

STATE OF SOUTH DAKOTA  
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES  
Application for a Permit to Inject - Class II Underground Injection Control

Return To: PMB 2020  
SD Department of Environment and Natural Resources  
Ground Water Quality Program  
523 East Capitol Ave. - Joe Foss Building  
Pierre SD 57501  
Telephone 605.773.3296  
Fax 605.773.6035

RECEIVED  
OCT 19 2015  
Dept. of Environment &  
Natural Resources  
GROUND WATER QUALITY

1.0 General Information

1.1 Application Type

- New Permit to Inject
- Major Modification to Existing Permit to Inject
- Minor Modification to Existing Permit to Inject

1.2 If requesting a new permit or major modification, provide a brief description of the new activity or proposed modification (include additional attachments as needed).

The 2-33 Alkali Federal well was drilled to be used as an water disposal injection well for the Alkali Creek Field in Sec. 33,T11S, R1E, Fall River County

1.3 If requesting a minor modification, select the type(s) of modification requested (ARSD 74:12:07:09)

- Correction of typographical errors and language changes that have no legal or substantive effect
- More frequent monitoring or reporting proposed by the permittee
- A change in ownership or operational control of the well if the secretary determines that no other change in the permit is necessary, provided a written agreement containing a specific date for transfer of responsibility for the injection well, coverage, and liability between the current and new owner or operator has been submitted to the secretary pursuant to ARSD 74:12:07:06
- A change in quantities or types of fluids injected which are within the capacity of the injection well as permitted and, in the judgement of the secretary, would not interfere with the operation of the injection well or its ability to meet conditions described in the permit, and would not change its classification
- A change in construction requirements approved by the secretary pursuant to this chapter if the alteration complies with the conditions of the permit to inject and this section
- Amendment of a plugging and abandonment plan which has been updated pursuant to this article
- Recementing, reworking, or reconditioning a well
- Deepening, extending, or sidetracking an existing well within the permitted injection horizon

As described in ARSD 74:12:07:09, if the department determines that a minor modification request has the potential to degrade or threaten freshwater resources, it will be treated as a major modification and subject to the Notice of Recommendation procedures (ARSD 74:12:09)

1.4 Operator Information (ARSD 74:12:07:03(8))

Name: Peter K. Roosevelt

Address: 621 17th Street Suite 710, Denver, CO 80293

Telephone: 303-825-8606

Email: jar523@comcast.net

1.5 Basic information about the well(s) covered by the requested permit to inject

API Number	Well Name	Legal Location	Latitude	Longitude
4004720340	2-33 Alkali Federal	NWNE Sec. 33, T11S, R1E, Fa	43.056948*	104.002557*

The information required below should be included as attachments to the application form. The following should be used as a checklist to ensure all necessary material is submitted. The department recommends using the same numbering system as shown in the application form; however, if a different system is used please use the location box to identify the location of the information in the application.

1.6 Affidavit of Delivery (ARSD 74:12:07:04) - Include an affidavit showing the names and addresses of the parties to whom the application has been delivered.

*NA*

Included

*Roosevelt is only operator in field*

Location: attached

2.0 Specific Application Requirements

2.1 Maps (ARSD 74:12:07:03(1))

2.1.1 Vertical Wells (ARSD 74:12:07:03(1)(a))

A one-half mile fixed radius area of review plat which shows the location of the injection well or wells, existing or proposed; the location of all oil and gas wells; the location of all water wells, active and abandoned; the location of all other wells, including plugged and abandoned wells; abandoned locations; dry holes; current drilling locations; the names of operators; the surface and mineral owners; and each offset operator

Included

Location: attached

2.1.2 Horizontal Wells (ARSD 74:12:07:03(1)(b))

*NA* A one-half mile fixed radius area of review plat extending in all directions from the horizontal well and any sidetracks. The plat must show the location of the injection well or wells, existing or proposed; the location of all oil and gas wells; the location of all water wells, active and abandoned; the location of all other wells, including plugged and abandoned wells; abandoned locations; dry holes; current drilling locations; the names of operators; the surface and mineral owners; and each offset operator

Included

Location:

2.2 Formation or formations from which oil, gas, and water wells are producing or have produced within the area of review (ARSD 74:12:07:03(2))

Included

Location:

3080

2.3 The name, stratigraphic and structural description, and depth of the receiving formation or formations and the overlying and underlying confining zone(s) or formation(s) (ARSD 74:12:07:03(3))

Included

Location:

2.4 The well type, construction, spud date, total depth, formation tops, record of completion or recompletion, and plugging for all oil, gas, and injection wells within the area of review, **and any additional pertinent information which the secretary determines is necessary to make an informed judgement on the issuance of a permit**, including drill stem tests and well logs for all oil and gas wells identified in the area of review (ARSD 74:12:07:03(4))

Included

14-28 Pussy Cat Federal: P&A  
Location:   
~~3-33 Piggy Wig Federal: Logs, Spud date and plug date~~

2.5 Information on abandoned and active water wells within the area of review, as follows (ARSD 74:12:07:03(5))

*NA*

2.5.1 Abandoned water wells: None

2.5.1.1 The legal location

2.5.1.2 Well name

2.5.1.3 Method and supporting information on abandonment, if available

2.5.2 Active Water Wells None

2.5.2.1 The legal location

2.5.2.2 Well name

2.5.2.3 An analysis of water quality, including information on total dissolved solids content,

chlorides, sodium, sulfates, nitrates, and hydrocarbons

2.5.2.4 The construction program, including casing size and type, if available

2.5.2.5 Depth of the well, if available

2.5.2.6 A geologic / driller's log, if available

2.5.2.7 The water level and pump type, if available

Included

Location:

2.6 A description of the injection well's casing and the proposed casing program, and the proposed method for testing the casing for mechanical integrity before use as an injection well (ARSD 74:12:07:03(6))

Included

Location:

2.7 The geologic name and the depth to and interval of all freshwater resources which may be affected by injection (ARSD 74:12:07:03(7))

Included

Location:

2.8 Schematic drawings of the surface and subsurface construction details of the well with detailed drawings of the gauge connections (ARSD 74:12:07:03(9))

Included

Location:

2.9 The source and nature of the substance or substances to be injected, its viscosity, its compatibility with the receiving formation, including stability indices, and the estimated average and maximum daily amounts to be injected. If the nature of the injected fluid is produced water, a water quality analysis must be submitted and must include information on total dissolved solids content, chlorides, sodium, sulfates, nitrates, and hydrocarbons. (ARSD 74:12:07:03(10))

Included

Location:

2.10 The average and maximum estimated injection pressure (ARSD 74:12:07:03(11))

Included

Location:

2.11 A narrative description of any proposed production stimulation program, including a feasibility study, process description, and an explanation of how the data were determined, such as working calculations (ARSD 74:12:07:03(12))

NA

Included

Location:

2.12 A list of wells identified in subdivision 74:12:07:03(1) in need of corrective action or where corrective action has been performed, and a written justification describing how the corrective action will protect freshwater resources. (ARSD 74:12:07:03(13))

NA

Included

Location:

2.13 The injection zone characteristics including porosity, compressibility, and intrinsic permeability. Please include the reference or source of the information. (ARSD 74:12:07:03(14))

Included

Location:

2.14 The expected project life (ARSD 74:12:07:03(15))

Included

Location:

2.15 Surface owner name, address, and telephone number (ARSD 74:12:07:03(16))

Included

Location:

**3.0 Certification of Applicant**

3.1 Certification of Applicant (Form 13). The applicant is required to submit a notarized Certification of Applicant (Form 13). This form can be found at <http://denr.sd.gov/documents/form13.pdf> or by contacting the Ground Water Quality Program at 605.773.3296.

Included

Location:

**3.2 Applicant's Signature**

Peter K. Roosevelt  
Signature

16 October 2015  
Date

Peter K. Roosevelt  
Printed Name of Person Signing

operator  
Title

STATE OF SOUTH DAKOTA  
BEFORE THE SECRETARY OF

THE DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

IN THE MATTER OF THE	)	
APPLICATION OF	)	
	)	CERTIFICATION OF
<u>Peter K. Roosevelt</u>	)	
	)	APPLICANT
STATE OF <u>COLORADO</u>	)	
	)	
COUNTY OF <u>BENVER</u>	)	

I, Peter K. Roosevelt, the applicant in the above matter after being duly sworn upon oath hereby certify the following information in regard to this application:

I have read and understand South Dakota Codified Law Section 1-40-27 which provides:

*"The secretary may reject an application for any permit filed pursuant to Titles 34A or 45, including any application by any concentrated swine feeding operation for authorization to operate under a general permit, upon making a specific finding that:*

- (1) The applicant is unsuited or unqualified to perform the obligations of a permit holder based upon a finding that the applicant, any officer, director, partner, or resident general manager of the facility for which application has been made:
 
  - (a) Has intentionally misrepresented a material fact in applying for a permit;*
  - (b) Has been convicted of a felony or other crime involving moral turpitude;*
  - (c) Has habitually and intentionally violated environmental laws of any state or the United States which have caused significant and material environmental damage;*
  - (d) Has had any permit revoked under the environmental laws of any state or the United States; or*
  - (e) Has otherwise demonstrated through clear and convincing evidence of previous actions that the applicant lacks the necessary good character and competency to reliably carry out the obligations imposed by law upon the permit holder; or**
- (2) The application substantially duplicates an application by the same applicant denied within the past five years which denial has not been reversed by a court of competent jurisdiction. Nothing in this subdivision may be construed to prohibit an applicant from submitting a new application for a permit previously denied, if the new application represents a good faith attempt by the applicant to correct the deficiencies that served as the basis for the denial in the original application.*

*All applications filed pursuant to Titles 34A and 45 shall include a certification, sworn to under oath and signed by the applicant, that he is not disqualified by reason of this section from obtaining a permit. In the absence of evidence to the contrary, that certification shall constitute a prima facie showing of the suitability and qualification of the applicant. If at any point in the application review, recommendation or hearing process, the secretary finds the applicant has intentionally made any material misrepresentation of fact in regard to this certification,*

consideration of the application may be suspended and the application may be rejected as provided for under this section.

Applications rejected pursuant to this section constitute final agency action upon that application and may be appealed to circuit court as provided for under chapter 1-26.”

I certify pursuant to 1-40-27, that as an applicant, officer, director, partner, or resident general manager of the activity or facility for which the application has been made that I; a) have not intentionally misrepresented a material fact in applying for a permit; b) have not been convicted of a felony or other crime of moral turpitude; c) have not habitually and intentionally violated environmental laws of any state or the United States which have caused significant and material environmental damage; (d) have not had any permit revoked under the environmental laws of any state or the United States; or e) have not otherwise demonstrated through clear and convincing evidence of previous actions that I lack the necessary good character and competency to reliably carry out the obligations imposed by law upon me. I also certify that this application does not substantially duplicate an application by the same applicant denied within the past five years which denial has not been reversed by a court of competent jurisdiction. Further;

“I declare and affirm under the penalties of perjury that this claim (petition, application, information) has been examined by me, and to the best of my knowledge and belief, is in all things true and correct.”

Dated this 16th day of October, 2015.

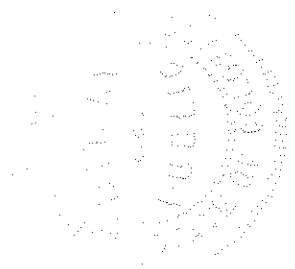
Peter K. Roosevelt  
Applicant (print)

Peter K. Roosevelt  
Applicant (signature)

Subscribed and sworn before me this 16th day of October, 2015.

James A. Russell  
Notary Public (signature)

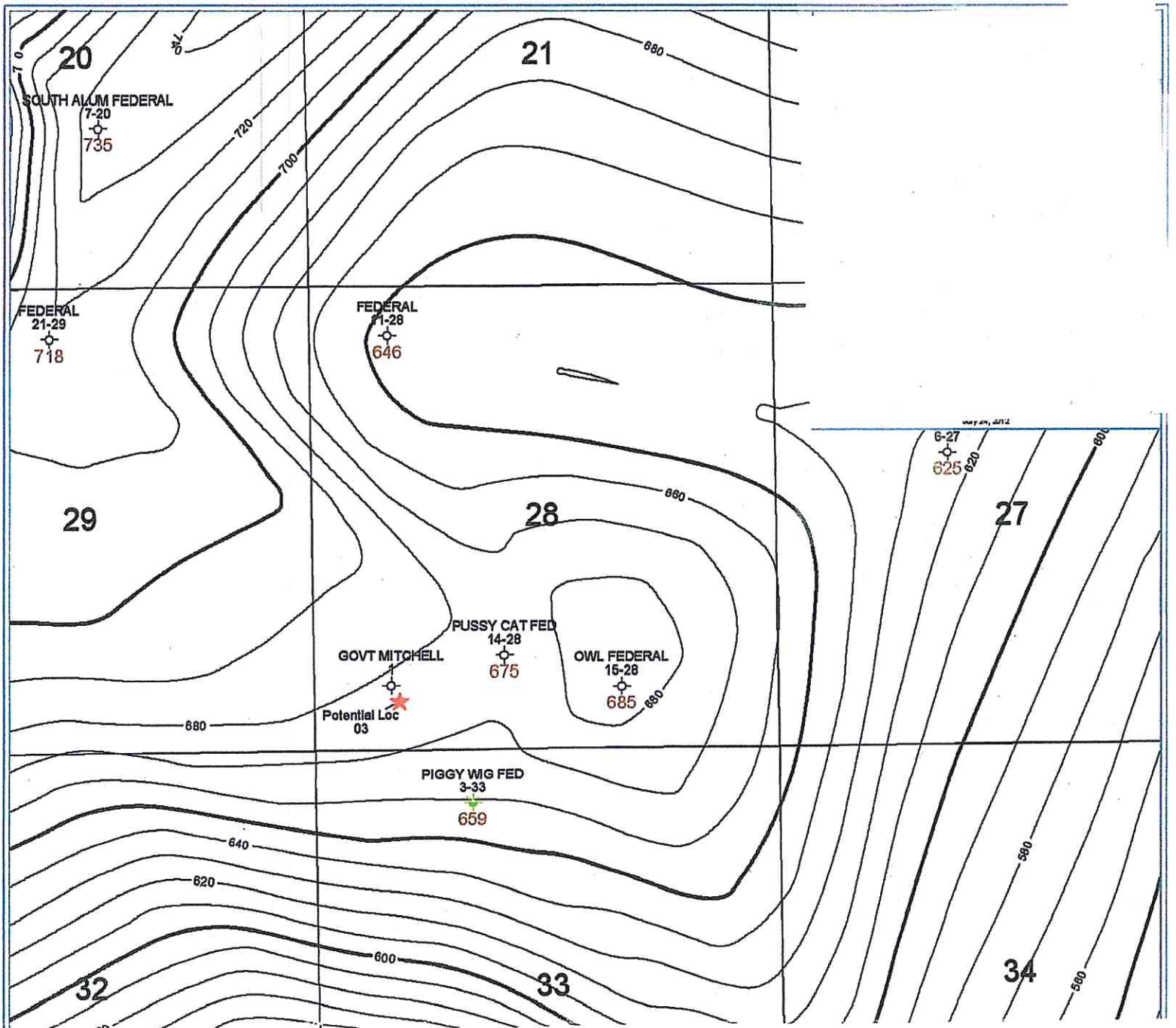
My commission expires: 2/24/2016



(SEAL)

**PLEASE ATTACH ANY ADDITIONAL INFORMATION NECESSARY TO DISCLOSE ALL FACTS AND DOCUMENTS PERTAINING TO SDCL 1-40-27 (1) (a) THROUGH (e). ALL VIOLATIONS MUST BE DISCLOSED, BUT WILL NOT AUTOMATICALLY RESULT IN THE REJECTION OF AN APPLICATION**

2.1.1





2.6

ONSHORE ORDER NO. 1  
 Peter K. Roosevelt  
Alkali Federal 2-33  
 500' FNL and 1979' FEL,  
 NW NE Sec. 33, T11S - R1E  
 Fall River County, South Dakota

Lease No. SDM- 103752

DRILLING PROGRAM

Page 3

- d. The surface casing shall be cemented back to surface.
- e. **Surface:** 4 centralizers will be run on the surface pipe.  
**Production:** 8 centralizers will be run on the long string casing.
- f. All casing strings below the conductor shall be pressure tested to 1500 psi.
- g. The proposed casing program will be as follows:

Purpose	Depth	Hole Size	O.D.	Weight	Grade	Type	New/Used
Surface	0 - 220'	12-1/4"	8-5/8"	24#	J-55	LT&C	New
Production	0' - 3,750'	7-7/8"	5-1/2"	15#	K-55	BT&C	New

- h. Casing design subject to revision based on geologic conditions encountered.

Purpose	Inside Diameter Inches	Drift Diameter Inches	OD of Coupling Inches	Optimum Torque lbs	Collapse (psi)	Burst (psi)	Pipe Tension (1000 lbs)	Joint Strength (1000 lbs)
Surface	8 5/8"	7.972	9.625	2440	1370	2700	263	244
Production	5 1/2"	4.825	6.050	2170	4040	4400	239	217

- The safety factor for collapse is 1.125, and 1.80 for tension/joint strength.

5. PROPOSED CEMENTING PROGRAM

- a. The cement program will be as follows:

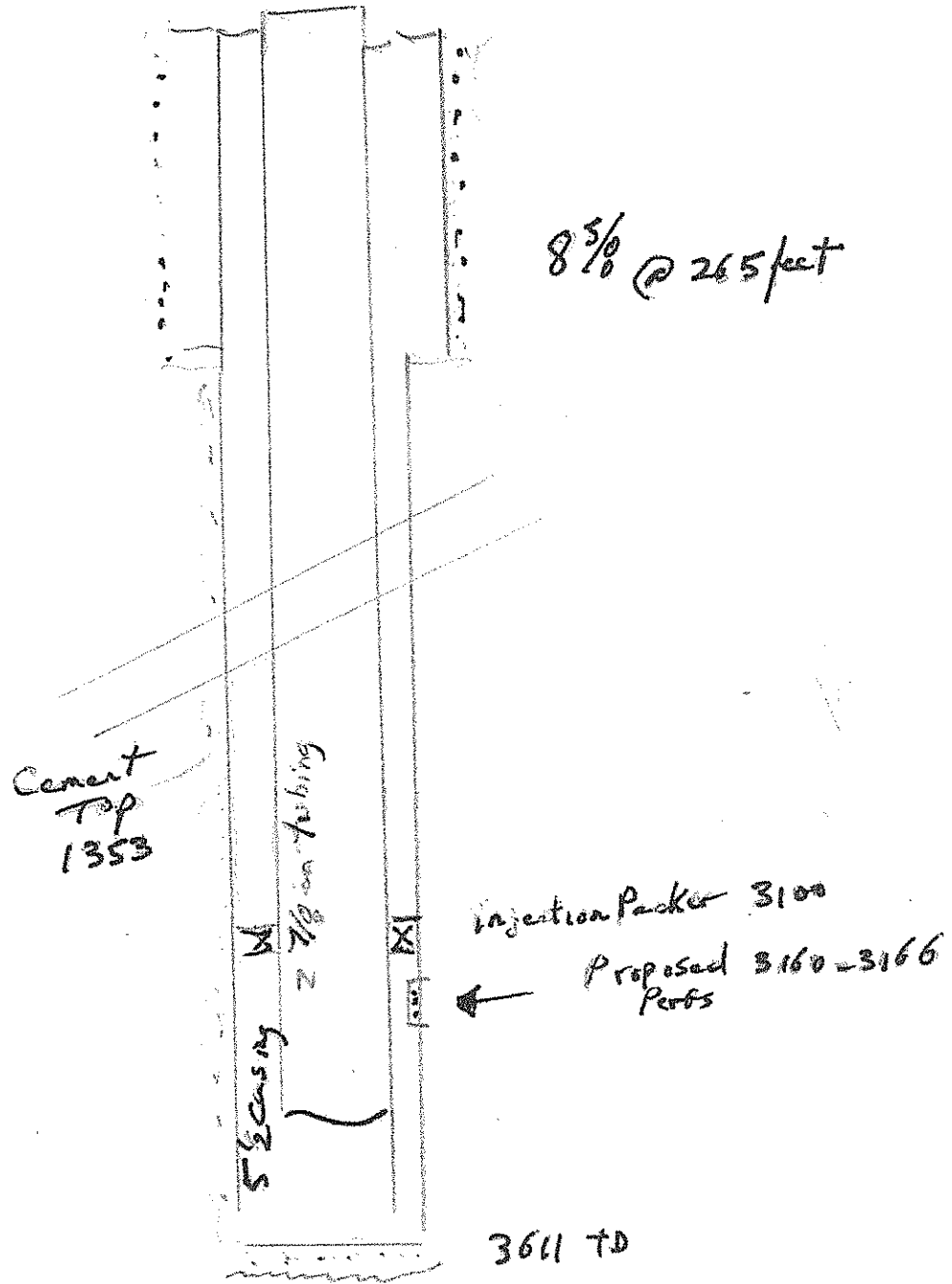
Surface	Type and Amount
TOC @ Surface	175 sks class G w/2% Ca Cl, 1.34 ft/3 yield per sack, 14.8 ppg, 2% gel additive
Production	Type and Amount
TOC @ 1,650'	1 <sup>st</sup> stage: 200 sxs class G w/2% Ca Cl, 1.34 ft/3 per sack, 14.8 ppg, 2% gel additive. 2 <sup>nd</sup> stage: 100 sxs class G w/2% Ca Cl, 1.34 ft/3 per sack, 14.8 ppg, 2% gel additive. Sufficient to cover Dakota plus 50'.



2.8

2-33 Federal Well bore Schematic

2-33 Federal Well Bore Schematic



CUSTOMER #: 04210

**HUFFMAN**  
**LABORATORIES, INC.**  
Quality Analytical Services Since 1936  
4630 Indiana Street • Golden, CO 80403  
Phone: (303) 278-4455 • FAX: (303) 278-7012

DATE 9/28/98  
LAB# 217698  
P.O.  
RECD 09/25/98

ANALYSIS REPORT

PETER K. ROOSEVELT  
518 17TH STREET, STE 1140  
DENVER CO 80202

SEQUENCE/ SAMPLE ID	01 WATER FROM
RESISTIVITY OF WATER-----OHM/CM - - -	22.4
DILUTED 1:10*	16.8
SPEC COND-us/CM -	44600.
DILUTED 1:10*	59500.

SAMPLE 01 - PIGGY WIG FEDERAL 3-33

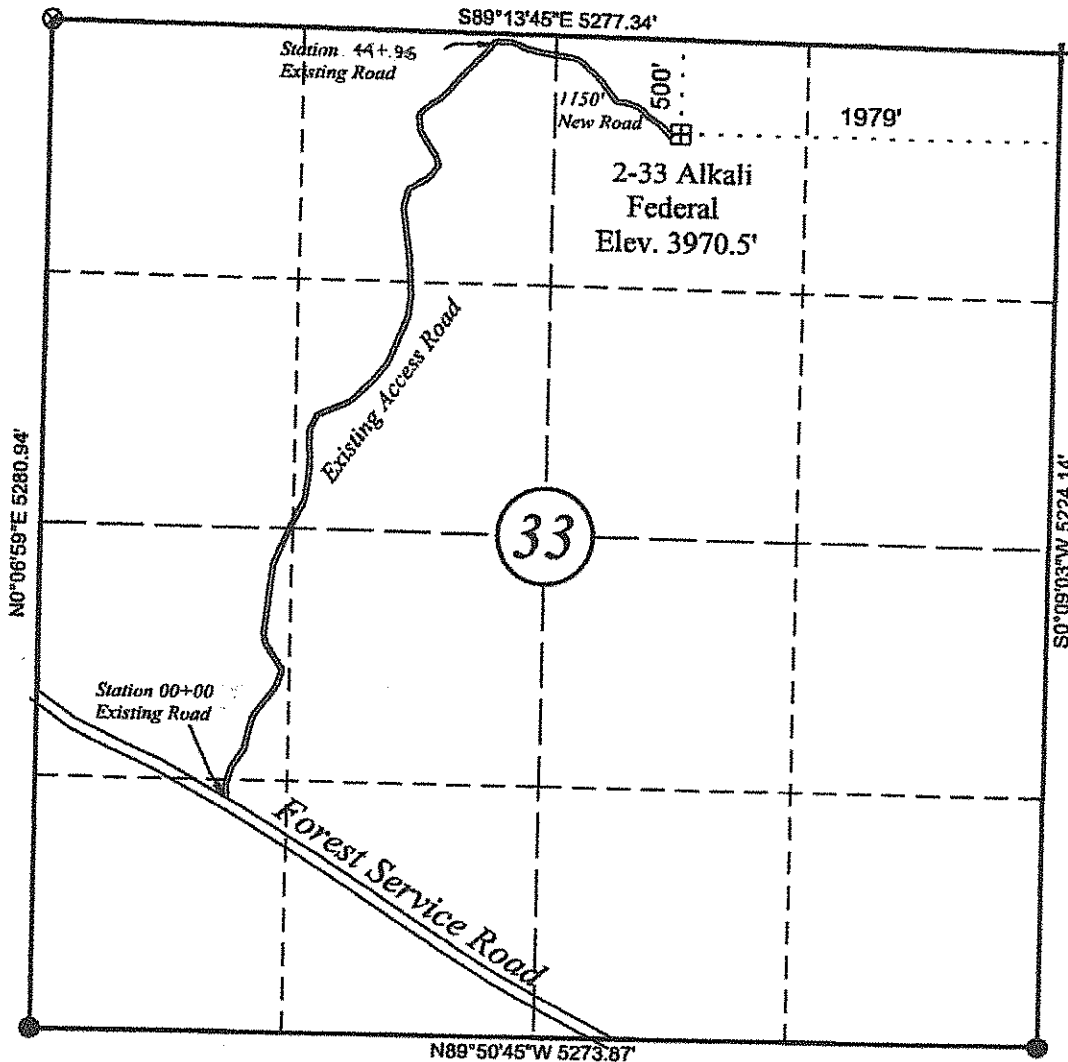
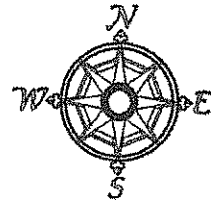
\*DILUTIONS CALCULATED BACK TO UNDILUTED SAMPLE (ANALYTICAL VALUE MULTIPLIED BY DILUTION FACTOR).

*Would be .224  
ohm m<sup>2</sup> at  
room Temp  
lower at Bkt  
of 120° F*

*RW of  
Acropolis State 6.27  
was .18*

**TRI-STAR  
SURVEING**  
(307) 746-2451  
22 Ash Street  
Newcastle, WY  
82701

*Fall River County, South Dakota*  
*Section 33, T11S, R1E*



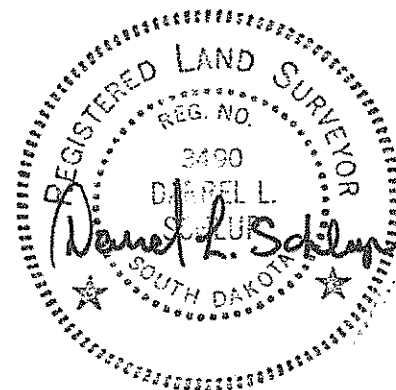
LEGEND	
●	Brass Cap
⊞	2-33 Alkali Federal
+	Fence Corner
⊗	1.5 Inch A.C.

Wellsite

Latitude: 43.056948°  
Longitude: 103.002557°

Section 33, T 11 S, R 1 E  
Basis of Bearing: R.T.K. G.P.S.  
Basis of Elevation : U.S.G.S. Topo  
Scale 1" = 1000'

I, Darrel L. Schlup of Newcastle, Wyoming, certify that in accordance with a request from Peter Roosevelt, of Denver Colorado, for Peter Roosevelt made a survey on the 2nd day of August, 2012 for the location and elevation of 2-33 Alkali Federal. As shown on the above map, the wellsite is in the NW¼ NE¼ Section 33, Township 11 South, Range 1 East, Fall River County, South Dakota.  
Elevation is 3970.5 feet above mean sea level before dozing.





DEPARTMENT of ENVIRONMENT  
and NATURAL RESOURCES

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

denr.sd.gov

October 27, 2015

Peter K. Roosevelt  
621 17<sup>th</sup> Street, Suite 710  
Denver CO 80293

FILE COPY

RE: Request to Inject Production Water into the 2-33 Alkali Federal Well – Underground Injection Control Salt Water Disposal Application – South Dakota Oil and Gas Case No. 8-2015

Dear Mr. Roosevelt:

The South Dakota Department of Environment and Natural Resources (DENR) received your October 19, 2015, 2-33 Alkali Federal Underground Injection Control (UIC) Salt Water Disposal application and determined the following additional information is needed to complete the application. For consistency, the section numbers shown below are the same as the section numbers used in the department's UIC application form.

*2.1.1 A one –half mile fixed radius area of review plat which shows the location of the injection well or wells, existing or proposed; the location of all oil and gas wells; the location of all water wells, active and abandoned; the location of all other wells, including plugged and abandoned wells; abandoned locations; dry holes; current drilling locations; the name of operators; the surface and mineral owners; and each offset operator*

The map provided in the application is incomplete. To complete this section please resubmit a map centered on the 2-33 Alkali Federal well identifying the fixed ½ mile radius Area of Review, all wells, existing or proposed; the location of all oil and gas wells; the location of all water wells, active and abandoned; the location of all other wells, including plugged and abandoned wells; abandoned locations; dry holes; current drilling locations; the name of operators; the surface and mineral owners; and each offset operator. For your reference, much of this information can be found using the department's online oil and gas GIS database located at:

<http://www.arcgis.com/explorer/?open=dfb223c6d8974f46a123b9f903adb04d>

*2.8 Schematic drawings of the surface and subsurface construction details of the well with detailed drawings of the gauge connections.*

In section 2.8 you provided the required subsurface information for the 2-33 Alkali Federal well but did not provide a schematic of the proposed surface gauge connections. To complete the section please provide schematic drawings of the surface construction details of the well with detailed drawings of the gauge connections.

*2.9 The source and nature of the substances to be injected, its viscosity, its compatibility with the receiving formation, including stability indices, and the estimated average and maximum daily amounts to be injected. If the nature of the injected fluid is produced water, a water quality analysis must be submitted and must include information on total dissolved solids content, chlorides, sodium, sulfates, nitrates, and hydrocarbons. (ARSD 74:12:07:03(10))*

The water quality data provided in the application is incomplete and did not include total dissolved solids data from the proposed injection water. Please provide water quality analysis for the proposed injection water as required in this section. If a sample of the proposed injection water is not immediately available, DENR will accept water quality analysis of produced water from the same production formation/member in nearby wells.

In addition, a water quality analysis from the receiving formation in the 2-33 Alkali Federal is also required. This analysis should include total dissolved solids data and a compatibility test with the proposed injection water. If the total dissolved solids concentration in the receiving formation is less than 10,000 parts per million (ppm) an EPA approved aquifer exemption will be required prior to commencement of any injection activities. If a sample from the receiving formation is not immediately available, DENR will accept, for permitting purposes, a water quality analysis from the same formation/member in nearby wells. However, a water quality sample and water compatibility test from the receiving formation in the 2-33 Alkali Federal must be submitted prior to commencing injection. If the proposed injection water is not compatible with the receiving formation injection may not be allowed.


*2.13 The injection zone characteristics including porosity, compressibility, and intrinsic permeability.*

Please provide injection zone characteristics including porosity, compressibility, and intrinsic permeability information as soon as it is available. If this information is not immediately available for the proposed injection well DENR will accept data from nearby wells completed in the same injection zone.

Finally, it is DENR's understanding, since the 2-33 Alkali Federal well is on a federal lease, you will need to submit a request to the Bureau of Land Management (BLM) Dickinson, North Dakota Office to convert the well to a salt water disposal well. To do this, please complete and file a BLM sundry notice (form 3160-5) with the Dickinson, North Dakota Office. If you have any questions for BLM please contact Don Herauf at 701.227.7750 or [dherauf@blm.gov](mailto:dherauf@blm.gov).

Thank you for your efforts to complete this application. If you have any questions about this letter or the application process, please feel free to contact me or Brian Walsh at 605.773.3296 or email [ryan.fitzpatrick@state.sd.us](mailto:ryan.fitzpatrick@state.sd.us) or [brian.walsh@state.sd.us](mailto:brian.walsh@state.sd.us).

Sincerely,

A handwritten signature in black ink, appearing to read "Ryan Fitzpatrick". The signature is written in a cursive style with a large initial "R".

Ryan Fitzpatrick  
Environmental Scientist I  
Ground Water Quality Program

Enclosure

c: Bob Townsend, Administrator, Minerals and Mining Program, SD DENR, Pierre

**Peter K. Roosevelt**  
621 17<sup>th</sup> Street Suite 710  
Denver, CO 80293  
303-825-8606

September 15, 2017

Mr. Ryan Fitzpatrick, Environmental Scientist I  
Ground Water Quality Program  
523 East Capitol Avenue  
Pierre, SD 57501-3182

**RECEIVED**  
**SEP 18 2017**  
Dept. of Environment &  
Natural Resources  
GROUND WATER QUALITY

Re: 2-33 Alkali Federal  
NWNE Sec. 33  
T11S, R1E, Fall River, SD  
Request to inject – Case #8-2015

Dear Mr. Fitzpatrick:

This is to respond to your letter of 10/17/15 requesting more information regarding our application to dispose of production water into the 2-33 Alkali Federal well.

Re: 2.1.1 – Enclosed please find the map showing the location of the Piggy Wig Federal 3-33 well which we now call the 3-33 Alkali Federal oil well and the location of the 2-33 Alkali Federal proposed disposal well at the center of a half mile radius drawn within the one miles radius centered on the 2-33 Alkali Federal well.

There are no locations of other water wells in the area. The locations of all other wells including P&As are on the map. The locations of dry holes are on the map and there are no current drilling operations within the area.

Peter K. Roosevelt is the name of the operator. The surface owner is the USDA Buffalo Gap National Forest and the mineral owner is the USA. The offset operator is Darrah.

Re: 2.8 – We do not understand the meaning of ‘surface gauge connections’.

Re: 2.9 – Please find enclosed the water analyses for samples from both the 3-33 Alkali Federal oil well and the 2-33 Alkali Federal proposed disposal well.

Re: 2.13 – The injection zone characteristics displayed from the Density Neutron Log, in your possession, shows porosity of over 26%. Permeability in the injection zone



is described by the onsite well geologist in his report, also in your possession, as “Highly permeable abundantly unconsolidated sand”.

We hope this satisfies your questions and completes the application.

Sincerely,

A handwritten signature in black ink, appearing to read "Peter K. Roosevelt". The signature is written in a cursive style with a large initial "P" and "R".

Peter K. Roosevelt

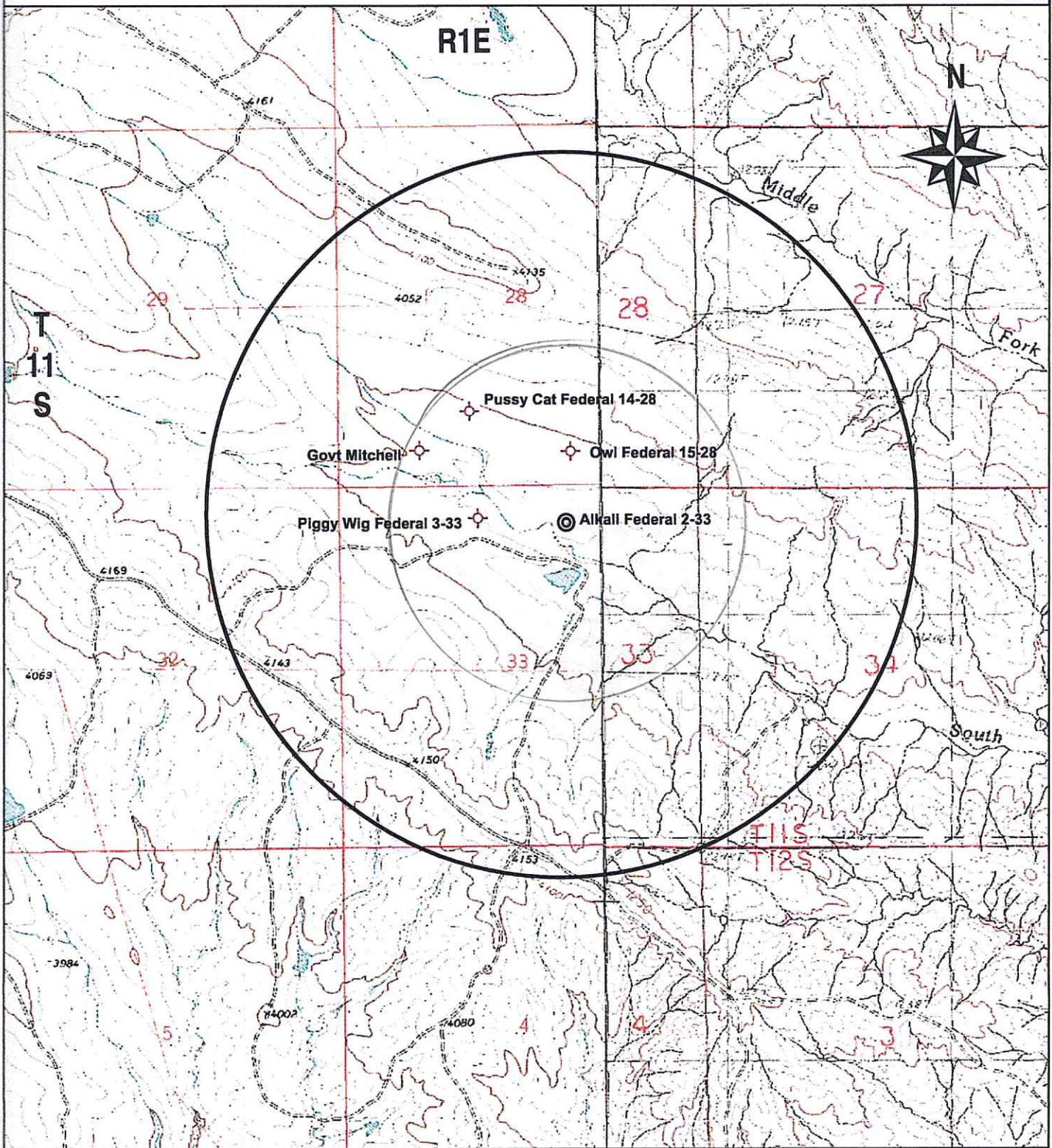
9/25/17 2.1.1

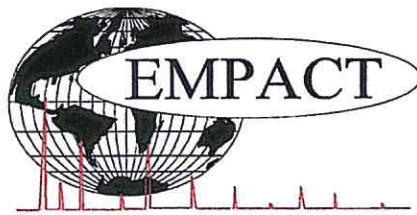
**Map C**

Peter K. Roosevelt  
Alkali Federal #2-33  
NW NE, 500' FNL and 1979' FEL  
Section 33, T11S-R1E  
Fall River County, South Dakota

**LEGEND**

- ⊙ Proposed Location
- ⊕ Dry Hole
- 1-Mile Radius
- ⊙ - 1/2 mile Radius



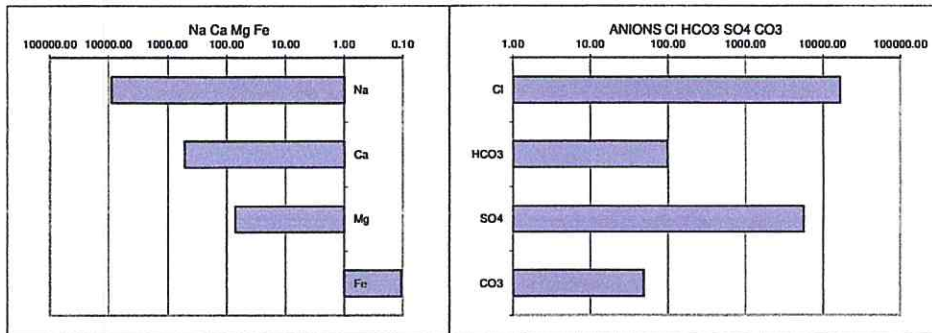


**FORMATION WATER**

2.9 9/25/17

PROJECT NO. : 201708070 ANALYSIS NO. : 02  
 COMPANY NAME : PETER K. ROOSEVELT ANALYSIS DATE: SEPTEMBER 12, 2017  
 ACCOUNT NO. : SAMPLE DATE :  
 PRODUCER : CYLINDER NO. : IL GLASS  
 LEASE NO. : SAMPLED BY :  
 NAME/DESCRIP : 3-33 ALKALI FIELD  
 MINNELUSA WATER 3250'  
 \*\*\*FIELD DATA\*\*\*  
 SAMPLE PRES. : SAMPLE TEMP. :  
 COMMENTS : AMBIENT TEMP.:

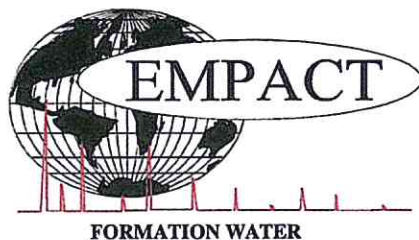
PARAMETER	METHOD	DETECTION LIMIT	REPORTED RESULTS/UNITS	
Ammonia Nitrogen	SM 4500-NH3-G	0.03	93.08	mg/L as NH4-N
Bicarbonate	SM 2320-B	3	98.0	mg/L as HCO3
Boron	SM 4500-B B	0.25	12.20	mg/L
Calcium - Total	SM 3500-Ca B	0.5	514.0	mg/L
Calcium - Hardness	SM 3500-Ca B	10	1283.0	mg/L as CaCO3
Carbonate	SM 2320-B	3	48.0	mg/L as CO3
Chloride	EPA 300.0	2000	16400.00	mg/L
Iron - Total	SM 3111-B	0.1	0.107	mg/L
Magnesium - Total	SM 3500-Mg B	0.5	70.9	mg/L
Nitrate Nitrogen	EPA 300.0	1600	#VALUE!	mg/L as NO3-N
pH	SM 4500-H-B	1	8.49	units
Potassium - Total	SM 3111-B	0.5	190.0	mg/L
Resistivity @ 77° F	SM 2520 B	0.01	0.23	ohm.m
Sodium - Total	SM 3111-B	0.5	8920.0	mg/L
Sodium Adsorption Ratio	SM 3111-B	0.1	97.6	units
Specific Conductance	0	1	42700.0	umhos/cm
Specific Gravity	SM 2710 F	0.001	1.064	
Sulfate	EPA 300.0	2000	5570.00	mg/L
Total Alkalinity	SM 2320-B	1	160.0	mg/L as CaCO3
Total Dissolved Solids	SM 2540-C	8	46200.0	mg/L



BDL = Below Dection Limit

mg/L = Milligram Per Liter or ppm (wt/vol); ug/L = Micrograms Per Liter or PPB (wt/vol)  
 SM = "Standard Methods for the Examination of Water and Wastewater", APHA, 19th Edition, 1995  
 EPA = "Methods of Chemical Analysis of Water and Wastes", USEPA, EPA-600/4-79-020 rev 3/83  
 N/A = Not Analyzed for this Parameter

The data presented herein has been acquired by means of current analytical techniques and represents the judicious conclusion EMPACT Analytical Results of the analysis can be affected by the sampling conditions, therefore, are only warranted through proper lab protocol. EMPACT assumes no for interpretation or any consequences from application of the reported information and is the sole liability of the user. The reproduction in any me reported information may not be made, in portion or as a whole, without the written permission of EMPACT Analytical Systems, Inc.



2.9 9/25/17

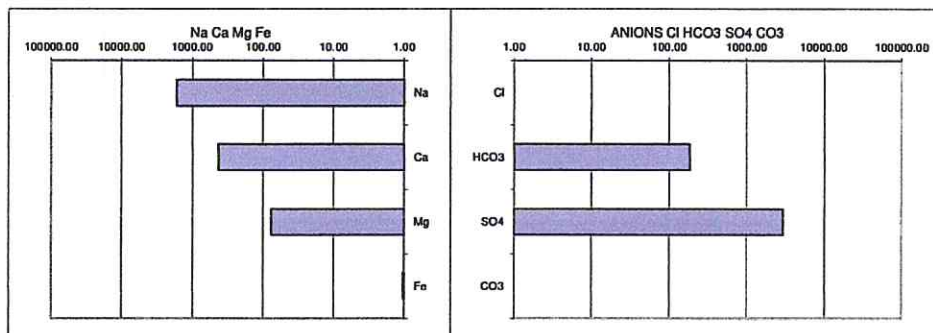
**FORMATION WATER**

PROJECT NO. : 201708070 ANALYSIS NO. : 01  
 COMPANY NAME : PETER K. ROOSEVELT ANALYSIS DATE: SEPTEMBER 12, 2017  
 ACCOUNT NO. : SAMPLE DATE :  
 PRODUCER : CYLINDER NO. : 1L GLASS  
 LEASE NO. : SAMPLED BY :  
 NAME/DESCRIP : 2-33 ALKALI FIELD  
 MINNELUSA WATER 3250'

\*\*\*FIELD DATA\*\*\*  
 SAMPLE TEMP. :  
 AMBIENT TEMP.:

COMMENTS :

PARAMETER	METHOD	DETECTION LIMIT	REPORTED RESULTS/UNITS	
Ammonia Nitrogen	SM 4500-NH3-G	0.03	18.12	mg/L as NH4-N
Bicarbonate	SM 2320-B	3	183.0	mg/L as HCO3
Boron	SM 4500-B B	0.25	3.03	mg/L
Calcium - Total	SM 3500-Ca B	0.5	423.0	mg/L
Calcium - Hardness	SM 3500-Ca B	10	1056.0	mg/L as CaCO3
Carbonate	SM 2320-B	3	BDL	mg/L as CO3
Chloride	EPA 300.0	2000	BDL	mg/L
Iron - Total	SM 3111-B	0.1	1.040	mg/L
Magnesium - Total	SM 3500-Mg B	0.5	76.3	mg/L
Nitrate Nitrogen	EPA 300.0	1600	BDL	mg/L as NO3-N
pH	SM 4500-H-B	1	7.28	units
Potassium - Total	SM 3111-B	0.5	75.9	mg/L
Resistivity @ 77° F	SM 2520 B	0.01	0.99	ohm.m
Sodium - Total	SM 3111-B	0.5	1660.0	mg/L
Sodium Adsorption Ratio	SM 3111-B	0.1	19.5	units
Specific Conductance	0	1	10100.0	umhos/cm
Specific Gravity	SM 2710 F	0.001	0.999	
Sulfate	EPA 300.0	2000	2960.00	mg/L
Total Alkalinity	SM 2320-B	1	150.0	mg/L as CaCO3
Total Dissolved Solids	SM 2540-C	8	8630.0	mg/L



BDL = Below Dection Limit

mg/L = Milligram Per Liter or ppm (wt/vol); ug/L = Micrograms Per Liter or PPB (wt/vol)

SM = "Standard Methods for the Examination of Water and Wastewater", APHA, 19th Edition, 1995

EPA = "Methods of Chemical Analysis of Water and Wastes", USEPA, EPA-600/4-79-020 rev 3/83

N/A = Not Analyzed for this Parameter

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DEPARTMENT of ENVIRONMENT  
and NATURAL RESOURCES

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

denr.sd.gov

October 10, 2017

**FILE COPY**

Peter K. Roosevelt  
621 17<sup>th</sup> Street, Suite 710  
Denver CO 80293

RE: Request to Inject Production Water into the 2-33 Alkali Federal Well – Underground Injection Control Salt Water Disposal Application – South Dakota Oil and Gas Case No. 5-2017 (Formerly 8-2015). Request for Additional Information.

Dear Mr. Roosevelt:

The South Dakota Department of Environment and Natural Resources (DENR) received your October 19, 2015, 2-33 Alkali Federal Underground Injection Control (UIC) Salt Water Disposal application and determined additional information was required to complete the application. DENR received the additional information on September 18, 2017, has reviewed the application for completeness, and in accordance with Administrative Rule of South Dakota (ARSD) 74:12:07:03 has determined the application is complete. However, DENR requires additional information on certain sections of the application to clarify the file, complete the technical review, and prepare and aquifer exemption application to the U.S. Environmental Protection Agency (EPA).

Please note, due to the length of time between receipt of the original application and the submittal of the supplemental information DENR case #8-2015 was closed. DENR has reassigned this application case number #5-2017.

During the review, DENR determined the injection activity proposed in the application requires an Aquifer Exemption (AE) in accordance with ARSD 74:12:07:24. In order for an AE to become effective, DENR must apply for and receive concurrence from EPA. To complete this process DENR requires you to submit the following information to support the AE determination that the proposed injection well and formation is in a location which makes recovery of water for drinking water purposes economically impractical (ARSD 74:12:07:24(2)).

**AE #1:** Please submit an estimated cost per foot to install a water pipeline in the vicinity of the proposed injection well.

**AE #2:** Please submit an estimated cost per foot to install a drinking water well into the Minnelusa and Madison formations in the vicinity of the proposed injection well.

In addition to the AE information requested above, the following information must be submitted to clarify the file, allow DENR to complete its technical review, and to ensure the applicant is responsible for the development of the entire UIC application. Please note, the section numbers used below are the same as the section numbers used in DENR's UIC application form.

2.4 *The well type, construction, spud date, total depth, formation tops, record of completion or recompletion, and plugging for all oil, gas, and injection wells within the area of review, and any additional pertinent information which the secretary determines is necessary to make an informed judgement on the issuance of a permit, including drill stem tests and well logs for all oil and gas wells identified in the area of review (ARSD 74:12:07:03(4))*

Please submit completion reports, plugging reports, and geology reports for all wells identified in the area of review. If you do not have this information, it may be available in DENR's Oil and Gas database. DENR's Oil and Gas database can be accessed online at:

<http://usd.maps.arcgis.com/apps/webappviewer/index.html?id=9888ec2e3ee844998385265dfa22e449&center=-100.33,%2044.36>

or

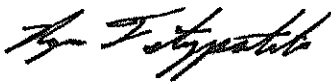
<http://cf.sddenr.net/sdoil/>

2.8 *Schematic drawings of the surface and subsurface construction details of the well with detailed drawings of the gauge connections.*

Please submit a drawing of the surface equipment, well head and gauges associated with the proposed injection well.

If you have any questions about this letter or the application process, please feel free to contact me or Brian Walsh at 605.773.3296 or email [ryan.fitzpatrick@state.sd.us](mailto:ryan.fitzpatrick@state.sd.us) or [brian.walsh@state.sd.us](mailto:brian.walsh@state.sd.us).

Sincerely,



Ryan Fitzpatrick, PG, CPRR  
Environmental Scientist II  
Ground Water Quality Program

Enclosure

c: Mike Lees, Minerals and Mining Program, SD DENR, Pierre