Zenergy Operating Company, LLC

ROBERT M. ZINKE
PRESIDENT

June 23, 2014

PMB 2020
SD Department of Environment and Natural Resources
Groundwater Quality Program
523 East Capital Ave. - Joe Foss Building
Pierre, SD 57501

RE: Tecton Federal #2-1H
API #: 40-063-20637
Sec. 1, T22N-R2E
Harding Co., SD

Dear Mr. Walsh:

Zenergy Operating Company, LLC is respectfully requesting approval for this well to be converted into a disposal well. We have attached the Application along with backup documents, Water Analysis of 2 wells which would inject into the Tecton Federal along with Form 13, Certification of Applicant. An extra copy of each has also been included.

We have mailed a copy of this application to the surface owner information as follows.
Bureau of Land Management
5001 Southgate Dr.
Billings MT 59101

If you have any questions or need additional information, please let us know. Sean LiSooey can be reached at 918-488-6482.

Thank you for your consideration.

Sincerely,

B. Brock

Belinda M. Brock
Regulatory Specialist/Engineering Assistant

Zenergy Operating Company, LLC
One Warren Place, 6100 South Yale Avenue, Suite 1700
Tulsa, Oklahoma 74136
Phone: (918) 488-6400, Fax: (918) 488-6570

SD EForm 2150LD V2

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

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 proposed modification is to convert the Tecton Federal 2-1H into a SWD well. The need for a close disposal well and gathering system will drastically aid in the economics of the existing & future producing source wells. This will not only reduce the cost of SWD but reduce the unwanted truck traffic on the local ranch and county roads

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:	Zenergy Operating Company, LLC.
Address:	6100 S. Yale Ave., Tulsa, OK, 74136
Telephone:	(918)488-6400
Email:	sean.lisooey@zenergyok.com

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

API Number	Well Name	Legal Location	Latitude	Longitude
40-063-20637	Tecton Federal 2-1H	NWNE Sec. 1-T22N-R2E	45°54'15.98"	103°48'58.71"

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.

☒ Included

Location:

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: On Page 1 of the Tecton Federal #1 SWD Application.

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

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: On Page 1 of the Tecton Federal #1 SWD Application.

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: On Page 1 of the Tecton Federal #1 SWD Application.

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: On Page 2 of the Tecton Federal #1 SWD Application.

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

Location: On Page 1 of the Tecton Federal #1 SWD Application and on Current WBD.

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

2.5.1 Abandoned water wells:

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

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: On Page 1 of the Tecton Federal #1 SWD Application.

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: On Conversion WBD and On Page 6 of the Tecton Federal #1 SWD Application.

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: On Page 3 of the Tecton Federal #1 SWD Application.

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: On Excel attachments.

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: Page 4: Tecton Federal #1 SWD Application and Water Analysis's for source wells attached

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

☒ Included

Location: On Page 4 of the Tecton Federal #1 SWD Application.

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

☒ Included

Location: On Page 6 of the Tecton Federal #1 SWD Application.

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))

☒ Included

Location: On Page 3 of the Tecton Federal #1 SWD Application.

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: On Page 3 of the Tecton Federal #1 SWD Application.

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

☒ Included

Location: On Page 2 and 4 of the Tecton Federal #1 SWD Application.

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

☒ Included

Location: On Page 7 of the Tecton Federal #1 SWD Application.

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

Signature

5/28/14
Date

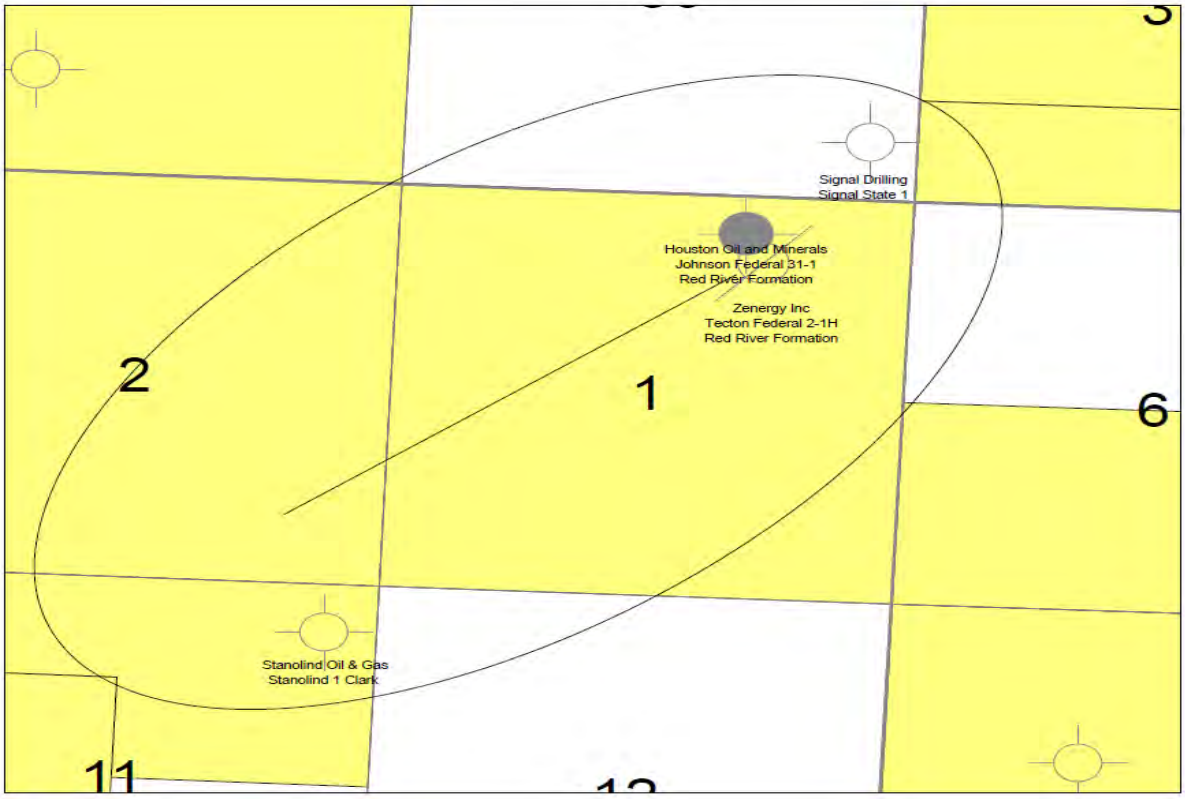
Sean LiSooey
Printed Name of Person Signing

Drilling / Production / Operations Engineer
Title

Print Form

Zenergy Operating Company, LLC.
Tecton Federal #1 SWD Well Application
NW NE Section 1 – T22N – R2E
Harding County, South Dakota

Maps: One-half mile fixed radius from Area of Review Plat.



Area of Review

Well Name	Location	Producing Formation	Current Status
Tecton Federal 2-1H	Sec. 1-T22N-R2E	Red River "B"; Drilled to 13,677'.	TA
Johnson Federal 31-1	Sec. 1-T22N-R2E	Red River; Drilled to 8,630'.	P&A
Signal State 1	Sec. 36-T23N-R2E	Not Listed; In 1960, Drilled to 8633'.	P&A
Stanolind 1 Clark	Sec. 11-T22N-R2E	Deadwood; Drilled to 9300' (4/9/54)	P&A on 6/11/54

NOTE: According to Public data, the Johnson Federal 31-1 spud on 7/28/77 and has only produced 77 BO, 22 Mcf and 1,540 BW; then was P&A. As for the Signal State 1 well, it spud on 11/2/60 and has never produced according to public data. The Stanolind 1 Clark commenced drilling operations on 4/9/54 and P&A on 6/11/54. According to public data, no production had been recorded. Also, according to SD water well completion reports, there are no active or abandoned water wells within the area of review.

Zenergy Operating Company, LLC.
Tecton Federal #1 SWD Well Application
NW NE Section 1 – T22N – R2E
Harding County, South Dakota

Lithologic Description of Proposed Injection Zone

Red River Group

The Red River Group in this well is from 8,399' to approximately 8,650' and consists of a dolomitized laminated carbonate with microsucrosic porosity. The upper Red River is comprised of three depositional cycles, the "A," "B," and "C". Each cycle of the upper Red River Group consists of a lo1wer burrowed limestone, middle laminated dolomite, and a capping anhydrite or limestone. The lower Red River "D" consists of fossiliferous, dolomitic, limestones. These carbonates were likely deposited in a shallow marine environment which explains individual depositional cycles of the Red River. Porosity is generally high in the upper Red River "B" and contains salt water. The Red River member is approximately 250 ft thick and the Red River "B" member is 54 ft thick, with 12 ft. in the "B" porosity (based on the Johnson Federal 31-1 open-hole logs). It is confined by the Stony Mountain Shale (30 ft thick) above the zone and the Winnipeg Roughlock Shale (±15 ft thick) below the injection zone.

Zenergy Operating Company, LLC.
Tecton Federal #1 SWD Well Application
NW NE Section 1 – T22N – R2E
Harding County, South Dakota

Freshwater Resources:

Control Well: Johnson Federal 31-1

Geologic Name	Top of formation	Thickness
Inyan Kara	4251'	130'
Minnelusa	5980'	62'

Note: Formation tops were based on the Johnson Federal 31-1 (Close in proximity) open-hole logs due to logs not ran in the Tecton Federal 2-1H. TOC behind 7" casing is @ 3700', which is protecting all freshwater zones. See attached bond log.

Zenergy Operating Company, LLC.
Tecton Federal #1 SWD Well Application
NW NE Section 1 – T22N – R2E
Harding County, South Dakota

Brief Description of Proposed Injection Program

The proposed Zenergy Tecton Federal #1 SWD well will handle and dispose of produced water from certain Zenergy horizontal Red River "B" producing wells in South Cedar Creek Field. A local SWD along with associated infrastructure (Electric and Gathering system) could change economics in order to encourage additional development in this area. A list of completed potential source wells for the Tecton Federal #1 SWD is attached. **Note:** The furthest source well at this time is approximately 2 miles away from the proposed SWD.

Produced water from the source wells will be transferred at low pressure via a buried 4" Composite Flex Pipe gathering system to Tecton Federal #1 SWD location. The water will be stored on location, pressurized if necessary and disposed of into the Red River "B" formation.

The system will need to install Composite Flex Pipe gathering lines from the source wells which would be equipped with a SCADA monitoring system with numerous check valves, control valves and automatic shut-down devices to insure the system's safety.

The ½ mile area of review currently produces approximately 0 bbls SWPD (salt water per day) but the source wells combined are currently producing ~900 bbls SWPD. Zenergy is investigating alternative means of artificial lift to increase fluid recovery in existing producing wells outside of the area of review. The anticipated increased fluid production could have a dramatic effect on revenues. The need for a close disposal well and gathering system will drastically aid in the economics of the existing & future producing source wells. This will not only reduce the cost of SWD but reduce the unwanted truck traffic on the local ranch and county roads. The anticipated initial average injection rate for this well is 3500 to 4000 bbls water per day with maximum rates and pressures in the range of 6000 BWPD @ 1625 psi.

Zenergy Operating Company, LLC.
Tecton Federal #1 SWD Well Application
NW NE Section 1 – T22N – R2E
Harding County, South Dakota

List of Probable Source Wells

Well Name	Section
Pronghorn 32P-29-20H	Sec 32-T23N-R3E
Gunderson 31P-30-19H	Sec 31-T23N-R3E

Note: The expected project life is about 20 years.

Zenergy Operating Company, LLC.
Tecton Federal #1 SWD Well Application
NW NE Section 1 – T22N – R2E
Harding County, South Dakota

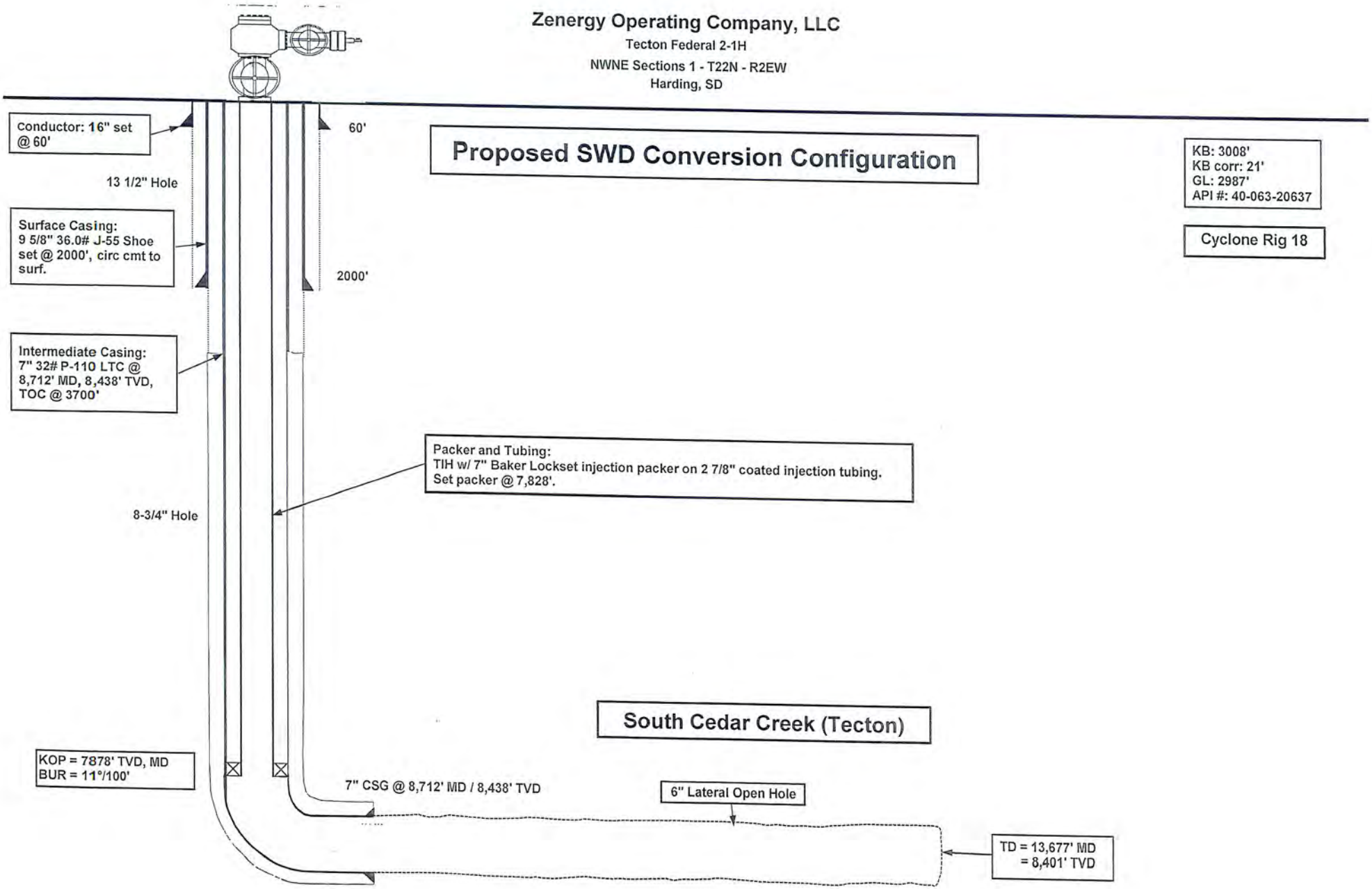
Proposed SWD Conversion Procedure

1. Notify SD DENR prior to commencing operations.
2. MIRU workover rig, power swivel and reverse unit. Hook up BOP's.
3. TOH w/ rods and pump.
4. TOH w/ 2 7/8" tbg.
5. Make up 6" OD bit and 7" casing scraper, PU and TIH w/ 2-7/8" 6.5# L-80 8rd to 8,812', which is +100' outside of 7" shoe (8,712').
6. TOH w/ 2-7/8" tbg, Lay down bit and scraper.
7. TIH w/ 2-7/8" tbg & packer. Acidize well. Swab back. Establish injection rate. TOH LD work string.
8. TIH and run 7" coated Baker Lockset injection packer on
9. 3 ½" seal-tite injection tbg to set packer @ 7,828' (+50' above KOP).
10. Displace annulus with packer fluid and set packer. Nipple up wellhead and pressure test annulus to 1000 psi to check mechanical integrity.
11. Break down lateral with salt water and perform additional stimulation if necessary.
12. RDMO completion unit.
13. Clean up location, build surface facilities and install injection pump. Start up system.

Zenergy Operating Company, LLC.
Tecton Federal #1 SWD Well Application
NW NE Section 1 – T22N – R2E
Harding County, South Dakota

Surface Owner Information

Surface Owner Name	Address	Telephone #
Bureau of Land Management	5001 Southgate Dr., Billings MT, 59101	406-896-5012

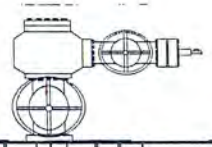

Zenergy Operating Company, LLC
Tecton Federal 2-1H
NWNE Sections 1 - T22N - R2EW
Harding, SD
Proposed SWD Conversion Configuration
KB: 3008'
KB corr: 21'
GL: 2987'
API #: 40-063-20637
Cyclone Rig 18
conductor: 16" set @ 60'
60'
13 1/2" Hole
Surface Casing: 9 5/8" 36.0# J-55 Shoe set @ 2000', circ cmt to surf.
2000'
Intermediate Casing: 7" 32# P-110 LTC @ 8,712' MD, 8,438' TVD, TOC @ 3700'
Packer and Tubing: TIH w/ 7" Baker Lockset injection packer on 2 7/8" coated injection tubing. Set packer @ 7,828'.
8-3/4" Hole
South Cedar Creek (Tecton)
KOP = 7878' TVD, MD
BUR = 11°/100'
7" CSG @ 8,712' MD / 8,438' TVD
6" Lateral Open Hole
TD = 13,677' MD
= 8,401' TVD

Zenergy Operating Company, LLC

Tecton Federal 2-1H

NWNE Sections 1 - T22N - R2EW

Harding, SD



Current Configuration

conductor: 16" set @ 60'

60'

13 1/2" Hole

Surface Casing:
9 5/8" 36.0# J-55 Shoe set @ 2000', circ cmt to surf.

2000'

Intermediate Casing:
7" 32# P-110 LTC @ 8,712' MD, 8,438' TVD, TOC @ 3700'

Date: 4/23/2013
TIH with 2 7/8" EUE, 248 total jts.

8-3/4" Hole

Date: 4/24/2013
TIH with rods (8-K-bar, 113-3/4", 99-7/8", 91-1" rods.) Pick up polish rod, stack out on stuffing box, left subs out.

South Cedar Creek (Tecton)

KOP = 7878' TVD, MD
BUR = 11°/100'

7" CSG @ 8,712' MD / 8,438' TVD

6" Lateral Open Hole

TD = 13,677' MD
= 8,401' TVD

KB: 3008'
KB corr: 21'
GL: 2987'
API #: 40-063-20637
Spud Date: 11/8/2008
TD Date: 12/18/2008
Comp. Date: 2/13/2009

Cyclone Rig 18

JACAM LABORATORIES

DownHole R_X

WATER CHEMISTRY

ZENERGY OPERATING
BART HONEYMAN
HARDING SD

PRONGHORN 32P-29-20H
WELLHEAD

Report Date: 06-13-2014
Sample #: 2200

Sampled: 05-21-2014
at 0000

Sample ID: 72188

CATIONS		ANIONS	
Calcium (as Ca)	2137	Chloride (as Cl)	30100
Magnesium (as Mg)	174.50	Sulfate (as SO_4)	1880
Barium (as Ba)	0.204	Bromine (as Br)	0.00
Strontium (as Sr)	139.10	Dissolved CO_2 (as CO_2)	270.00
Sodium (as Na)	16330	Bicarbonate (as HCO_3)	292.00
Potassium (as K)	1199	Carbonate (as CO_3)	0.00
Lithium (as Li)	25.67	Oxalic acid (as C_2O_4)	0.00
Ammonia (as NH_3)	0.00	Silica (as SiO_2)	0.00
Aluminum (as Al)	0.00	Phosphate(as PO_4)	0.00
Iron (as Fe)	20.65	H_2S (as H_2S)	5.00
Manganese (as Mn)	0.256	Fluoride (as F)	0.00
Zinc (as Zn)	1.24	Nitrate (as NO_3)	0.00
Lead (as Pb)	0.00	Boron (as B)	126.90

PARAMETERS	
Calculated T.D.S.	52685
Molar Conductivity	67830
Resistivity	14.74
Sp.Gr.(g/mL)	1.03
Pressure(atm)	1.00
pCO_2(atm)	0.0251
pH_2S(atm)	0.00315
Temperature (^oF)	93.00
pH	6.87

COMMENTS

HARDING SD

JACAM LABORATORIES
205 S. Broadway · P.O. Box 96 · Sterling, KS 67579-0096

JACAM LABORATORIES

DownHole R_X

DEPOSITION POTENTIAL INDICATORS

ZENERGY OPERATING
BART HONEYMAN
HARDING SD

PRONGHORN 32P-29-20H
WELLHEAD

Report Date: 06-13-2014
Sample #: 2200

Sampled: 05-21-2014
at 0000

Sample ID: 72188

SATURATION LEVEL	
Calcite ($CaCO_3$)	2.83
Aragonite ($CaCO_3$)	2.44
Witherite ($BaCO_3$)	< 0.001
Strontianite ($SrCO_3$)	0.483
Calcium oxalate (CaC_2O_4)	0.00
Magnesite ($MgCO_3$)	0.237
Anhydrite ($CaSO_4$)	0.541
Gypsum ($CaSO_4*2H_2O$)	0.768
Barite ($BaSO_4$)	3.16
Celestite ($SrSO_4$)	2.32
Fluorite (CaF_2)	0.00
Calcium phosphate	0.00
Hydroxyapatite	0.00
Silica (SiO_2)	0.00
Brucite ($Mg(OH)_2$)	< 0.001
Magnesium silicate	0.00
Iron hydroxide ($Fe(OH)_3$)	< 0.001
Strengite ($FePO_4*2H_2O$)	0.00
Siderite ($FeCO_3$)	45.21
Halite (NaCl)	0.00654
Thenardite ($Na2SO_4$)	< 0.001
Iron sulfide (FeS)	17.84

MOMENTARY EXCESS (Lbs/1000 Barrels)	
Calcite ($CaCO_3$)	0.106
Aragonite ($CaCO_3$)	0.0963
Witherite ($BaCO_3$)	-19.99
Strontianite ($SrCO_3$)	-0.256
Calcium oxalate (CaC_2O_4)	-0.0344
Magnesite ($MgCO_3$)	-0.441
Anhydrite ($CaSO_4$)	-330.14
Gypsum ($CaSO_4*2H_2O$)	-142.32
Barite ($BaSO_4$)	0.0826
Celestite ($SrSO_4$)	54.24
Fluorite (CaF_2)	-6.54
Calcium phosphate	>-0.001
Hydroxyapatite	-380.07
Silica (SiO_2)	-48.19
Brucite ($Mg(OH)_2$)	0.00435
Magnesium silicate	-115.53
Iron hydroxide ($Fe(OH)_3$)	< 0.001
Strengite ($FePO_4*2H_2O$)	>-0.001
Siderite ($FeCO_3$)	0.185
Halite (NaCl)	-177646
Thenardite ($Na2SO_4$)	-68807
Iron sulfide (FeS)	0.933

SIMPLE INDICES	
Langelier	0.644
Ryznar	5.58
Puckorius	4.48
Larson-Skold Index	196.42
Stiff Davis Index	0.106
Oddo-Tomson	-0.115

BOUND IONS	TOTAL	FREE
Calcium	2137	1932
Barium	0.204	0.204
Carbonate	3.99	0.281
Phosphate	0.00	0.00
Sulfate	1880	1086

OPERATING CONDITIONS

Temperature (^oF)	93.00
Time(secs)	0.00

JACAM LABORATORIES
205 S. Broadway · P.O. Box 96 · Sterling, KS 67579-0096

DownHole SAT™ Water Analysis Report

JACAM LABORATORIES

SYSTEM IDENTIFICATION

ZENERGY OPERATING
PRONGHORN 32P-29-20H
BART HONEYMAN
WELLHEAD
HARDING SD

Sample ID#:	2200
ID:	72188
Report Date:	06-13-2014
Sample Date:	05-21-2014 at 0000

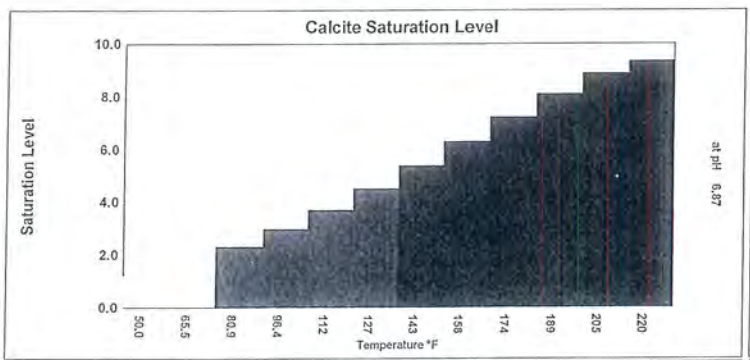
WATER CHEMISTRY

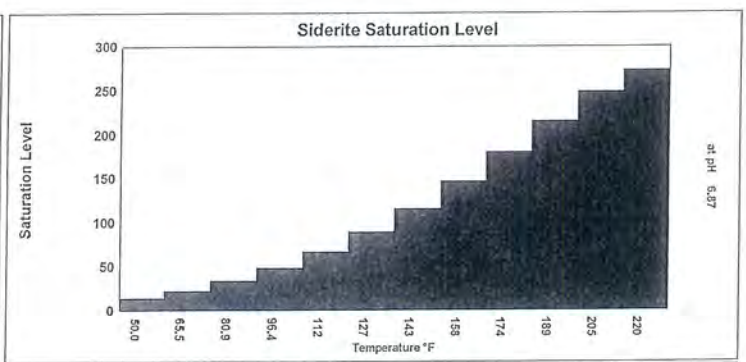
CATIONS		ANIONS	
Calcium(as Ca)	2137	Chloride(as Cl)	30100
Magnesium(as Mg)	174.50	Sulfate(as SO_4)	1880
Barium(as Ba)	0.204	Bromine(as Br)	0.00
Strontium(as Sr)	139.10	Dissolved CO_2(as CO_2)	270.00
Sodium(as Na)	16330	Bicarbonate(as HCO_3)	292.00
Potassium(as K)	1199	Carbonate(as CO_3)	0.00
Lithium(as Li)	25.67	Silica(as SiO_2)	0.00
Iron(as Fe)	20.65	Phosphate(as PO_4)	0.00
Field Iron(as Fe)	0.00	H_2S (as H_2S)	5.00
Ammonia(as NH_3)	0.00	Fluoride(as F)	0.00
Aluminum(as Al)	0.00	Nitrate(as NO_3)	0.00
Manganese(as Mn)	0.256	Boron(as B)	126.90
Zinc(as Zn)	1.24		
Lead(as Pb)	0.00	**PARAMETERS**	
		Temperature(^{0}F)	93.00
Sample pH	6.87	T.D.S.	52685
Conductivity:	67830	Resistivity:	14.74

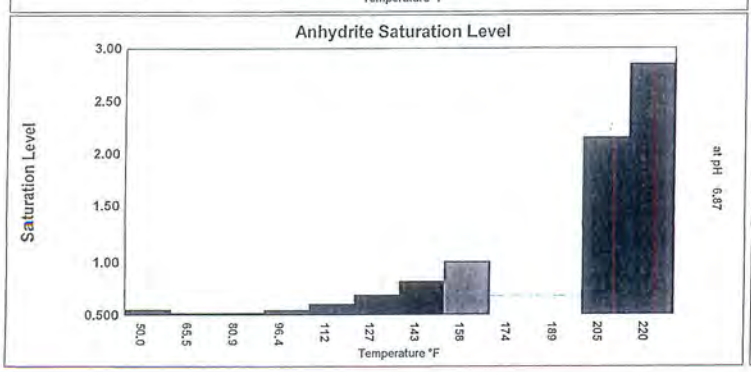
SCALE AND CORROSION POTENTIAL

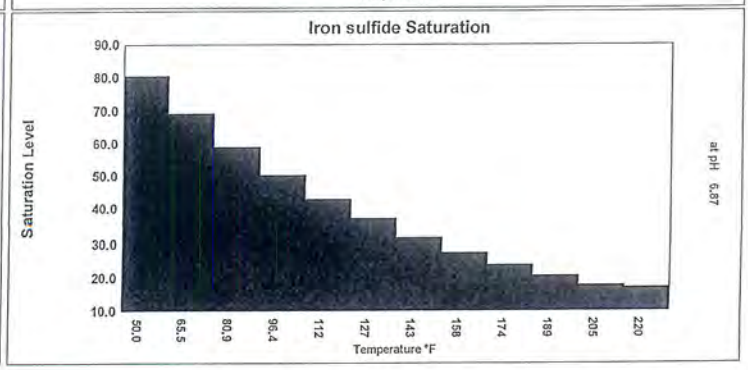
Temp.	Press.	Calcite $CaCO_3$		Anhydrite $CaSO_4$		Gypsum $CaSO_4*2H_2O$		Barite $BaSO_4$		Celestite $SrSO_4$		Siderite $FeCO_3$		Mackawenite FeS		CO_2	pCO_2
(^{0}F)	(atm)	xSAT	Lbs per 1000 Barrels	xSAT	Lbs per 1000 Barrels	xSAT	Lbs per 1000 Barrels	xSAT	Lbs per 1000 Barrels	xSAT	Lbs per 1000 Barrels	xSAT	Lbs per 1000 Barrels	xSAT	Lbs per 1000 Barrels	(mpy)	(atm)
50.00	0.00	1.22	0.0178	0.554	-334.16	0.941	-32.88	9.60	0.108	2.60	59.32	14.26	0.105	80.52	2.22	0.0314	0.0251
65.45	0.00	1.72	0.0507	0.523	-365.82	0.859	-82.27	6.11	0.101	2.38	55.56	22.61	0.134	69.20	2.17	0.0589	0.0251
80.91	0.00	2.31	0.0823	0.522	-358.73	0.801	-120.23	4.13	0.0916	2.32	54.24	34.00	0.163	59.06	2.11	0.0364	0.0251
96.36	0.00	2.98	0.112	0.549	-319.17	0.761	-147.36	2.95	0.0799	2.33	54.34	48.68	0.191	50.28	2.03	0.0477	0.0251
111.82	0.00	3.70	0.139	0.604	-255.16	0.790	-122.88	2.20	0.0660	2.37	55.06	66.74	0.217	42.87	1.94	0.0500	0.0251
127.27	0.00	4.51	0.166	0.691	-175.33	0.868	-70.28	1.67	0.0483	2.40	55.57	89.04	0.244	36.81	1.84	0.0419	0.0251
142.73	0.00	5.38	0.192	0.820	-87.52	0.945	-27.07	1.27	0.0258	2.42	55.84	115.85	0.271	31.77	1.72	0.0340	0.0251
158.18	0.00	6.30	0.218	1.00	1.32	1.02	8.48	0.979	-0.00258	2.43	55.89	146.76	0.298	27.51	1.61	0.0354	0.0251
173.64	0.00	7.23	0.242	1.26	85.86	1.09	37.79	0.760	-0.0382	2.42	55.73	180.68	0.324	23.82	1.50	0.0367	0.0251
189.09	0.00	8.11	0.264	1.63	162.36	1.16	62.01	0.594	-0.0828	2.41	55.37	215.62	0.347	20.59	1.39	0.0185	0.0251
204.55	0.00	8.87	0.281	2.16	228.72	1.22	82.03	0.467	-0.138	2.38	54.81	248.71	0.366	17.71	1.29	0.0155	0.0251
220.00	0.171	9.34	0.297	2.85	284.12	1.25	92.92	0.362	-0.213	2.29	53.26	273.10	0.384	17.11	1.29	0.0211	0.0293

Saturation Levels (xSAT) are the ratio of ion activity to solubility, e.g. $\{Ca\}\{CO_3\}/K_{sp}$. pCO_2 (atm) is the partial pressure of CO_2 in the gas phase.
Lbs/1000 Barrels scale is the quantity of precipitation (or dissolution) required to instantaneously bring the water to equilibrium.









JACAM LABORATORIES

DownHole R_X

WATER CHEMISTRY

ZENERGY OPERATING
BART HONEYMAN
HARDING SD

GUNDERSON 31P-30-19H
TREATER

Report Date: 06-13-2014
Sample #: 2200

Sampled: 05-21-2014
at 0000

Sample ID: 72190

CATIONS		ANIONS	
Calcium (as Ca)	923.70	Chloride (as Cl)	20100
Magnesium (as Mg)	123.00	Sulfate (as SO_4)	1600
Barium (as Ba)	0.204	Bromine (as Br)	0.00
Strontium (as Sr)	41.30	Dissolved CO_2 (as CO_2)	270.00
Sodium (as Na)	11868	Bicarbonate (as HCO_3)	297.00
Potassium (as K)	636.40	Carbonate (as CO_3)	0.00
Lithium (as Li)	19.57	Oxalic acid (as C_2O_4)	0.00
Ammonia (as NH_3)	0.00	Silica (as SiO_2)	0.00
Aluminum (as Al)	0.00	Phosphate(as PO_4)	0.00
Iron (as Fe)	16.14	H_2S (as H_2S)	5.00
Manganese (as Mn)	0.0120	Fluoride (as F)	0.00
Zinc (as Zn)	1.15	Nitrate (as NO_3)	0.00
Lead (as Pb)	0.00	Boron (as B)	87.89

PARAMETERS

Calculated T.D.S.	35981
Molar Conductivity	47267
Resistivity	21.16
Sp.Gr.(g/mL)	1.02
Pressure(atm)	1.00
pCO_2(atm)	0.0272
pH_2S(atm)	0.00311
Temperature (^oF)	89.00
pH	6.85

COMMENTS

HARDING SD

JACAM LABORATORIES
205 S. Broadway · P.O. Box 96 · Sterling, KS 67579-0096

JACAM LABORATORIES

DownHole R_X

DEPOSITION POTENTIAL INDICATORS

ZENERGY OPERATING
BART HONEYMAN
HARDING SD

GUNDERSON 31P-30-19H
TREATER

Report Date: 06-13-2014
Sample #: 2200

Sampled: 05-21-2014
at 0000

Sample ID: 72190

SATURATION LEVEL

Calcite ($CaCO_3$)	1.31
Aragonite ($CaCO_3$)	1.13
Witherite ($BaCO_3$)	< 0.001
Strontianite ($SrCO_3$)	0.179
Calcium oxalate (CaC_2O_4)	0.00
Magnesite ($MgCO_3$)	0.166
Anhydrite ($CaSO_4$)	0.270
Gypsum ($CaSO_4*2H_2O$)	0.402
Barite ($BaSO_4$)	4.64
Celestite ($SrSO_4$)	0.920
Fluorite (CaF_2)	0.00
Calcium phosphate	0.00
Hydroxyapatite	0.00
Silica (SiO_2)	0.00
Brucite ($Mg(OH)_2$)	< 0.001
Magnesium silicate	0.00
Iron hydroxide ($Fe(OH)_3$)	< 0.001
Strengite ($FePO_4*2H_2O$)	0.00
Siderite ($FeCO_3$)	40.31
Halite (NaCl)	0.00329
Thenardite ($Na2SO_4$)	< 0.001
Iron sulfide (FeS)	17.13

MOMENTARY EXCESS (Lbs/1000 Barrels)

Calcite ($CaCO_3$)	0.0375
Aragonite ($CaCO_3$)	0.0182
Witherite ($BaCO_3$)	-17.52
Strontianite ($SrCO_3$)	-1.03
Calcium oxalate (CaC_2O_4)	-0.0701
Magnesite ($MgCO_3$)	-0.670
Anhydrite ($CaSO_4$)	-654.98
Gypsum ($CaSO_4*2H_2O$)	-461.53
Barite ($BaSO_4$)	0.0948
Celestite ($SrSO_4$)	-2.51
Fluorite (CaF_2)	-9.36
Calcium phosphate	>-0.001
Hydroxyapatite	-353.35
Silica (SiO_2)	-46.95
Brucite ($Mg(OH)_2$)	0.00343
Magnesium silicate	-110.70
Iron hydroxide ($Fe(OH)_3$)	< 0.001
Strengite ($FePO_4*2H_2O$)	>-0.001
Siderite ($FeCO_3$)	0.180
Halite (NaCl)	-179444
Thenardite ($Na2SO_4$)	-63880
Iron sulfide (FeS)	0.914

SIMPLE INDICES

Langelier	0.261
Ryznar	6.33
Puckorius	5.18
Larson-Skold Index	128.75
Stiff Davis Index	-0.158
Oddo-Tomson	-0.356

BOUND IONS	TOTAL	FREE
Calcium	923.70	819.54
Barium	0.204	0.204
Carbonate	2.22	0.275
Phosphate	0.00	0.00
Sulfate	1600	1097

OPERATING CONDITIONS

Temperature (^oF)	89.00
Time(secs)	0.00

JACAM LABORATORIES
205 S. Broadway · P.O. Box 96 · Sterling, KS 67579-0096

DownHole SAT™ Water Analysis Report

JACAM LABORATORIES

SYSTEM IDENTIFICATION

ZENERGY OPERATING
GUNDERSON 31P-30-19H
BART HONEYMAN
TREATER
HARDING SD

Sample ID#:	2200
ID:	72190
Report Date:	06-13-2014
Sample Date:	05-21-2014 at 0000

WATER CHEMISTRY

CATIONS

Calcium(as Ca)	923.70
Magnesium(as Mg)	123.00
Barium(as Ba)	0.204
Strontium(as Sr)	41.30
Sodium(as Na)	11868
Potassium(as K)	636.40
Lithium(as Li)	19.57
Iron(as Fe)	16.14
Field Iron(as Fe)	0.00
Ammonia(as NH_3)	0.00
Aluminum(as Al)	0.00
Manganese(as Mn)	0.0120
Zinc(as Zn)	1.15
Lead(as Pb)	0.00
Sample pH	6.85
Conductivity:	47267

ANIONS

Chloride(as Cl)	20100
Sulfate(as SO_4)	1600
Bromine(as Br)	0.00
Dissolved CO_2(as CO_2)	270.00
Bicarbonate(as HCO_3)	297.00
Carbonate(as CO_3)	0.00
Silica(as SiO_2)	0.00
Phosphate(as PO_4)	0.00
H_2S (as H_2S)	5.00
Fluoride(as F)	0.00
Nitrate(as NO_3)	0.00
Boron(as B)	87.89

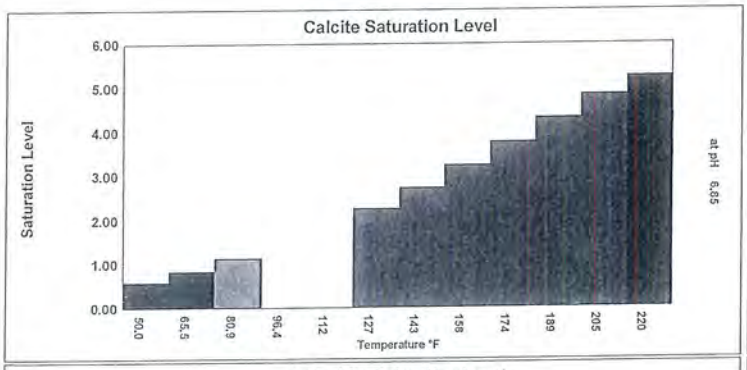
PARAMETERS

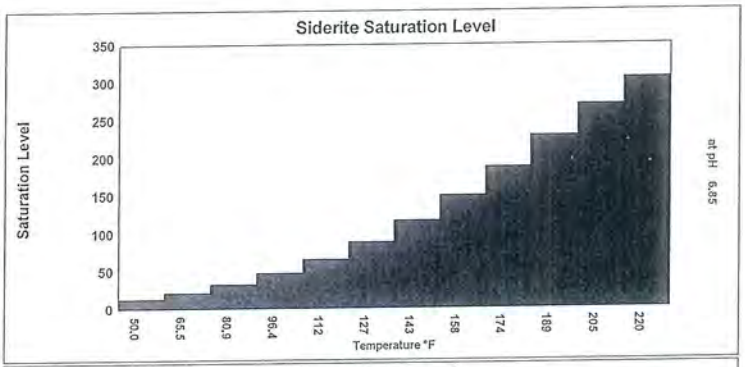
Temperature(°F)	89.00
T.D.S.	35981
Resistivity:	21.16

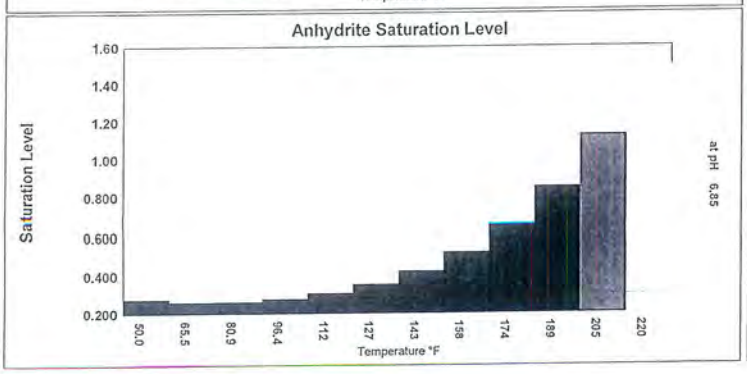
SCALE AND CORROSION POTENTIAL

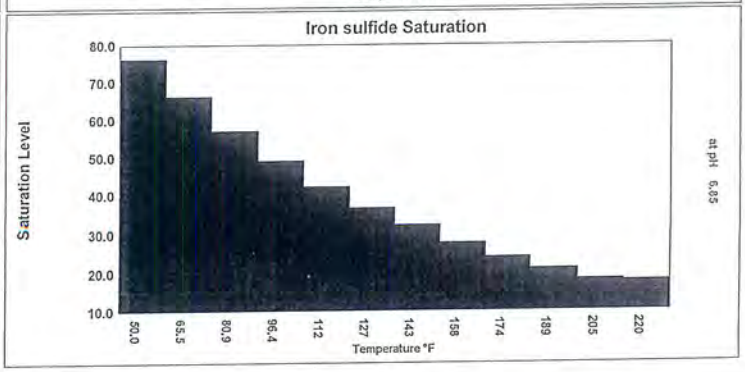
Temp. (°F)	Press. (atm)	Calcite $CaCO_3$		Anhydrite $CaSO_4$		Gypsum $CaSO_4*2H_2O$		Barite $BaSO_4$		Celestite $SrSO_4$		Siderite $FeCO_3$		Mackawenite FeS		CO_2 (mpy)	pCO_2 (atm)
50.00	0.00	0.588	-0.0680	0.276	-663.73	0.479	-369.19	12.71	0.111	1.02	0.432	13.57	0.104	76.35	1.91	0.0324	0.0272
65.45	0.00	0.836	-0.0238	0.263	-689.73	0.440	-414.87	8.15	0.106	0.937	-1.96	21.77	0.134	66.29	1.87	0.0607	0.0272
80.91	0.00	1.13	0.0173	0.264	-676.04	0.412	-448.52	5.55	0.0990	0.917	-2.61	33.06	0.164	57.13	1.83	0.0384	0.0272
96.36	0.00	1.47	0.0550	0.279	-628.77	0.394	-470.87	3.99	0.0905	0.927	-2.27	47.73	0.194	49.07	1.77	0.0503	0.0272
111.82	0.00	1.84	0.0890	0.309	-555.64	0.412	-437.71	3.00	0.0805	0.950	-1.51	65.96	0.222	42.19	1.71	0.0527	0.0272
127.27	0.00	2.26	0.122	0.355	-464.62	0.454	-373.55	2.28	0.0678	0.969	-0.925	88.86	0.251	36.52	1.65	0.0442	0.0272
142.73	0.00	2.73	0.155	0.423	-363.16	0.497	-319.46	1.75	0.0517	0.982	-0.534	116.91	0.281	31.78	1.57	0.0358	0.0272
158.18	0.00	3.24	0.188	0.520	-257.69	0.538	-273.81	1.35	0.0315	0.989	-0.320	150.14	0.312	27.73	1.49	0.0373	0.0272
173.64	0.00	3.78	0.219	0.657	-153.42	0.578	-235.30	1.05	0.00616	0.991	-0.270	187.93	0.344	24.20	1.41	0.0386	0.0272
189.09	0.00	4.32	0.249	0.851	-54.27	0.616	-202.87	0.827	-0.0254	0.988	-0.376	228.81	0.374	21.07	1.32	0.0195	0.0272
204.55	0.00	4.85	0.277	1.13	37.01	0.651	-175.69	0.652	-0.0645	0.979	-0.633	270.29	0.402	18.26	1.23	0.0163	0.0272
220.00	0.171	5.25	0.303	1.49	114.77	0.670	-162.29	0.506	-0.118	0.946	-1.65	305.14	0.432	17.80	1.20	0.0222	0.0318
		xSAT	Lbs per 1000 Barrels	xSAT	Lbs per 1000 Barrels	xSAT	Lbs per 1000 Barrels	xSAT	Lbs per 1000 Barrels	xSAT	Lbs per 1000 Barrels	xSAT	Lbs per 1000 Barrels	xSAT	Lbs per 1000 Barrels		

Saturation Levels (xSAT) are the ratio of ion activity to solubility, e.g. $\{Ca\}\{CO_3\}/K_{SP}$. pCO_2 (atm) is the partial pressure of CO_2 in the gas phase.
Lbs/1000 Barrels scale is the quantity of precipitation (or dissolution) required to instantaneously bring the water to equilibrium.









DEPARTMENT of ENVIRONMENT and NATURAL RESOURCES
Minerals & Mining Program
2050 West Main, Suite #1, Rapid City, SD 57702-2493
Telephone: 605-773-4201, FAX: 605-394-5317

FORM 13

STATE OF SOUTH DAKOTA
BEFORE THE SECRETARY OF
THE DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

IN THE MATTER OF THE APPLICATION OF PERMIT TO INJECT ZENERGY OPERATING COMPANY, LLC)

CERTIFICATION OF APPLICANT

STATE OF OKLAHOMA)
) SS
COUNTY OF TULSA)

I, SEAN LISOOEY, the applicant in the above matter after being duly sworn upon oath hereby certify the following information in regard to this application:

South Dakota Codified Laws Section 1-40-27 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 of 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;

(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."

Pursuant to SDCL 1-40-27, I certify that I have read the forgoing provision of state law, and that I am not disqualified by reason of that provision from obtaining the permit for which application has been made.

Dated this 28 day of May, 2014.

Applicant

Subscribed and sworn before me this 28 day of May, 2014.

Notary Public

My commission expires:

CHRIS HILL
Notary Public
State of Oklahoma
Commission #11007152
Expires: August 5, 2015

(SEAL)

PLEASE ATTACH SHEET DISCLOSING ALL FACTS 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.

June 23, 2014

Bureau of Land Management
5001 Southgate Dr.
Billings MT 59101

COPY

RE: Tecton Federal #2-1H
API #: 40-063-20637
Sec. 1, T22N-R2E
Harding Co., SD

Dear Sir:

As Surface owner of the above mentioned property we are sending you a copy of the application and backup paperwork submitted to the SD Department of Environment and Natural Resources on June 23, 2014.

Thank you,

Zenergy Operating Company, LLC
918-488-6400

enclosure

Zenergy Operating Company, LLC
One Warren Place, 6100 South Yale Avenue, Suite 1700
Tulsa, Oklahoma 74136
Phone: (918) 488-6400, Fax: (918) 488-6570

OIL AND GAS EXPLORATION AND PRODUCTION