POWERTECH (USA) INC. 174

S. Dak. Oil & Gas Board
FORM 7

PLUGGING RECORD

Operator	Address
CRYSTAL OIL COMPANY	P. O. Box 21101, Shreveport, LA 71120

Name of Lease	Well No.	Field & Reservoir
Peterson	1	Wildcat - Dry

Location of Well: 660' FNL & 658' FEL NE¼, NE¼ of Section 21, T7S, R1E — Sec-Twp-Rge or Block & Survey — County: Fall River

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

Date plugged	Total depth	Amount well producing when plugged: Oil (bbls/day)	Gas (MCF/day)	Water (bbls./day)
April 6, 1979	2500'	0	0	0

Name of each formation containing oil or gas. Indicate which formation open to wellbore 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.
Dry	---	---	---

CASING RECORD

Size pipe	Put in well (ft.)	Pulled out (ft.)	Left in well (ft.)	Give depth and method of parting casing (shot ripped etc.)	Packers and shoes
8-5/8"	253'	0	253'	---	None
5-1/2"	2499'	0	2499'	---	None

Was well filled with mud-laden fluid, according to regulations? Yes

Indicate deepest formation containing fresh water: Second Leo

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 sand, perforated interval to fresh water sand, 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.

4-6-79 - Pump plug from 2424-2274' w/16 sx 50-50 Posmix
Pump plug from 290-210' w/8 sx 50-50 Posmix
Pump plug from 15'-0' w/5 sx cement
Pump 10 sx cement into surface casing annulus.

Plugged and Abandoned 4-6-79

RECEIVED
APR 1979
WESTERN FIELD OFFICE

USE REVERSE SIDE FOR ADDITIONAL DETAIL

Executed this the 24 day of April, 1979

State of Louisiana
County of Parish of Caddo

James O. Glass
Signature of Affiant

Before me, the undersigned authority, on this day personally appeared James O. Glass 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 24 day of April, 1979

SEAL

My commission expires with life

Lillian Connor Nixon
LILLIAN CONNOR NIXON, Notary Public
Caddo Parish, Louisiana
My Commission Is For Life

Notary Public in and for County,

DO NOT WRITE BELOW THIS LINE

Approved May 8, 1979
Date

OIL AND GAS BOARD OF THE STATE OF SOUTH DAKOTA

Fred A. Steck, Secretary

Supervisor, Western Field Office

API ID 40 047 20074

Well name: Wulf #1 Peterson   CO: Fall River

Legal Location: NENE 21-7S-2E   Status: P&A

open hole size: 12 1/4
Depth: 252

surface csg size: 8 5/8 weight 24#
Depth: 252

Cement Amt: 250
calculations

[redacted]

1) RIH 5 1/2 - Sandline to 1200' - until stacked on obstruction
2) Pumped 50 sks in 8 5/8 - 292-0
3) pumped 105 sks in 5 1/2 - 766-0

Formation Tops

Wulf 1A - 200' Gurney

Dakota - 335

- 545

Basal Sundance - 1155

- 1830

298 open Hole size 7 7/8

2504 Depth

5 1/2 - 14# Poduction csg size & Weight

Cemt Amt; type:

calculations

766

CBL

P&A on 11/6/79

2391 - 2410 ports

csg depth

PB

TD -

SUNDRY NOTICES AND REPORT ON WELLS

FARM OR LEASE NAME: Peterson

WELL NO.: 1

☐ OIL WELL ☐ GAS WELL ☐ -- ---------- ☒ DRY

FIELD AND POOL, OR WILDCAT: Wildcat

OPERATOR: Crystal Oil Company

NO. ACRES IN LEASE: 1200

ADDRESS: P.O. Box 21101 -Shreveport, Louisiana 71120

LOCATION (In feet from nearest lines of section or legal subdivision, where possible): 660' FNL and 658' FEL of Sec. 21, T7S, R1E

SEC., TWP., RGE.: NE ¼, NE ¼ Sec. 21, T7S, R1E

ELEVATIONS (D.F., R.K.B., R.T., GRD., etc.; how determined): 3533' GR.

COUNTY: Fall River

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	X						

(Note: Report results of multiple completion on Well Completion or Recompletion and Log Form—Form 4)

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

4-6-79 Pump plug from 2424'-2274' w/16 sx 50-50 pozmix
Pump plug from 290'-210' w/8 sx 50-50 pozmix
Fill top of 5 1/2" casing w/15' cement, pump 10 sx cement in to surface casing.

APR 1979
WESTERN FIELD OFFICE

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

SIGNED James O. Shaw TITLE Asst. Mgr. of Prod. Admin. DATE 4/9/79

DO NOT WRITE BELOW THIS LINE

Approved 4-17-79 Date

OIL AND GAS BOARD OF THE STATE OF SOUTH DAKOTA

CONDITIONS, IF ANY:

Supervisor, Western Field Office

See Instructions On Reverse Side

CORRESPONDENCE

McGillivray, Mack

From: McGillivray, Mack
To: Steece, Fred; Townsend, Bob
Cc: Gledd, Roxanne; Hamann, Sheldon
Subject: RE: Leaking oil test well, Fall River County
Date: Tuesday, September 05, 1995 4:25PM

I witnessed the plugging of this well last Thurs (8/31). When I arrived on location a backhoe had finished digging down to the casing. Water was shooting out of the weld around the cap on the surface (8 5/8") casing. The welder welded a 2" collar on the side of the surface pipe and cut a hole through the pipe. I estimated the flow at about 20 gpm. When the welder cut off the old casing cap, it was apparent the flow was coming up the inside of the production (5 1/2") casing, not the production/surface casing annulus as we had expected. This led us to speculate that the 5 1/2 had holes in it somewhere. Since the rig only had 400' of tubing, I had the rig run their sand line with a large sinker bar into the hole to determine where the top cement plug was. They didn't hit anything until 1800'; there was supposed to be cement plugs at the surface and at 210-290'.

A ring was welded in the annulus to isolate the two strings of casing, and a vaccuum truck pumped up the water flowing out of the casing. A line from the cement pump was hooked up to the 8 5/8 casing, and we pumped 50 sacks of cement down the casing at 2 bpm - 400 psi, leaving a plug from 295-0'. There was still 300 psi when we stopped pumping, so we shut the valve, and left the pressure on the pipe. The flow from the 5 1/2 never changed.

The rig ran 12 jts of 2 3/8" tubing into the 5 1/2 casing to 399', and we pumped a 50 sk plug from 419-0' (base of surface csg - 385'). When the tubing was pulled out, the cement level dropped about 100' in the pipe, but the water flow had stopped completely. I had them shut down for 1 hour, then we pumped 20 more sks cmt. The cement level dropped again, to the 100' level. I told them I wanted to see the cement level stay at surface, so we released the rig and waited 3 hours for the cement to set up. After 3 hours, we pumped another 35 sks cmt to fill the pipe. This time, the cement level stayed static. A total of 105 sks cmt were pumped down the 5 1/2 csg, which calculates to a plug from 798' to surface.

A steel cap was welded on top of the pipe, and the backhoe filled the hole and levelled the location. Wayne Peterson (the landowner), stopped by and said he was pleased with the response, cooperation, and results from Crystal Oil Co. and DENR.

As a side note, I witnessed another plugging of a former producing well the day before south of Provo. The company rep spent most of the time informing me SD plugging regs were too strict and expensive, and we were killing future exploration in the state. He asked why we required so much cement in shallow wells. I invited him to ride with me the next day to this well, and I would show him why.

From: Steece, Fred
To: Townsend, Bob
Cc: McGillivray, Mack
Subject: Leaking oil test well, Fall River County
Date: Wednesday, June 07, 1995 10:49AM

Bob, I received a fax from Crystal Oil Co. this morning that they are talking with Updike Brothers , Inc., a drilling contractor in Newcastle, WY, and have asked for Updike to submit a bid on repairing the well.

Steece, Fred

From: Townsend, Bob
To: Markley, Bill; Goodman, Jim; Tolleferud, Tim
Cc: Pimer, Steve; Steece, Fred
Subject: FW: Well failure
Date: Friday, June 02, 1995 9:54AM

I discussed this with Fred this morning. The leakage rate was estimated by Mack at about 10 gpm. The leakage is probably related to a problem with cementing in the annulus between the surface casing and long string. Fred has been in contact with the company that did the test several times and has faxed well information to them in that they no longer have records on this well. Fred indicates that they plan to fix the well although they don't have a time line for the fix yet because they are still evaluating the information Fred sent. If the company does not respond with a plan in the next week or two, Fred will write them a letter requesting a plan for fixing the well.

MicrosoR Mail v3.0 IPM.MicrosoR Mail.Note
From: Steece, Fred
To: Townsend, Bob
Cc: Gledd, Roxanne
McGillivray, Mack
Subject: 1979 oil test leaking water, Fall River County
Date: 1995-06-01 10:48
Priority:
Message ID: 534D4BE1
Conversation ID: 534D4BE1

Bob, this note is for your information.

Mr. Wayne Peterson, a rancher in Fall River County informed us that an oil test drilled on his land in 1979 has started to leak water for the past several months. Mack and Mr. Peterson inspected the site on Tuesday and found the well to be flowing maybe 10 gpm. The water is being diverted from his hay field onto the Cheyenne River flood plain where it is being dissipated into the alluvium. I talked to Roxanne who told me that even though the operator's drilling bond has long since been released, they would still have some responsibility to fix the problem. I phoned the operator, located in Louisiana, and was told they would repair the well at an early date.

POWERTECH (USA) INC.

DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES
OIL AND GAS PROGRAM
2050 West Main, Suite #1
Rapid City, SD 57702
605-394-2229 FAX 605-394-5317

TO: WFO Files
FROM: Fred V. Steece
DATE: June 2, 1995
SUBJECT: Leaking oil test, Fall River County

May 22

This office was contacted by Mr. Mark Tubbs for Mr. Wayne Peterson on ~~or about May 29,~~ 1995 informing Mack that an old oil test drilled on Peterson's land had begun to flow water several months ago. The Wulf #1 Peterson located in NENE 21-7S-1E, Fall River County, was started by Wulf, taken over and plugged by Crystal Oil Company in 1979.

The following day Mack McGillivray met Mr. Peterson and inspected the well location and took photos and kept notes on his findings. He found that the water was flowing at an estimated rate of 10 gpm and had been channelled away from a hayfield toward the Cheyenne River. The water was not entering the river but was disappearing into the alluvium some distance from the river.

I spoke to Roxanne Giedd, Assistant Attorney General, to find out what responsibility the company would have after all this time, particularly since their drilling and plugging bond had long since been released. Roxanne told me as long as the well was not completed as a water well and turned over to the landowner for his use that, the company would still be responsible for plugging the hole.

I next visited with Jim Goodman at Water Rights to inform him of the flowing well and to inquire whether his division had a fund for plugging uncontrolled wells. He informed me they did not.

On June 1, 1995, I telephoned the company in Shreveport, LA and spoke with Mr. Sam Clinton who assured me that Crystal is a responsible company and would fix the problem. He arranged for Mr. Pat Eddings to contact me and we spoke about details of information in our well files. I faxed the information that he requested, including a list of drilling contractors who have drilled in South Dakota in recent times. Mr. Eddings said he would study the information and get back to me when they had made a decision on the well.

I conveyed some of this information to Bob Townsend via E-Mail dated June 2, 1995.

POWERTECH (USA) INC.

MCM STOCK TRANSFER COMPANY, INC.

"STOCK TRANSFER & REGISTRAR SERVICES"

MICHAEL C. MILLER
PRESIDENT

(303) 860-7842

September 2, 1986

Mr. Fred Steece, Supervisor
Department of Water & Natural Resources
Western Field Office
36 E. Chicago
Rapid City, South Dakota 57701

Re: Letter of 06/09/86
Wulf Oil Corporation

Dear Mr. Steece:

As per requested in your letter of June 9, 1986, in regard to the Wulf #1 Peterson well and the Wulf #4 Federal well in Fall River County, South Dakota, I have sent you the material I found in the company files. The Wulf #1 Peterson was operated by Crystal Oil, who took over in the middle of the drilling of it. Any further information you need on this, I would suggest you contact them.

The information I am sending includes this:
(1) Geological Report Wulf Oil #4 Federal
(2) Plugging Record Wulf Peterson #1
(3) Drilling Report Wulf #1 Peterson

I received copies of the above from Banks Enterprises, Inc., one of the partners on the projects. Most of our records were lost in [redacted]

Yours very truly,

Larry C. Wulf, President
WULF OIL CORPORATION

LCW/lw
Enc: 1

MAILING ADDRESS: P.O. BOX 100317, DENVER, CO 8
OFFICE ADDRESS: 901 EAST 17th AVENUE, SUITE 300, DEN[illegible]R,CO

Mr. Fred V. Steece, Supervisor
Western Field Office
36 East Chicago
Rapid City, SD 57701

Dear Mr. Steece:

This letter informs you that the surface restoration at the site of the following oil or gas test well has been completed to my satisfaction.

Permit	Well Name and Location
903	Wulf #1 Peterson, NENE 21-7S-1E, Fall River

I am the surface owner of record.

SIGNED Wayne L Peterson dba DATE 9/19/85

CRYSTAL
OIL COMPANY
SUITE 879, TOWER III, PARK CENTRAL BUILDING
1515 ARAPAHOE ST., DENVER, COLORADO 80202
TELEPHONE 303-623-2228

April 10, 1979

Department of Natural Resources
South Dakota Geological Survey
Western Field Office
308 West Boulevard
Rapid City, South Dakota 57701

Attention: Fred V. Steece

Re: Crystal No. 1 Peterson
NE/4NE/4 Section 21
Township 1 East, Range 7 South
Fall River County, South Dakota

Gentlemen:

This is to advise I do not want a dry hole marker locating the Crystal No. 1 Peterson erected in my cultivated field because of a hindrance to my future farming of same. Thank you.

Very truly yours,

PETERSON AND SONS, INC.

By: Wayne T. Peterson Pres.

MAY 1979
RECEIVED
WESTERN FIELD OFFICE

CRYSTAL
OIL COMPANY
P.O. BOX 21101, SHREVEPORT, LOUISIANA 71120
TELEPHONE 318-222-7781 TWX 510 973 4067

March 13, 1979

South Dakota
State Geological Survey
308 West Boulevard
Rapid City, South Dakota 57701

Re: Transfer of Drilling Permit
Wulf Oil Corp.-Paterson #1
Permit no. 903

Gentlemen:

We acquired the above well March 13, 1979 and assume the full responsibility for its operation and abandonment in conformity with the law, rules, regulations, and orders issued by the board.

A Blanket Bond in our name is attached.

If there is any other information we should furnish you, please let us know.

Yours very truly,

CRYSTAL OIL COMPANY

James O. Gbur
Asst. Manager of Production Admin.

JOG/mr

Attachments

SURETY

NOV 30 1978

State Pub. Co., Pierre

S. Dak. Oil & Gas Board
FORM 6

Bond No. 708E675-4

BOND

KNOW ALL MEN BY THESE PRESENTS,

That
we Gulf Oil Corporation
of the County of: Dawes In the State of: Nebraska
as Principal,
and Travelers Indemnity Company
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 ($5,000.00; $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 whereas 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:

Blanket
(May be used as blanket bond or for single well)

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 said 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 Dollars and no/100----------($20,000.00)

Witness our hands and seals, this 25th day of October 1978

Gulf Oil Corporation
Dennis R Steed
Vice President
Principal

Witness our hands and seals, this 25th day of October 1978

Countersignature:
Cheryl J. Knapp

Travelers Indemnity Company
Norman Sterling, Jr.
Norman Sterling, Jr., Attorney-in-fact

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

DO NOT WRITE BELOW THIS LINE

OIL AND GAS BOARD OF THE STATE OF SOUTH DAKOTA

Approved 11-1-78
Date

Fred V. Steece
Supervisor, Western Field Office
Secretary

Bond No. 708E[illegible]-4

NOV 1978

STATE OF SOUTH DAKOTA

Department of Natural Resource Development Division of Geological Survey
Form 8

BONDING COMPANY INFORMATION SHEET

Information about your bonding company:

Name of bonding company: Travelers Indemnity Company

Street Address: 101 University Blvd.

City, State: Denver, CO 80206

Phone: (303) 321-2333 Remarks:

Information about your South Dakota bonding company agent:

Name of South Dakota Agent: Kluthe & Land Agency

Street Address: 619 Mount Rushmore Rd., P.O. Box 3031

City, State: Rapid City, South Dakota 57701

Phone: Remarks:

Information about releasing your bond:

When the Principal for whom you are providing Surety has fulfilled all obligations, whom should we contact with our Bond Release?

Name of Contact: Bayly, Martin & Fay, Inc.

Street Address: 817 17th Street, Suite 500

City, State: Denver, Colorado 80202

Phone: (303) 292-500 Remarks:

Please file this form together with Oil & Gas Form No. 3 with: Mr. Fred V. Steece, Supervisor, South Dakota Geological Survey, Western Field Office, 308 West Boulevard, Rapid City, South Dakota 57701 PH: (605) 394-2229

POWERTECH (USA) INC.

NOV 1978
RECEIVED
WESTERN
FIELD
OFFICE

The Travelers Indemnity Company
Hartford, Connecticut

POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS:

That THE TRAVELERS INDEMNITY COMPANY, a corporation of the State of Connecticut, does hereby make, constitute and appoint

Norman Sterling, Jr., Paul M. Barbour, Norman C. Headrick, David H. Snead, Thomas J. Sisk, Jr., all of Denver, Colorado, EACH

its true and lawful Attorney(s)-in-Fact, with full power and authority, for and on behalf of the Company as surety, to execute and deliver and affix the seal of the Company thereto, if a seal is required, bonds, undertakings, recognizances, consents of surety or other written obligations in the nature thereof, as follows:

Any and all bonds, undertakings, recognizances, consents of surety or other written obligations in the nature thereof not exceeding in amount Two Hundred Thousand Dollars ($200,000) in any single instance

and to bind THE TRAVELERS INDEMNITY COMPANY thereby, and all of the acts of said Attorney(s)-in-Fact, pursuant to these presents, are hereby ratified and confirmed.

This appointment is made under and by authority of the following by-laws of the Company which by-laws are now in full force and effect:

ARTICLE IV, SECTION 14. The Chairman of the Board, the President, the Chairman of the Finance Committee, any Executive Vice President, any Senior Vice President, any Vice President, any Second Vice President, the Corporate Secretary or any Department Secretary may appoint attorneys-in-fact or agents with power and authority, as defined or limited in their respective powers of attorney, for and on behalf of the Company to execute and deliver, and affix the seal of the Company thereto, bonds, undertakings, recognizances, consents of surety or other written obligations in the nature thereof and any of said officers may remove any such attorney-in-fact or agent and revoke the power and authority given to him.

ARTICLE IV, SECTION 16. Any bond, undertaking, recognizance, consent of surety or written obligation in the nature thereof shall be valid and binding upon the Company when signed by the Chairman of the Board, the President, the Chairman of the Finance Committee, any Executive Vice President, any Senior Vice President, any Vice President or any Second Vice President and duly attested and sealed, if a seal is required, by the Corporate Secretary or any Department Secretary or any Assistant Corporate Secretary or any Assistant Department Secretary, or shall be valid and binding upon the Company when duly executed and sealed, if a seal is required, by a duly authorized attorney-in-fact or agent, pursuant to and within the limits of the authority granted by his or her power of attorney.

This power of attorney is signed and sealed by facsimile under and by the authority of the following Resolution adopted by the Directors of THE TRAVELERS INDEMNITY COMPANY at a meeting duly called and held on the 30th day of November, 1959:

VOTED: That the signature of any officer authorized by the By-Laws and the Company seal may be affixed by facsimile to any power of attorney or special power of attorney or certification of either given for the execution of any bond, undertaking, recognizance or other written obligation in the nature thereof; such signature and seal, when so used being hereby adopted by the Company as the original signature of such officer and the original seal of the Company, to be valid and binding upon the Company with the same force and effect as though manually affixed.

This power of attorney revokes that dated October 20, 1976 on behalf of Norman Sterling, Jr., Schuyler F. Cross, Paul M. Barbour

IN WITNESS WHEREOF, THE TRAVELERS INDEMNITY COMPANY has caused these presents to be signed by its proper officer and its corporate seal to be hereunto affixed this 30th day of May 1978.

THE TRAVELERS INDEMNITY COMPANY

By

Secretary, Surety

State of Connecticut, County of Hartford—ss:

On this 30th day of May in the year 1978 before me personally came D. J. Nush to me known, who, being by me duly sworn, did depose and say: that he resides in the State of Connecticut; that he is Secretary (Surety) of THE TRAVELERS INDEMNITY COMPANY, the corporation described in and which executed the above instrument; that he knows the seal of said corporation; that the seal affixed to said instrument is such corporate seal; that it was so affixed by authority of his office under the by-laws of said corporation, and that he signed his name thereto by like authority.

Notary Public

My commission expires April 1, 1983

(Over)

A-1000 Rev. 4-78 Printed in U.S.A.

MISCELLANEOUS

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

Department of Environment & Natural Resources ...Today

Oil and Gas Search for: *api_no_ like '40 047 20077'*

Page 1 of 1	**Download Database** (Excel spreadsheet format)	Page: Prev 1 Next

Record 1 of 1

Well Information

API No:	40 047 20077	**County:**	FALL RIVER
Well Name:	WULF 2 PETERSON	**Location:**	SWSW 15-7S-1E
Permit No:	919	**Total Depth:**	2462
Operator Name:	WULF OIL CORPORATION	**Bottom Hole:**	Minnelusa
Permit Date:	06-08-1979	**KB Elevation:**	3572
Spud Date:	08-03-1979	**Ground Elevation:**	3564
Plug Date:	08-13-1979	**Latitude:**	43.435870
		Longitude:	-103.991563
Well Field	WILDCAT	**Status**	P&A
Class:	DRY HOLE	**Type:**	DRY HOLE

Formation Tops

Formation	Depth (ft.)
Sundance	822
Spearfish	1164
Goose Egg	1515
Minnekahta	1689
Opeche	1728
Minnelusa	1817
Red Marker	2232
1st Leo	2242
2nd Leo	2349

Page 1 of 1 (goto top)	Page: Prev 1 Next

COUNTY:	**FALL RIVER**
LEGAL LOCATION:	**SWSW 15-7N-1E**
API NO:	**40 047 20077**
PERMIT NO:	**919**
WELL NAME:	**WULF #1 PETERSON**
OPERATOR:	**WULF OIL CORPORATION**
PERMIT ISSUED:	**06/08/1979**
PERMIT CLOSED:	**09/21/1979**
FILE LOCATION:	**7N-1E-15 SWSW**

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

BOND RELEASE CHECKLIST

Well Name and Location

Permit # 919

Wulf #2 Peterson
SWSW 15-7S-1E, Fall River

API # 40 063 20077

Bond # 708E675-4 Date Issued ..... Date Released NOV 06 1985

Surface Restoration

- ✓ Pits filled
- ✓ Site Level
- ✓ Site policed
- ✓ Dry-hole marker solid, sealed, correctly inscribed
- NA No dry-hole marker desired, letter in WFO files from surface owner
- ✓ Letter from surface owner

Paperwork filed

- ✓ Form 4 (Completion or Recompletion Report)
- ✓ Form 6 (Sundry Notice and Report on Wells)
- ✓ Form 7 (Plugging Report)

Geological Information Filed

- ✓ Well Logs: IES, SNP, (DIL), GR, NEUT, CALIP, Cement Bond, Temp, Micro, Laterlog, SM Dens. (Acoustilog)
- ✓ DST Charts and Reports
- ✓ Geologist's Report
- — Results of coring and core analyses (None cut)
- ✓ Set of 10-foot sample cuttings (Check with Bob Schoon)

Date NOV 1 1985 Checked By JR Stacy

PERMIT CHECKLIST

Well Name and Location:	Permit # 919
Wulf #2 Peterson SWSW 15-7S-1E, Fall River	API # 40 047 20077
	BOND # 708E675-4

Paperwork filed with WFO

- x Organization Report
- x Application
- x Bond
- x Permit Fee

The Following Papers sent to Operator:

- x Permit (Form 2a)
- x Receipt for $100 permit fee
- x Cover letter explaining material sent

Permit Fee Filed:

- x Permit fee w/Cash Receipts Transmittal Form sent to State Treasurer

Notification of New Permit sent to:

- x Dr. Duncan J. McGregor
- x ~~Mrs. Nancy W. Rotzler~~ Mr. Warren R. Neufeld
- ~~Mrs. Allen Lockhart~~
- x ~~Mrs. George Kane~~ Mr. Jack Gerken

Date June 22, 1979 Check By cp

PERMIT TO DRILL / INTENT TO DRILL

State Pub. Co., Pierre

APPLICATION FOR PERMIT TO:

S Dak Oil & Gas Board
FORM 2

XX DRILL ☐ DEEPEN ☐ PLUG BACK
☒ SINGLE ZONE
XX OIL WELL ☐ GAS WELL ☐ MULTIPLE ZONE

FARM OR LEASE NAME: Peterson
WELL NO.: #2

OPERATOR: Wulf Oil Corporation

FIELD AND POOL, OR WILDCAT: Wildcat

ADDRESS: P.O. Box 1320, Chadron, NE 69337

NO. ACRES IN LEASE: 1200.00

LOCATION (In feet from nearest lines of section or legal subdivision, where possible)*

1/ 330' FSL - 987' FWL Section 15

¼ ¼ SEC. TWP. RGE: Sec 15: T7S, R1E
Center SE¼SW¼SW¼

COUNTY: Fall River, South Dakota

NAME AND ADDRESS OF SURFACE OWNER: Peterson & Son, Inc.
Edgemont, South Dakota
HCR - 59, Box 16

ELEVATION: 3564.9' gr

PROPOSED DEPTH: 2400'

NO. OF WELLS ETC: 1

ROTARY OR CABLE TOOLS: Rotary

NAME AND ADDRESS OF CONTRACTOR:
Northern Wyoming Drilling Co., Inc.
P.O. Box 487
Gillette, Wyoming 82716

APPROXIMATE DATE WORK WILL START: July 1, 1979

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

PROPOSED CASING AND CEMENTING PROGRAM

SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	NEW OR SECOND HAND	DEPTH	SACKS OF CEMENT
12¼"	8 5/8"	24#	New	250'	200 sx.
7 7/8"	5½"	15.50#	New	2,400'	150 sx.

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

We plan to drill a 2,400' well into the Leo Fromation. We plan to start the well July 1, 1979 with operations lasting approximately 14 days.

Northern Wyoming Drilling Rig #2 is equipped with a 10" Ragan Blowout Preventor which will be used while drilling the well.

Operator

SIGNED Dennis R. Staal TITLE President DATE 5-15-79

DO NOT WRITE BELOW THIS LINE

PERMIT NO. 919

APPROVAL DATE 6-8-79

CHECKED BY

School and Public Lands Board Secretary

CONDITIONS:

☐ COMPLETE SET OF SAMPLES, AND CORES IF TAKEN, MUST BE SUBMITTED.

☐ SAMPLES, AND CORES IF TAKEN, BELOW DEPTH, MUST BE SUBMITTED.

SOUTH DAKOTA
STATE GEOLOGICAL SURVEY
WESTERN FIELD OFFICE

Exception to statewide spacing for geologic reasons. FVS

MAY 1979
RECEIVED
WESTERN FIELD OFFICE

API ID 40 047 20077 JUN 27 1979

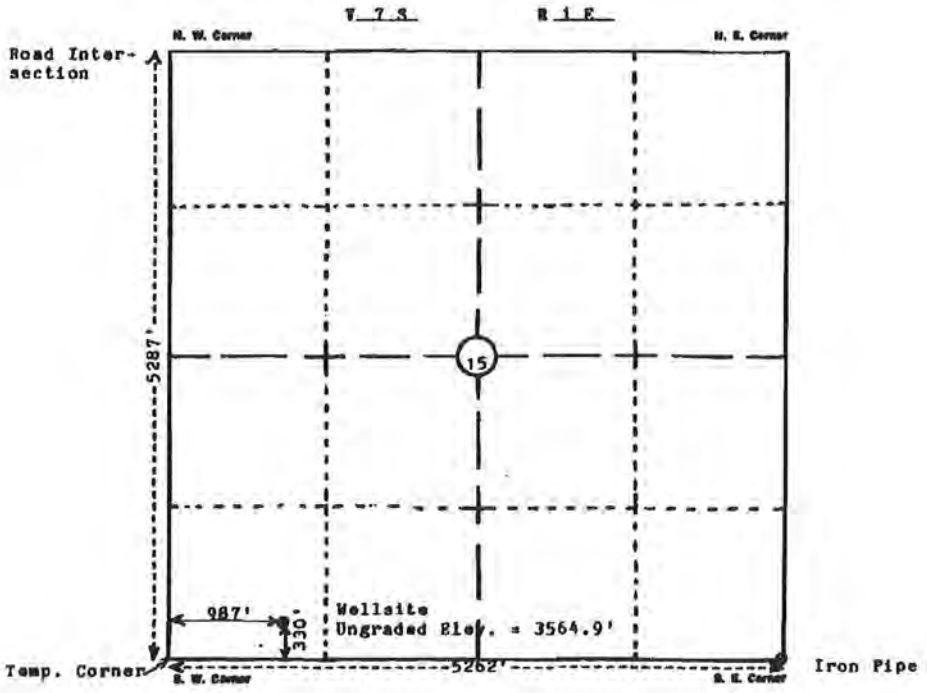
PLAINS ENGINEERING
Consulting Engineers & Land Surveyors

NEWCASTLE
P. O. BOX 737
NEWCASTLE, WYOMING 82701
PHONE 307-746-3764

HOT SPRINGS
CITY HALL
HOT SPRINGS, SOUTH DAKOTA 57747
PHONE 605-745-5000

GILLETTE
BOX 117
GILLETTE, WYOMING 82716
PHONE 307-682-7986

BUFFALO
P. O. BOX 420
BUFFALO, WYOMING 82834
PHONE 307-684-7976



Dry Hole Site - NE¼ NE¼ Section 21 - Elev.=3536.5'

Water Well - SW¼ NW¼ Section 22 - Elev.=3532.5'

I, Darral L. Schlup of Newcastle, Wyoming, certify that in accordance with a request from Jim Cox of Chadron, Nebraska, for Wulf Oil Corp. P. O. Box 1320, Chadron, Nebraska 69337 That I [redacted] made a survey (date) May 8 1979 for the location and elevation Wellsite

As shown on above map, the wellsite is in Center SE¼ SW¼ SW¼ Section 15, Township 7 South, Range 1 East, Fall River County, So. Dak. Elevation is 3564.9 feet above mean sea level before dozing.

Darral L. Schlup
Licensed Surveyor No. 545

MAY 1979
WESTERN FIELD OFFICE

Notes Attached
NW 799003.29

WELL INSPECTION / SCOUT REPORTS

SOUTH DAKOTA GEOLOGICAL SURVEY
Western Field Office

SCOUT REPORT

Number -2-3

Date Scouted -'-'7-

Operator [illegible]

Permit Number -1-

Farm/Lease Name #2 Petersen

API Number 4 [illegible]

[illegible] Sec. 15 T. 7[illegible] R. 1[illegible] County Fall River

Elev. [illegible] Est. T.D. 2400 Actual T.D. 2462 Spudded

Contractor Northern Wyo. Drilling Geologist Dr. Gries

SCOUT'S OBSERVATION:

Drilling at 1[illegible], expect TD in 3 days - move out on Tuesday, 7-1 .
8-12-79: Logger was broken down but is now fixed. Couldn't get all the way down the hole. Contractor plans to trip in and condition and then try logging again, will plug sometime tomorrow. Had fresh water flow from Lakota.

FORMATION TOPS:

8/12-13/79: Plugged, no problems.

8-21-79: Dry hole marker solid, sealed, properly labeled. Two baskets of pipe are still at the site. The pits are open and not fenced and there is assorted junk lying around. Mouse, rat holes still open. Site not approved.

10-6-79: Pits are filled, site is clean, level. Not seeded. Site approved.

DST RECORD:

PLUGGING RECORD:

DATE PLUGGED/~~COMPLETED~~ 8/12-13/79

10 sax - 0' - surface
60 sax - 682' - Top Morrison - BS
25 sax - 1922' - Minnelusa
25 sax - 2232' - Red Marker

CASING RECORD:

[illegible] From [illegible] To [illegible]

From To

SITE INSPECTION:

Approved X

Not Approved

REMARKS:

SCOUTED BY Tim Kenyon

Tim Kenyon
Geologic Assistant

Fred V. Steece, Supervisor
Western Field Office

WULF # 2 PETERSON

OPERATOR'S TECHNICAL REPORTS / MAPS

PROPERTIES: WT. _____ VIS. _____ PH _____ H_2O LOSS ____

SAMPLE TOPS:

REMARKS:

Finished RURT & Spudded at 7:00 P.M.
August 4, 1979

Drilling rat and mouse hole

August 5, 1979

7:00 A.M. — Tripping

drilled 600' of 12¼" hole

2 hrs — rat hole
3 hrs — trip
18½ hrs — drill
½ hrs — rig service

Surveys at — 250' with 1° deviation
600' with 3/4° deviation

August 6, 1979

7:00 A.M. nippling up

½ hr — circulating
1 hr — trip out
2 hr — rig up & run casing
2 hr — cementing
12 hr — waiting on cement
6½ hr — nippling up

ran 13 joints of 8 5/8", 24 lbs. ST & C
588' set at 596' KB
plugged down at 11:00 A.M. with good returns

water flow in Lakota at 500', strong 3 inch, improving

225 sxs lite cement with 3% calcium chloride and 1% chip plug followed by
175 sxs regular cement with 3% calcium chloride and 1% chip load.

August 7, 1979

3 days since spud
7 days since move

drilling with water

surface bit — 12¼ Y-12-J — drilled 600' in 20 hrs.

bit #1 — 7 7/8" Y-12-J, in at 600', drilled 820' in 17 3/4 hrs.

¼ hrs — rig service
17 3/4 hrs — drilling
2 hrs drilling cement
1 hrs redrill mouse hole
3 hrs finish nippling up

(Pg 1)

REMARKS:

8-8

4 days since spud

drilled 495' in 24 hrs

present operation — drilling

drilling in shale

total rotating hrs. - 56 3/4 hrs

drilling with water

Bit #2 — 7 7/8" Y-12, in at 600', out at 1432', drilled 832' in 18 hrs.

Bit #3 — 7 7/8" Y-13, in at 1432', present operation is drilling, drilled 483' in 19 hrs.

19 hrs. — drilling
3 hrs. — trip
½ hrs. — rig repair
1 hrs. — washing
½ hrs. — rig service

NOTE: The surface bit is Bit #1.

8-9

five days since spud

present operation is drilling

Bit #3 — 7 7/8" Y-13, in at 1432', out at 1924', drilled 492' in 20 hrs. teeth are 7, bearings are 8

Bit #4 — FP-53, in at 1924', drilled 281' in 20 hrs., weight 25-30,000 lbs., 55-60 RPM's, pump 14 x 5½, 54 strokes per minute, 900 lbs.pressure

20 hrs. — drilling
2 hrs. — trip
2 hrs. — wash to bottom

1/4" estimated water flow

pg. 2

SAMPLE TOPS:

2nd Leo — 2344'

REMARKS:

8-10

6 days since spud

Formation is Minnelusa

drilled 149' in 24 hrs.

present operation is drilling.

total rotating hrs. — 97 3/4

21 hrs. — drilling
2½ hrs. — circulating
½ hrs. — rig service

Sample Description
Drilling break at 2344'
2nd Leo Sandstone 2344'-2360'
sandstone, hard, calcareous and anhydritic, stained, bleeding oil, drilled slow but that may be because of button bit.

will drill to 2365' and test 2nd Leo

8:00 P.M. — DST #1 2348-2378 (corrected 11 feet downhole based on pipe strap)
Bottom hole temperature - 86°F

Open 5 minutes, SI 30 minutes, Open 30 minutes, SI 60 minutes
opened with very strong blow off bottom of bucket in 2 minutes; decreased to top of water at end of second flow period.

Recovered 2250 feet of fluid - 600 feet gas cut muddy water, 1650 feet of gas cut sulphur water

Top sample Rw 1.08 @ 64° (3800 ppm)
Middle " 0.9 @ 70° (6800 ppm)
Bottom " 0.89 @ 70° (6950 ppm)

HP 1163-1134
FP_1 379-437
FP_2 452-988
SIP 1003-1006

Geologic Notes: Fair to good staining in samples but very poor porosity; sand very dolomitic and anhydritic. No significant drilling break. Considerable chattering of bit indicating fractures throughtout 2nd Leo section; fractures in cuttings also. Generally poor samples.

(pg. 3)

10

8-11 7 days since spu

API ID 40 047 20077

drilled 51' in 24 hrs.

104 3/4 total rotating hrs.

7 hrs — drilling
10 3/4 hrs — trip
1 hrs — wait on tester
2¼ hrs — testing
2¼ hrs — pick up & make & break down & load out test tool.

8:00 P.M. Drilled to 2462', ran Laterolog-SP from 2458'-2150'. Tool malfunctioned.
Tentative log tops (KB=3572)

Red Marker	2230	(+1342)
1st Leo (Meng)	2250	
2nd Leo "Zone"	2351	(+1221)

pg. 4

8-12

8 days since spud

drilled 57' in 24 hrs.

116 3/4 total rotating hrs.

¼ hrs — rig service
12 hrs — drilling
4 3/4 hrs — trip
1 hrs — circulate
6 hrs — logging

Attempted to run logs, but hole bad; will recondition hole and finish logging on August 13.

8-13

9 days since spud

8:30 a.m. on bottom logging, one log down

7¾ hrs — trip
3 hrs — circulate to log
3½ hrs — logging
10 hrs — wash to bottom

8-14-79

4:00 P.M.

Log Tops and Calculations:

Red Marker	2229	(+1343)
1st Leo	2248	
2248-53	100% water, 25% por	
2255-58	100% water, 22% por	
2nd Leo	2350	
2350-2406	100% water, 5% por	

Ran GR Sonic Log from 596-2458

Ran Dual Induction Focused Log from 605-2460

(P9.5)

6

Gulf Oil Corporation

DAILY DRILLING REPORT

DATE: August 14, 1979 OPERATOR: Gulf Oil Corporation

WELL NAME AND LOCATION: #2 Peterson, T7S, R1E, Sec. 15: SE¼SW¼SW¼, Fall River Co., SD

DEPTH: _____

BIT NUMBER: _____

DRILLING MUD
PROPERTIES: WT. _____ VIS. _____ PH _____ H_2O LOSS _____

REMARKS:

4½ hrs — waiting on orders
5½ hrs — logging
8 hrs — lay down collars, picking up pipe, going in hole, plugging, and lay down pipe
6 hrs — rigging down BOP

2132-2232	25 sxs
1822-1922	25 sxs
582-682	60 sxs
5-25	10 sxs

Plugged at 1:30 A.M.

(pg 6)

JOHN PAUL GRIES

Consulting Geologist

230 ST. CHARLES STREET

RAPID CITY, SOUTH DAKOTA

Wulf No. 2 Wayne Peterson
SE¼ SW¼ SW¼ sec. 15, T. 7 S., R. 1 E. Elevation: 3572 KB
Custer County, South Dakota 3564 Gnd

Contractor: Northern Wyoming Drilling Co., Joe Banks Enterprises. 682-9354
Tool pusher: Milo Wiseman, Gillette, Wyoming 307-682-9861
Spud: August 4, 1979 Plugged August 13, 1979
Well site geologist: J. P. Gries, Rapid City, S. D. 605-342-5841
Testing: B & S Testers, P. O. Box 1436, Gillette, Wyoming
Dean Boese, tester, 307-682-9626
Logging: Dresser-Atlas, Gillette, Wyoming 307-682-5123; Paul Gardner, Eng'r.
Ran BHC Acoustic w/ caliper and GR
Dual Induction focused log w/ GR
Casing: 596' of 8 5/8-inch 24 pound in 12¼-inch hole with 300 sacks cement

Bit record:	12 1/4-in.	Reed Y-12	145628	out of hole at 600 feet
	7 7/8-in.	Reed Y-12	40794	out of hole at 1432. 18 hr.
	7 7/8-in.	Reed Y-13	212925	out of hole at 1924. 20 hr.
	7 7/8-in.	Reed FP-53	141792	out of hole at 2462.

Cores: none

DST No. 1. Drillers depth 2336-2366. After strapping out, corr. to 2348-2378.

Test started 4:00 PM, Aug. 10th. Open 5 minutes, shut in 5 minutes, open 30 minutes, shut in 60 minutes. Recovered 600 feet gas cut muddy water and 1650 feet of gas cut sulfur water.

Pressures	inside	outside
IH	1163	1201
FH	1134	1172
IF-1	379	447
FF-1	437	566
IF-2	452	507
FF-2	988	954
SIP-1	1003	987
SIP-2	1006	987

E-log tops:		
	Sundance	822
	Spearfish	1164
	Goose Egg	1515
	Minnekahta	1689
	Opeche	1728
	Minnelusa	1817
	Red marker	2232 - 2240

JOHN PAUL GRIES
Consulting Geologist
220 ST. CHARLES STREET
RAPID CITY, SOUTH DAKOTA

Wulf No. 2 Wayne Peterson
Sample description by J. P. Gries

Note: There are intervals where samples were not taken or where depth labeling is obviously in error. Due to constant inflow of water from basal Lakota sand, drilling mud was not maintained until a critical depth was reached with the result that the button bit ground the cuttings very fine. Erros of depth were found when strapping out of hole. Cuttings above these points were not corrected to the new depth, and none of the samples was lagged to correct for return time.

Lakota formation

617 - 648 sandstone, f to m, poorly sorted, gray to white, with calcareous and pyritic cement

Morrison formation

648 - 679 shale or clay, gray to greenish gray; some new light green, very waxy
711 clay, conchoidal fracture, gray to greenish gray
741 clay, same; and very light gray lithographic limestone
805 clay, same; sample almost all limestone
836 shale and clay, brownish gray to greenish gray

Sundance formation

836 - 868 clay, same, and sandstone and siltstone, greenish gray, glauc.
896 shale, greenish gray; very poor sample
930 shale, greenish gray; trace glauconitic siltstone
1020 no samples
1170 samples mislabeled
1200 shale, silty, greenish gray

Spearfish formation (E-log top at 1164)

1200 - 1230 redbeds and anhydrite, cx, white
1260 anhydrite and redbeds
1290 redbeds
1310 redbeds; trace of anhydrite
1340 redbeds
1466 no samples
1498 redbeds; mostly cavings of Jurassic shale
1529 redbeds, poor sample
1560 redbeds, good

Goose Egg formation (E-log top at 1515)

1560 - 1592 redbeds and fresh white anhydrite
1686 no samples

.9

Wulf No. 2 Wayne Peterson (cont'd)

Minnekahta formation (E-log top at 1689)

1686 - 1717 redbeds and anhydrite; trace limestone very fx, pink, brown
- 1817 no samples

Opeche formation (E-log top at 1728)

no samples

Minnelusa formation (E-log top at 1817)

1817 - 1993 no samples
2013 traces of Minnelusa sand in very poor samples
2010 dolomite, orange and white sand, traces of anhydrite. Sample caught by geologist using 80-mesh sieve
2022 same finely ground mixture of dolomite and sand
2027 dolomite, light brown, dense, 2/3; anhydrite, white, 1/3; trace sandstone
2029 sandstone, fine, white, 1/2; dolomite, as above, 1/4; anh., 1/4
2033 poor sample, mostly redbeds
2043 log as anhydrite, 2/3; dolomite, 1/3
2053 dolomite, fx, light gray-brown, 1/2; anhydrite, fx to mx, white, 1/2
2063 anhydrite, same; 3/4; dolomite, same, 1/4
2073 dolomite, vy fx, dns, gray, 2/3; anhydrite, white, 1/3
2083 dolomite as above, 1/2; anhydrite, 1/2
2093 poor sample, log as anhydrite
2103 anhydrite, mx, white, 2/3; dolomite, very fx, dense, light gray-brown, 1/3
2123 anhydrite, same but some very sandy, 2/3; dolomite, same, 1/3.
2133 dolomite, finely crystalline, dense, gray-brown
2143 dolomite, same, 1/2; anhydrite, same, 1/2
2153 poor sample, about same; some anhydrite is very sandy
2163 anhydrite, same, 3/4; dolomite, same, 1/4
2173 dolomite, 2/3; anhydrite, 1/3
2183 dolomite, same, 1/2; anhydrite, same, 1/2
2193 poor sample; log as anhydrite
2200 no sample
2210 poor sample, trace splintery red shale
2220 no sample
2230 sample all gray shale, cvd
2240 same
2250 no sample
2260 circulated sample, all shale from above
2270 no sample
2283 poor sample; redbeds with some Minnelusa dolomite & anhydrite
2303 poor samples, probably fine white anhydritic sandstone and anh.
2310 starting to build up drilling mud; dolomite and anhydrite
2320 dolomite, fx, dense, light brown; trace sandstone, fn, white, por.
2333 probably dolomite, vy fx, light gray; trace sandy
2339 dolomite, fx, light gray, anhydritic, to medium gray, dense, 3/4; anhydrite, 1/4. First good sample after mudding up
2343 dolomite, medium gray dense, fractured w/ anhydrite in the fractures; dolomite, light gray, anhydritic

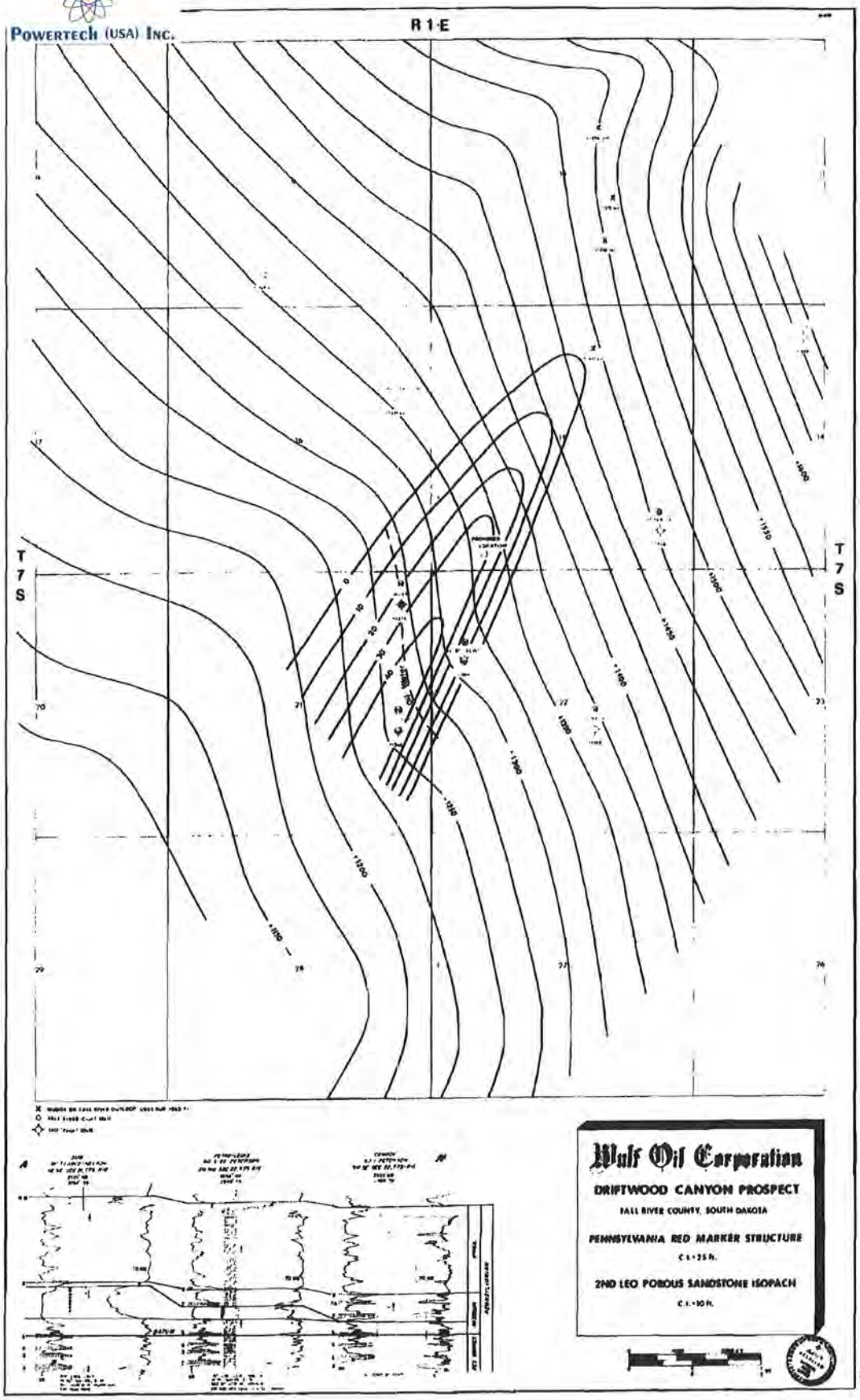
22

Wulf No. 2 Peterson (cont'd)

2343 - 2345 sandstone, f to m, rounded to angular, cemented w/ dolomite and anhydrite, light gray; some porous pieces have fair oil staining
2346 sandstone, same but better staining-some bleeding oil when first examined
2348 poor sample; some stained sandstone as above; some new tight white siltstone or fine sandstone
2352 sandstone, f to m, dolomitic, gray; little staining
2358 sandstone, poorly sorted, larger grains well rounded, tight, gray, little staining
2360 sandstone, f, round to angular, tight, with dolomite and anhydrite cement
2365 probably dolomite, argillaceous, dark gray
2366 dolomite, fx, medium gray, some sandy, grading to sandstone, fine, tight, gray; much black fissile shale. Circulated sample
SLM 2367 = 2383

2383 - 2388 Trip, poor sample. dolomite and some sand as above
2393 poor sample. Dolomite, vy fx, dense, gray to brown
2398 dolomite, vy fx, dense but slightly vuggy, medium gray; good sample
2403 dolomite, same, fractured with anhydrite healing the fractures; 2/3; sandstone, f, dolomitic, tight, gray, 1/3
2408 dolomite and sand, same; also more black fissile shale
2413 dolomite, vy fx, dense, medium gray
2420 dolomite, same, 2/3; sandstone, f, dolomitic, light gray
2425 dolomite, same, with some thin streaks black fissile shale
2430 dolomite, same, 1/3; shale, black, fissile, 2/3
2435 dolomite, same; still some black shale coming in
2440 dolomite, same, some sandy; traces mx white anhydrite
2445 dolomite, same, 2/3; sandstone, f, dolomitic, tight, gray, 2/3
2450 dolomite, same, 3/4; shale, black, fissile, 1/4
2455 dolomite, same, 1/2; sandstone, same, 1/4; shale, black, fissile, almost coaly, 1/4
2460 dolomite, vy fx, dense, very light gray
2462 dolomite, same, with some fractures healed with anhydrite
2462 circ. dolomite, same, 1/2; sandstone, vy f, dense, tight, no staining, 1/2. TOTAL DEPTH

21


R 1 E
T 7 S
T 7 S
Wulf Oil Corporation
DRIFTWOOD CANYON PROSPECT
FALL RIVER COUNTY, SOUTH DAKOTA
PENNSYLVANIA RED MARKER STRUCTURE
C.I. 25 ft.
2ND LEO POROUS SANDSTONE ISOPACH
C.I. 10 ft.

ADMINISTRATIVE / SUNDRY REPORTS

POWERTECH (USA) INC.

S. Dak. Oil & Gas Board
FORM 7

PLUGGING RECORD

Operator	Address
WULF OIL CORPORATION	P. O. BOX 1320 - CHADRON, NEBRASKA 69337

Name of Lease	Well No.	Field & Reservoir
Peterson	#2	Wildcat - Leo

Location of Well	Sec Twp-Rge or Block & Survey	County
330 FSL, 987 FWL (SE¼SW¼SW¼)	Sec. 15, T7S, R1E	Fall River

Application to drill this well was filed in name of	Has this well ever produced oil or gas	Character of well at completion (initial production): Oil (bbls/day)	Gas (MCF/day)	Dry?
Wulf Oil Corporation	No	N/A	N/A	YES

Date plugged	Total depth	Amount well producing when plugged: Oil (bbls/day)	Gas (MCF/day)	Water (bbls./day)
August 13, 1979	2462'	N/A	N/A	??

Name of each formation containing oil or gas. Indicate which formation open to wellbore 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
Leo	See Geologists Report, Attached	See Attached	2132-2232 25 sx. 1822-1922 25 sx 582 - 682 40 sx 5 - 25 10 sx. Surf. w/marker - 10 sx.

CASING RECORD

Size pipe	Put in well (ft.)	Pulled out (ft.)	Left in well (ft.)	Give depth and method of parting casing (shot, ripped etc.)	Packers and shoes
8 5/8"	596'	-0-	596'	N/A	None

Was well filled with mud-laden fluid, according to regulations?	Indicate deepest formation containing fresh water
Yes	Lakota (not sure of type of 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 sand, perforated interval to fresh water sand, 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.

on August 15, 1979 we went back in and squeezed the well with 50 sx. of cement to kill the water flow. (Cement had 3% CaCl)

RECEIVED SEP 1979 WESTERN FIELD OFFICE

USE REVERSE SIDE FOR ADDITIONAL DETAIL

Executed this the 10th day of September, 1979

State of Nebraska

County of Dawes

Dennis R. Stahl
Signature of Affiant

Before me, the undersigned authority, on this day personally appeared Dennis R. Stahl 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 10th day of September, 1979

SEAL

ANNE M. RUBECK
GENERAL NOTARY
State of Nebraska
My Commission Expires October 4, 1982

Anne M Rubeck
Notary Public in and for Dawes
County, Nebraska

My commission expires

DO NOT WRITE BELOW THIS LINE

Approved SEP 21 1979

OIL AND GAS BOARD OF THE STATE OF SOUTH DAKOTA

POWERTECH (USA) INC.

047 20077

S. Dak. Oil & Gas Board
FORM 4

WELL COMPLETION OR RECOMPLETION REPORT AND LOG

13

FARM OR LEASE NAME: Peterson

WELL NO: #2

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

FIELD AND POOL, OR WILDCAT: Wildcat

OPERATOR: WULF OIL CORPORATION

NO. ACRES IN LEASE: 1200.00

ADDRESS: P.O. BOX 1320 - CHADRON, NEBRASKA 69337

LOCATION (In feet from nearest lines of section or legal subdivision where possible)*

Surface: 330 FSL, 987 FWL (SE¼SW¼SW¼)

SEC. TWP. RGE.: SW¼SW¼ Sec. 15, T7S, R1E

Top prod. interval: Same

At total depth: Same

COUNTY: Fall River

PERMIT NO.	DATE ISSUED	PREVIOUS PERMIT NO.	DATE ISSUED
919	6-8-79	None	None

DATE SPUDDED	DATE T.D. REACHED	DATE COMPL. (Ready to Prod.)	ELEVATIONS (DF, RKB, RT, GR, etc.)*	ELEV. CASINGHEAD FLGE.
8-3-79	8-12-79	Dry Hole	3564 GR 3572 KB	Ground

TOTAL DEPTH (MD & TVD)	PLUG, BACK T.D. (MD & TVD)	IF MULTIPLE COMPL., HOW MANY*	INTERVALS DRILLED BY	ROTARY TOOLS	CABLE TOOLS
2462'	N/A	N/A	▸	X	

PRODUCING INTERVAL(S), THIS COMPLETION, TOP, BOTTOM, NAME (MD & TVD)*: None - Dry Hole

DATE DIRECTIONAL SURVEY SUBMITTED: None

TYPE ELECTRIC AND OTHER LOGS RUN (Circle those filed): BHC Acoustic,w/caliper & GR - Dual Induction Focused Log w/GR

WAS WELL CORED: No

CASING RECORD (Report all strings set in well)

CASING SIZE	DEPTH SET (MD)	HOLE SIZE	WEIGHT LBS./FT.	PURPOSE	SACKS CEMENT	AMOUNT PULLED
8 5/8"	596' KB	12¼"	24#	Surface	300 sx.	None

LINER RECORD				TUBING RECORD		
SIZE	TOP (MD)	BOTTOM (MD)	SACKS CEMENT*	SCREEN (MD)	SIZE	DEPTH SET (MD)	PACKER SET (MD)
	None					None	

PERFORATION RECORD				ACID, SHOT, 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—size & type of pump)	WELL STATUS (Prod. or Shut-in)
None - Below not applicable - Dry Hole		

DATE OF TEST	HOURS TESTED	CHOKE SIZE	PRODUCTION FOR TEST	OIL, Bbls.	GAS, Mcf.	WATER, Bbls. & C	OIL GRAVITY-API (Corr.)
			→				

FLOW. TUBING PRESS.	CASING PRESSURE	CALCULATED 24-HOUR RATE	OIL, Bbls.	GAS, Mcf.	WATER, Bbls.	GAS-OIL RATIO
		→				

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

TEST WITNESSED BY

RECEIVED SEP 19 1979 WESTERN FIELD OFFICE

LIST OF ATTACHMENTS: None

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

SIGNED Dennis R. Sloan TITLE President DATE 9-14-79

DO NOT WRITE BELOW THIS LINE

Approved SEP 21 1979 (Date)

OIL AND GAS BOARD OF THE STATE OF SOUTH DAKOTA

By J. W. Reese

S. Dak. Oil & Gas Board
FORM 6

SUNDRY NOTICES AND REPORT ON WELLS v

FARM OR LEASE NAME: Peterson

WELL NO.: #2

☒ OIL WELL ☐ GAS WELL ☐ ☒ DRY

FIELD AND POOL, OR WILDCAT: Wildcat

OPERATOR: WULF OIL CORPORATION

NO ACRES IN LEASE: 1,200.00

ADDRESS: P. O. BOX 1320 - Chadron, Nebraska 69337

LOCATION (In feet from nearest lines of section or legal subdivision, where possible): 330 FSL, 987 FWL (SE¼SW¼SW¼)

SEC. TWP. RGE.: SW¼SW¼ Sec. 15, T7S, R1E

ELEVATIONS (D.F., R.K.B., R.T., GRD., etc.; how determined): 3564' GR (Survey) 3572 KB

COUNTY: Fall River

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	Abandonment X	ALTERING CASING
ABANDON		(Note: Report results of multiple completion on Well Completion or Recompletion and Log Form. Form 4)	

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

Well was plugged on August 13, 1979 with plugs as follows:

2132 - 2232	25 sx
1822 - 1922	25 sx
582 - 682	40 sx
5 - 25	10 sx.
Surface w/ marker	10 sx

On August 15, 1979 it was necessary to go back in and squeeze the well with 50 sx, cement w/3% CaCl to kill the water flow.

Dry hole marker has been set, and location will be cleaned up and re-seeded as soon as possible. We would like to know if your office has any requirements as to the seed mixture it would like used when we do re-seed the location, etc.

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

SIGNED [signature] TITLE [illegible] DATE [illegible]

DO NOT WRITE BELOW THIS LINE

Approved SEP 21 1979 Date

OIL AND GAS BOARD OF THE STATE OF SOUTH DAKOTA

CONDITIONS, IF ANY

[signature]

RECEIVED
OIL & GAS BOARD
FIELD OFFICE

S. Dak. Oil & Gas Board
FORM 6

SUNDRY NOTICES AND REPORT ON WELLS

FARM OR LEASE NAME: Peterson

WELL NO.: #2

☒ OIL WELL ☐ GAS WELL ☐ ..... ☒ DRY

FIELD AND POOL, OR WILDCAT: Wildcat

OPERATOR: MELF OIL CORPORATION

NO. ACRES IN LEASE: 1,200.00

ADDRESS: P. O. BOX 1320 - CHADRON, NEBRASKA 69337

LOCATION (In feet from nearest lines of section or legal subdivision, where possible): 330 FSL, 987 FWL (SE¼SW¼SW¼)

¼ ¼ SEC. TWP. RGE.: SW¼SW¼ Sec. 15, T7S, R1E

ELEVATIONS (D.F., R.K.B., R.T., GRD., etc., how determined): 3564 GR (Survey) 3572 KB

COUNTY: Fall River

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	☒						

(Note: Report results of multiple completion on Well Completion or Recompletion and Log Form—Form 4)

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

Verbal permission to plug was obtained August 13, 1979.

Well to be plugged as follows:

2132 - 2232	25 sx
1822 - 1922	25 sx.
582 - 682	40 sx
5 - 25	10 sx.
Surface w/ marker	10 sx.

RECEIVED SEP 1979 WESTERN FIELD OFFICE

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

SIGNED Dennis Steed TITLE Resident DATE 9-10-79

DO NOT WRITE BELOW THIS LINE

Approved SEP 2 1 1979 (Date)

OIL AND GAS BOARD OF THE STATE OF SOUTH DAKOTA

CONDITIONS, IF ANY:

Fred V. Steece, Secretary

CORRESPONDENCE

Mr. Fred V. Steece, Supervisor
Western Field Office
36 East Chicago
Rapid City, SD 57701

Dear Mr. Steece:

This letter informs you that the surface restoration at the site of the following oil or gas test well has been completed to my satisfaction.

Permit	Well Name and Location
919	Wulf #2 Peterson, SWSW 15-7S-1E, Fall River

I am the surface owner of record.

SIGNED Wayne F. Peterson Jr. DATE 2/19/85

SURETY

NO SURETY INFORMATION FOR THIS WELL AS OF 5/18/2011

MISCELLANEOUS

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

Department of Environment & Natural Resources

...Today

Oil and Gas Search for: *api_no_ like '40 047 20085'*

Page 1 of 1	**Download Database** (Excel spreadsheet format)	Page: 1

Record 1 of 1

Well Information

API No:	40 047 20085	**County:**	FALL RIVER
Well Name:	WULF 1A PETERSON	**Location:**	NENE 21-7S-1E
Permit No:	957	**Total Depth:**	2460
Operator Name:	WULF OIL CORPORATION	**Bottom Hole:**	Minnelusa
Permit Date:	12-18-1979	**KB Elevation:**	3545
Spud Date:	01-13-1980	**Ground Elevation:**	3537
Plug Date:	01-24-1980	**Latitude:**	43.433064
		Longitude:	-103.996978
Well Field	WILDCAT	**Status**	P&A
Class:	DRY HOLE	**Type:**	DRY HOLE

Formation Tops

Formation	Depth (ft.)
Dakota Mud	335
Lakota	645
Sundance	840
Minnekahta	1705
Minnelusa	1840
Converse	1910
Red Marker	2267
1st Leo	2290
2nd Leo	2382

Page 1 of 1 (goto top)	Page: Prev 1 Next

COUNTY:	**FALL RIVER**
LEGAL LOCATION:	**NENE 21-7N-1E**
API NO:	**40 047 20085**
PERMIT NO:	**957**
WELL NAME:	**WULF #1-A PETERSON**
OPERATOR:	**WULF OIL CORPORATION**
PERMIT ISSUED:	**12/13/1979**
PERMIT CLOSED:	**04/21/1982**
FILE LOCATION:	**7N-1E-21 NENE**

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

BOND RELEASE CHECKLIST

Well Name & Location

Wulf #1-A Peterson
NENE 21-7S-1E, Fall River

Permit # 957

API # 40 047 20085

Bond # 708E675-4 Date Issued _____ Date Released NOV 06 1985

Surface Restoration

✓ Pits filled

✓ Site Level

✓ Site policed

NA Dry-hole marker solid, sealed, correctly inscribed

✓ No dry-hole marker desired, letter in UFO files from surface owner

✓ Letter of Approval from Surface owner

Paperwork filed

___ Form 4 (Completion or Recompletion Report)

✓ Form 6 (Sundry Notices and Report on Wells)

✓ Form 7 (Plugging Report)

Geological Information Filed

✓ Well Logs: IES, SNP, DIL, GR, HDLT, CALIP, Cement Bond, Temp, Micro, Laterlog, Williams

✓ DST Charts and Reports

✓ Geologist's Report

— Results of coring and core analyses (None Cut)

✓ Set of 10-foot sample cuttings (check with Bob Schoon)
(Transy To Vernal on 7-17-81)

Date NOV 1 1985 Checked By [signature]

PERMIT CHECKLIST

Well Name and Location:	Permit # 957
Wulf #1-A Peterson NENE 21-7S-1E, Fall River	API # 40 047 20085
	BOND # 708E675-4

Paperwork filed with WFO

X Organization Report

X Application

X Bond

X Permit Fee

The Following Papers sent to Operator:

X Permit (Form 2a)

X Receipt for $100 permit fee

X Cover letter explaining material sent

Permit Fee Filed:

X Permit fee w/Cash Receipts Transmittal Form sent to State Treasurer

Notification of New Permit sent to:

X Dr. Duncan J. McGregor

X [redacted] Mr. Warren R. Neufeld

X [redacted] Mr. Jack Gerken

X [redacted] Fall River County Auditor

Date 12-18-79 Check By Cheryl Pederson

2

PERMIT TO DRILL / INTENT TO DRILL

State Pub. Co., Pierre

APPLICATION FOR PERMIT TO:

S Dak Oil & Gas Board
FORM 2

☒ DRILL	☐ DEEPEN	☐ PLUG BACK	FARM OR LEASE NAME: Peterson
		☐ SINGLE ZONE	WELL NO: #1-A
☒ OIL WELL	☐ GAS WELL	☐ MULTIPLE ZONE	

OPERATOR
Wulf Oil Corporation

FIELD AND POOL, OR WILDCAT
Wildcat

ADDRESS
P. O. Box 1320 - Chadron, Nebraska 69337

NO. ACRES IN LEASE
1,200.00

LOCATION (In feet from an established corner of the legal subdivision)*
660' FNL - 458' FEL Section 21

¼ ¼ SEC. TWP RGE
NE¼NE¼ Sec. 21, T7S, R1E

COUNTY
Fall River

NAME AND ADDRESS OF SURFACE OWNER
Peterson & Son, Inc.
Edgemont, S.D.
HCR - 59, Box 16

ELEVATION
3,537 GR

PROPOSED DEPTH
2,400'

NO. OF WELLS ETC
1

ROTARY OR CABLE TOOLS
Rotary

NAME AND ADDRESS OF CONTRACTOR
Northern Wyoming Drilling Company
P. O. Box 487
Gillette, Wyoming 82716

APPROXIMATE DATE WORK WILL START
December 28, 1979

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

PROPOSED CASING AND CEMENTING PROGRAM

SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	NEW OR SECOND HAND	DEPTH	SACKS OF CEMENT
12¼"	8 5/8"	24#	New	250'	200 sx.
7 7/8"	5½"	15.50#	New	2,400'	150 sx.

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

We plan to drill a 2,400' well into the Leo Formation. We plan to start the well December 28, 1979 with operations lasting approximately 14 days.

Northern Wyoming Drlg. Rig #2 is equipped with a 10" Ragan Blowout Preventor which will be used while drilling the well.

DEC 1979
FIELD OFFICE

PERMIT NO. ______
DATE ISSUED ______

SIGNED R. Stan TITLE President Operator DATE 11-30-79

DO NOT WRITE BELOW THIS LINE

PERMIT NO. 857
SOUTH DAKOTA STATE GEOLOGICAL SURVEY WESTERN FIELD OFFICE

CHECKED BY (School and Public Lands) Date

APPROVAL DATE December 28, 1979

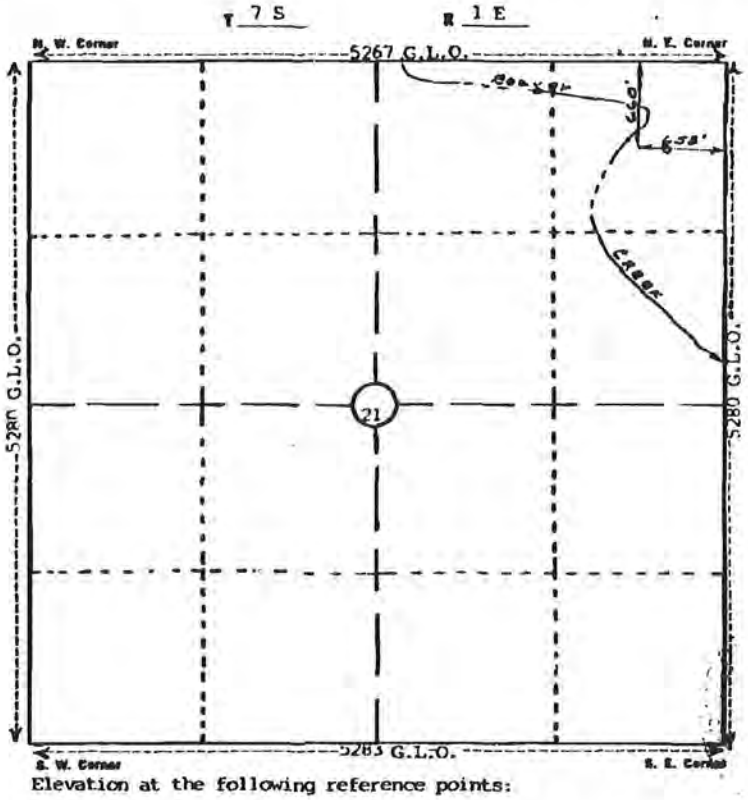
Supervisor, Western Field Office

CONDITIONS:

** COMPLETE SET OF SAMPLES, AND CORES IF TAKEN, MUST BE SUBMITTED.
** SAMPLES AND CORES IF TAKEN BELOW ______ DEPTH MUST BE SUBMITTED.

POWERTECH (USA) INC. & ENGINEERING
A DIVISION OF HOSKINS-WESTERN SONDEREGGER, INC
ENGINEERS • ARCHITECTS • PLANNERS • SURVEYORS

P.O. BOX 727 • NEWCASTLE, WY 82701 • 307 746 4453
1413 MAIN ST • MILES CITY, MT 59301 • 406 232 6666
P.O. BOX 432 • BUFFALO, WY 82834 • 307 684 7976
BHP&L BLDG • HOT SPRINGS, SD 57747 • 605 745 5800
P.O. BOX 2020 • GILLETTE, WY 82716 • 307 687 7205



WULF OIL CC
MAR 2[illegible] RECD

Elevation at the following reference points:

130' North (on bank of Beaver Creek) - 3532'
150' West (on bank of Beaver Creek) - 3533'
200' South - 3532'
200' East (possible alternate site) - 3537.4'

I Lawrence T. Price, of Newcastle, Wyoming, certify that in accordance with a request from Sherry Samuels of Gillette, Wyoming for Wulf Oil Corp.
P. O. Box 1320, Chadron, Nebraska 69337

That I [illegible] made a survey (date) November 29, 19 78 for the location and elevation of the #1 Peterson Wellsite

As shown on above map, the wellsite is in NE¼ NE¼ Section 21, Township 7 South, Range 1 East, Fall River County, South Dakota. Elevation is 3533 feet above mean sea level befor dozing.

Lawrence T. Price
Licensed Surveyor No.

789663.54
Notes in Bk 312 Pg 46

POWERTECH (USA) INC. 085

George R. Wulf, President
Dennis E. Stead, Vice-President
Lynne M. Gorichs, Secretary-Treasurer

Wulf Oil Corporation

P. O. Box 1320
Suite 25, Chaney Center Building
CHADRON, NEBRASKA 69337
Phone 308-432-4492

WELL DRILLING PROCEDURE RECOMMENDATION

LOCATION AND WELL NAME:	Wulf Oil #1-A Peterson NE¼NE¼, Section 21, T7S, R1E, Fall River County, South Dakota
METHOD OF DRILLING:	Rotary
HOLE SIZE:	12¼" surface - 7 7/8" drilling hole
CASING:	set 150' to 300' of 8 5/8" surface pipe.
MUD PROGRAM:	Gel chemical mud—weight 8829#'s per gallon—viscosity of 35-45 seconds per quart—viscosity of 75-100 for testing or logging--water loss of 8 cc's and Ph of 8295
SURVEYS:	Dual Induction Laterolog and Sonic-Gamma Ray log from base of surface casing to TD
DRILL STEM TESTS:	1-2nd Leo Sandstone
CORES:	None
SAMPLES:	Every 10' from base of surface casing to TD
POOL NAME:	None
ELEVATION:	3537'
DEPTH AND OBJECTIVE:	2400' or 250' below Red Marker, whichever is the lesser.
FORMATION DATA:	Dakota - 295' (+3238) Red Marker - 2208' (+1325) 2nd Leo - 2328' (+1205)
CONTRACTOR:	Northern Wyoming Drilling Company
GEOLOGIST:	Forest Twiford

WELL INSPECTION / SCOUT REPORTS

POWERTECH (USA) INC.
API ID 40 047 20085

SOUTH DAKOTA GEOLOGICAL SURVEY
Western Field Office

SCOUT REPORT

Permit Number 957

API Number 40 047 20085

Well Name Wulf #1-A Peterson

NENE Sec. 21 T. 7S R. 1E County Fall River

Elev. 3537 Gr Est. T.D. 2400 Actual T.D. 2460 Spudded 1/13/80

Contractor N. Wyoming #2 Geologist Dennis Stahl, Engr.

FORMATION TOPS:

PLUGGING RECORD: DATE PLUGGED/COMPLETED 1/24/80

CASING RECORD
8 5/8
FROM 0 TO 800
FROM ____ TO ____

	DRY HOLE MARKER	ADEQUATELY MARKED	MARKER STURDY	MARKER CAPPED	FENCES UP	MUD PITS FILLED	SITE LEVELED	SITE SMOOTHED	SITE SIZZED	SITE CLEAN	ROADS RECLAIMED	APPROVED	NOT APPROVED	LETTER TO SURFACE OWNER	LTR TO OPERATOR	SCOUTED BY
5/27/81	O	O	O	O	NA	X	X	X	O	O	X		X			KEF,WES
6/9/82	O	O	O	O	NA	X	X	X	O	X	X		X			JRC,JDO
7-13-82															X	
7/11/83													X			MNS,DWE

X - Satisfactory O - Not satisfactory NA - Not applicable

REMARKS: 5/27/81: Includes #1 &1A Peterson; landowner unhappy w/results. ~~MC~~ letter regarding dry hole marker. 6/8/82: Mr. Peterson not satisfied with restoration. Says he seeded site himself, but only weeds grew. Company didn't seed site. Lots of garbage in creek; looks like owner dumped it.

* No dry hole marker de _red ltr from land owner in _ile dated 4/10/79.

7/11/83: Mr. Peterson contacted company in 1982. They said they would look at the site, but never have. Mr. Peterson says site is still very rough and he's not satisfied. Didn't visit site. Owner said site has not changed. MNS.

SOUTH DAKOTA GEOLOGICAL SURVEY
Western Field Office

SCOUT REPORT

Number 1

Date Scouted 1-9-80

Operator Wulf Oil Company

Permit Number 957

Farm/Lease Name #1-A Peterson

API Number 40 047 20085

NENE Sec. 21 T. 7S R. 1E County Fall River

Elev. 3537 Gr. Est. T.D. 2400 Actual T.D. 2460 Spudded 1-13-80

Contractor N. Wyoming Drilling #2 Geologist Dennis Staal, Engr.

SCOUT'S OBSERVATION:

RURT, will spud 1-13-80

Plugged: 1-24-80

DST RECORD:

#1: 23900-2410; rec 200 SG&MCW
1200 GC sulfur/lo gas

FORMATION TOPS:

Dakota	0335	Minnelusa	1840
Lakota	0545	Blue Anhyd	1910
Sundance	0840	Red Marker	2267
Basal	1130-1195	1st Leo	2290
Minnekahta	1705	2nd Leo	2382

PLUGGING RECORD:

DATE PLUGGED/~~COMPLETED~~ 1-24-80

2300-2200----40 sax
1922-1800----25 sax
1149-1050----30 sax
0868-0750----50 sax
Surface ----10 sax

9-09-80: Site is clean, level, seeded. Pits are filled, there is no marker and no letter from landowner in files.

CASING RECORD:

8 5/8 From 0 To 800

____ From ____ To ____

SITE INSPECTION:

Approved ____

Not Approved X

REMARKS:

SCOUTED BY Tim Kenyon — Fred V. Steece

Tim Kenyon
Geologic Assistant

Fred V. Steece, Supervisor
Western Field Office

OPERATOR'S TECHNICAL REPORTS / MAPS

Wulf Oil Corporation

DAILY DRILLING REPORT

DATE: January 25, 1980 OPERATOR: Wulf Oil Corporation

WELL NAME AND LOCATION: #1-A Peterson, NE¼NE¼, Sec 21, T7S, R1E, Fall River Co., S.D.

DEPTH: T.D.

BIT NUMBER: _____

DRILLING MUD
PROPERTIES: WT. _____ VIS. _____ PH _____ H_2O LOSS _____

1-25

DRILLERS REPORT:
Present operation - rigging down

8 hours plugging & laying down pipe
8 hours waiting on orders
8 hours rigging down

Cost to date - $182,158.15

1-24

PROPERTIES: WT. 10.6 VIS. 60 PH 10 H_2O LOSS 6
Cake - 1/32nds

DRILLERS REPORT:
Drilled 0' in last 24 hours. 135 total rotating hours
Present operation - tripping w/DST #2; testing Leo Sand
Recovered 1366' of gas cut water

5¼ hours testing
5 hours tripping
12 hours waiting on orders
1 3/4 hours pick up test tool

GEOLOGISTS REPORT:
DST #2—interval tested was 2395-2404'. TD Driller-2463';TD Logger-2459'

Opened tool with weak blow ¼" in water bucket; decreased to surface bubbles after 5 min.
Remained for rest of 15 min. flow.
Closed tool for 60 min; opened tool with ¼" blow on surface and remained steady for 20 min; decreased to surface bubbles for remainder of test.
Closed tool for 120 min—no gas to surface.
Recovered 1366' of slightly gas cut sulphur water.

Rw top sample 1.10 @ 46° F
Rw mid sample 1.10 @ 46° F
Rw bottom sample 1.20 @ 40° F
Rw sample - 1.10 @ 44° F
Rw of make-up water - 4.1 @ 50° F
Rw of mud pit sample - 1.38 @ 50° F
Total volume-sampler—2400 cc's
Total volume-sample —2250 cc's

Oil - none
Water - 2250 cc's
Mud - none
gas - 1.18 cubic feet
Other - none

8

#1-A Peterson
January 24, 1980
Page 2

Pressures

IH	1388	1392
FH	1374	1392
IF_1	30	-
FF_1	89	-
IF_2	179	-
FF_2	596	-
SIP_1	1013	1197
SIP_2	1013	-

BOP Temperature - 86° F

Wulf Oil Corporation recommends plugging; please indicate your confirmation as soon as possible today.

1-23 GEOLOGISTS REPORT:

Ran Dual Laterolog and GR-Neutron Density Logs. TD Driller-2460'; TD Logger-2459'. KB-3545'.

Log Tops

Dakota	336	
Lakota	545	
Morrison	686	
Sundance	840	
Minnekahta	1707	
Red Marker	2267	(+1271)
2nd Leo Zone	2385	(+1160)
2nd Leo SS	2399	(+1146)

Notes:

1) 2nd Leo SS is 6' high to #1 Peterson.
2) Based on core analysis in #1 Peterson, the zone 2399-2405 should be productive in the #1-A.
3) Preparing to run DST #2 2397-2404. Test should be out tomorrow a.m.

DRILLERS REPORT:

Drilled 0' in last 24 hours
Present operation - waiting on orders

6 hours waiting on loggers
9 hours waiting on orders
9 hours logging

Cost to date - $155,362.15

GEOLOGISTS REPORT:

Calculating & analyzing logs.

PROPERTIES: WT. 10.° VIS. 80 PH 10 H2O LOSS 6

1-22

DRILLERS REPORT:
10 days from spud. Drilled 50' in last 24 hours.
Present operation - out of hole to log.
Bit #3 7 7/8" F3—in at 2410', out @ 2460'; drilled 50' in 6 3/4 hours
30,000# wt., 55 rpms, 5½ x 14 pump, 52 SPM, 950# pump pressure
6 3/4 hours drilling
9½ hours tripping
3 hours rig repair
1½ hours testing
3/4 hour rig service
2½ hours circulating

Cost to date - $147,794.15
GEOLOGISTS REPORT:

Drilled last 50' at 5-10 mpf with a few 2-3 mpf.
Present operation is waiting on loggers
Samples are poor and soupy--Shale shaker is freezing up because mud is sticking.
Will have sample descriptions later

DRILLING MUD
PROPERTIES: WT. 10.6 VIS. 63 PH 10 H2O LOSS 6

1-21

DRILLERS REPORT:
Drilled 0' in last 24 hours. 129 total rotating hours.
Present formation - Leo Sand
Present operation - testing Leo
Bit #2 7 7/8" FP53--in at 1810', out at 2400'; drilled 600' in 54 hours.
30,000# wt., 55 rpms, 54 SPM, 900# pump pressure
5½ hours tripping
3 hours waiting on test tool
11½ hours waiting on orders
¼ hour rig service
3 3/4 hours testing
Pipe strap was 2432' and tally board was 2422'
Cost to date - $129,411.08
GEOLOGISTS REPORT:
DST #1 from 2390-2410' (depth correction of 10'). Corrected Drilling top of Red Marker -2270'
Corrected top of 2nd Leo - 2400'
IF period of 15 minutes
Tool opened with weak blow ½ min. in bucket. 5 min. blow increased to 1 min. 15 minute blow increased to 2 min.

ISI period--60 minutes
FF period of 90 minutes, opened tool with weak blow ½ min in bucket, 5 min blow increased to 1 min, 15 min blow increased to 2 min, 15 - 90 minutes blow remained steady in bucket.
Closed tool, blow died in 1 minute.

Recovered 1400' of fluid. 200' of slightly gas cut/mud cut water
1200' of gas cut sulphur smelling water. Gas would burn at tool joints.

Rw top sample - .129 @ 50° F
Rw mid sample - 0.8 @ 50° F
Rw bottom sample - 0.89 @ 50° F
Rw of make-up water - 4.1 @ 50° F
Mud pit sample Rw - 1.38 @ 50° F
Rw-sampler - 0.80 @ 50° F
Pressure in sampler - 30 psi
Total volume - 2700 cc's Total volume of sample - 2600 cc's

Oil - none
Water - 2600 cc's
Mud - none
gas - .16 cubic feet

#1-A Peterson
Page 2
January 21, 1980

Pressures

IH	1334	1388
FH	1334	1388
IF_1	3	36
FF_1	146	149
IF_2	207	265
FF_2	583	596
SIP_1	985	1013
SIP_2	991	1016

BOP temperature--86° F

Will drill to 2460' and run Dual Laterolog and GR-Density-Neutron to determine if additional DST's are needed.

17

Wulf Oil Corporation

DAILY DRILLING REPORT

DATE: January 20, 1980 OPERATOR: Wulf Oil Corporation

WELL NAME AND LOCATION: #1-A Peterson, NE¼NE¼, Sec 21, T7S, R1E, Fall River Co., SD

DEPTH: 2400'

BIT NUMBER: 2

DRILLING MUD PROPERTIES: WT. 10 VIS. 45 PH 10 H_2O LOSS 6

DRILLERS REPORT:

7 days from spud. Drilled 110' in last 24 hours.
Present formation - sand
Present operation - circulating samples
Bit #2 7 7/8" FP53—in at 1810; drilled 590' in 54 hours.
30,000# wt., 55 rpms, 52 SPM, 950# pump pressure
Survey at 2290' - 3/4° dev.
21 hours drilling
1½ hours circulating
½ hour survey
1 hour repairs

GEOLOGISTS REPORT:

Drilling in Upper Pennsylvanian.

2:00 p.m. report —top of 2nd Leo Zone at 2390'. Good drilling break from 20 mpf to 2 mpf. Circulated samples were SS, excellent P & P, good visible stain, excellent fluor and excellent streaming cut. TD 2400'. Will test from 2385-2400'. Test should be out by noon 1-21-80.

Wulf Oil Corporation

DAILY DRILLING REPORT

DATE: January 19, 1980 OPERATOR: Wulf Oil Corporation

WELL NAME AND LOCATION: #1-A Peterson, NE¼NE¼, Sec 32, T7S, R1E, Fall River Co., SD

DEPTH: 2290'

BIT NUMBER: 2

DRILLING MUD
PROPERTIES: WT. 9.0 VIS. 40 PH 9 H_2O LOSS 10

DRILLERS REPORT:

6 days from spud. Drilled 360' in last 24 hours.
Present formation-sand; Present operation-drilling
Bit #2 7 7/8" FP53--in at 1810'; drilled 480' in 33 hours.
30,000# wt., 55 rpms, 52 SPM, 900# pump pressure

24 hours drilling

GEOLOGISTS REPORT:

Drilling in lower Permian.

Gulf Oil Corporation

DAILY DRILLING REPORT

DATE: January 16, 1980 OPERATOR: Gulf Oil Corporation

WELL NAME AND LOCATION: #1-A Peterson, NE¼NE¼, Sec 21, T7S, R1E, Fall River Co., SD

DEPTH: 1035'

BIT NUMBER: 1

DRILLING MUD
PROPERTIES: WT. drilling with water VIS. _____ PH _____ H_2O LOSS _____

DRILLERS REPORT:

3 days from spud.
Drilled 233' in last 24 hours. 43 total rotating hours.
Present formation - Shale
Present operation - working on motor
Bit #1 Y-12 — in at 802'; drilled 233' in 7 hours.
25,000# wt., 100 rpms.
7 hours drilling
15¼ hours waiting on cement
3/4 hour cement
1 hour circulating casing

Set 18 joints of 8 5/8" JE24# - set 792' at 802'

Cement - 380 sxs regular, 3% CaCl, 1% chip plug.

$85,061.49 — Cumulative Costs.

POWERTECH (USA) INC.

BIT NUMBER: 2

DRILLING MUD
PROPERTIES: WT. drill w/water VIS. _____ PH _____ H_2O LOSS _____

DRILLERS REPORT:

5 days from spud. Drilled 180' in last 24 hours.
Present operation - drilling
Bit #1 7 7/8" Y12--in at 802', out at 1810'; drilled 1008' in 31 hours,
Bit #2 7 7/8" FP-53--in at 1810'; drilled 120' so far.
25,000# wt., 55 rpms, 54 SPM, 800# pump pressure
9 hours drilling
12½ hours tripping (had to borrow drill collars from another rig)
1½ hours reaming
1 hour cleaning mud tank

Cost to date - $97,224.84

GEOLOGISTS REPORT:

DRILLERS REPORT:

4 days from spud. Drilled 115' in last 24 hours. 75 total rotating hours.
Present operation - Drilling
Bit #1 7 7/8" Y12--in at 802'; drilled 948' in 29 hours.
pump 5½ x 14, 54 SPM, 950# pump pressure
22 hours drilling
2 hours mixing mud

Cost to date - $93,593.54

GEOLOGISTS REPORT:

.API ID 40 047 20085

Gulf Oil Corporation

DAILY DRILLING REPORT

DATE: January 15, 1980 OPERATOR: Gulf Oil Corporation

WELL NAME AND LOCATION: #1-A Peterson, NE¼NE¼, Sec 21, T7S, R1E, Fall River Co., SD

DEPTH: 802'

BIT NUMBER: _____

DRILLING MUD PROPERTIES: WT. water flow VIS. _____ PH _____ H_2O LOSS _____

DRILLERS REPORT:

37½ total rotating hours
Present formation - shale
Present operation - circulating casing

Bit #1-A 12¼" — in at 0', out at 802'; drilled 802' in 37½ hours.
Survey at 802' - 2° deviation

19½ hours drilling
2 hours tripping
2½ hours run casing
½ hour survey

Cumulative Costs - $74,381.91

GEOLOGISTS REPORT:

Gulf Oil Corporation

DAILY DRILLING REPORT

DATE: January 14, 1980 OPERATOR: Gulf Oil Corporation

WELL NAME AND LOCATION: #1-A Peterson, NE¼NE¼, Sec 21, T7S, R1E, Fall River Co., SD

DEPTH: 300'

BIT NUMBER: 1-A

DRILLING MUD PROPERTIES: WT. 8.6 VIS. 35 PH _____ H_2O LOSS _____

DRILLERS REPORT:

1 day from spud
Drilled 300' in last 24 hours
18 total rotating hours
Present formation - shale
Present operation - drilling
Bit #1-A 12 3/4" Y-12--in at 0'; out at 300', drilled 300' in 18 hours
110 rpms, 54 SPM, 600# pump pressure
Survey at 300' - 1° deviation
18 hours drilling
6 hours waiting on water

Cumulative Costs - $66,894.07

GEOLOGISTS REPORT:

POWERTECH (USA) INC.
Phone (307) 682-3616
or
(307) 682-6628

B&S Testers

Box 1436
Gillette, WY 82716

Field Ticket 1182 B&S Testers District Gillette, Wy. Date January 21, 1980

Operator Wulf Oil Corporation

Address P.O. Box 1320
Chadron, Nebraska 69337

Well Name & Number Peterson #1-A DST No. 1 Net Ft. Pay 10

Contractor N.W.D.C.	Top Choke 3/8"	Flow No. 1 15 Min.
Rig No. 2	Bottom Choke 3/4"	Shut-in No. 1 60 Min.
Spot NE NE	Size Hole 7 7/8	Flow No. 2 90 Min.
Sec. 29 21	Size Rat Hole 7 7/8	Shut-in No. 2 120 Min.
Twp. 7S	Size & WT. D. P. 3 1/2 IF 13.30	Flow No. 3 - Min.
Rng. 1E	Size Wt. Pipe None	Shut-in No. 3 - Min.
Field Wildcat	I. D. of D.C. 2.25 4 1/2 XH	Bottom Hole Temp. 86
County Fall River	Length of D.C. above Test 415	Mud Weight 10.6
State South Dakota	Total Depth 2410	Gravity 1.11
K. B. Elevation 3545 GL. 3537	Interval Tested 2390-2410	Viscosity 63
Formation 2 nd Leo	Type of Test Conventional	Test Opened @ 03:37 AM 1/21/80

BLOW: 00:15-Start tools in hole.
03:37-Open tool w/weak blow 1/2" deep in the water. 5 min., blow increased to 1" deep in the water. 15 min., blow increased to 2" deep in the water.
03:52-Close tool-blow died in 1 min.
04:52-Open tool w/weak blow-1/2" deep in the water. 5 min., blow increased to 1" deep in the water. 15 min., blow increased to 2" deep in the water. 30 min., blow steady @ 2" deep in the water. 60 min., blow steady @ 2" deep in the water. 90 min., blow steady @ 2" deep in the water.
06:22-Close tool-blow died in 1 min.
08:22-Equalize tools & work loose.

REMARKS: No gas to surface.

Top Pkr at 2384	Middle Pkr at -
Bottom Pkr at 2390	4th Pkr at -
Length of Test Interval 20	
Test Interval: Anchor 20 Collars 0 DP 0	
Below Straddle: Anchor - Collars - DP -	
Was tool plugged? No Was anchor plugged? No	
Did bottom packer hold? Yes Press. below bottom pkr -	

TIME	MIN./P.S.I.	CHOKE	M CUBIC FEET/DAY

RECEIVED FEB 1980 WESTERN FIELD OFFICE

Cushion None Amount - Ft.

Total Fluid Recovered 1400 Ft. Consisting of: -

200 Ft. of Slightly gas cut, mud cut water
1200 Ft. of Gas cut sulpher smelling water.
gas would burn in tool joint.
Ft. of
Ft. of

Test was/was not reverse circulated? Was not

Recovery

Top Sample R.W. 1.29 @ 50°
Middle Sample R.W. 0.9 @ 50°
Bottom Sample R.W. 0.89 @ 50°

Pressure in Sampler: 30 PSIG
Total Volume of Sampler: 2700 cc.
Total Volume of Sample: 2600 cc.
Oil: None cc.
Water: 2600 cc.
Mud: None cc.
Gas: .16 cu. ft.
Other: -
Sample R.W.: 0.80 @ 50°
Gravity - Gas/Oil Ratio -
Make Up Water R.W.: 4.1 @ 50°
Mud Pit Sample R.W.: 1.38 @ 50°
Where was Sample drained? Rotary table

	Type AK-1 No. 3051	Clock	Type AK-1 No. 2015	Clock	Type No.	Clock
	Cap. 5700 Lor. 2364 No. 21070		Cap. 5750 Lor. 2406 No. 13496		Cap. Lor. No.	
	Inside X Outside Hrs. 24		Inside Outside X Hrs. 24		Inside Outside Hrs.	

	Press.	Field	Corrected	Press.	Field	Corrected	Press.	Field	Corrected
IH	A	1334	1357	IH	1388	1388	IH		
FH	K	1334	1349	FH	1388	1354	FH		
IF-1	B	3	17	IF-1	36	39	IF-1		
FF-1	C	146	160	FF-1	149	152	FF-1		
IF-2	E	207	242	IF-2	265	268	IF-2		
FF-2	F	583	612	FF-2	596	611	FF-2		
IF-3	H			IF-3			IF-3		
FF-3	I			FF-3			FF-3		
SIP-1	D	985	1006	SIP-1	1013	1022	SIP-1		
SIP-2	G	991	1006	SIP-2	1016	1022	SIP-2		
SIP-3	J			SIP-3			SIP-3		

B&S TECHNICIAN

Dean Boese

No. Final Copies 15

WELL OWNERS REPRESENTATIVE (Please Print Legibly)

Badgley-Mills-Wireman

TIME: First Flow 39 152
ICIP 1022
Second Flow 268 611
ICIP 1022

Factor:
Initial Hydrostatic 1388
Final Hydrostatic 1354

Gauge No. 2015 Depth 2406 Clock No. 13496 Hour 24 Ticket Number 1182

	1st FLOW PRESSURE Time Defl. .000"	1st FLOW PRESSURE Psi Defl. .000"	Psi Temp. Corr.	INITIAL CIP Time Defl. .000"	INITIAL CIP Psi Defl. .000"	Psi Temp. Corr.	2nd FLOW PRESSURE Time Defl. .000"	2nd FLOW PRESSURE Psi Defl. .000"	Psi Temp. Corr.	FINAL CIP Time Defl. .000"	FINAL CIP Psi Defl. .000"	Psi Temp. Corr.
P-1				.000	.102	152				.000	.410	611
P-2				.014	.628	936				.030	.638	95
P-3				.027	.642	957				.061	.652	972
P-4				.041	.650	969				.091	.660	983
P-5				.054	.658	981				.121	.666	993
P-6				.068	.664	990				.151	.670	999
P-7				.082	.668	996				.182	.672	1001
P-8				.095	.670	999				.212	.674	1004
P-9				.109	.674	1004				.242	.676	1007
P-10				.122	.676	1007				.272	.678	1010
P-11				.136	.680	1013				.303	.680	1013
P-12				.150	.680	1013				.333	.682	1016
P-13				.163	.682	1016				.363	.683	1017
P-14				.177	.683	1017				.393	.685	1020
P-15				.190	.685	1020				.424	.686	1022
Ext.				.204	.686	1022				.454	.686	1022

Remarks:

25 of 39

COMPANY GULF OIL COMPANY

WELL API 40 047 20085 GULF-PETERSON #1-

FIELD WILDCAT

COUNTY FALL RIVER

STATE SOUTH DAKOTA

Quantitative Log Interpretc

This interpretation represents [illegible] best judgement. However, because all log analysis is based on best assumptions and empirical relationships, we cannot guarantee the accuracy of these figures. For this reason, we must disclaim any responsibility for any loss or expense which results from the use of this interpretation.

Dresser Atlas

DEPTH	ΔT	ϕ_{AL}	D_B	ϕ_D		R_w	R_t	R_{wa}	S_w	Remarks
2399 2403		20		12		.45	50	.4	80	If use Rw=.65 @ 100 Then Sw 95
2404-06		22		[illegible]		.45	[illegible]		100	
2406-08		25		12		.45	40		86	
2409-11		21		17		.45	30		72	
2412-14		21		17		.45	32		84	
2414-16		20.5		17.5		.45	26		78	
2416-19		23		19		.45	26		69	
2420-21		22		16		.45	70		50	
2422-23		20		10		.45	40		100	
2422-25		19		8		.45	110		80	
2425-27		18		7		.45	65		100	$S_w\sqrt{\frac{R_w}{\phi^2 R_T}}$
2298 2304		18		8		.65	15		100	
2291-95		18		7		.65	22		100	R_w TOP 1.29 @ 50
										R_w MIDDLE .9 @50
2171-74		14		2		.65	1000		100	R_w @ .89 @ 50
2176-80		20		6		.65	30		100	R_w @ .65 @ 100
2182-88		20		6		.65	65		100	R_w @ .45 @ 100
1967-72		23		17		.65	75		55	
1973-78		23		17		.65	100		45	

References

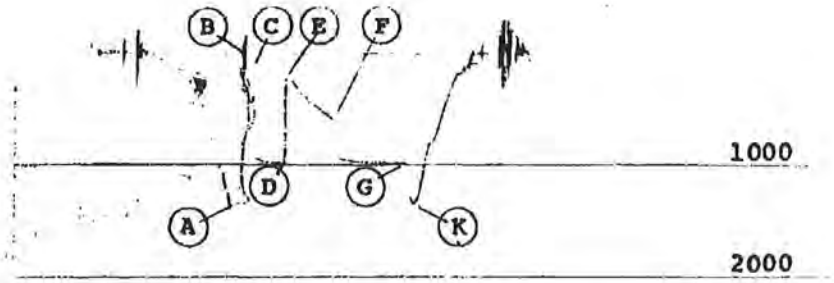
ΔT_{ma} D_{ma}

ΔT_f D_f

ΔT_{sh}

G. VAUGHN
DRESSER ATLAS ENGINEER

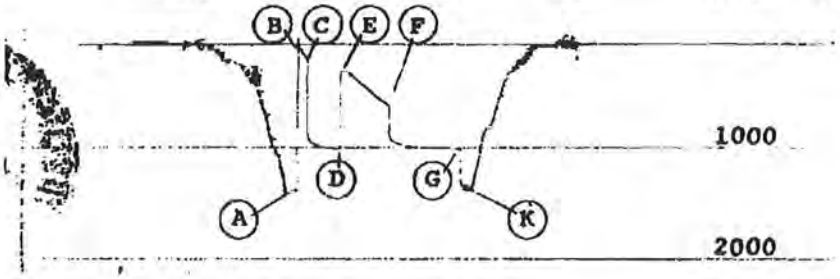
1/21/80
DATE



Ticket No. 1182 D.S.T.No.1 Gauge No. 3851

PRESSURE

TIME



Ticket No.1182 D.S.T.No.1 Gauge No. 2015

Each Hor ontal Line Equal to 10. p.s.i.

14

ADMINISTRATIVE / SUNDRY REPORTS

POWERTECH (USA) INC.

7 20085

5 Dak (Oil & Gas) Board
FORM 7

PLUGGING RECORD

Operator	Address
Wulf Oil Corporation	P.O. Box 1320, Chadron, NE 69337

Name of Lease	Well No	Field & Reservoir
Peterson	1-A	Wildcat - Dry

Location of Well	Sec-Twp-Rge or Block & Survey	County
NE¼NE¼ Sec. 21, T7S, R1E		Fall River

Application to drill this well was filed in name of	Has this well ever produced oil or gas	Character of well at completion (initial production) Oil (bbls/day)	Gas (MCF/day)	Dry
Wulf Oil Corporation	No	---	---	Yes

Date plugged:	Total depth	Amount well producing when plugged: Oil (bbls/day)	Gas (MCF/day)	Water (bbls./day)
January 25, 1980	2460'	0	0	0

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.
Dry	---	---	---

CASING RECORD

Size pipe	Put in well (ft.)	Pulled out (ft.)	Left in well (ft.)	Give depth and method of parting casing (shot, ripped etc)	Packers and shoes
8-5/8"	802'	0	802'	---	None

Was well filled with mud-laden fluid, according to regulations?	Indicate deepest formation containing fresh water.
Yes	None

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 sand, perforated interval to fresh water sand, 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.

January 25, 1980 Plugs were placed as follows:

2200 to 2300	40 sx.
1800 to 1900	25 sx.
1050 to 1150	30 sx.
750 to 850	40 sx.
surface no/marker	10 sx.

Plugged and abandoned 1-25-80

USE REVERSE SIDE FOR ADDITIONAL DETAIL

Executed this the 8th day of January, 19 80.

State of Nebraska

County of Dawes

George R. Wulf
Signature of Affiant

Before me, the undersigned authority, on this day personally appeared George R. Wulf 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 8th day of January, 19 80.

GENERAL NOTARIAL SEAL
STATE OF NEBRASKA
My commission expires
May 21, 1985

Notary Public in and for Dawes
County, Nebraska

APR 2 1 1982
Approved Date

DO NOT WRITE BELOW THIS LINE

OIL AND GAS BOARD OF THE STATE OF SOUTH DAKOTA

S. Dak. Oil & Gas Board
FORM 6

SUNDRY NOTICES AND REPORT ON WELLS

FARM OR LEASE NAME: Peterson
WELL NO: #1A

☒ OIL WELL ☐ GAS WELL ☐ ☒ DRY

FIELD AND POOL, OR WILDCAT: Wildcat

OPERATOR: WULF OIL CORPORATION

NO ACRES IN LEASE: 1,200.00

ADDRESS: P. O. BOX 1320 - CHADRON, NEBRASKA 69337

LOCATION (In feet from nearest lines of section or legal subdivision, where possible): 660 FNL — 458 FEL Section 21 (NE¼NE¼)

¼ ¼ SEC TWP RGE: NE¼NE¼ Sec. 21, T7S, R1E

ELEVATIONS (D.F., R.K.B., R.T., GRD., etc., how determined): 3537' Ungraded Ground (Surveyed Elevation)

COUNTY: Fall River

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 X		(Note: Report results of multiple completion on Well Completion or Recompletion and Log Form—Form 4)	

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

Verbal permission was obtained to plug the well [redacted] January 25, 1980.

Plugs to be placed as follows:

2200 to 2300	40 sx.
1800 to 1900	25 sx.
1050 to 1150	30 sx.
750 to 850	40 sx.
Surface w/marker	10 sx.

RECEIVED MAR 1980 WESTERN FIELD OFFICE

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

SIGNED Dean R. Stahl TITLE President DATE 1/31/80

Approved Mc... Date

CONDITIONS, IF ANY:

DO NOT WRITE BELOW THIS LINE

OIL AND GAS BOARD OF THE STATE OF SOUTH DAKOTA

Fred A. Steck Secretary

CORRESPONDENCE

Mr. Fred V. Steece, Supervisor
Western Field Office
36 East Chicago
Rapid City, SD 57701

Dear Mr. Steece:

This letter informs you that the surface restoration at the site of the following oil or gas test well has been completed to my satisfaction.

Permit	Well Name and Location
957	Wulf #1-A Peterson, NENE 21-7S-1E, Fall River

I am the surface owner of record.

SIGNED Wayne L Peterson & Bea DATE 9/18/85

WULF OIL CORP.

APR 2 - 1982

Edgemont, South Dakota 57735
April 8, 1982

Wulf Oil Corporation
P.O. Box 1320
Chadron, NE 69337

Attention: Tim Schuckman

Re: Wulf #1-A Peterson
NE1/4NE1/4, 21-75-1E
Fall River County, South Dakota

Dear Mr. Schuckman:

This is to advise Wulf Oil Corporation that as surface owner I hereby request that no dry hole marker be erected for the above referenced well.

Very truly yours,

Wayne Peterson

APR 1982
WESTERN FIELD OFFICE

March 11, 1980

Ms. Deb Richards
Wulf Oil Corporation
P.O. Box 1320
Suite 25, Chaney Center Bldg.
Chadron, NE 69337

Dear Ms. Richards:

Please find enclosed the approved copy of Sundry Notices and Report on Wells, (Form 6) for the following well:

Permit	Well Name and Location
957	Wulf #1A Peterson, NENE 21-7S-1E, Fall River

This is for your information.

If there is any other way that I can be of help, please let me know.

Sincerely,

Fred V. Steece, Supervisor
Western Field Office

FVS/cp
Enc.
cc: Dr. Duncan J. McGregor

SURETY

NO SURETY INFORMATION FOR THIS WELL AS OF 5/18/2011

MISCELLANEOUS

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

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SOURCE E

DEWEY BURDOCK GROUNDWATER WELL REPORT

2010 & 2011 FIELD WORK COMPLETED

(Mike Beshore, Powertech (USA) Inc., October 4, 2011)

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Dewey Burdock Groundwater Well Report (2010 & 2011 – Field Work Completed):

During the field seasons of 2010 and 2011, Powertech personnel conducted groundwater well work at the Dewey Burdock project area. This work consisted of locating groundwater wells within the Area of Review (AOR), monitoring water levels of selected wells, measuring flow rates of artesian wells, and determining groundwater well construction information by running the down-hole camera and geophysical logging tools. Groundwater wells within the AOR are shown in **Map 1**. The conducted field work is detailed below.

Groundwater Level Measurements:

Groundwater levels were monitored by Powertech personnel on selected groundwater wells, in order to construct groundwater potentiometric surfaces for various aquifers. Standard operating procedures (SOP) for water level measurements under artesian and sub-surface conditions are shown in **Attachment 1**. Groundwater elevation data from the monitoring program are contained within **Table 1**. It should be noted that a significant amount of work had to be completed on many groundwater well surface casings in order to obtain accurate measurements. This was particularly the case for artesian groundwater wells that needed to be fully sealed up and shut in, in order to obtain accurate pressure measurements. Below is a photograph showing an example of well head work completed in order to accurately obtain artesian pressure measurements.

Artesian/Windmill Groundwater Well Flow Rates:

Groundwater wells that free-flow at the ground surface under artesian pressure and by the use of a windmill and their associated flow rates are shown in **Table 2**. This information was provided to Petrotek to incorporate into the project area groundwater flow model. Flow rates of free flowing groundwater wells was obtained by using a 5-gallon bucket, and noting the amount of time it took to fill the bucket, which yielded an estimate of the flow rate. Below are photographs of a typical artesian groundwater well and a flowing windmill within the project area, that are allowed to free-flow to the ground surface.

Groundwater Well Work Completed:

Below is a well by well summary of work completed on groundwater wells during the field season of 2011. Several tasks were completed in order to determine the construction details of many groundwater wells. A tabulated summary of groundwater well status as of September 30, 2011 is included in Table 3.

Hydro ID 5 is former oil test well API 40 047 20065

Groundwater Well Hydro ID 5:

Groundwater well number 5 is located about 0.5 miles south of the Powertech Burdock pump test location. The well is artesian and consists of a 4-inch casing. Originally the well was expected to produce water from the Chilson aquifer, however further investigations utilizing the down-hole camera and geophysical tool actually revealed that the well is screened within the lower Fall River aquifer. The geophysical log and the screened interval were sent to Powertech geologists for sub-surface geologic interpretations. The well consists of 4-inch casing to a depth of 155 feet below the ground surface, and is open hole from 155 to 175 feet.

Groundwater Well Hydro ID 6:

Groundwater well number 6 is located within the project AOR and about 1-mile south of the Powertech Burdock pump test location. This well is non-flowing and consists of a 12-inch steel casing. The static water level in the well is at about 20 feet below ground surface.

The 2-inch down-hole camera was run down the well casing in order to determine the well construction details. As with many groundwater wells in the area, it was very difficult to see the screened interval of the well due to mineralization on the inner casing walls. It appeared from the video that the steel well casing ended at a depth of 135 feet below the ground surface, below which was open bore hole to a total depth of 200 feet below ground surface. These depths correspond to other Fall River wells in the area. The geophysical logging tool was also run down the well casing to its total depth. The logs suggest that sandy facies with good porosity exists from the ground surface to 200 feet below the ground surface.

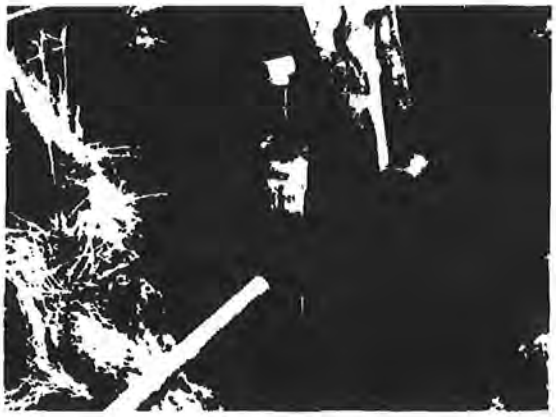
Groundwater Well Hydro ID 9:

Groundwater well number 9 is located within the AOR and south of the Powertech Burdock pump test area. The status of this well was unknown, and was identified at the ground surface by the presence of upwelling water flow from what was hypothesized to be a broken-off casing (see photo below). Historical documents from TVA identify this well as being screened within the Fall River Aquifer. Conversations with the landowner also help validate that well number 9 is screened within the Fall River Aquifer.

Powertech personnel excavated a small portion of the area near the upwelling water in an attempt to locate the groundwater well. After much effort, the broken off 2-inch groundwater well casing was located about 6 feet below the ground surface. A pipe was then attached to the casing to ensure that artesian pressure would lift the groundwater to the ground surface before repairing the well-head, but water did not flow to the ground surface.

Powertech personnel then constructed a 6-foot long 1-inch drill bit. This tool was used to ream out sulfide mineralization that had accumulated on the inner walls of the well casing. This process increased artesian flow from the well to about 1.0 gallon/minute at the ground surface.

After verifying flow from the well at the ground surface, a 2-inch pipe was placed inside the existing well casing and penetrated into the well about 2-feet. A protective riser was then placed around the 2-inch pipe, and cement was added to the space between the 2-inch well head and the protective riser. Artesian flow of 1 gallon/minute was observed at the ground surface. Below is a photograph of the final well-head configuration.



The excavated area around the well was then replaced and smoothed out to match the existing topography. The landowner can now utilize the groundwater well for stock watering purposes.

Powertech personnel were unable to run a down-hole camera on the well due to mineralization on the inner casing walls. A one inch camera, once obtained, may penetrate into the water well and allow construction details to be ascertained. This effort resulted in verifying the presence of a groundwater well and is now set up so water level measurements can be obtained.

Groundwater Well Hydro ID 37:

Groundwater well number 37 is located outside of the project boundary but within the AOR, about 0.75 miles south-east of the south-east corner of the project boundary. This groundwater well is not artesian and produces stock water by a windmill. The windmill was disassembled by Powertech personnel so access to the well could be obtained.

This groundwater well originally produce water from an unknown aquifer, but further investigations reveal that it produces from the upper Fall River aquifer according to Powertech geologists who interpreted the geophysical log and screened interval obtained from the down-hole camera. The down-hole camera revealed that the well is cased at the surface, but is open-hole from a depth of 93-145 feet below the ground surface.

Groundwater Well Hydro ID 49:

Groundwater well number 49 is located within the Powertech Dewey aquifer pump test area. This well has a construction report associated with it, is screened from a depth of 475-540 feet, and is known to be screened within the upper Fall River aquifer. The total depth of the well was verified to be 540 feet by Powertech personnel.

This groundwater well is artesian, and when first visited had a leaky surface casing. In order to be able to measure artesian pressure and groundwater levels with a high degree of accuracy, the leak in the surface casing had to be fixed, and fitted with valves to isolate the pressure gauge. Below is a photograph of surface casing work completed. There are no leaks at the ground surface, and measured water levels now correlate very well with other surrounding upper Fall River wells.

Groundwater Well Hydro ID 106:

Groundwater well number 106 is located within the AOR just north of the town of Dewey, and north of the Dewey Fault zone. The status of this 7-inch was unknown, and expected to produce from Inyan Kara aquifers. The well is artesian and flows about 0.1 gallons/minute.

The 2-inch down-hole camera was run down the well casing to determine well construction details. The casing walls were very difficult to see due to mineralization and algae growth. It appeared from the video that the steel casing ended at 160 feet below the ground surface, below which was open bore hole to a depth of 196 feet below ground surface. The geophysical logging tool was then run down the well casing to its total depth. The logs show a zone of good porosity below about 175 feet to 196 feet below the ground surface.

Groundwater Well Hydro ID 220:

Groundwater well number 220 is an existing stock well located about 1.5 miles north north-west of the Powertech Dewey pump test location, consisting of a 6-inch surface casing. Flow from the groundwater well is artesian and produces about 0.2 gallons of water per minute to a nearby stock tank. Below is a photograph of well number 220.

The down-hole camera and geophysical logging tool was used by Powertech personnel to investigate the groundwater well. The well was initially screened within an unknown aquifer. Through the use of the down-hole camera, it was determined that the well is screened from at least 463-523 feet below the ground surface. This corresponds to the upper Fall River aquifer according to Powertech geologists. However as can be seen from the down-hole video, the screened interval extends below 523 feet to an unknown depth. At 523 feet the camera could not go any deeper as the casing was broken and caved in.

Groundwater Well Hydro ID 270:

Groundwater well number 270 has been found and is located about 1.5 miles north and west of the Powertech Dewey pump test location. This groundwater well is artesian and produces about 12 gallons/minute from a 2-inch steel casing. Currently the construction details of the groundwater well are unknown, but is expected to produce from the Inyan Kara aquifers.

Powertech personnel excavated the area around the groundwater well to fix the leaky well-head and prepare it for down-hole tools. A new well-head riser pipe was installed and fitted with a valve for artesian water level measurements. The well-head is no longer leaky.

An attempt was made to run a down-hole camera in the well in order to obtain construction details. Due to mineralization on the inner casing walls, the down-hole camera would not enter the well casing. A 1-inch camera must be obtained to penetrate the well casing and obtain construction details.

Groundwater Well Hydro ID 605:

The original groundwater well database provided to Powertech from their consultants identified a ground water well hydro ID 605, which was suppose to be located about 1500 feet east of the TVA Burdock aquifer pump test well 668. There is in fact no groundwater well at this location. There is a vertical 1-inch pipe that comes up from the ground and provides water to a livestock tank. However this pipe comes from groundwater well Hydro ID 668, which provide water to this location via artesian flow from 668. There is no evidence that groundwater well 605 exists.

Groundwater Wells Hydro ID's 622 and 623:

The status of groundwater wells 622 and 623 are known as TVA construction reports exist, and were utilized in the TVA Dewey pump test as observation wells. Powertech personnel verified in the field each of these wells using a tag line to determine well depth, and most maps that show the screened interval are incorrect. Groundwater well 622 is the southern well and is the lower Chilson, as defined by the well depth being 780 feet below the ground surface. Groundwater well 623 is the northern well and is the lower Fall River, as defined by the tag line going to a depth of 580 feet below the ground surface. Furthermore, groundwater levels obtained from surrounding wells correlate perfectly with the above conclusions. Most maps that have been generated to date are labeled incorrectly, and the well symbols need to be revised to show the verified aquifer. Groundwater well 622 is Chilson and well 623 is Fall River.

Groundwater Well Hydro ID 635:

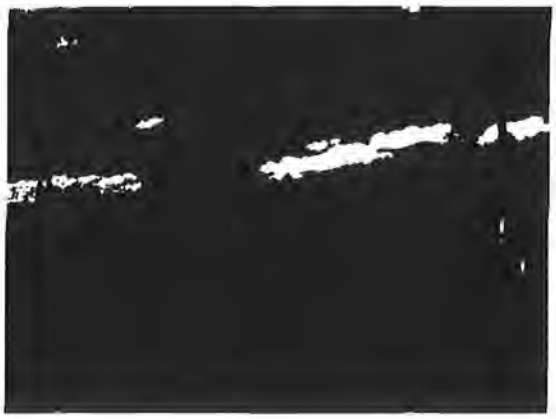
It was originally thought that Hydro ID 635 was an Sundance groundwater well located near the stock reservoir about 750 feet east of groundwater well Hydro ID 5. However, it has been confirmed that this is actually a discharge point from groundwater well Hydro ID 5. Any groundwater quality samples obtained that are labeled as Hydro ID 635 are actually from Hydro ID 5.

According to well construction reports, there was once a Sundance groundwater well in this area. The construction report shows that an oil test well was plugged back and perforated in the Sundance aquifer. Powertech personnel found a solid steel pipe sticking out of the ground about 2000 feet north of the reservoir where the Hydro ID 5 discharge point is located. It is thought that this is the location of the oil test well. The steel pipe needs to be excavated to check if the well has been plugged back to the ground surface.

This is a different oil test, API 40 047 20071, which was plugged and the dry hole marker placed. Excavation is not required. L.S. 3/12/2012

Groundwater Well Hydro ID 642:

Groundwater well number 642 is located in the extreme south-east corner of the project boundary, and was originally hooked up to a windmill for livestock watering purposes. The well is currently not being used for any purpose except for groundwater monitoring. The photograph below shows the windmill structure below which groundwater well 642 is located.



Well number 642 consists of a 5-inch steel surface casing that is in good condition. Groundwater level measurements completed by Powertech personnel yield a water level of about 5-feet below the ground surface. Below is a close up photograph of groundwater well 642.

The construction details of groundwater well 642 were initially unknown. Powertech personnel ran down-hole tools on the well to determine construction information. The down-hole camera shown that *the 5-inch surface casing extends to a depth of 12 feet below the ground surface, below which is an open hole to a total well depth of 33 feet. Location and geophysical log information was provided to* Powertech geologists, and they interpreted the well to be producing water from surface alluvial sediments. However while running the camera down the hole, it was noted that the walls of the *borehole consisted of solid-rock. The geophysical log from the hole should be re-examined to make sure* the well is not completed in a sandstone formation such as the Fall River or Chilson.

Groundwater Well Hydro ID 651:

The original groundwater well database provided to Powertech from its consultants identified a groundwater well Hydro ID 651. Powertech personnel inspected this area, and confirmed that there is no groundwater well at this location. There is a stock tank at the location, but it originally received water from groundwater well Hydro ID 6 via a trenched pipeline. Inspection of an aerial photograph of this location clearly shows that a pipeline exists from well number 6 to the location of the stock tank, which was originally thought to be a stand-alone well. From conversations with the current landowner, the groundwater well 6 at one time would provide water to the stock tank, but following TVA pumping of aquifers, the well failed to deliver water to the stock tank location.

Groundwater Well Hydro ID 668:

Groundwater well number 668 is located within the project area and within the proposed groundwater aquifer exemption boundary at the location of the TVA Burdock groundwater pumping test.

As can be seen from the above photograph, this groundwater well is in excellent condition and consists of a 10-inch casing. The groundwater well is artesian and provides livestock water for the landowner. This groundwater well was used as the pumping well during the TVA Burdock aquifer test, and so there is a lot of construction information available. The TVA well construction report shows that the well produces groundwater from both the Fall River and Chilson aquifers, but Powertech personnel thought it was important to verify that information by running the down-hole camera and geophysical logging tool.

Powertech personnel ran the down-hole camera on the water well and confirmed that the well is screened at multiple intervals. The upper screen of the well extends from 300 feet to 350 feet below the ground surface. A solid, unscreened interval exists from 350 feet to 495 feet below the ground surface. From 495 feet to 550 feet below the ground surface is the lower screened interval of the well. The total depth of the well is 550 feet.

The geophysical logs ran by Powertech personnel were provided to Powertech geologists for geologic interpretation. It was confirmed that the upper screened interval of the well (300-350 feet) is in fact within the lower Fall River Formation aquifer. The lower screen of the well from 495 to 550 feet intersects the Lower Chilson Member of the Lakota aquifer. The solid casing that runs between the two screened intervals intersects the Fuson Member confining layer.

During the summer of 2011 Powertech personnel installed an inflatable packer within the groundwater well 668, in an attempt to isolate the two screened intervals of the groundwater well and conduct monitoring of the artesian pressures of each screened aquifer. That task and monitoring details are contained within a stand-alone report provided to Powertech engineering.

Dewey Burdock Groundwater Potentiometric Surface Measurements - Collected by Beshore and VanEaton

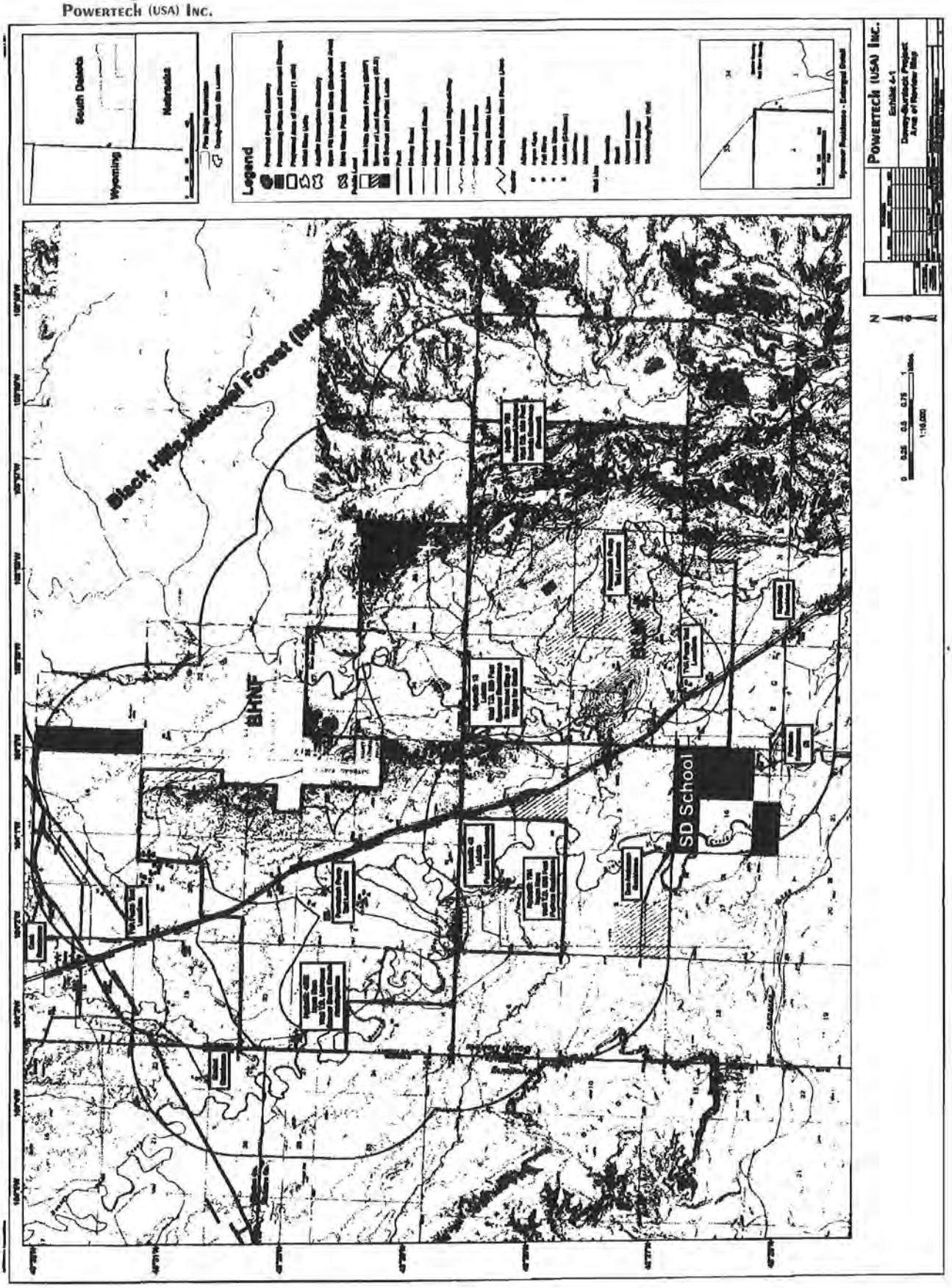
Hydro ID or Hydro Code	SD State Plane 1983 East (Feet)	SD State Plane 1983 North (Feet)	Screened Formation	Total Depth (Feet)	TOC Elevation (Feet)	Measuring Point Elevation (Feet)	Water Level Elevation (Feet) - Week of 8/30/2010	Water Level Elevation (Feet) - Week of 12/13/2010	Water Level Elevation (Feet) - Week of 1/17/2011	Water Level Elevation (Feet) - Week of 2/21/2011	Water Level Elevation (Feet) - Week of 3/21/2011	Water Level Elevation (Feet) - Week of 4/25/2011
12	995376.8	434378.5	Lakota	805	3641.14	3641.51	3653.19	3653.46	3654.06	3654.26	3654.09	3654.55
14	1002109.3	434723.34	Fall River	300	3669.88	3669.88	Not Measured	3662.91	3663.07	3663.02	3663.05	3663.15
38	992726.9	442289.6	Fall River	494	3638.75	3639.63	3644.96	3646.23	3644.76	3646.61	3646.75	3647.01
48	987330.6	444022.8	Fall River	600	3620.86	3621.27	3648.59	3642.36	3642.34	Not Measured	3644.64	3645.47
436	988648.88	454700.89	Fall River	580	3739.85	3739.85	Not Measured	3707.48	3707.56	3707.31	3707.36	3707.31
609	990133.3	447808.3	Lakota	1000	3700.67	3700.67	3688.5	3688.85	3686.81	3687.76	3687.75	3688.05
610	989884	447949.6	Fall River	680	3704.85	3704.85	3691.75	3691.74	3691.51	3691.45	3691.33	3691.52
611	990213.96	453955.33	Lakota	804	3737.36	3737.36	Not Measured	3691.99	3690.77	3691.03	3691.32	3691.26
612	990153.49	454128.57	Lakota	800	3732.34	3732.34	Not Measured	3694.04	3692.69	3692.9	3693.17	3693.15
613	990523.4	453775.8	Fall River	580	3736.93	3736.93	3700.03	3700.2	3700.25	3700.02	3700	3700.03
615	990571	453708.9	Lakota	800	3741	3741	3689.31	3689.79	3688.49	3688.72	3688.99	3688.99
616	990530.63	453135.16	Lakota	835	3751.04	3751.04	Not Measured	3693.43	3692.16	3692.4	3692.63	3692.6
617	988425.25	453583.39	Lakota	810	3725.55	3725.55	Not Measured	3692.35	3691.11	3691.33	3691.58	3691.53
622	991174.5	454033.8	Lakota	780	3754.91	3754.91	3692.85	3693.33	3692.03	3692.24	3692.5	3692.47
623	991084.6	454311.84	Fall River	580	3753.28	3753.28	3708.51	3708.64	3708.65	3708.5	3708.53	3708.55
628	990894.7	449719.2	Fall River	520	3731.99	3731.99	3694.78	3694.93	3694.77	3694.69	3694.42	3694.68
631	1002575.7	449309.8	Fall River	80	3745.37	3745.37	3716.86	3716.95	3716.92	3717.11	3717.37	3717.41
657	989882.27	454729.93	Lakota	800	3747.58	3747.58	Not Measured	3693.34	3692.06	3692.28	3692.48	3692.53
680	1003476.6	429969.1	Lakota	436	3701.94	3701.94	3661.02	3660.69	3661.06	3661.09	3661.07	3661.45
681	988728.3	443725.3	Fall River	600	3626.99	3630.31	3649.22	3643.89	3644.21	Not Measured	3646.05	3646.63
682	1009538.2	431257.9	Lakota	460	3718.24	3718.24	3665.4	3665.14	3665.49	3665.54	3665.45	3665.75
683	988610.5	446104.7	Fall River	650	3663.66	3666.64	3662.67	3659.52	3658.88	Not Measured	3660.21	3660.57
684	1003590.38	429744.24	Lakota	423	3689.04	3689.04	Not Measured	3661.57	3661.96	3661.96	3661.95	3662.34
685	989088.4	443409.7	Fall River	595	3627.85	3630.35	3686.88	3642.12	3642.58	Not Measured	3645.51	3646.14
686	1003368.77	429749.56	Lakota	428	3692.06	3692.06	Not Measured	3661.23	3661.52	3661.56	3661.48	3661.96
687	988480.18	443724.72	Fall River	608	3623.84	3624.79	Not Measured	3641.48	3641.58	Not Measured	3643.99	3644.39
688	1003425.8	429974.4	Fall River	255	3701.26	3701.26	3663.36	3662.81	3663.09	3663.08	3663.06	3663.37
689	988715	443789.2	Lakota	730	3627.27	3629.69	3684.72	3684.1	3678.86	Not Measured	3684.23	3683.99
691	988762.9	443688.4	Fall River	505	3628.88	3630.29	3646.65	3643.51	3643.58	Not Measured	Not Measured	3646.12
692	1003474.48	430014.33	Lakota	335	3704.98	3704.98	Not Measured	3663.21	3663.54	3663.57	3663.54	3663.83
694	997116.1	426836.1	Fall River	392	3598.29	3600.69	3680.25	3640.12	3641.29	3641.2	3641.28	3641.64
695	990783.4	439312.5	Fall River	508	3597.8	3599.12	3688.98	3634.18	3633.64	3634.95	3634.42	3634.95
696	996936.6	427141.5	Lakota	587	3597.96	3599.91	3641.08	3649.16	3649.78	3649.6	3649.58	3650.74
697	990748.4	439347.4	Lakota	682	3597.69	3600.3	3679.68	3675.76	3670.51	3678.16	3672.58	3672.69
698	1004307.8	435651.1	Fall River	205	3714.25	3714.25	3679.28	3679.45	3679.38	3679.22	3679.21	3679.35
705	997022.63	453314.89	Lakota	460	3826.42	3826.42	Not Measured	3709.77	3709.62	3709.41	3709.53	3709.64
706	996987.91	453276.44	Fall River	316	3824.32	3824.32	Not Measured	3725.19	3725.32	3725.1	3725.29	3725.15
3026	1012037.4	432833.2	Lakota	196	3820.48	3820.48	3680.3	3680.89	3680.78	3680.38	3680.46	3680.58

BOLD = OUTLIERS

Hydro ID	Township	Range	Section	1/4 - 1/4 Location	Coordinates East	Coordinates North	Screened Location	Well Use	Status	Flow Rate (GPM)	Notes
1	7	1	9	SESE	1027696	429227	Chilson	Stock	Flowing	1.5	
2	7	1	16	SESE	1026724	423922	Chilson	Domestic		4.11	
3	7	1	22	SWNW	1028593	421104	Chilson	Stock	Flowing	3	
4	7	1	15	SESE	1032516	423080	Unknown	Stock	Flowing	5	
5	7	1	14	NENW	1035181	427284	Chilson	Stock	Flowing	1.5	
6	7	1	14	NESE	1037218	425012	Unknown	Stock			
7	7	1	23	NWNW	1033304	422417	Fall River	Domestic		0.056	2 X 40 GPD (Est)
8	7	1	23	SWSE	1036052	418515	Fall River	Domestic		0.14	5 X 40 GPD (Est)
9	7	1	23	NENE	1038003	421806	Fall River	Stock	Flowing	3	
12	7	1	4	SESE	1026978	434378	Chilson	Stock	Flowing	3.3	
13	7	1	3	NWNW	1028360	438470	Chilson	Domestic		0.085	1 X 123 GPD (Est)
14	7	1	2	NWSW	1033704	434723	Fall River	Stock			
15	7	1	2	NENW	1035304	438317	Chilson	Stock			
16	7	1	1	NESW	1041428	434446	Chilson	Domestic			Not In Use
17	7	1	12	SENW	1040223	431329	Fall River	Stock			Windmill - Not In Use
18	7	1	9	SWSW	1022812	428960	Fall River	Domestic		6	
37	7	2	18	NWSW	1044183	423947	Unknown	Stock		2.5	
38	6	1	33	SWNW	1024328	442289	Fall River	Stock	Flowing	1.5	
40	6	1	30	SWNW	1013415	447182	Inyan Kara	Domestic			Not In Use
41	6	1	31	SWNE	1015385	442081	Unknown	Stock			Not In Use
42	7	1	5	SWNE	1021144	436481	Chilson	Domestic		16.2	
43	6	1	34	SWSE	1031123	439436	Chilson	Domestic			Not In Use
49	6	1	32	NWNW	1018932	444022	Fall River	Stock	Flowing	1.2	
51	7	1	9	SENE	1027411	431487	Chilson	Stock	Flowing	12.9	
61	7	1	11	NWSE	1036832	429987	Chilson	Stock			
96	41	60	22	SWSW	1011630	451853	Chilson	Domestic		0.11	4 X 40 GPD
102	6	1	18	SWNE	1016825	458312	Chilson	Domestic		1.5	2 Residents & 2 Gardens
106	6	1	18	NENE	1018099	459625	Unknown	Stock			
107	6	1	18	SWNE	1017018	458158	Fall River	Domestic			Not In Use
108	6	1	18	SWNE	1016478	458698	Fall River	Domestic			Not In Use
109	6	1	17	NENW	1020801	459625	Chilson	Domestic		0.085	1 X 123 GPD (Est)
110	6	1	17	NENE	1023777	459643	Chilson	Stock			
111	6	1	17	NWNE	1022074	459586	Fall River	Stock			
112	6	1	16	SESE	1027864	455881	Fall River	Stock			Windmill - Not In Use
113	7	2	6	NESW	1046437	434417	Unknown	Stock			Not In Use
114	7	2	7	SESW	1045410	428654	Unkpapa	Stock		0.56	40 cows X 20 GPD
115	6	1	18	SENE	1017697	457640	Fall River	Domestic		0.17	2 X 123 GPD
116	6	1	18	SENE	1017992	458111	Fall River	Stock	Flowing	1.5	Dewey Post Office

Hydro ID	Township	Range	Section	1/4 - 1/4 Location	Coordinates East	Coordinates North	Screened Location	Well Use	Status	Flow Rate (GPM)	Notes
117	6	1	8	SWSE	1022177	460796	Unknown	Stock			Not In Use
138	6	1	18	NENE	1017537	459030	Fall River	Domestic		0.75	2 Residents & 10 Horses
147	6	1	17	NESW	1020879	456566	Chilson	Monitor			
220	6	1	19	SENE	1017872	452334	Unknown	Stock	Flowing	0.2	
270	6	1	19	NWSW	1014108	451942	Unknown	Stock	Flowing	0.8	
436	6	1	20	NWNE	1021450	454700	Fall River	Monitor			
506	7	2	8	SWNW	1050129	430704	Unkpapa	Stock			
510	7	1	12	SESE	1042933	428178	Chilson	Stock			
609	6	1	29	SWNE	1021735	447808	Chilson	Monitor			
610	6	1	29	SWNE	1021599	447969	Fall River	Monitor			
611	6	1	20	NWNE	1021835	453954	Chilson	Monitor			
612	6	1	20	NWNE	1021755	454128	Chilson	Monitor			
613	6	1	20	NWNE	1022125	453775	Fall River	Monitor			
614	6	1	20	NWNE	1022185	453769	Fuson	Monitor			
615	6	1	20	NWNE	1022172	453708	Chilson	Monitor			
616	6	1	20	SWNE	1022132	453134	Chilson	Monitor			
617	6	1	20	NENW	1021026	453582	Chilson	Monitor			
618	7	1	2	SENE	1038074	435906	Unknown	Stock			
619	7	1	2	SENW	1034866	436729	Chilson	Stock			
620	6	1	35	NWNW	1033951	443209	Chilson	Stock			
622	6	1	20	NENE	1022776	454033	Chilson	Monitor			
623	6	1	20	NENE	1022686	454311	Fall River	Monitor			
628	6	1	20	SESE	1022496	449718	Fall River	Stock			
631	6	1	23	SWSW	1034177	449309	Fall River	Stock			
635	7	1	14	NENW	1004085	427131	Sundance	Monitor			
637	7	1	11	NESE	1038075	430320	Unknown	Monitor			
638	7	1	2	NENE	1038269	437976	Fall River	Monitor			
639	7	2	7	SENW	1045704	430722	Unknown	Stock			
640	7	1	12	SESE	1043010	427965	Unknown	Stock			
642	7	1	12	SESE	1042926	428042	Unknown	Stock			
645	7	1	16	NENE	1027681	427998	Unknown	Stock			
650	7	1	1	SESE	1043781	433331	Chilson	Stock			
656	6	1	31	SENW	1014230	442000	Unknown	Stock	Flowing	6.25	
657	6	1	20	NWNE	1021483	454729	Chilson	Monitor			
662	7	1	11	SESW	1035381	428928	Unknown	Monitor			
668	7	1	15	NWNE	1031029	427450	Inyan Kara	Stock	Flowing	6.25	Measured @ ST
676	6	1	34	SESW	1030846	439891	Alluvial	Monitor			
677	7	1	4	SWSW	1023527	434077	Alluvial	Monitor			

Hydro ID	Township	Range	Section	1/4 - 1/4 Location	Coordinates East	Coordinates North	Screened Location	Well Use	Status	Flow Rate (GPM)	Notes
678	7	1	9	SWNE	1026522	431925	Alluvial	Monitor			
679	6	1	27	NWSE	1032294	446245	Alluvial	Monitor			
680	7	1	11	NESW	1035078	429969	Chilson	Monitor			
681	6	1	32	NENW	1020330	443725	Fall River	Monitor	Flowing		Shut-In
682	7	1	11	SENW	1035139	431257	Chilson	Monitor			
683	6	1	29	NESW	1020212	446104	Fall River	Monitor			
684	7	1	11	NESW	1035191	429744	Chilson	Monitor			
685	6	1	32	NWNE	1020690	443409	Fall River	Monitor	Flowing		Shut-In
686	7	1	11	NESW	1034970	429749	Chilson	Monitor			
687	6	1	32	NENW	1020081	443724	Fall River	Monitor	Flowing		Shut-In
688	7	1	11	NESW	1035027	429974	Fall River	Monitor			
689	6	1	32	NENW	1020316	443789	Chilson	Monitor	Flowing		Shut-In
690	7	1	11	NESW	1035114	429970	Unkpapa	Monitor	Flowing		Shut-In
691	6	1	32	NENW	1020364	443698	Fall River	Monitor	Flowing		Shut-In
692	7	1	11	NESW	1035075	430014	Chilson	Monitor			
693	6	1	32	NENW	1020327	443661	Unkpapa	Monitor	Flowing		Shut-In
694	7	1	15	NWNW	1028717	426836	Fall River	Monitor	Flowing		Shut-In
695	6	1	32	SESE	1022385	439312	Fall River	Monitor	Flowing		Shut-In
696	7	1	15	NWNW	1028538	427141	Chilson	Monitor	Flowing		Shut-In
697	6	1	32	SESE	1022350	439347	Chilson	Monitor	Flowing		Shut-In
698	7	1	2	NESW	1035909	435651	Fall River	Monitor			
703	7	1	1	SWSE	1041621	434334	Unkpapa	Domestic			Not In Use
704	7	1	5	SWNE	1020966	436647	Chilson	Domestic		1.5	1 Resident & Stock (est)
705	6	1	21	NENE	1028624	453314	Chilson	Monitor			
706	6	1	21	NENE	1028589	453276	Fall River	Monitor			
707	6	1	34	SWNE	1031935	441809	Alluvial	Monitor			
708	7	1	3	SESW	1030254	434094	Alluvial	Monitor			
709	7	1	15	SENW	1029286	426603	Alluvial	Monitor			
3026	7	1	12	NENE	1043638	432833	Chilson	Monitor			
4002	6	1	30	NWSW	1013414	446931	Inyan Kara	Domestic		2.72	
7002	7	1	23	NWNW	1033333	421931	Chilson	Stock		3.45	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Legend
Black Hills National Forest (BHNF)
BHNF
SD School
POWERTECH (USA) INC.
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Hydro ID	Township	Range	Section	1/4 - 1/4 Location	Coordinates East	Coordinates North	Screened Location	Well Use	Total Depth	Screened Interval	Screened Aquifer	Work to Complete
1	7	1	9	SESE	1027696	429227	Chilson	Stock				1 Inch Camera
2	7	1	16	SESE	1026724	423922	Chilson	Domestic	650	566-650		Need Access, Artesian
3	7	1	22	SWNW	1028593	421104	Chilson	Stock				1 Inch Camera
4	7	1	15	SESE	1032516	423080	Unknown	Stock				1 Inch Camera & Access
5	7	1	14	NENW	1035181	427284	Fall River	Stock	175	155-175	Lower Fall River	Complete
6	7	1	14	NESE	1037218	425012	Unknown	Stock	200	135-200		Complete
7	7	1	23	NWNW	1033304	422417	Fall River	Domestic	200			Need Access, Artesian
8	7	1	23	SWSE	1036052	418515	Fall River	Domestic	240			Need Access, Artesian
9	7	1	23	NENE	1038003	421806	Fall River	Stock				1 Inch Camera
12	7	1	4	SESE	1026978	434378	Chilson	Stock	805			1 Inch Camera
13	7	1	3	NWNW	1028360	438470	Chilson	Domestic	625	580-625		Complete
14	7	1	2	NWSW	1033704	434723	Fall River	Stock	300		Lower Fall River	1 Inch Camera
15	7	1	2	NENW	1035304	438317	Chilson	Stock				Ready, Dry Hole
16	7	1	1	NESW	1041428	434446	Chilson	Domestic	330			Remove Shed
17	7	1	12	SENW	1040223	431329	Fall River	Stock				Need Access, Pull Windmill
18	7	1	9	SWSW	1022812	428960	Fall River	Domestic	527			Need Access
37	7	2	18	NWSW	1044183	423947	Fall River	Stock	145	93-145	Upper Fall River	Complete
38	6	1	33	SWNW	1024328	442289	Fall River	Stock	494			Pull Pump
40	6	1	30	SWNW	1013415	447182	Inyan Kara	Domestic				1 Inch Camera & Access
41	6	1	31	SWNE	1015385	442081	Unknown	Stock				Need Access
42	7	1	5	SWNE	1021144	436481	Chilson	Domestic	600			Need Access, Artesian
43	6	1	34	SWSE	1031123	439436	Chilson	Domestic				Need Access
49	6	1	32	NWNW	1018932	444022	Fall River	Stock	600	475-540	Upper Fall River	Complete
51	7	1	9	SENE	1027411	431487	Chilson	Stock				Need Access
61	7	1	11	NWSE	1036832	429987	Chilson	Stock				Ready
96	41	60	22	SWSW	1011630	451853	Chilson	Domestic				Need Access
102	6	1	18	SWNE	1016825	458312	Chilson	Domestic				Need Access
106	6	1	18	NENE	1018099	459625	Unknown	Stock	196	160-196		Complete
107	6	1	18	SWNE	1017018	458158	Fall River	Domestic				Need Access
108	6	1	18	SWNE	1016478	458698	Fall River	Domestic				Need Access
109	6	1	17	NENW	1020801	459625	Chilson	Domestic				Need Access
110	6	1	17	NENE	1023777	459643	Chilson	Stock				Need Access
111	6	1	17	NWNE	1022074	459586	Fall River	Stock				Need Access
112	6	1	16	SESE	1027864	455881	Fall River	Stock				Need Access, Pull Windmill
113	7	2	6	NESW	1046437	434417	Unknown	Stock				Need Access, Pull Windmill
114	7	2	7	SESW	1045410	428654	Unkpapa	Stock				Need Access, Pull Windmill
115	6	1	18	SENE	1017697	457640	Fall River	Domestic				Need Access
116	6	1	18	SENE	1017992	458111	Fall River	Stock				Need Access
117	6	1	8	SWSE	1022177	460796	Unknown	Stock				Pull Pump
138	6	1	18	NENE	1017537	459030	Fall River	Domestic				Need Access
147	6	1	17	NESW	1020879	456566	Chilson	Monitor	750	650-750		Complete
220	6	1	19	SENE	1017872	452334	Unknown	Stock		463-523+	Upper Fall River	Complete
270	6	1	19	NWSW	1014108	451942	Unknown	Stock				1 Inch Camera

Hydro ID	Township	Range	Section	1/4 - 1/4 Location	Coordinates East	Coordinates North	Screened Location	Well Use	Total Depth	Screened Interval	Screened Aquifer	Work to Complete
436	6	1	20	NWNE	1021450	454700	Fall River	Monitor	590	505-590	Lower Fall River	Complete
506	7	2	8	SWNW	1050129	430704	Unkpapa	Stock				Ready
510	7	1	12	SESE	1042933	428178	Chilson	Stock				Need Access, Pull Pump
609	6	1	29	SWNE	1021735	447808	Chilson	Monitor	1000	903-966	Lower Chilson	Complete
610	6	1	29	SWNE	1021599	447969	Fall River	Monitor	680	630-672	Lower Fall River	Complete
611	6	1	20	NWNE	1021835	453954	Chilson	Monitor	804	695-730, 755-800	Middle Chilson, Lower Chilson	Complete
612	6	1	20	NWNE	1021755	454128	Chilson	Monitor	800	692-800	Lower Chilson	Complete
613	6	1	20	NWNE	1022125	453775	Fall River	Monitor	580	504-580	Lower Fall River	Complete
614	6	1	20	NWNE	1022185	453769	Fuson	Monitor	620	609-620	Fuson	Complete
615	6	1	20	NWNE	1022172	453708	Chilson	Monitor	800	712-800	Lower Chilson	Complete
616	6	1	20	SWNE	1022132	453134	Chilson	Monitor	835	735-835	Lower Chilson	Complete
617	6	1	20	NENW	1021026	453582	Chilson	Monitor	810	715-810	Lower Chilson	Complete
618	7	1	2	SENE	1038074	435906	Unknown	Stock				Complete
619	7	1	2	SENW	1034866	436729	Chilson	Stock	288	230-288	Upper Chilson	Pull Pump
620	6	1	35	NWNW	1033951	443209	Chilson	Stock				Need Access, Pull Pump
622	6	1	20	NENE	1022776	454033	Chilson	Monitor	780	714-780	Lower Chilson	Complete
623	6	1	20	NENE	1022686	454311	Fall River	Monitor	580	503-580	Lower Fall River	Complete
628	6	1	20	SESE	1022496	449718	Fall River	Stock	520		Upper Fall River	Need Access, Pull Pump
631	6	1	23	SWSW	1034177	449309	Fall River	Stock	80	30-80	Lower Fall River	Need Access, Pull Pump
635	7	1	14	NENW	1004085	427131	Sundance	Monitor				Not A Well
637	7	1	11	NESE	1038075	430320	Unknown	Monitor				1 Inch Camera
638	7	1	2	NENE	1038269	437976	Fall River	Monitor				Plugged?, Need to Verify
639	7	2	7	SENW	1045704	430722	Unknown	Stock				Ready, Hand Dug Well
640	7	1	12	SESE	1043010	427965	Unknown	Stock				Pull Pump
642	7	1	12	SESE	1042926	428042	Alluvial	Stock	33	12-33	Alluvial	Complete
645	7	1	16	NENE	1027681	427998	Unknown	Stock				Need Access, Pull Pump
650	7	1	1	SESE	1043781	433331	Chilson	Stock				Pull Pump
656	6	1	31	SENW	1014230	442000	Unknown	Stock				Remove Shed to Access
657	6	1	20	NWNE	1021483	454729	Chilson	Monitor	800	715-800	Lower Chilson	Complete
662	7	1	11	SESW	1035381	428928	Unknown	Monitor				1 Inch Camera
668	7	1	15	NWNE	1031029	427450	Inyan Kara	Stock	550	300-350, 495-550	Lower Fall River, Lower Chilson	Complete
676	6	1	34	SESW	1030846	439891	Alluvial	Monitor	22.5	12-22	Alluvial	Complete
677	7	1	4	SWSW	1023527	434077	Alluvial	Monitor	14.5	4-14	Alluvial	Complete
678	7	1	9	SWNE	1026522	431925	Alluvial	Monitor	14.5	4-14	Alluvial	Complete
679	6	1	27	NWSE	1032294	446245	Alluvial	Monitor	39	29-39	Alluvial	Complete
680	7	1	11	NESW	1035078	429969	Chilson	Monitor	436	426-436	Lower Chilson	Complete
681	6	1	32	NENW	1020330	443725	Fall River	Monitor	600	585-600	Lower Fall River	Complete
682	7	1	11	SENW	1035139	431257	Chilson	Monitor	460	450-460	Lower Chilson	Complete
683	6	1	29	NESW	1020212	446104	Fall River	Monitor	650	635-650	Lower Fall River	Complete
684	7	1	11	NESW	1035191	429744	Chilson	Monitor	423	413-423	Lower Chilson	Complete
685	6	1	32	NWNE	1020690	443409	Fall River	Monitor	595	580-595	Lower Fall River	Complete

Hydro ID	Township	Range	Section	1/4 - 1/4 Location	Coordinates East	Coordinates North	Screened Location	Well Use	Total Depth	Screened Interval	Screened Aquifer	Work to Complete
686	7	1	11	NESW	1034970	429749	Chilson	Monitor	428	418-428	Lower Chilson	Complete
687	6	1	32	NENW	1020081	443724	Fall River	Monitor	608	593-608	Lower Fall River	Complete
688	7	1	11	NESW	1035027	429974	Fall River	Monitor	255	245-255	Lower Fall River	Complete
689	6	1	32	NENW	1020316	443789	Chilson	Monitor	730	715-730	Middle Chilson	Complete
690	7	1	11	NESW	1035114	429970	Unkpapa	Monitor	631	621-631	Unkpapa	Complete
691	6	1	32	NENW	1020364	443698	Fall River	Monitor	505	490-505	Upper Fall River	Complete
692	7	1	11	NESW	1035075	430014	Chilson	Monitor	335	325-335	Upper Chilson	Complete
693	6	1	32	NENW	1020327	443661	Unkpapa	Monitor	930	910-930	Unkpapa	Complete
694	7	1	15	NWNW	1028717	426836	Fall River	Monitor	392	377-392	Lower Fall River	Complete
695	6	1	32	SESE	1022385	439312	Fall River	Monitor	508	493-508	Lower Fall River	Complete
696	7	1	15	NWNW	1028538	427141	Chilson	Monitor	587	572-587	Middle Chilson	Complete
697	6	1	32	SESE	1022350	439347	Chilson	Monitor	682	667-682	Middle Chilson	Complete
698	7	1	2	NESW	1035909	435651	Fall River	Monitor	205	180-205	Lower Fall River	Complete
703	7	1	1	SWSE	1041621	434334	Unkpapa	Domestic	525	475-525	Unkpapa	Complete
704	7	1	5	SWNE	1020966	436647	Chilson	Domestic				Complete
705	6	1	21	NENE	1028624	453314	Chilson	Monitor	460	428-458	Middle Chilson	Complete
706	6	1	21	NENE	1028589	453276	Fall River	Monitor	316	284-314	Lower Fall River	Complete
707	6	1	34	SWNE	1031935	441809	Alluvial	Monitor	44	30-40	Alluvial	Complete
708	7	1	3	SESW	1030254	434094	Alluvial	Monitor	28	17-27	Alluvial	Complete
709	7	1	15	SENW	1029286	426603	Alluvial	Monitor	40	28-38	Alluvial	Complete
3026	7	1	12	NENE	1043638	432833	Chilson	Monitor	196	166-196	Middle Chilson	Complete
4002	6	1	30	NWSW	1013414	446931	Inyan Kara	Domestic				Need Access, 1 Inch Camera
7002	7	1	23	NWNW	1033333	421931	Chilson	Stock	500			Need Access, Artesian

Powertech (USA) Inc.

Standard Operating Procedure (SOP)

Groundwater Well Water Level Monitoring

This SOP outlines procedures for measuring and documenting artesian and sub-surface water levels within groundwater monitoring wells.

Materials:

- Powertech Groundwater Well Monitoring Data Sheet.
- Electric Logging Water Level Measuring Tape.
- High-Resolution Digital Pressure Gauge.
- Tape Measure with 1/100th foot accuracy.

Personal Protective Equipment (PPE):

- Several potential hazards exist during groundwater well water level monitoring. These include but are limited to pinch-points, pressure, slip/trip/fall, and environmental hazards. Appropriate PPE must always be utilized when conducting groundwater well water level monitoring.

Documentation:

- The person conducting the groundwater well monitoring must completely and accurately fill out the Groundwater Well Monitoring Data Sheet.
- The person conducting the groundwater well monitoring must read and sign the SOP for Groundwater Well Water Level Monitoring. A copy of the signed SOP should be filed at the nearest Powertech Field Office. A copy of the SOP must accompany the person conducting the monitoring in the field.

Procedures:

1. Completely fill in the Powertech Groundwater Well Monitoring Data Sheet.
2. Procedure for pressurized artesian groundwater wells.
   a. Fully shut-in the artesian groundwater well so that there are no leaks that result in the loss of artesian pressure. This may require some tightening or replacement of plumbing fixtures. A closable valve should be fitted to the well head that allows the attachment of the high-resolution digital pressure gauge. This valve and other plumbing fittings should not be removed, so that future measurements can be conducted at the same elevation.
   b. Make sure that all air has been evacuated from the artesian groundwater well. The high-resolution digital pressure gauge can now be installed and turned on. Make sure that the gauge has been reset, or zeroed out.

c. Take an initial pressure measurement in pounds/square-inch (PSI) and document the measurement and time on the Powertech Groundwater Well Monitoring Data Sheet. Pressure measurements should be taken with an accuracy of 0.01 PSI.
d. Continue to take and document pressure measurements until the artesian water well pressure has stabilized. A stabilized artesian pressure measurement is defined as one of the following:
    a. A pressure measurement that reaches a maximum value, and then slightly decreases, but does not exceed the maximum documented value within a period of 15 minutes.
    b. If the pressure measurements DO NOT fluctuate more than 0.04 PSI (or 0.1 feet of water head) over 3 measurements within a 15 minute time period.
e. Make sure to measure the vertical distance between the surveyed control point (Top of Casing or Survey Pin) and the pressure sensor diaphragm on the pressure gauge. This measurement must be taken with an accuracy of 1/100th of a foot.

3. Procedure for sub-surface water level groundwater wells.
    a. Lower the probe of an Electric Logging Water Level Measuring Tape into the groundwater well, and lower at a slow rate. Be careful not to let the probe and tape unwind too quickly as they may come free of the spool and be lost into the well.
    b. Also make sure that the probe sensitivity is adequately adjusted. The deeper the water is in the well, the less sensitivity the probe will require. This is important as condensation in the well could give false readings of the water level in the well.
    c. Measure and document the depth to the water in the well from the top of the well casing. This measurement must be logged with an accuracy of 1/100th of a foot. Make sure to take several measurements to ensure an accurate final water level.

I certify that I have read and understand the content of this Standard Operating Procedure.

Employee Signature: _____ Date: _____

SOURCE F

RESPEC RESPONSES TO NUCLEAR REGULATORY COMMISSION COMMENTS (REVISION 1)

(Letter from Crystal Hocking, RESPEC, to Mark Hollenbeck, Powertech (USA) Inc., July 22, 2010)

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RESPEC
WATER & NATURAL RESOURCES

External Memorandum

To: Mr. Mark Hollenbeck
Powertech (USA) Inc.
310 2nd Avenue
P.O. Box 812
Edgemont, SD 57735

cc: Mr. John Mays, Powertech
Mr. Cory Foreman, RESPEC
Project Central File 1853 — Category A

From: Ms. Crystal Hocking
Staff Geologist
RESPEC
P.O. Box 725
Rapid City, SD 57709

Date: July 22, 2010

Subject: Responses to Nuclear Regulatory Commission Comments (Revision 1)

The purpose of this memorandum is to respond to the five tasks designated by Powertech to help respond to Nuclear Regulatory Commission (NRC) comments regarding the technical report. These tasks were outlined by Mr. John Mays and you at a meeting with RESPEC on June 24, 2010.

Task 1. Check Well 650 and Compare Water Level to Depth to Lakota to Determine Saturated/Unsaturated Conditions at That Location

In an effort to help identify areas where the Lakota Formation is fully saturated, water level measurements of Lakota wells were compared to the elevation of the top of the aquifer. Tables 1 and 2 include well completion and water level measurements for Wells 650, 3026, and 619. Well locations are shown on Figure 1.

The elevation of the top of the Lakota at Well 650, 3,775 feet, was approximated by interpolating the known depth to Lakota at Well 3026 with the location of the outcrop (where the depth equals 0). The average water level measurement is at 3,682 feet elevation, or 92 feet below the approximate top of the Lakota. At the location of Well 3026 (DB08-01-06), the water level is approximately 60 feet below the top of the Lakota Formation. At both of these wells, the Lakota is only partially saturated. At Well 619, the water level in the Lakota is approximately 300 feet above the top of the Lakota Aquifer based on estimates of the Lakota elevation from the sitewide structural contour maps; here the Lakota is fully saturated.

3824 Jet Drive, PO Box 725, Rapid City, South Dakota 57709-0725 Phone: 605.394.6400 Fax: 605.394.6456 www.respec.com

Table 1. Well Completion for Wells 650, 3026, and 619

Hydro I.D. or Hydro Code	650	3026	619
Powertech Borehole I.D.		DB08-01-06	
Formation	Lakota	Lakota	Lakota
Subsurface (SS) or Free-Flowing (FF)	SS	SS	SS
Depth (ft)	Unknown	196	280
Screened Interval (ft)	Unknown	166–196	Unknown
Measuring Point	Top of 8-inch steel casing	Top of 6-inch casing pipe	Top of 5-inch steel coupling on casing
Surveyed Well Casing Elevation (ft)		3,820.48	3,700.12
Stick Up (Well Casing Mark) (ft)		–0.20	0.00
Surveyed Control Point Elevation (ft)	3,821.06		3,698.82
Stick Up (Control Point) (ft)	–0.56		
Calculated Measuring Point Elevation (ft)	3,821.62	3,820.68	3,700.12

In an effort to better delineate where the Lakota Aquifer becomes fully saturated, RESPEC recommends Powertech acquire water levels from two or three additional Lakota wells in close proximity to the outcrop. Recommended wells include Wells 16, 61, and/or 620 (Figure 1). None of these wells have well completion reports, although they are listed in Tennessee Valley Authority (TVA) reports as being completed within the Lakota. Well 16 is listed in the TVA draft Environmental Impact Statement (EIS) as having a water elevation of 3,747 feet, and based on approximations from structure contour maps, the elevation of the Lakota is 3,730 feet or just below the water level of the Lakota. Based on this information alone, it appears that Well 16 is at or very near the area where the Lakota Aquifer becomes fully saturated. From this, it is reasonable to assume that the transition from saturated to unsaturated conditions in the Lakota is located geographically in the central to western portion of the Fall River Formation outcrop. However, because of fluctuations in the water table with time and precipitation patterns, it is highly recommended to take a new water level measurement at Well 16, the only Lakota well located on the Fall River outcrop.

Task 2. Check Field Notes to Verify Data on Existing Potentiometric Surfaces Is Correct

Water level data for wells with questionable data were spot checked to compare field notes with the tabular data. An explanation of the results is provided in the following sections.

Table 2. Water Level Measurements for Wells 650, 3026, and 619

Hydro I.D. or Hydro Code	650	3026	619
Powertech Borehole I.D.		DB08-01-06	
Date	ft above mean sea level		
2007-09-27			3,679.13
2007-10-02	3,682.35		
2007-11-09	3,682.35		3,679.19
2008-02-20	3,682.13		
2008-03-24	3,681.92		
2008-03-30		3,681.89	
2008-04-22		3,681.77	
2008-05-21		3,682.13	
2008-05-28		3,681.73	
2008-05-30	3,682.00		
2008-06-24		3,681.85	
2008-07-13		3,681.78	
2008-08-19		3,681.63	
2008-09-22		3,681.78	
2008-10-20		3,681.83	
2008-11-18		3,681.85	
2008-12-17		3,682.50	
2009-01-20		3,682.53	
2009-02-24		3,682.50	
Number	5	13	2
Mean Water Level Elevation	**3,682**	**3,682**	**3,679**
Elevation of Top Lakota	**3,775**[a]	**3,741**	**3,375**
Difference[b]	**-92**	**-59**	**304**

(a) Based on interpolation.

(b) Negative value indicates Lakota Aquifer is unsaturated at well location. Positive value indicates Lakota Aquifer is saturated at well location.

— DRAFT —

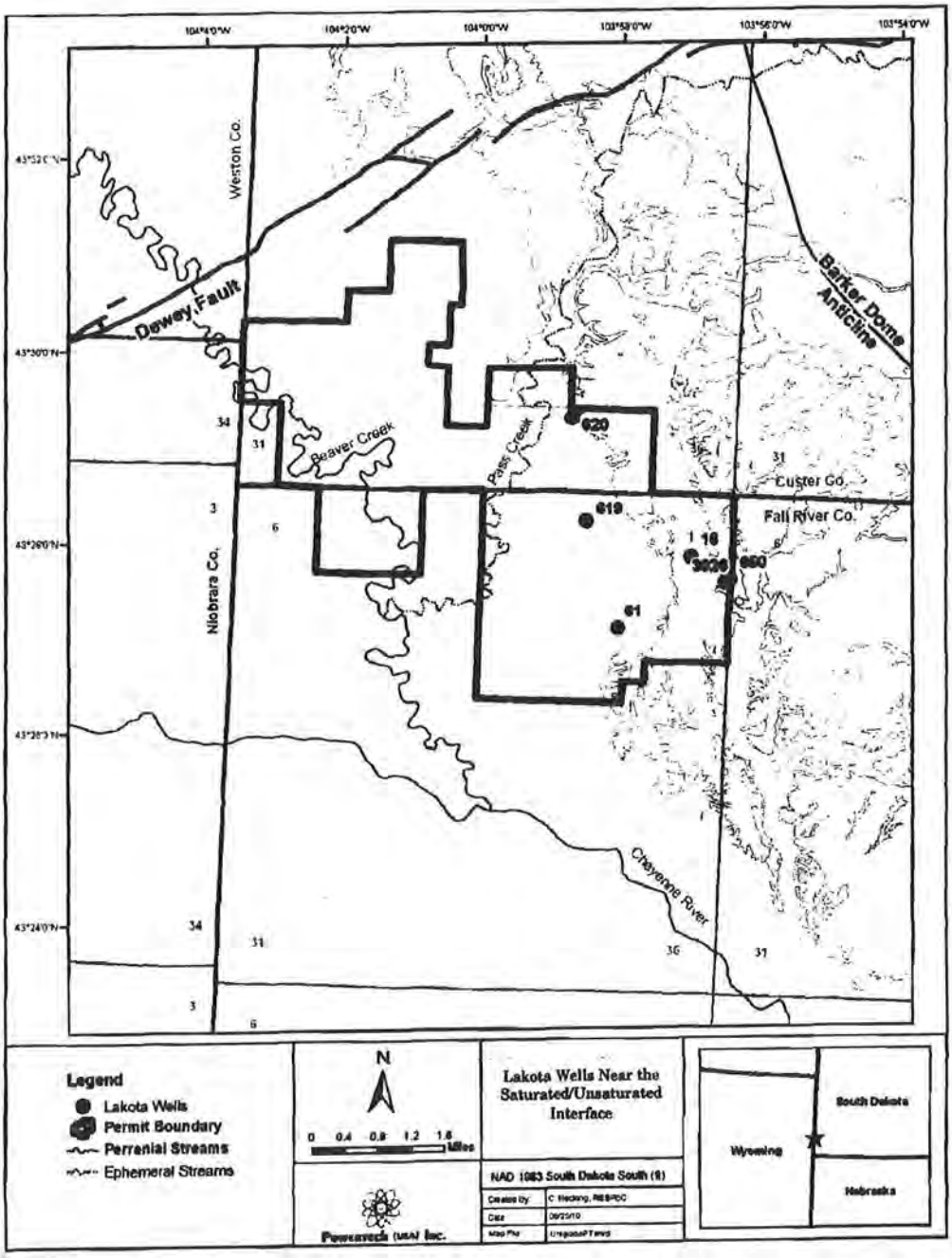


Figure 1. Lakota Wells Near the Saturated/Unsaturated Interface.

— DRAFT —

Fall River Aquifer

Well 613 and Well 622. These two wells are both completed to similar depth in the Fall River Formation (well completion reports available) and are located about 700 feet apart. Both wells have a total depth of 580 feet and similar surface elevation with well 613 screened between 504 and 580 feet and well 622 screened between 503 and 580 feet. The average water levels reported on Figure 2.7-14 of the NRC technical report (TR) are correct as compared to original field notes. These two wells have a difference in head of about 8 feet based on recent averages (3,701 and 3,709 feet elevation, respectively); at the time these wells were drilled, they also exhibited a difference of 8 feet (3,711 and 3,719 feet elevation). The difference in head between these two closely spaced wells is likely the result of minor differences in lithology and permeability of the aquifer.

Well 695. The mean water elevation for this well is 3,632 feet and is correct as presented on Figure 2.7-14 of the NRC TR. The pressure has a mean average of 12 pounds per square inch (psi) with individual measurements that range from 12.7 to 13.8 psi. As in all free-flowing wells, psi is converted to feet by the formula:

$$\text{Feet } H_2O \text{ above measuring point} = \text{psi} \times \left(144\,\text{in}^2/\text{ft}^2\right) \times \left(\text{ft}^3/62.43\,\text{lb}\right). \quad (1)$$

Lakota Aquifer

Well 8002. This Lakota stock well has an average elevation of 3,578 feet as presented on Figure 2.7-15 of the TR. This value was not used while generating the water level contours for several reasons. First, this well is a free-flowing artesian that was shut in during measurements; although no leaks were visible, it is possible that this well could not completely be shut in, as it is an older well with multiple fittings at the surface. Over the measurement time interval (September 2007 through February 2009), only 3 pressure measurements were made: 13, 15, and 14.65. Based on field notes, the value of 14.65 psi should be discarded as one of the lines froze during the stabilization period and the sampler was required by the landowner to open the valve to prevent well damage. It is also believed that the other two readings were potentially taken before the well had completely stabilized.

In generating the water level contours, Well 608 to the west was considered to have more reliable readings as this well is nonartesian and was measured with a water level tape. Water levels at Well 608 indeed exceeded estimates at Well 8002; that is unexpected and unlikely given the water gradient decreases toward the southwest. Water level data for Well 696, although not used in the generation of the original potentiometric surface, have an average value of 3,639 feet elevation; this value is extremely close to the potentiometric surface generated by ignoring the data from Well 8002. Therefore, it is our position that this decision to not use data from Well 8002 was sound. It is advisable to verify completion of this well and obtain additional water level measurements.

Well 615. Based on six measurements, the mean potentiometric surface at Well 615 is correctly reported at 3,690 feet elevation. A well completion report for this well is available to verify this well is completed into the Lakota.

Well 609. There are a total of 11 measurements for this well, all within ± 2 feet of each other. The value of 3,690 feet elevation on the existing potentiometric surface map is correct. A well completion report for this well is available to verify this well is completed into the Lakota. In addition, Well 610 (completed in the Fall River) is immediately adjacent to this well and has a comparable water level of 3,693 feet.

Well 689. This well was recently installed by Powertech as a monitoring well for the Dewey pump test. It is screened for 15 feet in the upper Lakota Formation. A total of 11 pressure measurements were collected from this well, ranging from 23 to 25 psi. The mean water level of 3,684 feet presented on the potentiometric surface is correct according to our database and field records.

Well 38. Based on the TVA EIS, this stock well is located in Sec. 33, T6S, R1E with a depth of 550 feet and completed in the Lakota. However, data from a well completion report (Figure 2) indicate this well has a depth of 494 feet. The surface elevation at this well is roughly 3,630 feet, making the depth of this well have an elevation of 3,136 feet (assuming the well completion report is correct). Based on structure contour maps, the bottom of the Fall River (top of Fuson) is around 3,130 feet. Based on the depth reported on the well completion form and the structural contour information based on exploration boreholes, this well is now believed to be completed in the Fall River Formation and not the Lakota Formation. The mean water elevation of 3,644 feet measured at this well could be used in the future to slightly modify the potentiometric surface for the Fall River Formation; the measured value is not unreasonable for the Fall River. Since this is a free-flowing well, it is also possible the water level could be higher than measured if shut in for a longer period of time. If potentiometric surfaces are redrawn in the near future, it is recommended to not include Well 38 on the Lakota surface. It is also recommended to log this well to verify completion.

Task 3. Generate Map of Potentiometric Surfaces That has Wells Labeled by Well I.D.

Existing potentiometric surfaces for the Fall River, Lakota, and Unkpapa Aquifers are presented in Figures 3 through 6. Contours have not been modified from previous versions. Figure 5 is a revised potentiometric map of the Lakota that has wells not used in generating contours removed to reduce confusion.

Task 4. Compile Water Level Data and Completion Information Into a Table

Tables 3 through 8 contain the field water level measurements and calculated water table elevations. Tables 3 and 4 contain data for the Inyan Kara Aquifers, Tables 5 and 6 contain alluvial aquifer information, and Tables 7 and 8 contain water level information on the Unkpapa Aquifer.

Form S - 3 DRILLER'S FINAL REPORT

OFFICE OF STATE ENGINEER
Pierre, South Dakota Well No. _____ (do not fill in)

CUSTER COUNTY

Location: SW NW¼ Section 33 Twp. 6S Range 1E

Owner George Putnam Address Burdock, S. Dak.

Depth 494 Drawdown _____ Type Rig Used cable tool

Flow(gpm) _____ Pressure _____ Date Measured _____

Grd. Elev. _____ Water Level Below Ground Surface _____

Temperature _____ Character Water (soft, medium, hard)

Date Commenced _____ Date Completed 11/12/49

x

Section _____

CASING DETAIL

Type	Size	Length	Depth
_____	4"	497	494

PERFORATIONS

Type	Size	Length	Depth

SCREEN

Type	Size	Length	Depth

Is there a seal between different size pipes? _____ What kind? _____

WATER BEARING SANDS

From _____ To _____

SOURCE OF INFORMATION

PMA office, Fall River Co.

DRILLER'S LOG

From	To	

Bonded Driller Roy Bonar (Signature)

Address Hot Springs, S. Dak.

Figure 2. Well Completion Report for Well 38.

— DRAFT —

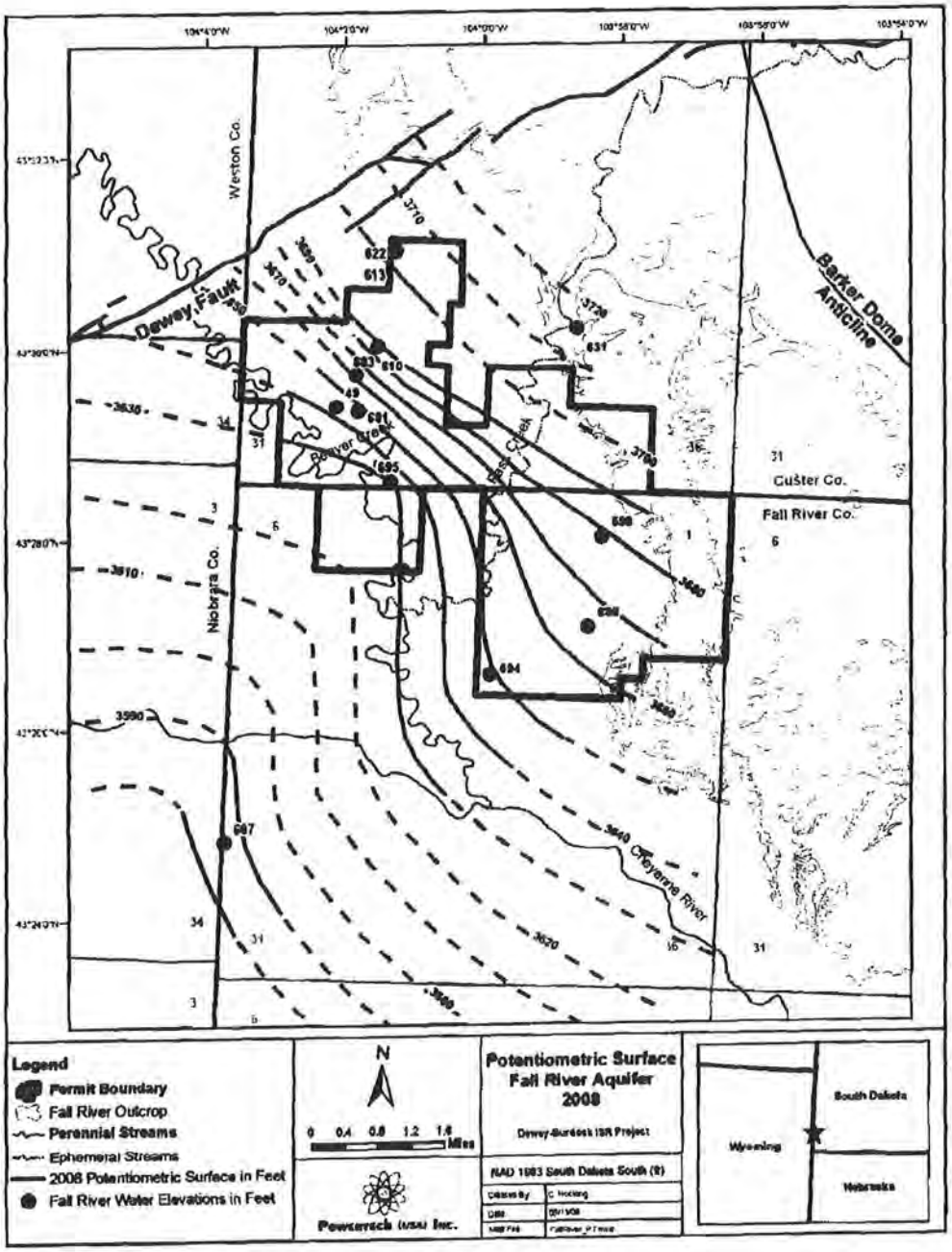


Figure 3. Fall River Aquifer Potentiometric Map With Wells Labeled by Hydro I.D.

— DRAFT —

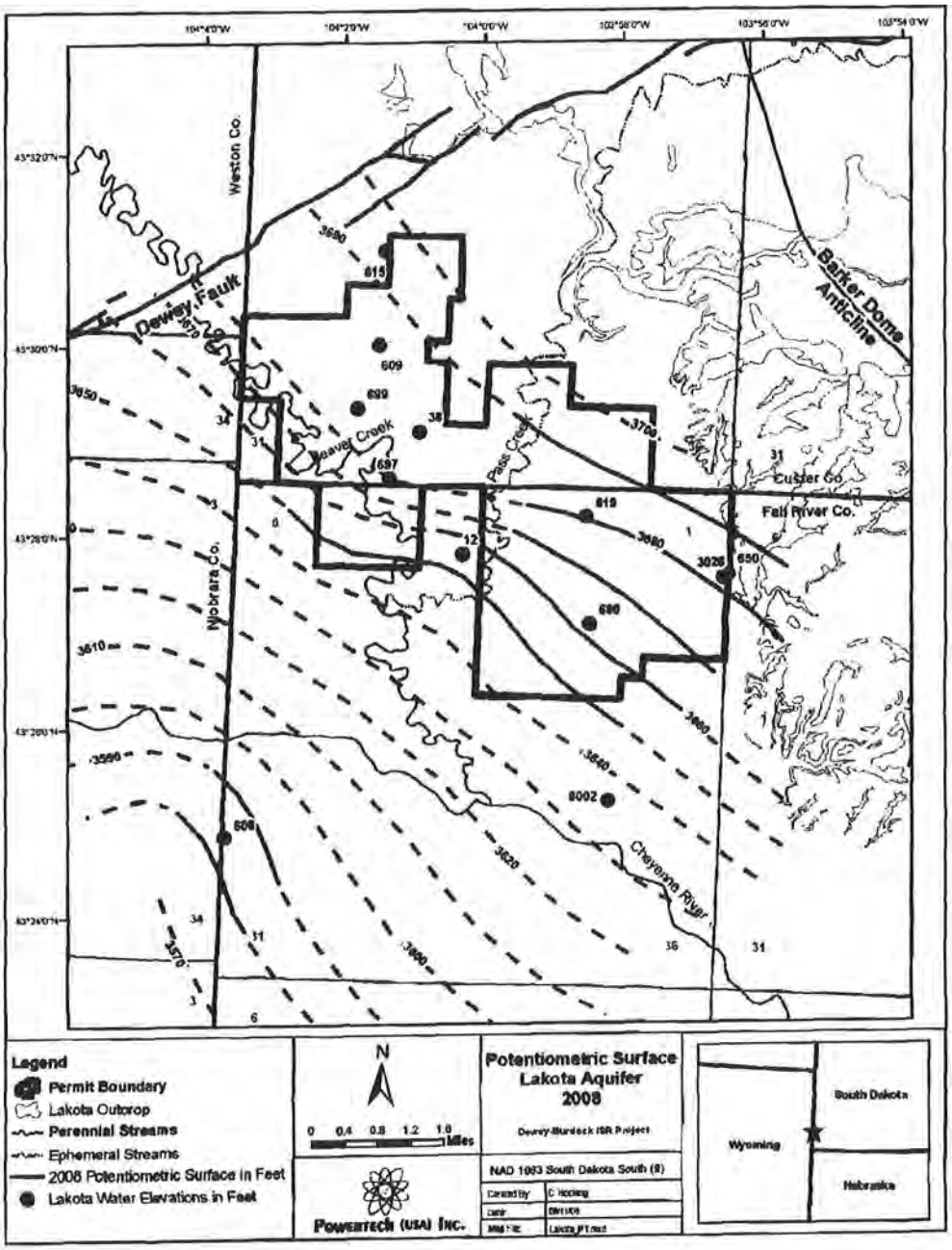


Figure 4. Lakota Aquifer Potentiometric Map With Wells Labeled by Hydro I.D.

— DRAFT —

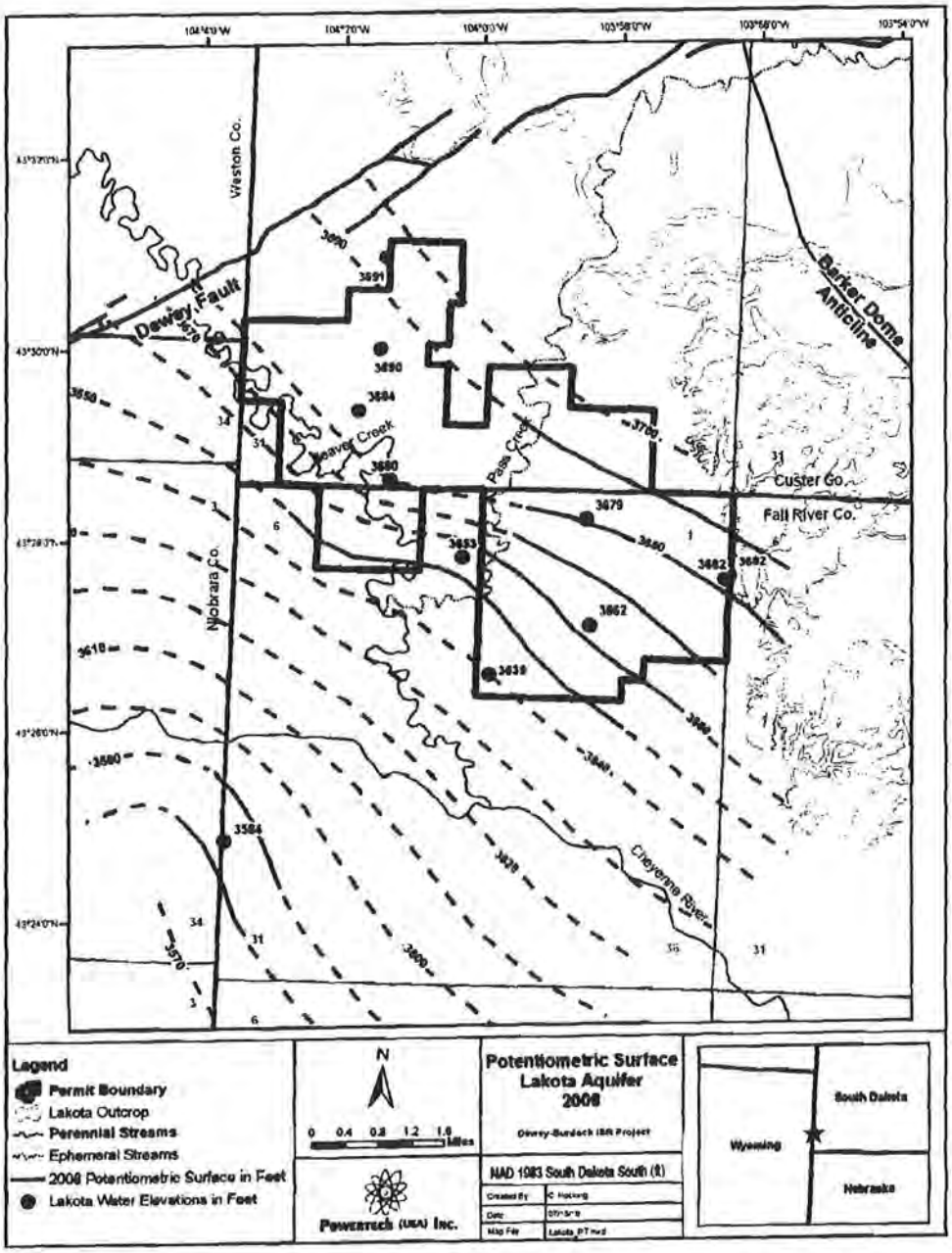


Figure 5. Revised Lakota Aquifer Potentiometric Surface. This map has removed Wells 38 and 8002 and added Well 696 to reflect data that were actually used to generate the contour map.

— DRAFT —

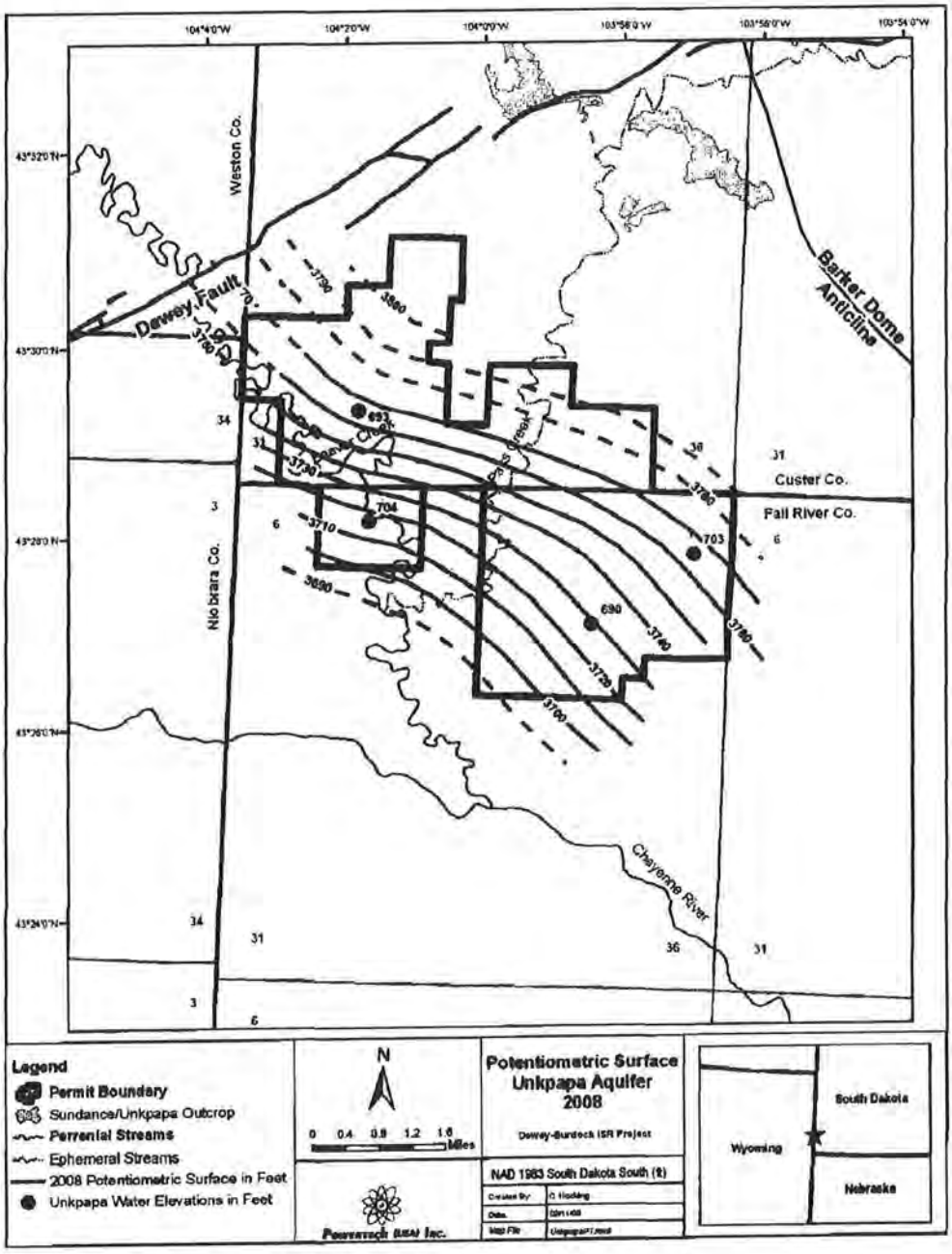
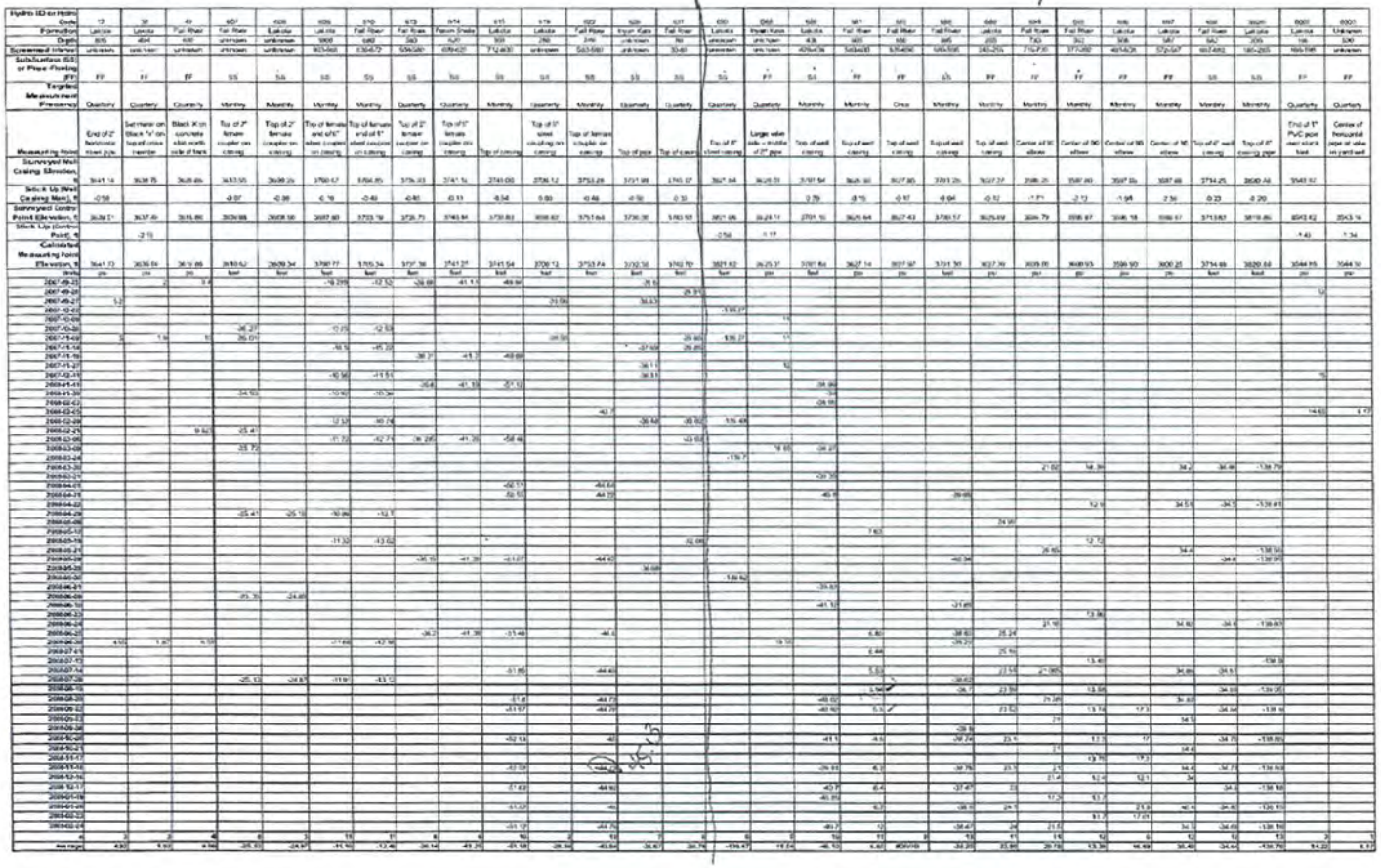


Figure 6. Unkpapa Aquifer Potentiometric Map With Wells Labeled by Hydro I.D.

— DRAFT —

Table 3. Inyan Kara Water Level Measurements in Feet or Pounds per Square Inch



POWERTECH (USA) INC.

3.2067 ft/psi
3.28 ft/m
(Use) throughout

Table 4. Inyan Kara Water Level Measurements in Elevation Above Sea Level

Hydro ID or Hydro Code	12	18	49	507	608	609	612	613	[illegible]
Formation	Lakota	Lakota	Fall River	Fall River	Lakota	Lakota	Fall River	Fall River	[illegible]
Depth	[illegible]	464	620	unknown	unknown	1000	[illegible]	580	[illegible]
Screened Interval	unknown	unknown	unknown	unknown	unknown	[illegible]	635-672	534-580	[illegible]
SubSurface (SS) or Free-Flowing (FF)	FF	FF	FF	SS	SS	SS	SS	SS	[illegible]
Targeted Measurement Frequency	Quarterly	Quarterly	Quarterly	Monthly	Monthly	Monthly	Monthly	Quarterly	[illegible]
Surveyed Well Casing Elevation, ft	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Stick Up (Well Casing Mark), ft	[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Surveyed Control Point Elevation, ft		[illegible]	[illegible]						[illegible]
Stick Up (Control Point), ft		[illegible]							[illegible]
Calculated Measuring Point Elevation, ft	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Units	feet	feet	feet	feet	feet	feet	feet	feet	feet
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Average	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]

3640.84
3639.58
3637.54
3708.61
3641.94
3654.84
ok

need to add 44"?

— DRAFT —

Table 5. Alluvial Water Level Measurements in Feet Below Measuring Point

Hydro I.D. or Hydro Code	675	676	677	678	679
Targeted Measurement Frequency	Monthly	Monthly	Monthly	Monthly	Monthly
Measuring Point	top of well casing	top of well casing	top of well casing	top of well casing	top of well casing
Distance from Measuring Point to Ground (ft)	2.3	2.4	2.3	2.3	2.3
Approximate Land Elevation From Topographic Map (ft)	3,491	3,662	3,570	3,591	3,717
Calculated Measuring Point Elevation (ft)	3,493.3	3,664.4	3,572.3	3,593.3	3,719.3
Date	ft below measuring point				
9/28/2007	-11.18	-20.14	-11.51	-12.1	-33.6
10/26/2007	-11.04	-20.3	-11.35	-11.73	-33.83
11/9/2007	-10.99	-20.3	-11.25	-11.45	-33.85
11/14/2007					-33.85
11/27/2007	-10.99	-20.37	-11.12	-11.22	
12/11/2007	-10.82	-20.4		-11.15	-33.88
1/11/2008	-10.6	-20.44			-33.87
1/30/2008			-10.17	-10.82	
2/3/2008					-33.88
2/5/2008	-10.37	-20.5	-10.1	-10.81	
3/6/2008	-10.045	-20.53	-9.9	-10.75	-33.93
4/29/2008	-10.42	-20.6	-9.63	-10.38	
5/18/2008					-34.02
6/30/2008		-20.65	-9.45	-10.95	-34.03

— DRAFT —

Table 6. Alluvial Water Level Measurements in Elevation Above Mean Sea Level

Hydro ID or Hydro Code	675	676	677	678	679
Formation	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial
Subsurface (SS) or Free-Flowing (FF)	SS	SS	SS	SS	SS
Depth (ft)	14–4	22.5	14.5	14.5	39
Screened Interval (ft)	4–14	12–22	4–14	4–14	29–39
Targeted Measurement Frequency	Monthly	Monthly	Monthly	Monthly	Monthly
Measuring Point	top of well casing	top of well casing	top of well casing	top of well casing	top of well casing
Distance from Measuring Point to Ground (ft)	2.3	2.4	2.3	2.3	2.3
Approximate Land Elevation From Topographic Map (ft)	3,491	3,662	3,570	3,591	3,717
Calculated Measuring Point Elevation (ft)	3,493.3	3,664.4	3,572.3	3,593.3	3,719.3
Date	ft above mean sea level				
9/28/2007	3,482.1	3,644.3	3,560.8	3,581.2	3,685.7
10/26/2007	3,482.3	3,644.1	3,561.0	3,581.6	3,685.5
11/9/2007	3,482.3	3,644.1	3,561.1	3,581.9	3,685.5
11/14/2007					3,685.5
11/27/2007	3,482.3	3,644.0	3,561.2	3,582.1	
12/11/2007	3,482.5	3,644.0		3,582.2	3,685.4
1/11/2008	3,482.7	3,644.0			3,685.4
1/30/2008			3,562.1	3,582.5	
2/3/2008					3,685.4
2/5/2008	3,482.9	3,643.9	3,562.2	3,582.5	
3/6/2008	3,483.3	3,643.9	3,562.4	3,582.6	3,685.4
4/29/2008	3,482.9	3,643.8	3,562.7	3,582.9	
5/18/2008					3,685.3
6/30/2008		3,643.8	3,562.9	3,582.4	3,685.3
Mean	**3,483**	**3,644**	**3,562**	**3,582**	**3,685**

— DRAFT —

Table 7. Unkpapa Water Level Measurements in Feet

Hydro I.D. or Hydro Code	690	693	703	704
Targeted Measurement Frequency	Once	Once	Once	Once
Measuring Point	top of casing	top of casing	top of casing	top of casing
Distance from Measuring Point to Ground				2
Surveyed Well Casing Elevation (ft)	3,700.04	3,627.27		
Stick Up (Well Casing Mark) (ft)				
Surveyed Control Point Elevation (ft)	3,699.59	3,626.31		
Stick Up (Control Point) (ft)	0.41			
Calculated Measuring Point Elevation (ft)	3,699.18	3627.27	3,877[a]	3,599[a]
Date	**ft above (+) or below (–) measuring point**			
5/14/08	29.15	135.77		
5/21/08			–109.96	
5/28/08	30.65			
5/30/08				116.5
6/24/08			–109.4	

(a) Wells were not surveyed. Elevation estimated from topographic map.

Task 5. Generate an Explanation of Water Level Measurement Feasibility for the Wells Listed in the NRC Comments

The wells listed in the NRC review of the TR and an explanation of the feasibility of obtaining a water level measurement from those specific wells is included in Table 9. Figures 7 and 8 display these wells for possible inclusion alongside those wells that are in the current water level monitoring plan. For many of these wells, water level measurements were not easily obtained, but could be obtained with additional work such as pulling a pump and shutting in a well for a period of time. At this time, it is assumed that Powertech will be conducting further field investigations into this matter based on RESPEC's cursory review.