHIEF ENGINEER

FOR WATER PERMIT NO. 1954-2, BURLINGTON NORTHERN RAILROAD COMPANY

Pursuant to SDCL 46-2A-2 and 46-5-37.1, the following is the recommendation of the Chief Engineer, Water Rights Program, Department of Environment and Natural Resources concerning Water Permit No. 1954-2.

The Chief Engineer is recommending cancellation of the above Water Permit due to abandonment and/or forfeiture. An investigation by Donald Stroup, June 11, 2001, found the well at the Dewey, SD depot had been plugged and the depot was closed.

**RON DUVALL, Natural Resources Engineer
for Garland Erbele, Chief Engineer
October 22, 2001**



POWERTECH (USA) INC.

NO MATCH SWNE 18-8S-1E BNRR

23 of 23



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

December 7, 2001

1954-2

NOTICE

R L Wolzen
Burlington Northern Railroad Company
PO Box 597
Alliance, NE 69301

Dear Mr. Wolzen:

This will notify you that the Water Management Board cancelled Water Permit No. 1954-2 on December 5, 2001. The water permit had authorized use of ground water for sanitary purposes in the maintenance building at the Dewey, South Dakota railroad depot.

This action was taken under the conditions outlined in our notice to you dated October 22, 2001. If you have any questions concerning the Board action, please contact Genny McMath, with our program, at (605) 773-3352.

Sincerely,

Garland Erbele, Chief Engineer
Water Rights Program



- 749-78 Smith + Assoc. Corralles #1
 30-31-78 (NENE (SEC 27) TBS 1R)
 S. Dalk 0-2 surface (6S 1R)
 2-26 Red silty shale streaks of Gyp.
 surface pipe set at 72 ft. Down
 5 ft. cemented with 18 sack Gyp. cement.
 PUT from surface 9-26 15 ft. cement in
 pipe
 76-95 Red silty shale streaks of Gyp
 95-102 White & pink Gyp.
 107-151 Red silty shale
 157-198 White & Gray Gyp.
 199-205 Red silty shale streaks of Gyp
 205-285 hard gray limy Gyp streaks of
~~285-386~~ Red silty shale
 285-386 Red silty shale
 386-427 pink & light lavender limestone
 427-429 Red & lavender limy shale
 429-459 Red silty shale
 459-482 White Gyp. & streaks of Red silty ph.
 482-508 Red silty shale
 508-517 White Gyp. streaks of pink limestone
 517-520 Red silty shale test. Gyp. Gyp.
 520-579 Red sandy shale
 579-591 Pink limestone
 591-592 White & pink sand
 592-592 Ant. hydrates white
 592-621 Pink & lavender limestone
 621-634 Pink sandstone
 634-667 Buff limestone & pink sand
 667-723 Gray limestone
 723-727 Gray shale & ant. hydrates
 727-747 Gray Dolomite & shale cement
 747-784 Gray & pink bitumens
 cemented with 640 ft. 7 1/2 inch black pipe
 cemented @ 405 ft. Gyp. cement 5' shown



NOTICE OF WELL CONSTRUCTION

Custer

(1) WELL CONSTRUCTION

Location of well: NW 1/4 NE 1/4 Section 25 Township 6S Range 1E

Well owner: Silver King Mines Box 49 Edgemont, South Dakota 57735

Date well drilling completed: 7-14-80 Purpose of well: observation

WELL LOG

Layers, top to top in feet	Description of layer	Depth to top of water producing casing	ft.
0-550	dkay sh & mdst	800	ft.
550-599	interbed fgs & sh	flowing	ft.
599-619	fgs	Lakota	ft.
619-622	mdst	860	ft.
622-640	fgs	800	ft.
640-700	variegated mdst	Casing information: in the space below show kind, size, weight, lengths per diameter, etc., for production casing and surface casing, if used.	
700-707	mdst & sh	4 1/2" OD. Sch 40	
707-716	fgs		
716-731	mdst		
731-755	fgs w/ltc thin mdst	Screen information: in the space below show length of screen below bottom of casing, diameter and kind of screen or casing perforations.	
755-767	mdst		
767-815	fgs	60 ft. open hole	
815-820	mdst	shut in pressure 3160 PSI	
820-844	fgs	If a flowing well, flow of completed well _____ G.P.M.	
844-860	mdst	Silver King Mines # 446 Name of Drilling Contractor	

DFR

(2) PUMP INSTALLATION

Company name and size of pump _____ HP.
Type of pump _____ Capacity of installed pump _____ G.P.M.
Depth of pump placement _____ ft., Date of pump installation _____

(3) WATER SURFACE MEASURING TUBE

On some wells an air-tight water surface measuring tube is required: See Section 48.408 of Chapter 48.4, MINNIES WELL CONSTRUCTION STANDARDS.

Show exact vertical length of water surface measuring tube, when installed _____ ft., tube diameter _____
tube material _____

Name of Pump Installation Contractor



NO MATCH 2-78-4 LUNCH Farm Lunch Index 2002
 Locality Fall River Company _____
 Sec. 2 T. 78 R. 1E Drilled by _____ Date _____
 Authority Mrs. Linnah (owner) Type of log _____
 Type of drill _____ Samples _____
 Elevation _____ by _____ method _____
 Remarks top information obtained verbally April 1988

1st water - - - - -
Striking water - - - - -
 Well flows size of thumb.
 Talks down side of well from a distance. Possibly
 in vicinity. In any case, the flow
 can't be evidence

*2nd 4th
 evidence is 2nd 4th
 evidence is 2nd 4th
 evidence is 2nd 4th*

177
 369



NO MATCH 20-7S-1E TUBBS

1 of 1

Open Tubbs Feb. 4, 1971
Cotton, C.B.
Fall River County Sec. 20 Twp. 75 Range 12

Total Depth 40' Static 26'
Dia. 30"

0-3 to: soil
3-26 sand
26-28 gravel
28-40 blue shale

← 1500

Hydro ID Cross Reference

Count	Powertech ID	Hydro ID	Log Date
1	DB07-11-2	682	5/24/2007
2	DB07-11-11C	680	10/16/2007
3	DB07-11-14C	684	11/2/2007
4	DB07-11-15	686	11/4/2007
5	DB07-29-7	683	11/19/2007
6	DB07-32-3C	681	11/27/2007
7	DB07-32-5	687	11/17/2007
8	DB08-32-10	689	1/26/2008
9	DB08-1-6	3026	3/24/2008
10	DB08-1-7	703	no date
11	DB08-2-1	698	3/21/2008
12	DB08-5-1	704	4/19/2008
13	DB08-11-17	688	3/25/2008
14	DB08-11-18	690	4/1/2008
15	DB08-11-19	692	4/4/2008
16	DB08-15-2	696	3/11/2008
17	DB08-15-3	694	3/19/2008
18	DB07-32-4C	685	12/4/2007
19	DB08-32-9C	691	1/15/2008
20	DB08-32-11	693	2/8/2008
21	DB08-32-12	697	2/26/2008
22	DB08-32-13	695	3/7/2008
23	DB09-21-1	705	11/19/2009
24	DB09-21-2	706	11/24/2009
25	DB-GW675	675	n/a
26	DB-GW676	676	n/a
27	DB-GW677	677	n/a
28	DB-GW678	678	n/a
29	DB-GW679	679	n/a
30	DB-11-34-ALLUV-4	707	n/a
31	DB-11-3-ALLUV-3	708	n/a
32	DB-11-15-ALLUV-4	709	n/a

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SOURCE D

SOUTH DAKOTA OIL AND GAS RECORDS

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Oil and Gas Search for: api_no_like '40 047 20045'		
Page 1 of 1	<u>Download Database</u> (Excel spreadsheet format)	Page: 1

Record 1 of 1

Well Information

API No:	40 047 20045	County:	FALL RIVER
Well Name:	PETRO LEWIS 5-22 PETERSON	Location:	SWNW 22-7S-1E
Permit No:	606	Total Depth:	2545
Operator Name:	PETRO-LEWIS CORPORATION	Bottom Hole:	Minnelusa
Permit Date:	10-21-1970	KB Elevation:	3542
Spud Date:	11-17-1970	Ground Elevation:	3534
Plug Date:	11-27-1970	Latitude:	43.429484
		Longitude:	-103.992869
Well Field	WILDCAT	Status	P&A
Class:	DRY HOLE	Type:	DRY HOLE

Formation Tops

<u>Formation</u>	<u>Depth (ft.)</u>
Fall River	324
Lakota	452
Morrison	700
Sundance	848
Goose Egg	1441
Spearfish	1704
Minnekahta	1704
Opeche	1738
Minnelusa	1815
Converse	1838
Red Marker	2237
2nd Leo	2353

Page 1 of 1 (goto top)	Page: 1
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COUNTY: FALL RIVER
LEGAL LOCATION: SWNW 22-7N-1E
API NO: 40 047 20045
PERMIT NO: 606
WELL NAME: PETRO-LEWIS #5-22
PETERSON
OPERATOR: PETRO-LEWIS
CORPORATION
PERMIT ISSUED: 10/21/1970
PERMIT CLOSED: 12/29/1971
FILE LOCATION: 7N-1E-12 SWNW

TARGET CODES:

WELL HISTORY / CHECKLIST

PERMIT TO DRILL / INTENT TO DRILL

WELL INSPECTION / SCOUT REPORTS

OPERATOR'S TECHNICAL REPORTS / MAPS

ADMINISTRATIVE / SUNDRY REPORTS

CORRESPONDENCE

SURETY

MISCELLANEOUS



WELL HISTORY / CHECKLIST



WELL HISTORY

Well Name Petro Lewis # 5-22 Peterson Permit Number 606
 Location SW NW 22-7a-1E Date of Permit Oct 22, 1970
 Elevation .3542 KB API Number _____
 Confidential Yes From 11-27-70 To 5-27-71
 Logs Received Dual End, Sonic Gamma-Ray, Sample
 Cuttings Received Yes Cores Received _____
 Drill Stem Records Ben Dist - No Copy 12-8-70

Cap Plug and Marker Set Approved June 23, 1971
 Surface Restored Approved June 23, 1971
 Plugging Affidavit Signed _____ Date _____
 Bond Released _____ Date _____

Summary of Scout Reports
No Cuttings 29 Apr 1971



PERMIT TO DRILL / INTENT TO DRILL



State Pub. Co., Pierre **APPLICATION FOR PERMIT TO:** S. Dak. Oil & Gas Board FORM 2

<input checked="" type="checkbox"/> DRILL	<input type="checkbox"/> DEEPEN	<input type="checkbox"/> PLUG BACK	FARM OR LEASE NAME
<input type="checkbox"/> OIL WELL	<input type="checkbox"/> GAS WELL	<input type="checkbox"/> SINGLE ZONE	Peterson
			WELL NO
			5-22
OPERATOR			FIELD AND POOL OR WILDCAT
PETRO-LEWIS CORPORATION			Wildcat
ADDRESS			NO. ACRES IN LEASE
1224 Denver Club Building, Denver, Colorado, 80202			4 1/2 SEC. TWP. RGE
LOCATION (to be met from an established corner of the legal subdivision)			SW-NW Sec. 22, T7S, R1E
1980' FNL, 660' FWL, SW-NW Section 22, T7S, R1E			COUNTY
Fall River County, South Dakota			Fall River
NAME AND ADDRESS OF SURFACE OWNER			NO. OF WELLS ETC.
Mrs. M. Lenore Peterson			
ELEVATION			ROTARY OR CABLE TOOLS
3534' Gr.			Rotary
PROPOSED DEPTH			APPROXIMATE DATE WORK WILL START
2490'			October 21, 1970
NAME AND ADDRESS OF CONTRACTOR			
Will follow			
IF LEASE PURCHASED WITH ANY WELLS DRILLED, FROM WHOM PURCHASED (Name and address)			

PROPOSED CASING AND CEMENTING PROGRAM					
SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	NEW OR SECOND HAND	DEPTH	SACKS OF CEMENT
12-1/4"	8-5/8"	24#	New	165' Minimum	To Surface

DESCRIBE PROPOSED OPERATIONS. IF PROPOSAL IS TO DEEPEN OR PLUG BACK, GIVE DATA ON PRESENT PRODUCTIVE ZONE AND PROPOSED NEW PRODUCTIVE ZONE. GIVE BLOW OUT PREVENTED PROGRAM IF ANY.

We propose to drill this well with rotary tools to an approximate depth of 2490' to test the Leo Sand. If commercial production is encountered a 5-1/2" OD 14# oil string will be run and cemented with sufficient cement to displace 1000'.

Certified Surveyors plat attached (3 copies)
Blanket drilling bond #1672873

SIGNED R. J. Doubek TITLE Manager of Operations DATE 10/7/70

DO NOT WRITE BELOW THIS LINE

PERMIT NO. 666 CHECKED BY Patricia Walker School and Public Lands Date

RECEIVED DATE October 13 1970 Patricia Walker Secretary

CONDITIONS:
1. COMPLETE SET OF SAMPLES, AND CORES IF TAKEN, MUST BE SUBMITTED.
2. SAMPLES, AND CORES IF TAKEN, BELOW DEPTH MUST BE SUBMITTED.

INSTRUCTIONS

General: This form is designed for submitting proposals to perform certain well operations, as indicated, on all types of lands and leases for appropriate action by either a Federal or a State agency, or both, pursuant to applicable Federal and/or State laws and regulations. Consult applicable Federal or State regulations, or appropriate officials, concerning approval of the proposal before operations are started.

If the proposal is to re-drill to the same reservoir at a different subsurface location or to a new reservoir, use this form with appropriate notations.

If the well is to be, or has been, directionally drilled, so state and show by attached sheets, if necessary, the coordinate location of the hole, in any present or objective productive zones.

File 3 copies of this form with Secretary, Oil & Gas Board, Pierre.

(*Sample location: 800' South and 800' East of the Northwest Corner of Section 16.)

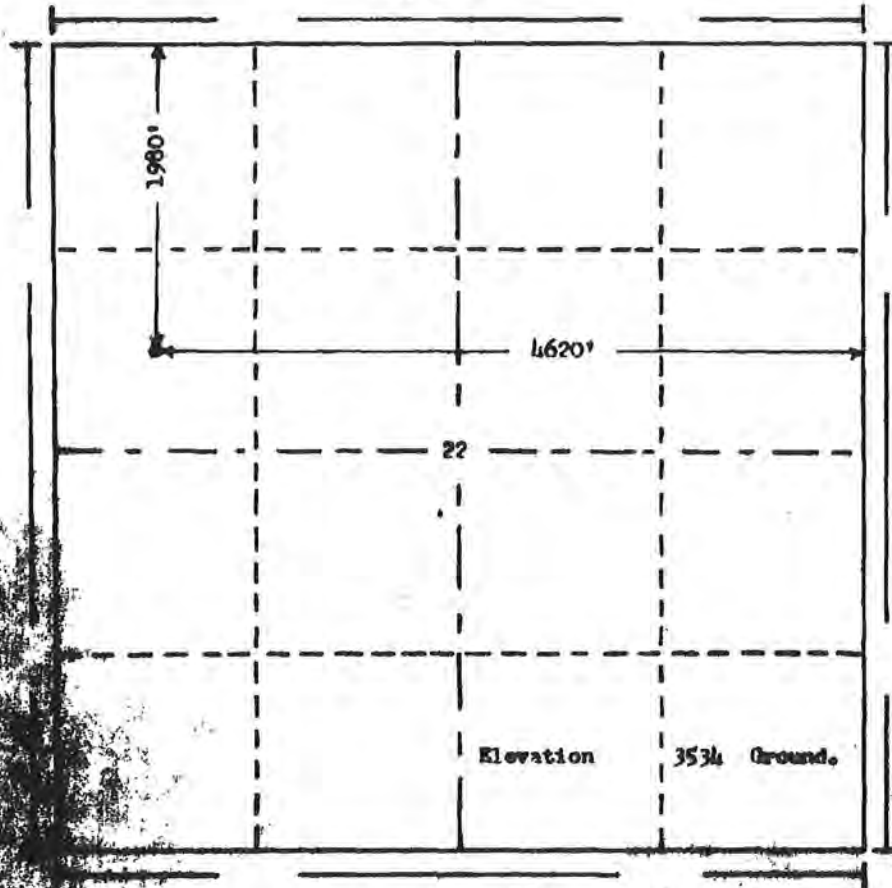


Hydro ID 3

8 of 88

N

R. 1 E.



T.
7
S.

Scale... 1" = 1000'

Elevation Company, Inc. of Denver, Colorado
in accordance with a request from **Oran Stevens**

Petre Lewis Corporation

showed the location of **#231 Driftwood Area**

1980' x 4620'

Section 22 Township 7 S.

R. 1 E. of the Black Hills

Meridian

Fall River

County,

South Dakota

I hereby certify that this plot is an
accurate representation of a correct
survey showing the location of
#231 Driftwood Area

Date: 7-24-70

[Signature]
Licensed Land Surveyor No. 1212 PE
State of South Dakota



STATE PUB. CO., P18888

ORGANIZATION REPORT

Full Name of the Company, Organization, or Individual

Petro-Lewis Corporation

Post Office Address (Box or Street Address)

122 1/2 Denver Club Building, Denver, Colorado, 80202

Plan of Organization (State whether organization is a corporation, joint stock association, firm or partnership, or individual)

Corporation

If a reorganization, give name and address of previous organization

(1) If foreign corporation, give State where incorporated

(2) Name and postoffice address of State agent

(3) Date of permit to do business in state

May 28, 1970

Principal Officers or Partners (in partnership) NAME

TITLE

POSTOFFICE ADDRESS

SEE THE ATTACHED SHEET

DIRECTORS NAME

POSTOFFICE ADDRESS

SEE THE ATTACHED SHEET

Executed this the 7th day of October, 19 70

State of Colorado

County of Denver

R. J. Doubek
Signature of Affiant

R. J. Doubek

Before me, the undersigned authority, on this day personally appeared R. J. Doubek known to me to be the person whose name is subscribed to the above instrument, who being by me duly sworn on oath states, that he is duly authorized to make the above report and that he has knowledge of the facts stated herein, and that said report is true and correct.

Subscribed and sworn to before me this 7th day of October, 19 70.

SEAL

My commission expires Nov. 3, 1971

Betty J. Burrows
Notary Public in and for

County, Colorado

DO NOT WRITE BELOW THIS LINE



PETRO-LEWIS CORPORATION

Attachment to Annual Corporate Report
Attachment dated May 15, 1970

Current Officers of the Corporation:

Title:	Name:	Street Address:	City:	State:
President	Jerome A. Lewis	3680 South Downing	Englewood	Colorado
Vice-President	Don E. Mettler	5741 East Nassau Place	Englewood	Colorado
Vice-President	Dwight C. Moorhead	1437 South Fairfax	Denver	Colorado
Vice-President	David A. Frawley	7343 E. Jefferson Drive	Denver	Colorado
Vice-President	Hal H. Wolfe	800 Lotus Way	Broomfield	Colorado
Vice-President	Herbert G. Allen			Colorado
Vice-President	Jim H. Hanlon	2195 Urban Drive	Lakewood	Colorado
Secretary-Treasurer	Robert B. Huffman	3162 South Gaylord	Englewood	Colorado

Current Directors of the Corporation:

Name:	Street Address:	City:	State:
Jerome A. Lewis	3680 South Downing	Englewood	Colorado
Don E. Mettler	5741 East Nassau Place	Englewood	Colorado
Ted P. Stockmar	15 Cherry Street	Denver	Colorado
W. Dale Schouweiler	5212 Indiana	Fort Wayne	Indiana
Cortlandt S. Dietler	888 Logan Street	Denver	Colorado
Carl K. Erpf	960 Park	New York	New York
James W. Vickers	346 North	Wichita	Kansas



WELL INSPECTION / SCOUT REPORTS



POWERTECH (USA) INC.

Hydro ID 3

12 of 69

NOV 25 1971

SCOUT REPORT
South Dakota Geological Survey

Number 2

Date Scouted 6-21-71

Operator Petro-Lewis Permit Number 506

Farm/Lease Name #5-22 Peterson API Number 40 047 20045

S.W.M. Sec. 22, T. 7S, R. 1E, Fall River County

Elev. 3534, Est. T.D. 2490, Actual T.D. 2545, Spudded 11-18-70

Contractor A. L. Schlaikjer Geologist Al Nelson

WORK IN PROGRESS:

DEVELOPMENTS SINCE LAST VISIT:

FORMATION TOPS:

PLUGGING RECORD:

Date Plugged 11-27-70

CASING RECORD:

4 1/2 From 0 To 367 Feet _____ From _____ To _____ Feet

_____ From _____ To _____ Feet _____ From _____ To _____ Feet

REMARKS:

Site approved. Converted to water well, good running well. Area restored and policed.

SCOUTED BY Ross Lamphere
Ross Lamphere, Ass't. Geologist

Fred V Steece Jr
Fred V. Steece, Principal Geologist



SCOUT REPORT
South Dakota Geological Survey

Number 1

Date Scouted 11-27-70

Operator Petro-Lewis Permit Number 506

Farm/Lease Name # 5-22 Peterson API Number 40 047 20045

S.W. Sec. 22 . T. 7S . R. 1E , Fall River County

Elev. 3534 Gr. , Est. T.D. 2490 , Actual T.D. 2545 , Spudded 11-18-70

Contractor A. L. Schlaikjer Geologist Al Nelson

WORK IN PROGRESS:

Logging

DST #1-2381-2395: IHP 1111, FH 1106, IF 20, FF20, IF 30, FF 75, SIP 963, SIP₂ 907, Flow, 15 min, SIP. 15 min, Flow₂ 45 min, SIP₂ 15 min, BHT 96°, mud wt. 9.5, viscosity 60; tool opened w/very weak blow and remained op 5 min, tool op w/very weak blow 1/4" under water, remained for 10 min, then intermittent blow. Rec: 140 fluid; 60' GCM w/sulfur smell, 80' water w/scum of oil and sulfur smelling gas; water flow throughout test; Resistivity: water 40.62 pf cl content 18,000ppm mud pit spl 2.6 @ 60 Of cl content 2,500 ppm.

DEVELOPMENTS SINCE LAST VISIT:

Drilled to T.D.

FORMATION TOPS: (Al Nelson)

Fall River-----324	Goosegg-----1441	2nd Converse-----1961-1991
Fuson-----452	ForelleLe-----1599	3rd Converse-----2076-2094
Lakota-----469	Glendo-----1618	4th Converse-----2154-2165
Morrison-----700	Minnekahta--1704	Red Marker-----2237-2247
Sundance-----848	Opeche-----1738	2nd Leo-----2353
Lak-----966	Minnelusa--1815	Des Moines-----2416
Basal Sund Sd--1061	1st Converse--1838	
Spearfish-----1174	Massive Anhydrite 1911-1942	

PLUGGING RECORD:

Date Plugged 11-27-70

- 40 sax--2410-2300 Leo
- 30 sax--1850-1750 Converse
- 30 sax--1130-1030 Basal Sand

CASING RECORD:

_____ From _____ To _____ Feet _____ From _____ To _____ Feet
 _____ From _____ To _____ Feet _____ From _____ To _____ Feet

REMARKS:

Plugged back to Morrison, # 1/2 casing ran to 367 and well completed as water well for Peterson farm; flows approx. 25.35 gal per min.

SCOUTED BY

Fred V. Steece
Fred V. Steece, Principal Geologist



	Peterson Lewis #5-2 Peterson				14 of 88
	SW NW 22-75-1E Fall River				10-29-70
	1980 FNL and 4620 FEL				No activity, location staked, but no work done.
PERMIT:	606 (10-21-70)				11-19-70
API:	40 047 20045				Phone call from Al Nelson saying well was started and that he would let me know when ready to plug.
ELEV:	3534 Gr 3542 KB				Said, Petroleum plans 3 tests in Edgemont area.
CONTR:	A.L. Schlaich ⁵⁶⁶²⁻⁷²⁴⁹				
GEOL:	Al Nelson ^{Rambro Motel Edgemont}				
ENGR:	W.J. Mc Peters				
SPUD:	11-18-70 (1:15 AM)				
EST T.D.:	2490				
CASING:	878-167				
CORES:	None				
DST'S:	2381-2395				11-26-70
LOGS:	DIL & Sonic GR				Nelson called saying would be logging late tonight, ready to plug in A.M.
T.D.:	2545 Drlr 2544 Cog				
PLUG:	11-27-70				



Hydro ID 3				
Plug Program :				blow and remained - op 5 min, tool open/very weak flow 1/4" under water, remained for 10 min, then instant blow. By passed tool to see if plugged. Rec 140 fluid; 60' gas GCM w/ sulfur smell, 80' water w/ seam of oil & sulfur smelling gas; Water flowed through out test.
40 day	2410-2300	Leo		
30 day	1850-1750	Concra		
30 day	1130-1030	Rand Sund		
Plan to run 360 - 4 1/2 coating and convert to water well. Schlumberger w/ do this before they tear down.				
DST #1 (Leo Sand) 2381-2395: HP III, FH 1106, IF 20 FF 20, IF 30, FF 75, SIP, 963, SIP ₂ 907, Flow 1.5 min, SIP 1 - 15 min, Flow 2 - 45 min, SIP ₂ - 15 min, BHT 96, Mud wt 9.5, viscosity 60; Tool opened with a very weak				Resistivity: water @ .62 of Cl content 18,000 ppm mud pit spl 2.6 @ .60 of Cl content 2500 ppm



Hydrostatic - ops		18 of 89	
Kd	324	3 rd Conv	2076 - 2094
Fuson	447 452	4 th Conv	2154 - 2165
Lakota	508 469	Basal Conv	2226
Moss	700	Red Mark	2237 - 2247
Sund	848	2 nd Leo	2353 -
Lak	966	Des Moines	2416
Basal Sl.	1061	TD	2548 Driller 2544 Log
Spear	1174	Site Imp.	
Goose	1441	Converted to H ₂ O well	
Forelle Lime	1599	is a good running well.	
Glendo Str	1618	Access is restricted	
Mk	1704	not real level. are	
Opedhe	1738	policed.	
Minnelusa	1815		
Comerse	1838		
Massive Anhydrite	1911		
Base	1942		
2 nd Converter	1961 - 1991		

Page 1



OPERATOR'S TECHNICAL REPORTS / MAPS



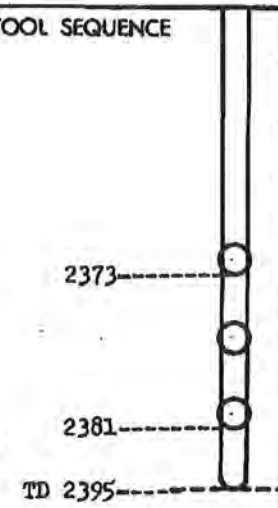
PHONE 522.1204 AREA 303

VIRG'S TESTERS, INC.

BOX 712 STERLING, COLORADO

Contractor A. L. Schlaikjer, Inc. Top Choke 1"
 Rig No. 4 Bottom Choke 9/16"
 Spot SW-NW Size Hole 7 7/8"
 Sec. 22 Size Rat Hole None
 Twp. 7 S Size & Wt. D. P. 3 1/2" 13.30
 Rng. 1 E Size Wt. Pipe None
 Field Wildcat I. D. of D. C. 2 3/4"
 County Fall River Length of D. C. 512'
 State South Dakota Total Depth 2395'
 Elevation 3534' "Ground" Interval Tested 2381-2395
 Formation "2nd Leo" Sand Type of Test Straight
 Tool Open @ 10:00 A.M.
 Flow #1 5 Min. SIP #1 15 Min. Flow #2 45 Min. SIP #2 15 Min.
 Flow #3 _____ Min. SIP #3 _____ Min. Flow #4 _____ Min. SIP #4 _____ Min.
 B. H. T. 96° Gravity _____
 Mud Wt. 9.0 Viscosity 60

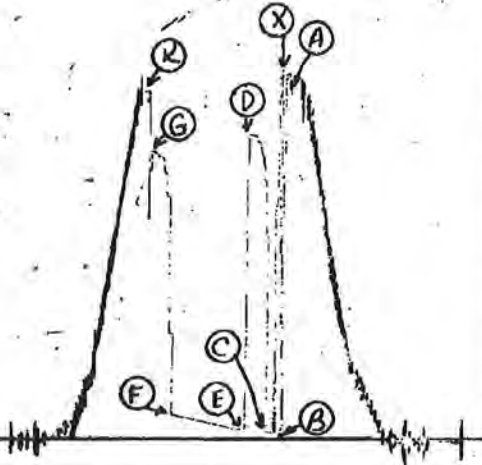
TOOL SEQUENCE



Operator Petro-Lewis Corp.
 Address See Distribution

T-0786

R-4153-N



PRD Make <u>Kuster AK-1</u>			
No.	Press	Field	Corrected
IH	A	1111	1102 ✓
FH	K	1106	1100 ✓
Flow #1-IF	B	20	1 ✓
FF	C	20	21 ✓
SIP #1	D	963	969 ✓
Flow #2-IF	E	30	31 ✓
FF	F	75	76 ✓
SIP #2	G	907	914 ✓
Flow #3-IF	H	None	Taken
FF	I	"	"
SIP #3	J	"	"

Well Name and No. Peterson #5-22
 Ticket No. 0786

Our Tester: Lloyd Welty
 Witnessed By: S. A. Nelson

Date 11-25-70

DSI No. 1
 No. Final Copies 10

RECOVERY IN PIPE

DID WELL FLOW - Gas No Oil No Water No

140' Total fluid
60' Gas-cut mud with a sulphur smell = .29 Bbl.
80' Water with a scum of oil & sulphur smelling gas = .39 Bbl.

REMARKS:

1st Flow - Very weak blow throughout period.
2nd Flow - Tool opened with a very weak blow (3/4" under water),
remained for 10 minutes, then decreased to intermittent blow
for remainder of test.
By-passed tool after 50 minutes (point "X") to see if it was plugged.

Well had 3" to 4" water flow from annulus throughout test. 3' fillup
on bottom.

Breakdown of Shut-in curves not practical because of very bad stair-
stepping on Shut-in curves, caused by tight formation.

TIGHT HOLE



Phone 522-1206

VIRG'S TESTERS, INC.

Box 712 - Sterling, Colo.

Fluid Sample Report

Date 11-25-70 Ticket No. 0786

Company Petro-Lewis Corp.

Well Name & No. Paterson #5-22 DST No. 1

County Fall River State South Dakota

Sampler No. 02 Test Interval 2381-2395

Pressure in Sampler 11 PSIG BHT 96 OF

Total Volume of Sampler: 2150 cc.

Sample: 2150 cc.

Oil: 10 cc.

Water: 2140 cc.

Mud: None cc.

Gas: None cu. ft.

Other: None

Reactivity

Water: 4 @ 62° of Chloride Content 17,200 ppm.

Mud Pit Sample 2.6 @ 60° of Chloride Content 2,550 ppm.

Gas/Oil Ratio Gravity °API @ OF

Where was sample drained RIG FLOOR

Remarks:

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 County Fall River State South Dakota Sec. 22 Twp. 7 S Rng. 1 E Spot SW-NW
 DST. No. 1 Date of Test 11-25-70 Interval Tested 2381-2395

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DENVER, COLORADO, 80202

21 of 69

1979

GEOLOGICAL WELL REPORT

PETRO-LEWIS

#5-22 PETERSON

C SW NW SEC. 22, T. 7 S., R. 1 E.
FALL RIVER COUNTY, SOUTH DAKOTA

(Wildcat)



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WELL DATA

LOCATION: 4620' from the East line and 1980' from the North line, C SW NW of Section 22, Township 7 South, Range 1 East, Fall River County, South Dakota.

ELEVATION: 3534 ground (before and after grading).
3542 kelly bushing (7.6' from ground to K.B.).
(Surveyed by Powers, 7-24-70).

TYPE WELL: Wildcat (Driftwood Canyon Prospect).

SPUD DATE: 1:15 A. M., November 18, 1970.

COMPLETION DATE: Approximately 5:00 P. M., November 27, 1970
(Finished plugging).

CASING RECORD: Ran 4 joints of new 8 5/8" surface casing, totalling 167', 8 round, 20 pound. Cemented with 100 sax regular cement with 3% Calcium chloride (Plug down at 10:15 A. M., November 18, 1970. Cement circulated). Pipe set at 177 K. B.

TOTAL DEPTH: 2545 Driller.
2544 Schlumberger.

DEEPEST FORMATION PENETRATED: Pre-Second Leo Sand (Des Moines or older).

DEPTH DATUM: 3542 K. B.

WELL STATUS: Plugged and abandoned (Landowner ran pipe into Dakota Sand to complete as flowing water well from Dakota-Lakota).

MUD PROGRAM: Mixed mud while drilling surface hole to combat lost circulation in river bed sands and gravels; mixed gel. Came out from under surface with native mud and gel and water and a 32-33 vis. Make-up water from nearby Beaver Creek.



WELL DATA (Continued)

Jetted pits at 953 in Sundance in order to convert to red bed type mud. Added 4 sacks of Caustic, 2 sacks of Soda Ash, and 6 sacks of Stabil-Vis. Requirements: 32-35 vis., wt. low as possible. On first trip below surface at 1086 in Sundance hole was flowing a 2" stream of water.

HOLE SIZE: 12 1/4" from surface to 178.
7 7/8" from 178 to 2545 T. D.

CORES: (None).

DRILL-STEM TEST: D.S.T. #1 2379-93 P. D. (Second Leo Sand).

LOGS: Ran Schlumberger Dual Induction-Laterolog first, running a logarithmic 5" and a logarithmic 2" from 2544 T. D. up above the Minnekahta. Then dropped back to bottom and came up to 1736 just above base of Opeche with another logarithmic 5" (repeat) and a linear 2". From above the Minnelusa ran a linear 2" and a linear 5" to base of surface casing at 177 K. B.

Second logs run consisted of the Borehole Compensated Sonic Log with Gamma Ray-Caliper Logs. Ran 5" Sonic, etc., from 2544 T. D. up above Minnelusa to 1732. Then ran a 5" repeat over same interval to see if variance was above 2%. Sonic was repeating good in Minnelusa so continued all the way out to base of surface casing at 177 K. B., running a 5" and 2".

At approximately 1700 added 2 sacks of C.M.C. (Driscose) to lower water loss to 10 cc. or less going into Minnelusa Converse section. At 2206 in lower Converse added 1320 gallons of #2 Diesel to speed drilling and prevent drill column getting stuck in hole. At approximately 2150 added 2 sacks of C.M.C. to lower water loss to 5 cc. or less for drilling Leo Section of Minnelusa. In this part



WELL DATA (Continued)

of section vis. was 38-40, wt. 9.9, Ph. 9.5 or more. Raised vis. to 72 for D.S.T. of Second Leo Sand.

Raised vis. with Gel and detergent for logging at 2545 T. D. Could not get vis. above 44 due to Dakota-Lakota water flow in upper hole; had no problems logging.

Mud furnished by American Mud Company, Gillette, Wyoming. Mud checks on location made every 1-2 days by engineer, Dick Myers, Gillette.

Est. mud bill at 2540, 5' above T. D.: \$3,344.35.

Logging truck and personnel from Gillette, Wyoming. Engineer: Mr. Golas. (Calculations in rear of report).

PLUGGING RECORD:

40 sacks from 2420 to 2300 across Red Marker.
30 sacks from 1850 to 1750 across top of Converse.
30 sacks from 1130 to 1030 across Basal Sand of Sundance.

Cementing by Halco.

Finished plugging at approximately 5:00 P.M., November 27, 1970. (Left Dakota-Lakota open for flowing water well for landowner; contractor ran pipe into Dakota).

CONTRACTOR AND RIG EQUIPMENT:

Schlaikjer Drilling Company, Newcastle, Wyoming.
Pusher: C. W. McPeters, part owner.
Rig. No. 4.
Spencer-Harris 6000 - Made in 1969 (trailer-mounted rig).
Spencer-Harris 97' derrick (pulls doubles) and trailer.
Bethlehem S-45E with 15" double T. W. in Hydromatic.



WELL DATA (Continued)

- 1 335 H.P. Cummins Diesel engine powering drawworks.
- 1 D-300 Emsco mud pump, 7 1/4" x 14", with 5 1/2" liners.
- 2 6-71 (twins) G.M.C. engines with H.D. gear box, 300 H.P., powering mud pump. Space-Saver Cameron S.S. 8" blow-out preventer with 2 valve Cameron hydraulic closing unit.
- 19 5 1/2" O.D. drill collars with 2 1/4" bore.
- 6,000' 3 1/2" I.F. Reed drill pipe with square shoulder tool joints.
Caterpillar D-315 generator with 25 K.W. gas engine standby.
32' trailer house.
- 1 auxiliary 4 x 6 Gardner-Denver mud-mixing pump.
New General Electric 2-way radio system on rig, in pusher's car, and in Newcastle office.

SAMPLE STORAGE:

Samples were shipped to American Stratigraphic in Casper where library cut will be made. Operator's complimentary cut will be sent to South Dakota Geological Survey as required.

DRILLING TIME RECORDS:

Original copy of Geologist 1' drilling time charts is on file in Denver office of G. A. Nelson.

LOG FORMATION TOPS

All depths are measured from 3542 K. B.

<u>FORMATION</u>	<u>DEPTH</u>	<u>DATUM</u>
LOWER CRETACEOUS	Surface	
MOWRY SHALE	Surface	
MUDDY SAND (NEWCASTLE)	(Behind pipe in surface hole)	
SKULL CREEK SHALE	(Behind pipe in surface hole)	
DAKOTA FORMATION (FALL RIVER FORMATION)	324	+3218
FUSON SHALE (FUSON MEMBER OF LAKOTA FORMATION)	452	
LAKOTA SANDS	469	+3073
UPPER JURASSIC	700	+2842
MORRISON FORMATION	700	+2842
SUNDANCE FORMATION	832	+2710
REDWATER SHALE MEMBER	832	
LAK MEMBER	966	
TENTATIVE HULETT SAND	1061	
BASE OF SAND	1092	
TENTATIVE STOCKADE BEAVER SHALE	1092	
TENTATIVE TOP OF BASAL SAND	1144	
TRIASSIC	1174	+2368
SPEARFISH FORMATION	1174	+2368
PERMIAN	1441	+2101

LOG FORMATION TOPS (Continued)

<u>FORMATION</u>	<u>DEPTH</u>	<u>DATUM</u>
GOOSE EGG FORMATION	1441	+2101
FORELLE LIME MEMBER	1594	
GLENDO SHALE MEMBER	1618	
MINNEKAHTA LIME MEMBER	1704	+1838
OPECHE SHALE MEMBER	1738	
MINNELUSA FORMATION (REWORKED MINNELUSA)	1815	+1727
UPPER MINNELUSA (PERMIAN)	1815	+1727
FIRST CONVERSE SAND	1838	+1704
MASSIVE ANHYDRITE	1911	
BASE ANHYDRITE	1942	
SECOND CONVERSE SAND	1961	
BASE OF SAND	1991	
TENTATIVE TOP OF THIRD CONVERSE SAND	2089	+1453
BASE OF SAND	2094	
FOURTH CONVERSE SAND	2154	+1388
BASE OF SAND	2165	
BASAL CONVERSE SAND	2226	
RED MARKER	2237	+1305
BASE RED MARKER	2247	
PENNSYLVANIAN	2247	+1295
MIDDLE MINNELUSA (LEO SECTION)	2247	+1295
VIRGIL	2247	+1295
MISSOURI	2353	+1189
SECOND LEO SAND	2354	+1188



LOG FORMATION TOPS (Continued)

<u>FORMATION</u>	<u>DEPTH</u>	<u>DATUM</u>
BASE OF SANDS	2396	
DES MOINES (?)	2416	+1126
TOTAL DEPTH DRILLER	2545	
TOTAL DEPTH SCHLUMBERGER	2544	

SAMPLE LITHOLOGIC DESCRIPTION

All depths are from 3542 K. B.

All sample depths following have been corrected for lag, and then matched to drilling time breaks wherever possible. *Sample lithology is then matched to log lithology so all lithology following matches log.

All shows are underlined with a solid line. Possible shows are shown with a dashed line.

<u>DEPTH</u>	<u>LITHOLOGY</u>
Surface	LOWER CRETACEOUS
Surface	MOWRY SHALE
	(Surface pipe to 177 K. B.; Muddy Sand or Newcastle Sand probably behind surface pipe).
	(Samples below are caught and described every 30').
180-200	Silty shale, steel gray, very soft Skull Creek; muddy cave: sandstone, gray, dark gray, shaly, dirty, limy, glauconitic, biotitic, very hard and tight; trace light gray inoceramus prism veinlet on same gray shale; trace sandstone, light gray, very fine, soft, porous; no fluorescence.
200-32	Same shale.
232-64	Same dark steel gray, very soft shale.
264-324	Same shale; trace light brown inoceramus prisms; trace loose pyrite.
324 (+3218)	DAKOTA FORMATION (FALL RIVER FORMATION)
324-28	Abundant sandstone, light gray, lot of sandstone laminated with black silty shale, no show, slightly dirty, very fine to fine, well-cemented, poor visible porosity, hard to soft, also gray; sandstone, fine, soft, porous, no show, white, friable; loose pyrite, crystalline to sandy with embedded sand grains; all with no fluorescence.



- 354-78 Shaly siltstone, light gray with thin blackish shaly laminations; sandstone, fine, slightly sugary, visible porosity, some glauconite, no show, soft, also very fine, light gray, few carbonaceous spots; also dark gray, very shaly siltstone; sandstone has spotty white cementation; no fluorescence; in stoppered shell vial Dakota cuttings above 354 are cut in C. Tet. solution with no fluorescence in resulting solution; this indicates no oil in samples.
- 378-452 Abundant shaly siltstone, dark gray; some friable, porous sand as above, no show; first traces of waxy clay, tannish light gray, grayish brown and gray (possibly Fuson); lot of small black carbonaceous spots and streaks in siltstone, no visible porosity, no show, no fluorescence.
- 452 Same dark gray shaly siltstone and fine light gray sandstone as above with good porosity, soft, white clay spots, no show; limited same waxy clay, tannish gray mottled with black (Fuson?); very shaly siltstone, gray mottled blackish, hard, tight; gray waxy clay.
- 452 FUSON SHALE
- 452-55 Abundant very soft clay, waxy, light gray, tannish light gray, whitish; grayish light green, very waxy, very soft; part sandy where light gray.
- 455-469 Same whitish, light gray clay; also mostly grayish purple and red.
- 469 (+3073) LAKOTA SANDS
- 469-98 Abundant snow white sandstone, highly kaolinitic with abundant white waxy clay cementation, no show, non-calcareous, very fine to fine, no visible porosity, mushy soft, abundant pyrite, few fine grains (Lakota top marked by extremely fast drilling).
- 498-522 Same as above, mostly loose sand grains, clear, very fine to fine to fine-plus, unconsolidated, few medium grains; very abundant pyrite; limited light gray sandstone, no show, fine, cleaner, friable, porous; all with no fluorescence; shale breaks of very waxy clay, bluish white, very pale green; trace chert, smoky gray with tiny white spots, very coarse, subangular.



522-45

Traces sandstone, slightly tannish light gray possibly stained, very fine to mostly fine, excellent visible porosity, friable, no fluorescence; abundant very sandy lime, grayish tan, very hard, dense, earthy; abundant loose pyrite, limited medium crystalline, mostly very sandy with embedded sand grains, very fine to fine, part all fine-plus; abundant chert, light gray translucent, tan; loose clear quartz sand grains, fine to medium to medium-plus.

545-77

All very dark gray shale (sand on log), slightly waxy, almost black, part slightly sandy; traces conglomeratic sandstone, clean, very sugary, fine to medium, no show; trace loose clear chert, coarse, angular, also frosted, milky white; ironstone (?) stringer, tannish brown, part very sandy, dense, very hard (Morrison-type shale).

577-620

Same greenish black shale, slightly waxy, very soft; trace chert, clear, angular, very coarse; traces brown sand, very fine, very well-cemented, no show, no visible porosity, very hard, tight, limy.

620-48

Abundant pebbles, mostly very coarse-plus, sub-angular, brown, milky white, clear angular; loose pyrite (pebbles surface cave?); same shale.

648-62

(Poor sample, mostly cave).

662-700

Loose chert, clear, pink opaque, yellow, subangular, very coarse to pebble size; loose sand grains, very poorly sorted very fine, fine, medium, coarse, very coarse, mostly clear; abundant loose pyrite.

700 (+2842)

JURASSIC

700 (+2842)

MORRISON FORMATION

700-42

Abundant pale green waxy clay, very soft, with embedded tan lime spots.

742-74

Same green clay; increasing tan dense lime.

774-803

Same green clay, becoming dark gray; limited limestone stringers, tan with green spots; traces sandstone, gray, light gray, very fine to fine, no show, no visible porosity, hard, tight, limy cementation.

803-32

Limestone, very light tan, cream, very dense, very hard; traces dark brown limestone, highly microfossiliferous, hard; trace sandstone, cream, very limy, very fine, very well-cemented, scat-



- tered orange grains, no visible porosity, hard, tight.
- 832 (+2710) SUNDANCE FORMATION
- 832 REDWATER SHALE MEMBER
- 832-33 Trace dark gray shaly siltstone, highly glauconitic with dark green grains, very soft; trace shaly siltstone, greenish gray, highly glauconitic, very fine and finer grains.
- 833-86 (Missing samples).
- 886-920 Silty shale, dark gray, very soft; very shaly sand to siltstone, dark gray, very, very fine where sand, very silty, highly biotitic and glauconitic, very soft, no porosity.
- 920-40 Waxy shale, pale green, very soft; dense limestone stringer, light gray, very hard; sandstone, light gray, very fine and finer, limy, scattered dark green glauconite grains, slightly soft.
- 940-66 Same waxy green shale; same very, very fine sandstone, cream, limited glauconite, no show, soft to slightly soft, no porosity.
- 966 LAK MEMBER OF SUNDANCE
- 966-70 Very shaly sand, dark orange, very fine and finer, excellent sorting, no visible porosity, no show, slightly soft; very silty shale, orange red, soft.
- 970-98 Same sand, orange brown, very fine, no show, soft.
- 998-1002 Waxy shale, dark gray to blackish.
- 1002-52 Black waxy shale, very soft.
- 1052-61 TENTATIVE HULETT SAND
- 1061-76 (Circulated 20" sample at 1076 before trip for bit in prospective zone). Traces light gray sandstone, very, very fine, excellent sorting, no show, friable, porous; also slightly greenish light gray sandstone, very fine to very, very fine, excellent sorting, no show, glauconitic, porous, soft to slightly soft where more cemented, no fluorescence.
- 1076-92 Same as above, becoming slightly shalier grayish; trace very pale green waxy shale laminations on sand; all with no show; trace light gray sandstone, very fine, excellent sorting, no show, well-cemented but porous, soft; all with no fluorescence.



1092	TENTATIVE STOCKADE BEAVER SHALE
1092-1144	(Shale on log).
1144	TENTATIVE TOP OF BASAL SAND OF SUNDANCE
1144-74	Sandstone, clean, friable, excellent visible porosity; traces tannish light gray sandstone, very fine, excellent sorting, spotty clay cementation in part.
1174 (+2368)	TRIASSIC
1174 (+2368)	SPEARFISH FORMATION
1174-1207	Smooth shale, red, part silty, all soft.
1207-37	Abundant silty shale, brownish red, finely biotitic, few small light gray spots.
1237-68	Same silty shale, orange red, brownish red, finely biotitic, soft to slightly soft.
1268-1304	Same shale, traces sandy.
1304-36	Same shale, trace greenish gray large spot.
1336-67	Same shale and silty shale.
1367-97	Same shale; trace fibrous white anhydrite veinlet in shale.
1397-1441	Same silty shale, brownish red, orange red; traces loose white fibrous anhydrite; traces white anhydrite inclusions in shale.
1441 (+2101)	PERMIAN
1441 (+2101)	GOOSE EGG FORMATION
1441-48	(7' of slower drilling). (Probably anhydrite --none visible in samples).
1448-61	Silty shale, brick red; small round light green spots in smooth red shale.
1461-81	Silty shale, brick red.
1481-96	Anhydrite, white, orange white, dense, hard.
1496-1524	Silty shale, orange red, white anhydrite inclusions; anhydrite, white, grayish white, dense, hard; white fibrous anhydrite trace, veinlet.
1524-94	Same shale, orange red, few small round light green spots; anhydrite interbeds, white, gray, dense, as above.
1594	FORELLE LIME MEMBER OF GOOSE EGG



1594-98	Abundant anhydrite, white mottled violet dense, hard; trace dolomite, bright orange adjacent to cream, dense, hard.
1598-1604	Anhydrite, white mottled with purple, dense, hard, becoming very shaly dark purple.
1604-14	Trace tan lime, dense, flaky; traces pink dolomitic lime to limy dolomite.
1614-18	Traces limestone, dolomitic limestone, cream, dense, very hard; trace dark tan dense lime.
1618	GLENDO SHALE MEMBER OF GOOSE EGG
1618-25	Shale, silty, finely sandy, dark orange, soft to hard.
1625-41	Same shale, very silty, few anhydrite inclusions and streaks.
1641-48	Same shale.
1648-59	Same shale; trace whitish anhydrite inclusion.
1659-67	Same as above; few white anhydrite inclusions, few small light green round spots.
1667-77	Same orange red silty shale with few white anhydrite inclusions.
1677-90	Same as above, trace anhydrite as veinlet on shale.
1690-1708	(Missing due to no circulation for sample just before trip at 1708 in nonprospective zone).
1704 (+1838)	MINNEKAHTA LIME MEMBER OF GOOSE EGG
1708-13	Limestone, cream to white chalky soft grading into tannish brown dense hard; trace light red slightly chalky limestone; trace dark orange anhydrite, very hard.
1713-22	Pink dense limestone, hard; tannish pink limestone, dense hard; also lime, chalky white to dense tan.
1722-38	(Missing).
1738	OPECHE SHALE MEMBER OF GOOSE EGG
1738-40	Silty shale, brownish red, reddish brown.
1740-49	(Poor sample, mostly cave).
1749-59	Silty shale, orange, orange red, soft to slightly soft.
1759-69	Silty shale, brick red, soft.
1769-79	Silty shale, brick red, soft to slightly soft, few greenish gray spots.



- 1779-89 Top 4' white anhydrite, microcrystalline, soft, to dense gray; bottom 6' same silty shale as above, few white anhydrite inclusions, small round green spots also; trace very sandy anhydrite to anhydritic sand trace, light gray, fine to fine-plus grains which powder under pressure.
- 1789-1815 Same brick red silty shale with few green small round spots; abundant white anhydrite, microcrystalline, part dense gray, hard.
- 1815 (+1727) MINNELUSA FORMATION (REWORKED MINNELUSA)
- 1815 (+1727) UPPER MINNELUSA (PERMIAN)
- 1815-16 Trace very shaly sand, fine, orange, soft, no show, no visible porosity; trace dark brown possibly stained sand, very quartzitic, very fine, excellent sorting, no visible porosity, very hard and tight, tiny pyrite specks, very well-cemented, to quartzite, no fluorescence.
- 1816-27 (No consolidated sand). Loose sand grains, light orange clear, poorly sorted very fine to fine to medium to medium-plus, also all clear, subround to round.
- 1827-33 Trace grayish tan possibly stained sand, very fine, well sorted, very well-cemented, no visible porosity, dolomitic cementation in part, trace pyrite speck; traces very anhydritic sandstone, conglomeratic, very poorly sorted very fine to fine to medium grains, light orange grains, * like those disintegrated just above, in white anhydrite matrix, no show, very well-cemented, no visible porosity, hard to slightly soft; all with no fluorescence.
- 1833-38 Trace same shaly sand as above, very fine to fine grains in orange red shaly matrix, no visible porosity, very well-cemented, no show, slightly soft, light orange clear grains when disintegrated, no fluorescence.
- 1838 (+1704) FIRST CONVERSE SAND
- 1838-43 (Fast drilling of 1+ⁿ/ft. suggests soft, porous sand). (Poor sample, mostly Sundance cave due to water-flow from Dakota-Lakota thinning mud or mudcake). Traces white anhydritic sandstone, very fine, clear grains, soft, no show, to fine, sugary, clean, excellent visible porosity, non-



- calcareous, loosely consolidated; traces dark red very shaly sandstone, very fine, well-cemented, less porous, no show, same as white sand but abundant red silty shale spots; all with no fluorescence.
- 1843-52 Same as above, mostly clean, white, light gray sugary sandstone, very anhydritic cementation, non-calcareous, fine to fine-plus, clear round to subround grains, excellent visible porosity, traces red shaly sandstone, very fine; all with no show, no fluorescence.
- 1852-56 (Slower drilling, tighter sand). (Poor sample due to abundant Sundance cave from water flow uphole). Traces same white sandstone, no show, fine, friable, no show, excellent visible porosity, no fluorescence.
- 1856-70 (Mostly very rapid drilling like very soft, porous sand). (Very poor sample, all cave, no visible sand or sand grains).
- 1870-94 (Same rapid drilling like very soft, porous sand). (Very poor sample, all cave, no visible sand nor sand grains).
- 1894-1911 (Top slower drilling like tight sand or anhydrite-dolomite; bottom fast drilling like soft, porous sand).
- 1911 **MASSIVE ANHYDRITE**
- 1911-21 Anhydrite, all hard, white finely crystalline to denser tannish cream, grading into very anhydritic dolomite, pinkish tan, and chalky white limestone; also white anhydrite mottled with orange to reddish denser anhydrite.
- 1921-29 Anhydrite, snow white, microcrystalline, slightly soft, to denser gray, hard, with tiny round white spots embedded; trace red silty shale on white anhydrite; trace white anhydrite with red shaly anhydritic dolomite.
- 1929-42 (Circulated 20" sample at 1945 just before trip for bit). Very dense hard anhydrite, white to denser orange red to purplish red; also chalky dolomite, dark pink, silty, limy where whiter, all purplish pink, slightly soft.
- 1942 **BASE OF ANHYDRITE**
- 1942-45 (Missing due to intentionally not circulating longer).



1945-56

(Poor sample, mostly cave following trip at 1945). Dolomite, anhydritic dolomite, tan, cryptocrystalline, distinctive tiny red silty shale spots scattered in part.

1956-60

(Missing).

1960-61

Tan anhydritic dolomite; mostly pink slightly silty anhydritic dolomite with light red shaly streaks, few small clear finely crystalline anhydrite spots.

1961

SECOND CONVERSE SAND

1961-65

Trace sandstone, light orange, very fine to fine, well-cemented but soft, no show, anhydritic cementation, light orange clear grains, no fluorescence, trace dolomitic cementation, porous, few small white spots.

1965-85

(1965 top of best porosity, breakdown to less than 1"/ft. from 1965 to 1968, same from 1970 to 1977, and from 1980 to 1985). (Very poor sample, mostly Sundance cave). Trace sandstone, white, very fine, friable, excellent visible porosity, no show; trace reddish orange sandstone, very fine, excellent sorting, shaly, no visible porosity, no show, silty; all with no fluorescence; trace same light orange sandstone; loose grains very fine to fine, light orange clear, subround.

Increasing sandstone, tannish light gray, possibly stained, as above, very fine, well-sorted, porous, friable, becoming less sorted very fine to fine, slightly dolomitic cementation, slightly yellowish, clear grains slightly yellowish, subround to round; trace pink silty well-cemented, soft; all with no fluorescence; sandstone, light orange white, very fine to fine, friable, soft, excellent visible porosity, no show, no fluorescence.

(Representative cuttings from Second Converse Sand were cut in C. Tet. in stoppered shell vial; resulting solution had no fluorescence, indicating no oil in cuttings).

1985-88

(Drills like sand but slower than above, suggesting less porous sand). (Poor sample, abundant cave). Trace sandstone, pinkish light gray, very fine, good sorting, porous, friable, no show, few tiny white spots like clay; traces sandstone, snow white with abundant clay cementation, no



	porosity, no show, non-calcareous, very fine to fine-plus, clear grains, round, friable.
1988-91	Trace fairly clean light gray sandstone, sugary very fine to fine-plus, excellent visible porosity, friable, no show.
1991	BASE OF SECOND CONVERSE SAND
1991-2006	Trace very anhydritic dolomite to dolomitic lime, grayish brown, slightly cherty, with tiny black spots of possible microfossils; trace light brown limestone, hard, brittle, dense; trace chalky limestone, light brown, mottled with light green shale, highly microfossiliferous with tiny round "bugs."
2006-18	Limestone, silty, chalky, grayish tan to tannish gray with small blackish spots, also tannish light gray to whitish chalkier with same black spots, slightly soft to hard and brittle where grayer (* good pre-Second Converse Sand marker bed).
2018-26	(Slower drilling, harder). (Poor sample, unusable, all cave).
2026-41	(Poor sample, cave). Traces very anhydritic dolomite, light to dark greenish brown, cryptocrystalline, intermingled with snow white anhydrite, microcrystalline; trace dark brown limestone, cherty, dense, with trace round microfossil fragment.
2041-46	Silty dolomite to limestone, tan, light tan, grayish tan denser, part lighter tan anhydritic denser; trace very dense limestone, cherty, tannish brown, highly microfossiliferous with cream "bugs" in brown limestone matrix, with encrusting waxy; trace chalky limestone, green shaly.
2046-59	Silty limestone, dolomitic, chalky, dark tan, light tan, cream, slightly soft where chalky to hard where dark tan.
2059-69	Anhydrite, white to tannish white, finely crystalline, denser dark gray.
2069-75	Abundant orange red dolomite (?) with anhydrite inclusions; top anhydrite, white to brown; trace brown limestone, slightly silty, hard, brittle; bottom faster drilling possibly sandstone with some porosity: loose sand grains, very fine to fine, clear.
2075-86	Anhydritic dolomite, greenish dark tan, dense, cryptocrystalline, slightly limy on fresh surface,



- 2086-89 hard, brittle, part siltier, greenish gray, slightly soft to soft.
Snow white anhydrite.
- 2089 TENTATIVE THIRD CONVERSE SAND
- 2089-94 Abundant greenish white quartzite, also gray, grading into greenish white sandstone and white sandstone, very fine, excellent sorting, all very well-cemented, no visible porosity, very hard and tight where quartzitic to soft where greenish white silty to white silty; trace white sandstone, very fine to fine, anhydritic; all with no show; non-calcareous, anhydritic; less of shaly light red sandstone mottled with same white sandstone, few fine grains; all with no fluorescence.
- 2094 BASE OF THIRD CONVERSE SAND
- 2094-2115 Abundant anhydrite, snow white finely crystalline to denser tan to limited brown dolomitic; shale break, brick red; trace very shaly sand, light red with pale green spot, very silty, very soft, no show, no visible porosity, very fine sand grains in a silty shale matrix.
- 2115-25 Same brown and white anhydrite; shaly sandstone streaks as above, red and white mottled, very fine, hard, tight, no show, no visible porosity.
- 2125-54 Same white anhydrite with brown to gray denser parts.
- 2154 (+1388) FOURTH CONVERSE SAND
- 2154-65 Abundant well-cemented sand, 50% white, pinkish white, anhydritic-looking, very fine, excellent sorting, no visible porosity, no show, slightly soft to some hard; 50% same sand but light red to dark pink, no show; white more anhydritic spot in red sand; all possibly slightly dolomitic, no fluorescence; trace white sandstone, cleaner, very fine, soft, porous, no show.
- 2165 BASE OF FOURTH CONVERSE SAND
- 2165-66 Anhydrite, white, gray denser; silty limestone, pinkish tan, soft to hard, white anhydrite spot, few dark purple silty shale streaks; dense brown



- dolomite grading into chalky limestone, tannish cream.
- 2166-76 Traces limestone to dolomite, creamy white, slightly soft to hard; silty dolomite to limy dolomite, pinkish cream, purplish shaly streaks, soft to slightly soft, becoming anhydritic dolomite, reddish purple, dense, hard.
- 2176-89 (Missing).
- 2189-92 Very anhydritic dolomite, few small limy spots, pink to light red with few small red silty shale spots, very cherty and hard, brittle, semi-crystalline, trace clear crystalline anhydrite veinlet on dolomite.
- 2192-2201 Abundant brick red shale, silty shale, smooth, with small round green spots; anhydrite, white, denser pink, light red; cream dolomite to limy dolomite, becoming very anhydritic dolomite as above, pink, light red, few yellow spots.
- 2201-12 Abundant anhydrite, snow white, finely crystalline.
- 2212-24 Anhydritic dolomite, tannish pink, small reddish spots, cherty, hard, brittle.
- 2224-26 Anhydrite, white to denser gray; abundant brick red shale with small green round spots, soft; anhydritic dolomite, pink, cherty, to limestone, hard, brittle.
- 2226 BASAL SAND OF CONVERSE
- 2226-37 Traces sandstone, white, pinkish white, very fine, few fine grains, no show, well-cemented, soft, anhydritic to traces of dolomitic cementation, no fluorescence, poor or less visible porosity, purplish part.
- 2237 (+1305) RED MARKER
- 2237-47 (All faster drilling 3"-4"/ft.). Shale, smooth, brick red, also silty; trace white anhydrite veinlet in shale; small round green spots in red shale.
Typical shiny, splintery Red Marker, platy, very soft.
- 2247 BASE OF RED MARKER
- 2247 (+1295) PENNSYLVANIAN



- 2247 (+1295) MIDDLE MINNELUSA (LEO SECTION)
- 2247 (+1295) VIRGIL
- 2247-56 (Faster drilling from 2250 to 2256 like well-cemented sand). Trace light red sand (cave?), very fine to fine, no show, slightly soft, poor porosity, pinkish clear grains; remainder of interval anhydritic dolomite, cream chalky to hard tan dense, dolomite is slightly limy. Trace sand, brown possible staining, very fine, excellent sorting, friable, porous, very limy, no rainbows on acid, no fluorescence.
- 2256-66 (Dries like anhydrite and dolomite--poor sample).
2266-77 (Poor sample, mostly Red Marker cave; drills slow like anhydrite and dolomite). Traces very well-cemented sand, purplish white, very fine, few fine grains, no show; trace snow white sandstone (cave?), very well-cemented, very fine, white clay cementation, slightly soft, no show; trace tannish gray possibly stained sandstone, very fine to fine to fine-plus, friable, porous, clear grains, clay cementation; all with no fluorescence. (All sand may be cave).
- 2277-79 Traces anhydritic dolomite, tan, cherty, hard, dark tan; traces sandstone, white, cream-white, very fine, silty, soft, no show, possibly porous, no fluorescence, few fine grains, anhydritic cementation.
- 2279-81 (Missing due to no circulation for sample at 2281 just before trip for bit in slow drilling).
- 2281-85 Silty dolomite, gray, very silty, limy, some black spots; sandstone streaks, white, light gray, very fine, well-cemented, few black shale spots, no show, no visible porosity, soft.
- 2285-90 (Slightly faster drilling like sand). Traces white sandstone, very fine, good sorting, well-cemented, poor to no visible porosity, no show, slightly salt and pepper with few blackish grains scattered, soft; trace cleaner white sandstone, less cemented, no show, porous, friable, very fine, excellent sorting; all with no fluorescence (shale break on log).
- 2290-93 Dolomite, part slightly limy, tan to brown, flaky, no show, no porosity.
- 2293-2302 (Slightly faster drilling). Trace chalky cream dolomite, slightly soft to soft, limy.



2302-05 Same dark tan dolomite as 2290 to 2293, limy.
2305-10 (Slightly faster drilling, like sand). Traces sandstone, white, very anhydritic-looking, abundant white cementation, silty, very fine, few fine grains, angular to subround, few purplish shaly spots, no show, soft; traces white sand, very fine, few fine grains, no show, silty, white, possibly some porosity.

2310-16 Same dark tan dolomite as 2290 to 2293.
2316-26 (Very poor unusable sample, almost all cave, not screened). (All drills very slow like hard dolomite, possibly anhydrite also).

2326-36 Dolomite, anhydritic dolomite, brown where more anhydrite, also dark gray dense to dark gray siltier.

2336-47 (Very poor sample, almost all cave). (All drills slow like dolomite above). Traces white sandstone, probably in streaks, light gray, no show, well-cemented, very fine; part less cemented very fine to fine friable with porosity (cave?).

2347-51 (Circulated 20" sample at 2351 before trip for bit). Anhydrite, white to tan, finely crystalline, grading into dark tan dolomite and limy dolomite.

2351-53 Same as above.

2353 (+1189) MISSOURI

2353-54 (Highly radioactive shale on log).

2354 (+1188) SECOND LEO SAND

2354-57 Loose sand grains, very fine, clear, also fine; trace clean sandstone, light gray, very fine, good visible porosity, friable, no show.

2357-60 (Drills 4" to 5"/ft.). Traces well-cemented sand, very fine, no show, poor visible porosity, soft, light gray, white, slightly silty, no fluorescence; loose sand grains, very fine, fine, clear grains, round to subround.

2360-64 (Circulated 20" sample at 2365). Limited sandstone, white, light gray, well-cemented, shaly, very fine, no show; part less cemented with some porosity, friable, no show; 2% light brown possibly stained, cleaner less cemented, very fine, soft, porous; all with no fluorescence (5"/ft.).

2364-65 (Circulated 30" sample at 2365). Same well-cemented sand, very fine, no show, few fine grains, anhy-



- dritic-looking cementation; trace same cleaner sand, very fine, very light brownish possibly stained, porous, friable.
- * All above sand from 2354 to 2365 has no hydrocarbon cut nor fluorescence after cutting representative cuttings in C. Tet. in stoppered shell vial.
- 2365-66 Traces clean sandstone (probably above 2365), friable, excellent visible porosity, no show, light gray, so soft disintegrates when picked up with tweezers; trace friable white sandstone, abundant white cementation like clay, very fine to abundant fine, porous, clear grains, no show, loosely consolidated, non-calcareous; trace same well-cemented sand, very fine sand as above; all with no fluorescence; trace white sandstone, very fine, excellent sorting, well-cemented, no show, soft; trace light tan possibly stained sandstone, fine to very fine, limy, porous, friable.
- 2366-73 Dolomite stringer, grayish dark tan; greenish gray anhydritic dolomite to dolomitic lime; trace sandstone, light tan possibly stained, no live oil on freshly broken surface, friable, excellent visible porosity, salt and pepper with scattered dark gray shale grains, clear to slightly frosted grains, non-calcareous.
- 2373-75 (Circulated 20" sample at 2378). 75% jet black shale, coaly, strong hydrocarbon odor.
- 2375-78 25% gray chalky dolomite.
* Representative sand cuttings from 2354 to 2373 were cut in C. Tet. with no fluorescence in resulting solution, indicating no live oil in cuttings.
- 2378-82 (Top 2' are 2"/ft., bottom 2' are 1"/ft.). Abundant sandstone, light to medium tan oil staining when wet, dries to fair or better tan stain, definite abundant tiny brown live oil spots scattered, 80% fair yellowish fluorescence to 20% with good bright yellow fluorescence, anhydritic to dolomitic cementation, silty, very fine, good visible porosity, friable.
- 2382-93 (Circulated 20" sample at 2393). Abundant sandstone, light gray with tannish cast plus tiny dark brown live oil spots scattered, limy cementation, very fine to fine more sugary, friable, excellent visible porosity, acid cuts immediate rainbows, clear subround quartz grains; sandstone soaked with tan oil stain in very fine, cemented sand-



- stone, some spotty white cementation like clay, tiny dark brown live oil stains scattered, acid brings out tiny dark brown oil bubbles, fair or better visible porosity, soft to slightly soft. * Representative cuttings of show zone were cut in C. Tet. in cork stoppered shell vial: there was no fluorescence in solution until several hours later when it was a faint grayish to yellowish.
- 2393-96 (Sand on log).
- 2396 BASE OF SECOND LEO SANDS
- 2396-2404 Chalky limy dolomite to dolomitic lime, cream-tan, denser tan also, few grayish streaks; limited associated anhydrite, finely crystalline white.
- 2404-15 Slightly silty dolomite, very finely sandy, grayish dark tan, minute pyrite specks.
- 2415-17 Coaly black shale, hard, brittle (probably a radioactive shale marker on log).
- 2416 DES MOINES (?)
- 2417-26 Abundant red shale in fast drilling breaks, orange red, silty to finely sandy, abundant small round light green spots in shale, with few anhydrite inclusions; remainder anhydritic dolomite, gray, few small limy streaks, part dark gray very shaly with few dark green spots; limited very sandy dolomite, limy, gray, flaky; limited sand streaks, gray, very well-cemented, no show, no porosity, hard, tight, very fine to fine; trace white sandstone, lot cleaner, very fine to fine, well-cemented, no show, possibly porous, soft (cave?).
- 2426-29 (Fast drilling shale break at 2429 to 2430). Same anhydritic dolomite, light grayish tan with dark gray shaly spots, minute pyrite specks, also dark tan with blackish spots, trace gray very sandy.
- 2429-30 Possibly jet black coaly shale (highly radioactive shale on log).
- 2430-35 Same as from 2426 to 2429.
- 2435-46 Shale break from 2440 to 2441, orange red smooth plain to silty; same anhydritic dolomite, gray to tan, less of silty limy dolomite, light gray, chalky; few sandstone streaks, grayish brown, slightly quartzitic-looking, very fine, very well-cemented, no show, poor to no visible poros-



- ity, part slightly soft; trace gray sandstone, very shaly and well-cemented, no show, no visible porosity, very fine to fine.
- 2446-53 Dolomite, limy dolomite, grayish tan to tan, cryptocrystalline, some associated white anhydrite, hard, brittle, few pyrite specks.
- 2453-55 Faster drilling plus shale on log.
- 2455-56 Sandstone stringer, white, fine, no show, very well-cemented, no visible porosity, same but shalier tannish gray, soft where white.
- 2456-59 Abundant sandstone, (possibly Third Leo Sand), snow white, very fine, fine, good sorting, no show, porous, anhydritic-looking, dolomitic to anhydritic cementation, part hard and tight, grayish yellow to yellow fluorescence, probably from dolomitic cementation, soft, part all fine grained.
- 2459-73 No odor in fresh sackfull, same sandstone as above; part softer, cleaner, more porous, trace more porous with slight tannish possible staining, same fair or better fluorescence; trace fine sandstone, sugary, friable, excellent visible porosity; becoming gray slightly quartzitic, poorly sorted fine to few medium grains, hard, tight.
- 2473-85 Abundant anhydrite, snow white, grayish where denser; abundant red shale, orange red, plain, silty, soft to slightly soft, few small light gray round spots.
- 2485-91 (Missing due to no circulation for sample before trip at 2491).
- 2491-2501 Mostly shaly dolomite, gray, dark gray, tannish dark gray, part limy, with abundant associated snow white anhydrite, finely crystalline; thin sand beds, white, light gray, fine, fairly clean, good visible porosity, no show, slightly soft, some black carbonaceous streaks; also dark gray shaly sand, soft, fine, porous to nonporous, black carbonaceous streaks; all with no fluorescence.
- 2501-10 Faster drilling sand, traces sand, white, very well-cemented, no show, very fine, no visible porosity to limited porosity, soft to slightly soft, possible faint grayish fluorescence.
- 2510-14 Limy dolomite to dolomitic lime, tannish brown, silty, blackish spots in part, also light gray; tan dense dolomitic lime to limy dolomite, hard, brittle.



2514-18 (Missing due to no circulation for sample just before trip at 2518).

2518-26 * First chert, trace, smoky gray translucent, very coarse and angular, also light brown translucent; sandstone, white, light gray, very well-cemented, poor visible porosity, very fine, well-sorted, slightly soft, part light gray less cemented; part white hard and tight; all limy, all with no show; limy dolomite, very light tan, cherty, hard, brittle, also dark tan limy dolomite, cryptocrystalline; white anhydrite; sand in top 7'.

2526-31 Brick red shale break with few small round light green spots; dolomite, sandy dolomite, gray, dark gray, mottled blackish in part, part limy dolomite; same chert; sandstone streaks, shaly, quartzitic, light gray to gray, very well-cemented, no show, no visible porosity, slightly soft.

2531-38 Chert, tan, milky white, angular, coarse; same quartzitic sandstone streaks, brownish gray; finely sandy limy dolomite to dolomitic lime, tannish brown.

2538-43 (Circulated 30" sample at 2543 T. D.). Chert, angular, very coarse, tan to light gray milky; limy dolomite to limestone, tannish brown, dense plain to cryptocrystalline; sandstone, white, very fine, very well-cemented, no show, no visible porosity, light gray, tannish light gray tighter, slightly limy, becoming brown quartzitic, good yellow fluorescence from limy mineralization.

2545 TOTAL DEPTH DRILLER

2544 TOTAL DEPTH SCHLUMBERGER

Samples examined and described on location by G. Allan Nelson.



DRILL-STEM TEST

D.S.T. #1 2379-2393 P. D. * (Corrected uphole 2' by matching lithology and drilling time to log).
(2381-2395 drillers depths at time test was run).
Zone tested: Lower of 2 Second Leo Sand benches.
November 25, 1970. Open hole conventional test.
Top packer at 2371 corrected.
Bottom packer at 2379 corrected.
Top choke 1". Bottom choke 9/16".
Hole size 7 7/8". 3 1/2" drill pipe.
2 1/4" I.D. of drill collars; 542' of drill collars.
Mud wt. 9.5. Vis. 60.
Packers held and did not leak. No cushion.

Tool opened with a very weak blow and remained open 5"; very weak blow throughout period. Tool reopened with a very weak blow (1/4" under water); remained for 10", then intermittent blow throughout rest of test. (By-passed tool after 50" to see if it was plugged--before opening. Well had 3" to 4" water flow from annulus throughout test--from Dakota-Lakota. 3' fillup on bottom).

Recovered: 60' gas-cut mud with a sulfur smell=.29 bbl.
80' water with scum of oil and sulfur smelling gas=.39 bbl.
140' Total Fluid

Pressures following are office-corrected:

Initial hydrostatic	-	1102
Final hydrostatic	-	1100
5" Initial flow	-	4 to 21
45" Final flow	-	31 to 76
15" Initial shut-in	-	969
15" Final shut-in	-	914

Fluid Sample Report:

Pressure in sampler	-	11 psig
BHT	-	96° F.
Total volume of sampler	-	2150 cc.
Sample	-	2150 cc.
Oil	-	10 cc.
Water	-	2140 cc.
(No mud or gas)		



DRILL-STEM TEST (Continued)

Resistivity -

Water - .4 @ 62° = 17,200 ppm chlorides

Mud pit sample - 2.6 @ 60° = 2,550 ppm
chlorides

Testing done by Virg's Testers, Gillette, Wyoming.
Tester: Lloyd Welty.

Checked periodically during test for combustability;
would not burn. No gas to surface.



SCHLUMBERGER LOG CALCULATIONS

Calculations were performed by Mike Golas, Schlumberger engineer on location.

<u>DEPTH</u>	<u>Rt</u>	<u>POROSITY (from Sonic)</u>	<u>Rw</u>	<u>Sw</u>	<u>FORMATION</u>
1062	29	22%	1.6 @ 80°	100%	Tentative Hulett Sand
1074	33	23	"	"	"
1078	31	23	"	"	"
1866	50	18	1.3 @ 88°	78%	First Converse Sand
1871	45	17	"	90	"
1878	55	16	"	"	"
1885	40	18	"	"	"
1966	45	15	"	100%	Second Converse Sand
1970	35	17	"	"	"
1980	35	17	"	"	"
2376	35	6	.34 @ 88°	"	Second Leo Sand
2378	26	25	("way too high")	42	"
2380	35	10	.34 @ 88°	92	"
2382	42	5	"	100	"
2384	30	6	"	"	"
2386	21	6	"	"	"
2388	25	9	"	"	"
2458	6.5	11	"	"	Pre-Second Leo
2460	5.5	14	"	"	"
2462	6.5	8	"	"	"
2464	6.0	7	"	"	"
2466	5.0	15	"	"	"
2468	6.5	10	"	"	"

HOLE DEVIATION SURVEYS

Surveys were made using a TOTCO instrument with a 7^o maximum.

<u>DEPTH</u>	<u>DEVIATION</u>	<u>FORMATION</u>
178	1/4 ^o	Skull Creek
1086	1	Tentative Hulett Sand
1691	1	Glendo Shale
1939	1	Massive Anhydrite
2188	1	Pre-Fourth Converse
2282	1 (?)	Upper Leo
2352	1	Basal Virgil



BIT RECORD

12 1/4" bit from surface to 178. All bits below 178 are 7 7/8".

<u>RUN NO.</u>	<u>MAKE</u>	<u>TYPE</u>	<u>FROM</u>	<u>TO</u>	<u>FEET</u>	<u>HOURS</u>	<u>FORMATION AT BASE OF RUN</u>
1A	HTC	OSC3 (RR)	0	178	178	5 1/2	Skull Creek
1	"	OSC1GJ	178	1086	908	18	Tentative Hulett
2	"	"	1086	1707	621	14	Minnekahta
3	"	OSC1G	1707	1939	232	11 1/4	Massive Anhydrite
4	Reed	YS1G	1939	2091	152	12 1/2	Third Converse
5	-	-	2091	2189	98	13 1/4	Pre-Fourth Converse
6	HTC	OWV	2189	2282	93	"	Upper Leo
7	Reed	YMG	2282	2352	70	13	Basal Virgil
8	"	"	2352	2395	43	5 1/2	Second Leo Sand
9	-	-	2395	2493	98	14	Pre-Second Leo
10	-	-	2493	2520	27	3	"
11	-	-	2520	2545			
				T.D.	25	3 1/4	"



DRILLING PROGRESS SUMMARY

Drilling depths as of 7 A. M. each date.

<u>DATE</u>	<u>NO. OF DAYS</u>	<u>P.D. DEPTH</u>	<u>FORMATION AT P. D.</u>	<u>STATUS</u>
Nov. 17, 1970	-	-	-	Rigging up rotary tools.
18	1/2	105	Skull Creek	Drilling surface hole.
19	1 1/2	821	Morrison	Drilling.
20	2 1/2	1681	Goose Egg	"
21	3 1/2	2040	Upper Minnelusa	"
22	4 1/2	2189	"	Trip for bit.
23	5 1/2	2284	Middle Minnelusa	Drilling.
24	6 1/2	2374	"	"
25	7 1/2	2395	"	Starting out to put tool on -- D.S.T. #1.
26	8 1/2	2493	"	Trip for bit.
27	9 1/2	2545 T.D.	"	Logging.

(Finished plugging at 5:00 P. M., November 27).

Respectfully submitted,

G. Allan Nelson
G. Allan Nelson, Consultant
 Denver, Colorado
 January 26, 1971



ADMINISTRATIVE / SUNDRY REPORTS



PLUGGING RECORD

Operator: **Petro-Lewis Corporation** Address: **1224 Denver Club Building, Denver, Colorado, 80202**

Name of Lessee: **Peterson** Well No.: **5-22** Field & Reservoir: **Wildcat**

Location of Well: **1980' ENL and 660' FWL, SW-1/4 Section 22, T75, R1E** Sec/Twp-Rge or Block & Survey: _____ County: **Fall River**

Applying to drill this well was filed in name of: **Petro-Lewis Corporation** Has this well ever produced oil or gas: **No** Character of well at completion (initial production):
Oil (bbls/day): _____ Gas (MCF/day): _____ Dry? **Yes**

Date plugged: **11/27/70** Total depth: **2544' Logger** Amount well producing when plugged:
Oil (bbls/day): _____ Gas (MCF/day): _____ Water (bbls./day): _____

Name of each formation containing oil or gas. Indicate which formation open to well-bore at time of plugging.	Fluid content of each formation	Depth interval of each formation	Size, kind & depth of plugs used (indicate zones squeeze cemented, giving amount cement).

CASING RECORD

Size pipe	Put in well (ft.)	Pulled out (ft.)	Left in well (ft.)	Give depth and method of parting casing (shot, rigged, etc.)	Packers and spacers
8-5/8"	167'	None	167'		

Was well filled with mud-filtrate fluid, according to regulations? Indicate deepest formation containing fresh water: _____

In addition to other information required on this form, if this well was plugged back for use as a fresh water well, give all pertinent details of plugging operations to base of fresh water zone, referenced interval to fresh water level, name and address of surface owner, and attach letter from surface owner authorizing completion of this well as a water well and agreeing to assume full liability for any subsequent plugging which might be required.

USE REVERSE SIDE FOR ADDITIONAL DETAIL

Executed this the **15th** day of **February**, 1971, at _____
State of **Colorado**, County of **Denver**.

R. J. Droubak
R. J. Droubak Signature of Affiant

Before me, the undersigned authority, on this day personally appeared **R. J. Droubak**, known to me to be the person whose name is subscribed to the above instrument, who being by me duly sworn on oath states that he is duly authorized to make the above report and that he has knowledge of the facts stated therein, and that said report is true and correct.

Subscribed and sworn to before me this **15th** day of **February**, 1971, at _____.

SEAL
My commission expires **September 26, 1974**.

Elsie J. Stone
Notary Public in and for **Colorado**, County, **Colorado**.

Approved: **December 23, 1971** Date
DO NOT WRITE BELOW THIS LINE
OIL AND GAS BOARD OF THE STATE OF SOUTH DAKOTA
Alma Larson Secretary

Dec. 28, 1971
Dwight Willard
State Geologist

Note: File 2 copies of this form with necessary Oil & Gas Board. Fees.





WELL COMPLETION OR RECOMPLETION REPORT AND LOG

FARM OR LEASE NAME
Paterson

WELL NO.
5-22

FIELD AND POOL OR WILDCAT
Wildcat

NO. ACRES IN LEASE
4 1/4 SEC. TWP. R01E

SW-NW Section 22, T7S, R1E
COUNTY

Fall River

TYPE OF COMPLETION
 Oil Well Gas Well Dry Hole
 New Well Work-Over Deepen Plug Back Same Zone Diff Zone

OPERATOR
Petro-Lewis Corporation

ADDRESS
1224 Denver Club Building, Denver, Colorado, 80202

LOCATION (In feet from nearest lines of section or legal subdivision where possible)*
 Surface 1980' FNL and 660' FNL, SW-NW, Section 22, T7S, R1E
 Top prod. interval Fall River County, South Dakota
 At total depth

PERMIT NO. 606 **DATE ISSUED** 10/21/70 **PREVIOUS PERMIT NO.** **DATE ISSUED**

DATE SPUNDED 11/17/70 **DATE T.D. REACHED** 11/27/70 **DATE COMPL. (Ready to Prod.)** P&A 11/27/70 **ELEVATIONS (DP, NER, RT, GR, etc.)*** Gr. Elev. 3534' **ELEV. CASINGHEAD FLOE**

TOTAL DEPTH (MD & TVD) 2544' **PLUG BACK T.D. (MD & TVD)** **IF MULTIPLE COMPL. HOW MANY?** **INTERVALS DRILLED BY** XXXX **ROTARY TOOLS** **CABLE TOOLS**

2544' Logger **PRODUCING INTERVAL(S), THIS COMPLETION. TOP, BOTTOM, NAME (MD & TVD)*** **DATE DIRECTIONAL SURVEY SUBMITTED**

Dry Hole **None**

TYPE ELECTRIC AND OTHER LOGS RUN (Circle those filed)
 Dual Induction Laterolog, Compensated Bohemia Sonic - Gamma Ray **WAS WELL CORED** No

CASING RECORD (Report all strings set in well)

CASING SIZE	DEPTH SET (MD)	HOLE SIZE	WEIGHT LBS./FT.	PURPOSE	BARRE CEMENT	AMOUNT FULLED
8-5/8"	167' KB	12-1/4"	20#	Surface casing	100 ss.	None

LINER RECORD **TUBING RECORD**

SIZE	TOP (MD)	BOTTOM (MD)	BARRE CEMENT*	SCREEN (MD)	SIZE	DEPTH SET (MD)	PACKER SET (MD)
None					None		

PREPARATION RECORD **ACID, BRU, FRAC, CEMENT SQUEEZE, Etc.**

DEPTH INTERVAL (MD)	HOLES PER FT.	SIZE AND TYPE	PURPOSE	AMOUNT AND KIND OF MATERIAL USED	DEPTH INTERVAL (MD)
None				None	

PRODUCTION

DATE FIRST PRODUCTION **PRODUCING METHOD (Flowing, gas lift, pumping, etc. & type of pump)** **WELL STATUS (Prod. or shut-in)**

Dry Hole **P&A 11/27/70**

DATE OF TEST **HOUSING PRESSURE** **CASING PRESSURE** **CALCULATED 24-HOUR RATE** **OIL, Bbls.** **GAS, Mcf.** **WATER, Bbls. & %** **OIL GRAVITY-API (Corr.)**

DISPOSITION OF GAS (held, used for fuel, vented, etc.) **TEST WITNESSED BY**

ANY OF ATTACHMENTS

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

R. J. Doubek **Manager of Operations** **DATE 2/15/71**

R. J. Doubek **DO NOT WRITE BELOW THIS LINE** **See Instructions On Reverse Side**

Approved _____ **OIL AND GAS BOARD OF THE STATE OF SOUTH DAKOTA** Secretary _____





DD-177 (Rev. 10-1-1968)

**SUNDRY NOTICES AND
REPORT ON WELLS**

NAME OR LEASE NAME

Peterson

WELL NO.

5-22

FIELD AND POOL, OR WILDCAT

Wildcat

NO. ACRES IN LEASE

W & H SEC. TWP. R1E

SW-1/4 Section 22, T7S, R1E

COUNTY

Fall River

OIL WELL GAS WELL _____ DRY

OPERATOR

Petro-Lewis Corporation

ADDRESS

1224 Denver Club Building, Denver, Colorado, 80202

LOCATION (In case there is more than one address, please specify)

1980' FNL and 660' FWL, SW-1/4 Section 22, T7S, R1E

Fall River County, South Dakota

ELEVATIONS (D.V., M.L.M., R.T., G.P., etc.; see instructions)

Gr. Elev. 3534'

INDICATE BELOW BY CHECK MARK NATURE OF REPORT, NOTICE OR OTHER DATA

NOTICE OF INTENTION TO:

SUBSEQUENT REPORT OF:

TEST WATER SHUT-OFF

SHOOT OR ACIDIZE

WATER SHUT-OFF

SHOOTING OR ACIDIZING

FRACTURE TREAT

REPAIR WELL

FRACTURE TREATMENT

REPAIRING WELL

MULTIPLE COMPLETE

PULL OR ALTER CASING

ALTERING CASING

ABANDON

(Check Report results of multiple completion on Well Completion or Resonance and Log Form—Form 6)

DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work)

T. D. 2544' Logger

Date of Work 11/27/70

We propose to plug and abandon this well as follows:

- 40 sx. cement from 2300'-2420'
- 30 sx. cement from 1750'-1850'
- 30 sx. cement from 1030'-1130'

(Contractor will run pipe to complete as water well for landowner. Pipe will be set at 350'. (Dakota).)

I hereby certify that the foregoing is to my work or operation performed to a true and correct report of such work or operation.

SIGNED R. J. Dousek TITLE Manager of Operations DATE 2/15/71
R. J. Dousek

DO NOT WRITE BELOW THIS LINE

Approved _____ OR. AND GAS BOARD OF THE STATE OF SOUTH DAKOTA

CONDITIONS IF ANY: _____ Secretary

See Instructions On Reverse Side





CORRESPONDENCE



AMERICAN STRATIGRAPHIC COMPANY

17 NORTH 51ST STREET • BILLINGS, MONTANA 59101 • PHONE 282-7647

November 18, 1971

NOV 22 1971

South Dakota Geological Survey
Attn: Dr. Duncan McGregor
Science Center, University
Vermillion, South Dakota 57069

Gentlemen:

Sample cuts on the following wells are being sent
to you today:

Petro-Lewis Corp. #14-14 Childers
14-8S-2E, Fall River Co., S. D.

Petro-Lewis Corp. #5-22 Peterson
22-7S-1E, Fall River Co., S. D.

Petro-Lewis Corp. #3-7 Trotter-Federal
7-9S-2E, Fall River Co., S. D.

Very truly yours,


Fred McCotter
Manager



Hydro ID 3

82 of 89



SOUTH DAKOTA GEOLOGICAL SURVEY

Science Center, University
Vermillion, South Dakota 57069
624-4471

Western Field Office
615 Birch Ave.
Rapid City, South Dakota 57701

JUN 24 1971

(605)394-2229

June 23, 1971

Dr. Duncan J. McGregor
State Geologist
South Dakota Geological Survey
Science Center USD
Vermillion, South Dakota 57069

Dear Dunc,

On June 21, 1971 we inspected the sites of the following oil tests and find that they have been satisfactorily restored. The wells are as follows:

Permit

- 606 Petro-Lewis #5-22 Peterson, SWNW 22-17N-1E, Fall River County
- 614 Petro-Lewis #14-14 Childers, SESW 14-8S-2E, Fall River County
- 631 Webb Resources #11-16 Zuehlke, SESE 11-11-4E, Fall River County

As soon as all other requirements have been met I recommend the release of bond.

Sincerely

Fred V. Steece
Principal Geologist

FVS/dme
cc: Petro-Lewis Corporation

Webb Resources, Inc.



January 13, 1971

Mr. Fred V. Steece
Western Field Office
615 Birch Ave.
Rapid City, South Dakota

Dear Fred:

I am enclosing the following logs:

1 Sonic log - Gamma ray and 1 Dual Induction-Laterolog for
Petro-Lewis 5-22 Peterson well, Fall River County
1 Induction-Electrical log and 1 Sonic log - Gamma ray for
Lee Banks #1-23 Federal-Richards in Butte County
1 Microlaterolog and 1 Sonic log - Gamma ray for Consolidated
#1 Tribal well in Corson County
1 Induction-electrical log for Consolidated #1 Tribal well
in Corson County.

Sincerely,

(Mrs.) Ruth Lynch
Accounting Clerk

For the State Geologist

Encl.

Small logs



POWERTECH (USA) INC.

Hydro ID 3

64 of 69

DEC 16 1970

Western Field Office
615 Birch Avenue
Rapid City, South Dakota 57701

((605)394-2229

December 15, 1970

Mrs. M. Lenore Peterson
Star Route
Edgemont, South Dakota

Dear Mrs. Peterson,

Thank you for your letter of December 11, 1970 regarding the Webb Resources #5-22 Peterson oil test, located on your land in Sw 1/4 & 1/4 Sec. 22, T. 7S., R. 1E., Fall River county, South Dakota. The letter is fine as far as it goes, however it is incomplete.

I have enclosed the original and three carbon copies of a suggested substitution to your letter. If you approve of this please date and sign the original and two carbon copies and send them to:

South Dakota Oil and Gas Board, Capitol Office Building, Pierre,
South Dakota 57501

Mr. J. W. Grimes, Chief Engineer, South Dakota Water Resources Com.,
Capitol Office Building, Pierre, South Dakota 57501

Fred V. Stacey, Principal Geologist, Geological Survey, Western
Field Office, 615 Birch Avenue, Rapid City, South Dakota 57701

The other copy is for your files.

Sincerely

Fred V. Stacey
Principal Geologist

FVS/dss

cc: Dr. Duncan J. McGregor
State Geologist



DEC 15 1970

Western Field Office
815 Birch Avenue
Rapid City, South Dakota 57701

(605) 394-2229

December 14, 1970

Mr. J. W. Grimes
Chief Engineer
South Dakota Water Resource Comm.
Capitol Office Building
Pierre, South Dakota 57501

Dear Joe,

Friday, December 11, 1970, I spoke with Don Driscoll on the telephone with regard to an oil test in Fall River county that has recently been converted to a water well. The well is the Petro-Lewis #8-22 Peterson located in S8W 22-7S-1E Fall River (permit 608). The well was drilled from November 18 to November 27, 1970 and completed as a water well in the Fall River Formation on November 28, 1970. The well has 167 feet of 8 5/8 surface casing cemented from top to bottom and was completed with 389 feet of 4 1/2 inch casing suspended inside the larger casing. The original depth of the well was 2545 feet and was plugged back to 1090, which plugs through the Basal Sundance sand and allows the well to take advantage of the marimum sand development of the Fall River and Lakota. The plugging record is as follows:

- 40 sec--2410-2200 across the Leo sand
- 30 sec--1850-1750 across the Converse sand
- 30 sec--1120-1020 across the Basal Sundance sand

If there is further information you need on this well, please let us know.

Sincerely

Fred V. Stoesoe
Principal Geologist

~~cc: Mr. Duncan J. McGregor~~
State Geologist

Miss Alva Larson
Secretary, Oil and Gas Board



SURETY



Hydro ID 3

07 of 00

State Pub. Co. Form

S. Dak. Oil & Gas Board FORM 3

BOND NO. 1672873

BOND

KNOW ALL MEN BY THESE PRESENTS,

That we: PETRO-LEWIS CORPORATION, 1224 Denver Club Building, Denver, Colorado 80202 of the County of: Denver State of: Colorado as Principal, THE TRAVELERS INDEMNITY COMPANY and of Hartford, Connecticut

as surety, authorized to do business in the State of South Dakota as surety, are held and firmly bound unto the State of South Dakota in the sum of TWENTY THOUSAND (\$20,000.00) lawful money of the United States, for which payment, well and truly to be made, we bind ourselves, and each of us, and each of our heirs, executors, administrators or successors, and assigns jointly and severally, firmly by these presents.

The condition of this obligation is that whenever the above bounden principal proposes to drill a well or wells for oil, gas, or stratigraphic purposes in and upon the following described land situated within the State, to wit:

ANY AND ALL LOCATIONS WITHIN THE STATE OF SOUTH DAKOTA

(May or use) as blanket bond or for single well(s)

NOW, THEREFORE, if the above bounden principal shall comply with all of the provisions of the laws of this State and the rules, regulations and orders of the Oil and Gas Board of the State, especially with reference to the proper plugging of old well or wells, and filing with the Oil and Gas Board of this State all notices and records required by said Board, and the restoration of the surface, in the event said well or wells do not produce oil or gas in commercial quantities, or cease to produce oil or gas in commercial quantities, then this obligation shall be terminated by the Board, the same shall be and remain in full force and effect.

Penal sum of

TWENTY THOUSAND AND NO/100 (\$20,000.00) DOLLARS-

Witness our hands and seals, this 17th day of July, 1970

PETRO-LEWIS CORPORATION

By: R. C. Frawley Principal

Witness our hands and seals, this 17th day of July, 1970

g. a. Talbert, Inc. SURETY BONDS AND INSURANCE TWELVE HUNDRED LINCOLN STREET DENVER, COLORADO 80202 AREA CODE 303/734-1210

THE TRAVELERS INDEMNITY COMPANY

By: G. A. Talbert, Attorney-in-Fact

(If the principal is a corporation, the bond should be executed by its duly authorized officer, with the seal of the corporation affixed. When principal of surety executes this bond by agent, power of attorney or other evidence of authority must accompany the bond.)

DO NOT WRITE BELOW THIS LINE

Approved: [Signature] Date: October 21, 1970

OIL AND GAS BOARD OF THE STATE OF SOUTH DAKOTA

[Signature] Secretary

County signed in South Dakota By: Francis P. Schmidt Agent at Rapid City, South Dakota 57701

30th July 70 E. Kelly

Keep file 3 copies of this form with Secretary, Oil & Gas Board, Pierre.



MISCELLANEOUS



**NO MISCELLANEOUS
INFORMATION FOR THIS WELL
AS OF 5/18/2011**



Oil and Gas Search for: <i>api_no_like '40 047 05093'</i>		
Page 1 of 1	<u>Download Database</u> (Excel spreadsheet format)	Page: 1

Record 1 of 1

Well Information

API No:	40 047 05093	County:	FALL RIVER
Well Name:	SUPERIOR OIL 1 PETERSON 44-15	Location:	SESE 15-7S-1E
Permit No:	382	Total Depth:	2264
Operator Name:	SUPERIOR OIL COMPANY	Bottom Hole:	Minnelusa
Permit Date:	02-18-1965	KB Elevation:	3585
Spud Date:	02-20-1965	Ground Elevation:	3576
Plug Date:	03-05-1965	Latitude:	43.436899
		Longitude:	-103.977905
Well Field	WILDCAT	Status	P&A
Class:	DRY HOLE	Type:	DRY HOLE

Formation Tops

<u>Formation</u>	<u>Depth (ft.)</u>
Dakota Mud	185
Lakota	371
Morrison	471
Sundance	670
Minnekahta	1518
Opeche	1557
Minnelusa	1645
Red River	2108

Page 1 of 1 (goto <u>top</u>)	Page: 1
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COUNTY: FALL RIVER
LEGAL LOCATION: SESE 15-7N-1E
API NO: 40 047 05093
PERMIT NO: 382
WELL NAME: SUPERIOR OIL #1
PETERSON (44-15)
OPERATOR: THE SUPERIOR OIL
COMPANY
PERMIT ISSUED: 02/18/1965
PERMIT CLOSED: 10/21/1966
FILE LOCATION: 7N-1E-15 SESE

TARGET CODES:

WELL HISTORY / CHECKLIST

PERMIT TO DRILL / INTENT TO DRILL

WELL INSPECTION / SCOUT REPORTS

OPERATOR'S TECHNICAL REPORTS / MAPS

ADMINISTRATIVE / SUNDRY REPORTS

CORRESPONDENCE

SURETY

MISCELLANEOUS



WELL HISTORY / CHECKLIST



WELL HISTORY

Well Name Superior Oil #1 Paterson 44-15 Permit No. 382

Location SESE 15-7S-1E - Fall River Date of Permit 2-18-65

Elev. 3576 Gr. API No. _____

Confidential _____ From _____ To _____

Logs Received _____

Cuttings Received _____ Cores Received _____

Drill Stem Records _____

Cap Plug and Marker Set _____

Surface Restored _____

Plugging Affidavit Signed _____ Date _____

Bond Released _____ Date 10-21-66

Summary of Scout Reports

2-19-65 First report

2-24-65 Spudded 2-20-65

3-4-65 Plugged

3-5-65 Planned to convert test to water well

4-9-65 Pits not filled - Rig still on location

5-25-65 Mud pits not filled - Rig moved from location

7-30-65 Pits not filled

7-1-66 Pits not filled



Hydro ID 4

Superior #1 (44-15) Peterson
660 FSL, 660 FEL
SE SE, -15-7S-1 E
Fall River Co

Surface & mineral owner.
F.A. Peterson
Elyment, S.Dak.

Contractor: Barnhart Drilling Co.
Casper, Wyo.

Elev: 3576 gft
3585 K.B.

Est 7.0. 2500 1st Sed.

Permit: 2-18-65 #382.

Plan to Set 500' 8 5/8, Cement test
1st Sed. & Run dual instructions - including
+GRS

water flow at about 400

Erroneous #7 Rainbow.

971' 8 5/8

March 2, 1965

Coning at 2175'

© 2179

986.54 of 8 5/8

w/ 450 ft Cement

+ 125 feet
Cement 971'

Don Benson - g ft

2-19-65

John Ryan of P.I.
Catal & Carl Barnhart
was Contractor & they were
on location.

2-20-65

Duiker Called at 11:00
A.M. Carl Barnhart was
Contractor & had spudded
at 1:30 AM 2-20-65
~~Don Benson~~
Don Benson - Eng. pusher.
(wagner will not be out until
reach Minnelusa)

Not Title
nothing will be title.

Feb 24, 1965

© 974

Log by L. Robinson

ml
top log E.
Dak 185'
Sed 371
mem 471
Sun 670
1 771 top Sun load.

Sample top

mlk. - 1527
ml - 1652

Lak + Sun flowed.

1st Sed being Coned.

est. 7.0. 2500



PERMIT TO DRILL / INTENT TO DRILL



State Pub. Co., Pierre

APPLICATION FOR PERMIT TO:

S. DAK. OIL & GAS BOARD FORM 2

<input checked="" type="checkbox"/> DRILL	<input type="checkbox"/> DEEPEN	<input type="checkbox"/> PLUG BACK	FARM OR LEASE NAME Peterson
<input checked="" type="checkbox"/> OIL WELL	<input type="checkbox"/> GAS WELL	<input type="checkbox"/> SINGLE ZONE	WELL NO. #1 (44-15)
<input type="checkbox"/> MULTIPLE ZONE		FIELD AND POOL, OR WILDCAT	
OPERATOR The Superior Oil Company		NO. ACRES IN LEASE 2848.03	
ADDRESS P. O. Box 200, Casper, Wyoming		4 SEC. TWP. RGE	
LOCATION (In feet from an established corner of the legal subdivision) 660' FSL & 660' FEL Sec. 15-7S-1E		SE SE 15-7S-1E COUNTY Fall River	
NAME AND ADDRESS OF SURFACE OWNER F. A. Peterson Edgemont, South Dakota		ELEVATION 3576 G.L.	NO. OF WELLS ETC.
NAME AND ADDRESS OF CONTRACTOR Unknown		PROPOSED DEPTH 2500'	ROTARY OR CABLE TOOLS Rotary
			APPROXIMATE DATE WORK WILL START 2-27-65

IF LEASE PURCHASED WITH ANY WELLS DRILLED, FROM WHOM PURCHASED (Name and address)

PROPOSED CASING AND CEMENTING PROGRAM

SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	NEW OR SECOND HAND	DEPTH	SACKS OF CEMENT
12-1/4"	8-5/8"	24#	New	500	300

DESCRIBE PROPOSED OPERATIONS. IF PROPOSAL IS TO DEEPEN OR PLUG BACK, GIVE DATA ON PRESENT PRODUCTIVE ZONE AND PROPOSED NEW PRODUCTIVE ZONE. GIVE BLOW OUT PREVENTER PROGRAM IF ANY.

- (1) The Superior Oil Company proposes to drill a 2500' 1st Leo Sand test at the above location.
- (2) Will set 8-5/8" csg. at 500' & cmt. to surface.
- (3) Will drill 7-7/8" hole to total depth.
- (4) Will catch 10' samples from base of surface to TD.
- (5) Expect to core & test the 1st Leo Sand plus any other zones that have significant shows.
- (6) Will run Dual Induction-Laterolog & GRS logs from TD to base of surf. csg.
- (7) Should commercial production be encountered, 5-1/2" casing will be cemented through the productive zone.

SIGNED: *J. P. Burke* TITLE: District Engineer DATE: 2-11-65

DO NOT WRITE BELOW THIS LINE

CHECKED BY: *Edward Linn* 2/17/65
School and Public Lands Secretary

APPROVAL DATE: *2/17/65*

CONDITIONS:
COMPLETE SET OF SAMPLES AND CORES IF TAKEN, MUST BE SUBMITTED.
13 SAMPLES AND CORES IF TAKEN, BELOW DEPTH, MUST BE SUBMITTED.

INSTRUCTIONS

General: This form is designed for submitting proposals to perform certain well operations, as indicated, on all types of lands and leases for appropriate action by either a Federal or a State agency, or both, pursuant to applicable Federal and/or State laws and regulations. Consult applicable Federal or State regulations, or appropriate officials, concerning approval of the proposal before operations are started.

If the proposal is to redrill to the same reservoir at a different subsurface location or to a new reservoir, use this form with appropriate notations.

If the well is to be, or has been, directionally drilled, so state and show by attached sheets, if necessary, the coordinate location of the hole in any present or objective productive zones.

File 3 copies of this form with Secretary, Oil & Gas Board, Pierre.

**Sample location: 660' South and 660' East of the Northwest Corner of Section 16.1



TRI-STATE COMPANY

X 787

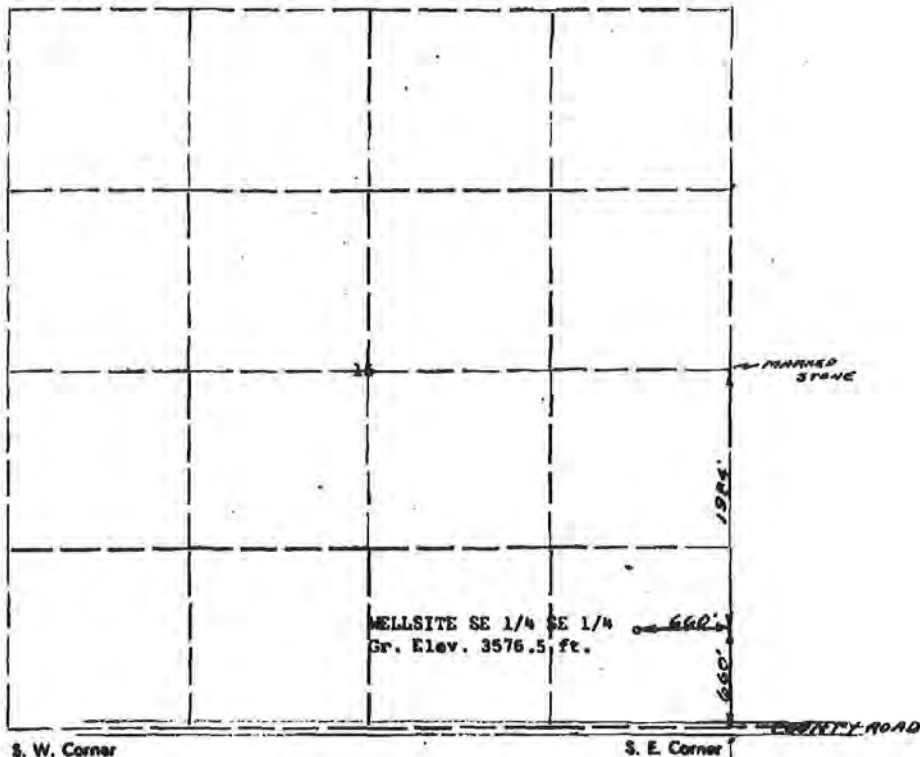
748-67

Hydro ID 4

NEWCASTLE, WYOMING

N. W. Corner

N. E. Corner



I, Lawrence T. Price, of Newcastle, Wyoming, Certify
 that in accordance with a request from J. P. Dutka
 of Casper, Wyoming, for The Superior Oil Company
P. O. Box 200, Casper, Wyoming

I made a survey (date) February 9 1965
 for the location and elevation of the Peterson No. 1 (44-15) oil
well site

As shown on above map, the well site is in center SE 1/4 SE 1/4
 Section 15, Township 7 South, Range 1 East
Fall River County, South Dakota Elevation is 3576.5 feet
above mean sea level before dozing.

Lawrence T. Price
 Licensed Surveyor No. 1311