

WATER PERMIT NO. 2025-1

Name of Applicant: **JKRK Properties LLC**

Address: **1935 Samco Rd, Suite 102, Rapid City SD 57702**

Phone: **605 381-0727**

Amount of Water Claimed: **2.67 cfs**

Total Acres: **NA**

Source of Water Supply: **groundwater (one well)**

Water to be used for: **water distribution system**

County: **Meade**

Type of Waste Disposal System:

Location: **3 1/2 miles northeast of Piedmont**

PRIORITY

Date Received: **9-30-22**

Application/License Fee: **\$1,150**

Corrected Application Received: **10-14-22**

Period of Annual Use: **Jan 1 – Dec 31**

Remarks:

Diversion Point: **SW 1/4 NW 1/4 (Gov't Lot 2)**

Section 31-T4N-R7E

Land to be Irrigated: **NA**

	⊗				
			31		

Depth of Well: **2230 feet deep**

Well Driller:

Remarks:

Type of Map: **aerial**

Prepared by:

Reviewed and the Number Assigned on: **10-18-22**

By: **Karen Schlaak**

Notice of Hearing - date to intervene: _____

**SOUTH DAKOTA
WATER PERMIT NO. 2025-1**

Date of first receipt of application September 30, 2022.

Date of return to applicant for corrections, amendments or changes October 3, 2022.

Date of receipt of corrected application October 14, 2022.

The Chief Engineer, on behalf of the Water Management Board, issues Water Permit No. 2025-1 to JKRK Properties LLC, c/o Ryan Kaski, 1935 Samco Road, Suite 102, Rapid City SD 57702 authorizing the construction of the water use system and the placing of water to beneficial use subject to the following limitations, conditions and qualifications:

1. Water Permit No. 2025-1 appropriates up to 450 acre-feet of water annually at a maximum diversion rate of 2.67 cubic feet of water per second from one well completed into the Madison Aquifer (2,690 feet deep) located in the SW 1/4 NW 1/4 (Gov't Lot 2) Section 31-T4N-R7E for a water distribution system located in the W 1/2 NW 1/4, SW 1/4 Section 28, Sections 29, 30, 31, S 1/2 N 1/2, S 1/2 Section 32; all in T4N-R7E. This site is located approximately 3 1/2 miles northeast of Piedmont SD.
2. The water appropriated shall be used for the purpose of a water distribution system and may not exceed the amount of water needed for beneficial use.
3. The water is to be used during the following described annual period: January 1 – December 31.
4. The date of approval of Permit No. 2025-1 is January 16, 2023.
5. The date from which applicant may claim right is September 30, 2022.
6. One-fifth of the construction is to be completed on or before July 16, 2025.
7. All construction is to be completed on or before January 16, 2028.
8. Water is to be put to beneficial use on or before January 16, 2032.
9. Water rights obtained in compliance with the laws of the State of South Dakota may not be unlawfully impaired by this appropriation.

QUALIFICATIONS

1. In accordance with SDCL 46-1-14 and 46-2A-20, Permit No. 2025-1 is issued for a twenty-year term. Pursuant to SDCL 46-2A-21, the twenty-year term may be deleted at any time during the twenty-year period or following its expiration. If the twenty-year term is not deleted at the end of the term, the permit may either be cancelled or amended with a new term limitation of up to twenty years. Permit No. 2025-1 may also be cancelled for nonconstruction, forfeiture, abandonment or three permit violations pursuant to SDCL 46-1-12, 46-5-37.1 and ARSD 74:02:01:37.
2. The well will be located near domestic wells and other wells which may obtain water from the same aquifer. The well owner, under these Permits shall control withdrawals so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights.

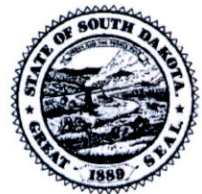
(continued)

3. The Permit holder shall report to the Chief Engineer annually the amount of water withdrawn from the Madison aquifer.
4. Water Permit No. 2025-1 appropriates up to 450 acre-feet of water annually.

WATER MANAGEMENT BOARD

By: Eric Gronlund
Eric Gronlund, Chief Engineer
Water Rights Program
Department of Agriculture and Natural Resources

FEB 17 2023
date



Mail to: SD DANR, Water Rights 523 E Capitol Ave Pierre, SD 57501-3182 ph. (605) 773-3352	No. <u>2025-1</u> Hydrologic Unit <u>1012011</u>
	Basin <u>Upper Cheyenne</u>
	Newspaper <u>Faith Independent</u>
	<u>Rapid City Journal</u> (office use only)

RECEIVED

SEP 30 2022

OFFICE OF
WATER

Application for Permit to Appropriate Water in South Dakota

Check use(s) of water:

☐ Municipal	☒ Water Distribution System	☐ Recreational	☐ Institutional
☐ Rural Water System	☐ Commercial	☐ Fish & Wildlife	☐ Geothermal
☐ Domestic (over 18 gpm)	☐ Industrial	☐ Other _____	

Type of Application: (check one)

☒ New	☐ Vested Right (Use predates Mar 2, 1955)	☐ Future Use Reservation
☐ Place to Beneficial Use Water Reserved by Future Use Permit No. _____		
☐ Amendment/Correction to Permit No. _____		

Description of amendment/correction: (i.e. change diversion point(s), add diversion point(s), change use, etc.)

1. Name to Appear on Water Permit JKRK Properties, LLC

Mailing Address 1935 Samco Road, Suite 102 Rapid City SD 57702

Phone 605-342-9606 Mobile 605-381-0727 Email kaskihomes@rushmore.com

2. Amount of water claimed 2.67 *CFS or 1200 **GPM and 450 ***AF or _____ Gallons
Flow rate and volume are both required. (*Cubic Feet per Second) (**Gallons per Minute) (***)Acre Feet - storage capacity of dam/dugout or annual use)

3. Source of water supply Madison Formation (Govt Lot 2) T4N

4. Location of point of diversion 1 well in the SW1/4NW1/4 of Section 31, T3N, R7E County Meade

(example - 3 wells in SW1/4 NE1/4 section 12-T104N-R53W)

If not a public water supply (e.g. municipal), will water be used outside of the area described above? ☐ Yes ☐ No

If "Yes," where will water be used? area served: see Oct 7 ltr.
(example - NW1/4 section 12-T104N-R53W)

5. County or counties where water will be used Meade

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

7. Give a description of the project. When available include any preliminary engineering report or other reports or information that will help explain the project. (Attach sheet if more space is needed)

Residential Housing Development

I, Ryan Kaski Member, JKRC, the applicant, certify under
Name of Person Title (if applicable)

penalty of perjury that I have read this application, examined the attached map, and that the matters stated are true. I further certify, if acting on behalf of an entity or individual other than myself, that I am authorized to submit this application.

Supplemental Information

(type or print)

1. **Well Information** (check one or both as applicable) ☐ Drilling new well(s) ☒ Using existing well(s)
- a) If new wells, how many _____ Have test holes been drilled? ☐ Yes ☐ No Drilled by _____
(if yes, please provide copies of logs)
- b) If existing wells, how many 1 Provide copy of log(s), if available. Drilled by Nicholas Enterprise, LLC

For either existing or proposed wells:

- c) Well Depth (required) 2230 Depth to Top of Water Bearing Material 1900 Depth to Water from Surface 0
- d) Distance to nearest domestic well on applicant's property 4987' Property owned by others 4272'

2. Wastewater Disposal System Information

- a) Type of System (i.e. septic tank, drain field) _____
- b) System Capacity (gallons) _____ Year Constructed _____
- c) Connected to the City of _____ Sanitary System

3. Dugout Information

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

4. Water Storage Dams

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

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

- b) Freeboard _____
- c) Crest Width _____
Crest Length _____
- d) Height _____
- e) Primary Outlet Capacity _____

If pipe, diameter _____

- f) Secondary Spillway Capacity _____
Spillway Width _____
- g) X & Y Slope (e.g. 3 to 1 is a typical slope)
Upstream _____
Downstream _____
- h) Area of Impoundment _____
- i) Storage _____ Acre Feet
- j) Drainage Area Above Dam _____ Acres

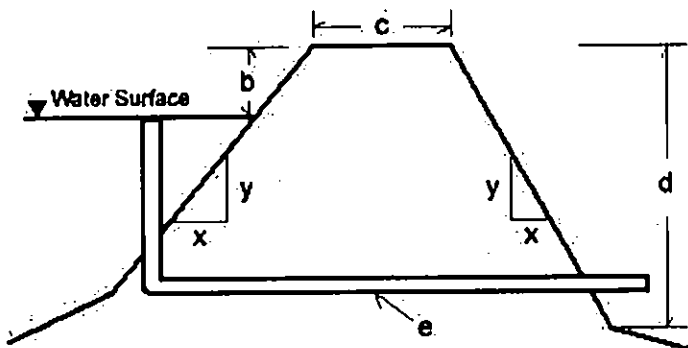
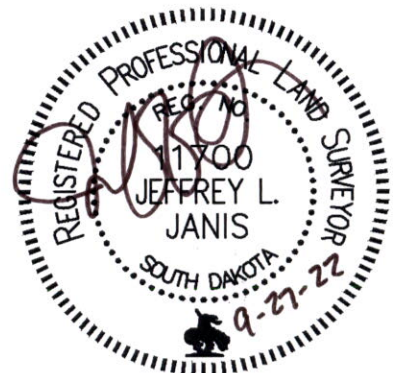
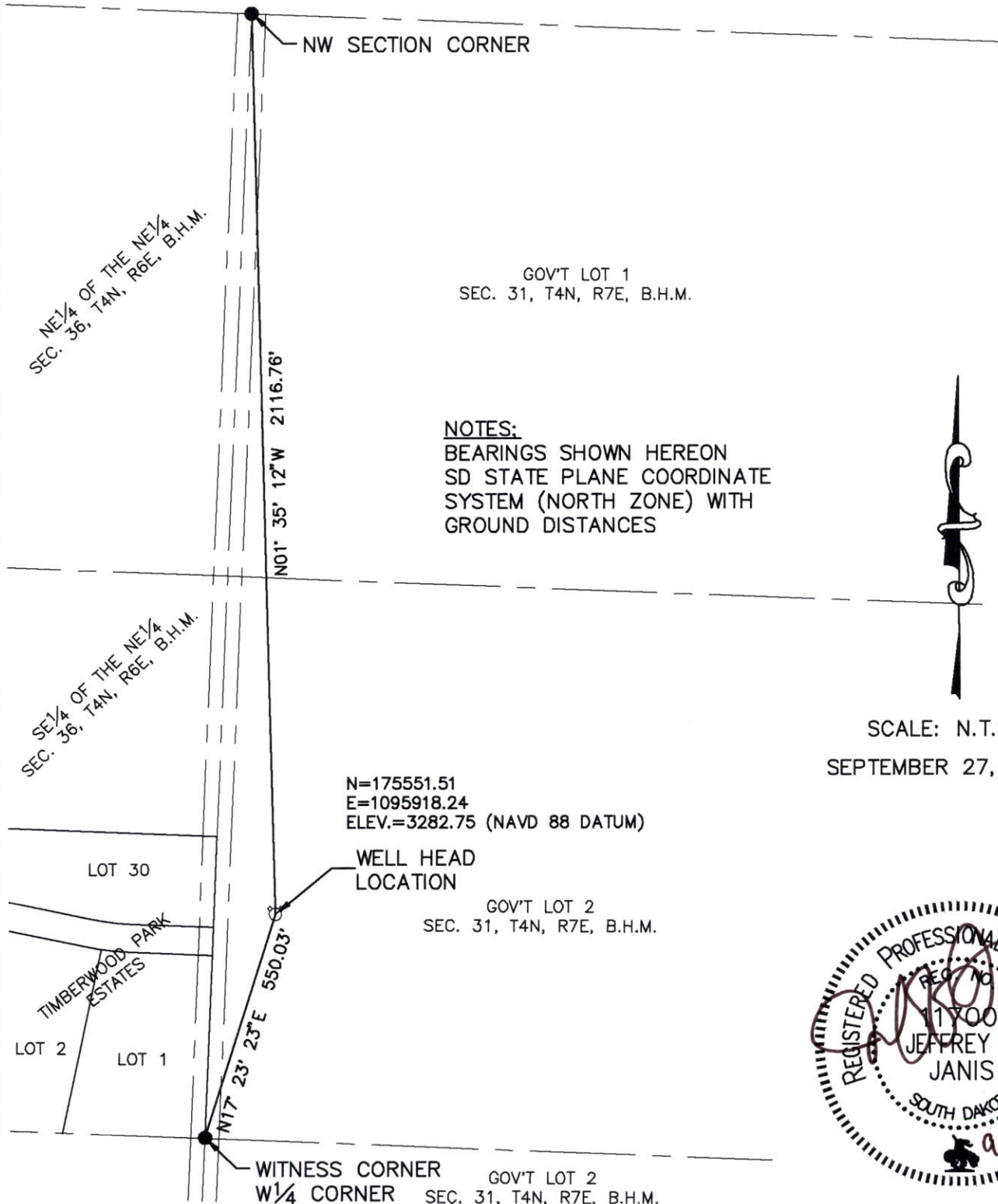


EXHIBIT 'A'
WELL PUMP LOCATION
GOV'T LOT 2 OF SECTION 31, T4N, R7E, B.H.M.,
LOCATED IN GOV'T LOT 2,
SECTION 31, T4N, R7E, B.H.M.,
MEADE COUNTY, SOUTH DAKOTA



Water Well Comple

Go Back

Go Forward

SEARCH WELLS DR
INSTALLERS Disclaimer

Feet

Measurement Result

4,986.9 Feet

TRS labels ☒ label darkness ☐



Search

209626

Compl Rpt: 000
Last Name: KAS
First Name: RYA
Business: JK-RK
County: Meade
Well Type: MUN
Township:
Range:
Section: 31
QQ: SWNW
Latitude: 44.265
Longitude: -103
Driller No.: 205
Compl Date: "W
00:00:00 GMT"
Permit No.:
Depth: 2231

[Zoom to](#)

Streets

Water Well Comple

Go Back

Go Forward

SEARCH WELLS DR
INSTALLERS Disclaimer

Feet

Measurement Result

4,272.1 Feet

TRS labels ☒ label darkness ☐



Search

209626

Compl Rpt: 000
Last Name: KASI
First Name: RYAN
Business: JK-RK
County: Meade
Well Type: MUN
Township:
Range:
Section: 31
QQ: SWNW
Latitude: 44.265
Longitude: -103.
Driller No.: 205
Compl Date: "W
00:00:00 GMT"
Permit No.:
Depth: 2231

[Zoom to](#)

Streets

RECEIPT

WATER RIGHTS PROGRAM South Dakota Department of Agriculture and Natural Resources

Date October 14, 2022

RECEIVED OF JKRR Properties c/o Ryan Kaski 1935 Samco R., Suite 102 Rapid City SD 57702

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

Fee for Application for Permit No. <u>2025-1</u> to Appropriate Water, to construct and to put water to beneficial use	\$ <u>950.00</u>
Fee for Application for Permit No. _____ to Appropriate Water for Future use	\$ _____
Fee to retain Future Use Permit No. _____ after period of seven years.	\$ _____
Fee for Inspecting Constructed Works, confirming beneficial use and issuing Water License No. <u>2025-1</u>	\$ <u>200.00</u>
Fee for Filing Transfer Form _____	\$ _____
Fee for _____	\$ _____
Fee for Issuing New Well Driller's License No. _____	\$ _____
Fee for Renewal of Well Driller's License No. _____	\$ _____
Fee for Issuing Well Pump Installer's License No. _____	\$ _____
Fee for Renewal of Well Pump Installer's License No. _____	\$ _____
(Any Other Work Provided by Law) TOTAL	\$ <u>1150.00</u>

By Eric Gronlund
Chief Engineer
EGM



OFFICE OF THE SECRETARY OF STATE

STEVEN J. BARNETT, SECRETARY OF STATE

JASON LUTZ, DEPUTY SECRETARY OF STATE

Filing Information

Name: **JKRK PROPERTIES, LLC**

General Information

SOS Business ID DL007082
Filing Type: Limited Liability Company - Domestic
03/19/2004
Status: Good Standing
Duration Term: Perpetual
Managed By: Manager-Managed

Registered Agent Address

RYAN KASKI
1935 SAMCO RD STE 102
RAPID CITY, SD 57702-6223

Principal Address

1935 SAMCO RD, STE 102
RAPID CITY, SD 57702-6223

The following document(s) was/were filed in this office on the date(s) indicated below:

Date Filed	Filing Description	Image #
01/03/2022	2022 Annual Report	B0204-4545
01/02/2021	2021 Annual Report	B0163-9578
02/17/2020	2020 Annual Report	B0130-0510
01/03/2019	2019 Annual Report	B0086-4800
02/16/2018	2018 Annual Report	B0052-9252
03/01/2017	2017 Annual Report	B0025-3257
03/02/2016	2016 Annual Report	
02/17/2015	2015 Annual Report	
02/18/2014	2014 Annual Report	
03/06/2013	2013 Annual Report	
03/08/2012	2012 Annual Report	
04/05/2011	2011 Annual Report	
03/01/2010	2010 Annual Report	
03/01/2009	2009 Annual Report	
03/12/2008	2008 Annual Report	
03/01/2007	2007 Annual Report	
03/01/2006	2006 Annual Report	
03/01/2005	2005 Annual Report	



**DEPARTMENT of AGRICULTURE
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 E. CAPITOL AVE
PIERRE SD 57501-3182
danr.sd.gov

September 27, 2022

JK-RK Properties LLC
Ryan Kaski
1935 Samco Rd
Rapid City SD 57702

Dear Mr. Kaski:

A well driller's report filed by TYVO, LLC shows they completed a new well for you in December 2021 (copy attached). The form states a water permit will be applied for.

Enclosed is an application form and instruction sheet to apply for a water permit for a water distribution system. The completed forms with the application fee and map can be returned to the "Water Rights Program, 523 E Capitol, Pierre SD 57501.

Please complete the application form or let us know the status of this well. We want to work with you to get the proper permitting in place.

Sincerely,

Karen Schlaak

Karen Schlaak
Water Rights Program
605 773-3352
karen.schlaak@state.sd.us

enclosure

76280



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CONSULTING ENGINEERS & SURVEYORS

December 22, 2021

Nickolas Enterprise, LLC.
4625 Moon Meadows Drive
Rapid City, SD 57702
(sent via Email – Dnikolas24@gmail.com)

Attn: Mr. Devon Nikolas

Re: Kaski Madison Well #2
Well Testing Report

Dear Devon:

The following letter report summarizes a quick overview of the hydrogeology in the Kaski Madison Well No. 2 area along with a summary of the recently completed flow test.

Hydrogeology:

The Kaski Madison Well #2 is located in the SW $\frac{1}{4}$ NW $\frac{1}{4}$ of Section 31, Township 4 North, Range 7 East in Meade County, South Dakota. This area is on the east flank of the Black Hills Uplift with formation dips in the area ranging from 4° to 6° to the northeast. The well is located near the northern plunging nose of an anticlinal structure that parallels the general strike of the sedimentary formations.

The Kaski Madison Well #2 was spudded in the Cretaceous Fall River Formation and penetrated the following formations with their associated drill depths from ground level.

Cretaceous Fall River	Surface
Cretaceous Lakota	202 feet
Jurassic Morrison	411 feet
Jurassic Unkpapa Sandstone	577 feet
Jurassic Sundance	621 feet
Triassic/Permian Spearfish	1,015 feet
Permian Minnekahta	1,433 feet
Permian Opeche	1,487 feet
Permian/Pennsylvanian Minnelusa	1,595 feet
Mississippian Pahasapa (Madison)	2,231 feet

Approximately 460 feet of Madison was drilled without encountering the Mississippian/Devonian Englewood Limestone.

Near the very top of the Madison Formation a fracture was encountered which resulted in the loss of circulation. The presence of this fracture in conjunction with the large production



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capacity demonstrated by this well indicates that the well is in good communication with a relatively well developed fracture system.

Aquifer Test:

Following the drilling, construction and development of the Kaski Madison #2 well, a three-day constant discharge flow test was conducted on the well from December 8, 2021 through December 11, 2021. Recovery data was collected at the conclusion of the drawdown test from December 11, 2021 through December 12, 2021. The discharge from the well was through two 4-inch hoses, each controlled by a gate valve. The hoses were manifolded together to a section of 7-inch casing pipe that was connected to a 6-inch McCrometer propeller flowmeter which was capable of measuring the instantaneous flow rate as well as a total volume (Figure 1). The drawdown (change in pressure) was measured and recorded using an In-Situ® Level TROLL 700 Data Logger with back-up provided with a 300 psi Weksler pressure gage.



Figure 1

The static water level (shut-in pressure) at the start of the test was 138.2 psi. Several days prior to the test, the well driller opened the 10-inch gate valve to allow the flow to cascade over the top of the valve. The measured height of this flow above the valve was approximately 14-inches (Figure 2). At this height the estimated flow would be approximately 1,925 gpm. Based on this documented flow rate, the initial flow rate for the constant-flow test was set at 1,500 gpm. The flow rate after approximately 12 hours settle in at approximately 1,200 gpm. This flow rate was held constant for the duration of the flow test. The average flow rate over the duration of the test based on the flowmeter totalizer volume was 1,180 gpm.



Figure 2

A plot of the measured aquifer pressure versus flow time is shown in Figure 3. These data were analyzed using the non-equilibrium method developed by Cooper and Jacob (1946). As shown in this figure the pressure of the aquifer within the first minute of flowing quickly drops to approximately 80 psi after the control valves on the discharge hoses are adjusted to a flow rate of 1,500 gpm. After approximately 10



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minutes of flowing, the flow rate has settled to a rate of approximately 1,200 gpm which, as mentioned previously, was maintained for the duration of the flow test.

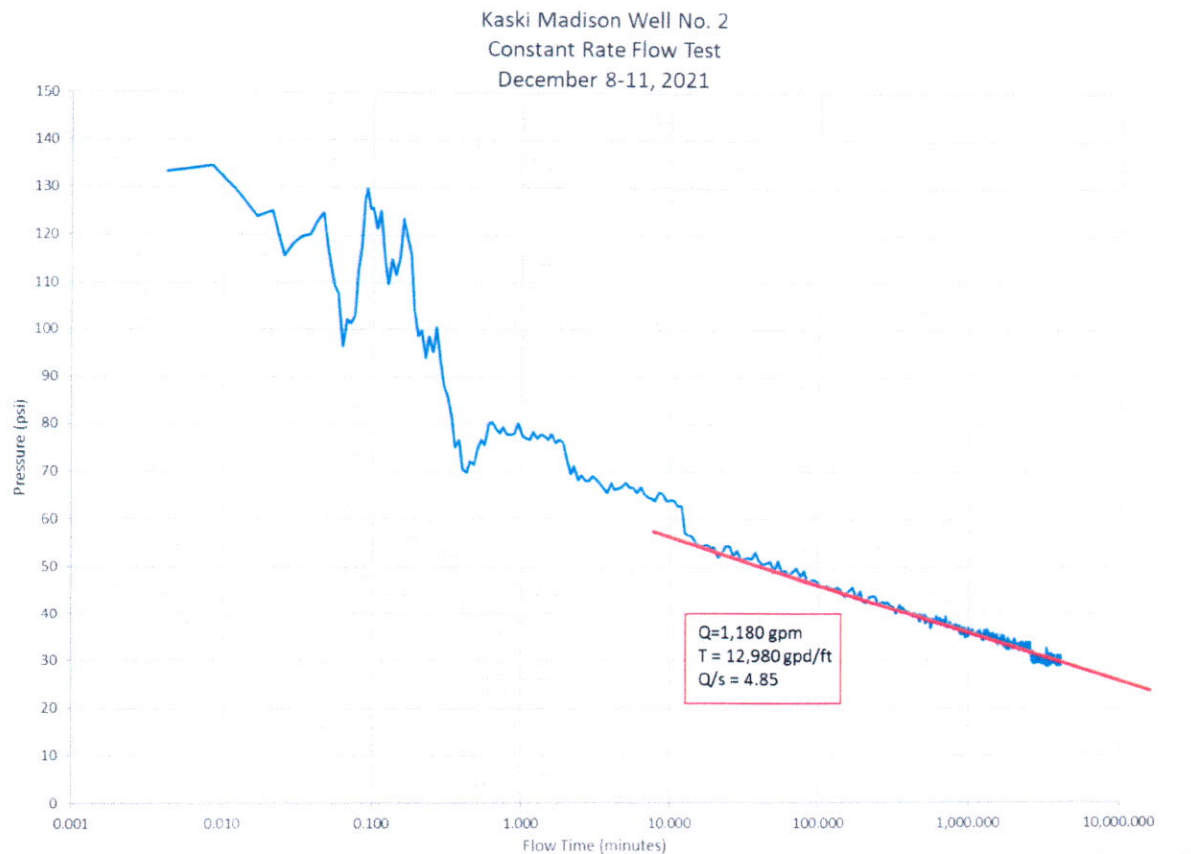


Figure 3

The calculated transmissivity of the Madison Aquifer in the area of the Kaski Madison #2 well is approximately 12,980 gallons per day per foot (gpd/ft). The specific capacity which is the flow rate divided drawdown was calculated to be 4.85 gpm per foot of drawdown. Extending the pressure data out several additional log cycles, indicates that the Kaski Madison #2 well will be capable of maintaining this flow rate continuously for over a two year period. The pressure at the surface at the end of this 2-year period would be less than 10 psi.

After approximately three days of flowing, the well was shut-in and recovery data collected. The recovery data was collected for 28.3 hours at which time the well had recovered to approximately 98% of the original static level. A semi-log plot, Cooper and Jacob (1946) analysis of the recovery data is shown in Figure 4. It should be noted that the residual drawdown is plotted against time since pumping started divided by the time since pumping



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stopped. With this type of plot, the early recovery data is shown on the right portion of the plot and the later data is shown on the left portion of the plot. These recovery data indicate a transmissivity of about 23,960 gpd/ft. The variation between the flow test data transmissivity and the recovery test data transmissivity is believed due to the additional drawdown (loss of pressure) due to the headloss associated with the turbulent flow as the water moved through the fractured aquifer matrix at the 1,180 gpm rate.

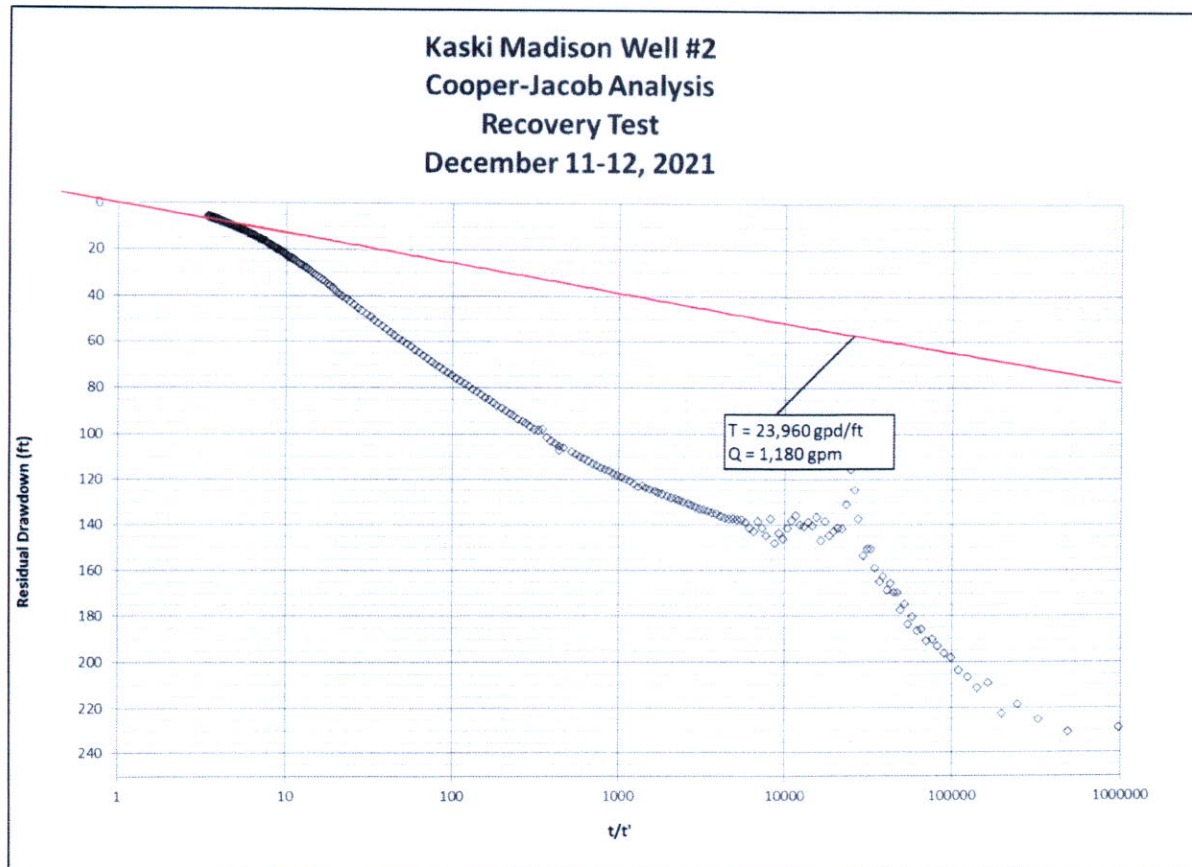


Figure 4

Based on the calculated transmissivity from the flow test data and using the Theis nonequilibrium equation (1935) with a storativity value of 1×10^{-5} , different flow rates and flow length periods were calculated at which the artesian pressure at the well could still fill the existing subdivision storage tank. The elevation to the high water line in the tank is approximately 130 feet above the ground level at well, therefore, the artesian pressure at the well head will have to be maintained above approximately 56 psi in order to fill the storage tank. A review of Figure 3 shows that the Kaski Madison #2 well will be able to supply water to the storage tank at a rate of 1,180 gpm continuously for a period of only 14 minutes before the pressure drops below 56 psi. Table 1 shows these different flow rates and their calculated period of flow for which they could fill the existing tank.



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Table 1
Kaski Madison #2 Well
Continuous Flow Duration (maintain 56 psi)

Flow Rate (gpm)	Continuous Flow Duration (Days)	Continuous Flow Duration (Hours)	Continuous Flow Duration (Years)
1,180		0.23	
1,000	0.27	6.48	
900	2.8	67.2	
800	54.8		0.15
785	90		0.25
700	2,400		6.6

As shown in Table 1, the Kaski Madison #2 well is capable of sustaining a flow of approximately 900 gpm for nearly a three day period while maintaining a pressure that is capable of feeding the existing subdivision storage tank.

The data collected during the flow test and recovery test are attached at the end of this report.

Water Quality:

Water quality constituents measured in the field during the flow test were pH, conductivity, temperature and total dissolved solids. The average temperature of the water was 13.95° C (57.11° F). The average pH value was 8.22 and the average conductivity and total dissolved solids (TDS) were 373.15 µmho/cm and 267.2 mg/L, respectively. Based on these field measured values, this is a very high quality water.

A water sample was collected on December 9, 2021 and submitted to an EPA certified laboratory (Energy Labs – Gillette) for an analysis of the full list of EPA Primary and Secondary Drinking Water Standards. The results of these analyses were not available at the time of this report.

If you have question, please do not hesitate to call or email me.

Respectfully submitted,
Engineering Associates


John Wetstein

Cc: Tim Barritt





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CONSULTING ENGINEERS & SURVEYORS

References:

- Cooper, H. H. and C. E. Jacob, 1946. A generalized graphical method for evaluating formation constants and summarized well field history. American Geophysical Union Transactions, vol. 27, pp. 526-534.
- Redden, Jack A., Ed DeWitt, et. al., 2008, Maps Showing Geology, Structure, and Geophysics of the Centra Black Hills, South Dakota, USGS, Scientific Investigations Map 2777.
- Theis, C.V., 1935, The Relation between Lowering of the Piezometric Surface and the Rate and Duration of Discharge of a Well Using Ground Water Storage: Transactions, American Geophysical Union, vol. 16, pp. 518-524.



**DEPARTMENT of AGRICULTURE
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 E. CAPITOL AVE
PIERRE SD 57501-3182
danr.sd.gov

October 3, 2022

JKRK Properties LLC
c/o Ryan Kaski
1935 Samco Rd, Suite 102
Rapid City SD 57702

Dear Mr. Kaski:

Thank you for submitting the *Application for a Permit to Appropriate Water* for a water distribution system in Meade County. To complete the application, the following is required.

- Item No. 4, Location of Point of diversion, indicated the well is located in the SW 1/4 SW 1/4 Section 31-T3N-R7E. Do you agree the township should be T4N?
- For purposes of the public notice, the entire area of the proposed subdivision needs to be included. From the map shown on Page 2 of the report, it appears the water distribution system will include the following areas: W 1/2 NW 1/4, SW 1/4 Section 28, Section 29, Section 30, Section 31, S 1/2, S 1/2 NW 1/4, S 1/2 NE 1/4 Section 32; all in T4N-R7E. Do you agree with these locations?
- The application/license fee will be \$1,150.00.

If you have any questions, please contact me.

Sincerely,

Karen Schlaak
Water Rights Program
605 773-3352
karen.schlaak@state.sd.us



PAID

OCT 14 2022

Ck# 2

Rec't# _____

October 7, 2022

RECEIVED

OCT 14 2022

OFFICE OF
WATER

**Department of Agriculture and
Natural Resources
Joe Foss Building
523 E. Capitol Ave
Pierre SD, 57501-3182**

Dear Ms. Schlaak,

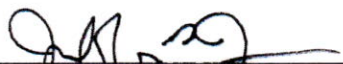
This letter is in response to the JK RK Properties LLC., Application for the Permit to Appropriate Water for a water distribution system in Meade County.

In response to Item No. 4 the Location of Point of diversion, the well indicated on the application states: 1 well in the SW $\frac{1}{4}$ of the NW $\frac{1}{4}$ of Section 31, T3N, R7E. The correct location of the well is: Gov't Lot 2 of Section 31, T4N, R7E, B.H.M.

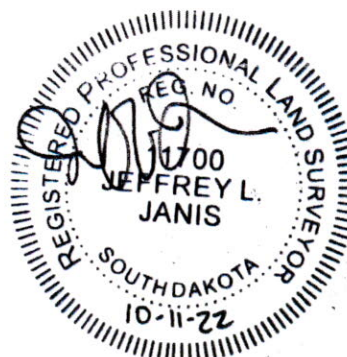
The entire area of the proposed subdivision shall be: The W $\frac{1}{2}$ of the NW $\frac{1}{4}$, and the SW $\frac{1}{4}$ of Section 28, and all of Section 29, and Section, 30, and Section 31, and the S $\frac{1}{2}$ of the N $\frac{1}{2}$ of Section 32, and the S $\frac{1}{2}$ of Section 32, all located in T4N, R7E, B.H.M.

If you have any questions, please contact Kale McNaboe, or myself at 605-721-4040.

Sincerely,



Jeffrey L. Janis P.L.S.
Longbranch Civil Engineering, Inc.



Schlaak, Karen

From: Schlaak, Karen
Sent: Monday, November 14, 2022 1:11 PM
To: Kale McNaboe
Subject: RE: [EXT] JKRK Properties, LLC

Good afternoon,

The application for JKRK Properties was complete on October 14th. We have 60 days from that date to prepare a report and recommendation. In the meantime, if the engineer preparing the report has questions, they will be in contact with you. We will notify Mr. Kaski and you with instructions regarding the public notice sometime around the middle of December.

Karen

From: Kale McNaboe <kale@longbrancheng.com>
Sent: Monday, November 14, 2022 12:17 PM
To: Schlaak, Karen <Karen.Schlaak@state.sd.us>
Cc: 'Kaski Homes' <kaskihomes@rushmore.com>
Subject: [EXT] JKRK Properties, LLC

Karen;

As a follow up to our Application for a Permit to Appropriate Water, for JKRK Properties, LLC

I believe that all the conditions outlined in your letter of October 3, 2022 have been addressed (see attached), including the revised legal and the submittal fee.

Can you give us an update on the status of this application?

Kale R. McNaboe, P.E.

Principal Engineer



ENGINEERING • SURVEY • LAND PLANNING • HYDROLOGY

1220 E. Minnesota Street
Rapid City, South Dakota 57701
Phone: 605-721-4040
www.longbrancheng.com

RECEIVED

SEP 30 2022

OFFICE OF
WATER



1220 E Minnesota Street

Rapid City, South Dakota 57701

Phone: 605-721-4040

Email: info@longbrancheng.com

September 26, 2022

**Report of Water System Demand Calculations
Future Expansion
Timberwood Park Estates
Meade County, South Dakota
Longbranch Project No. 3811.01**



Report Created For:

JKRK Properties, LLC
1935 Samco Road, Suite 102
Rapid City, South Dakota 57702

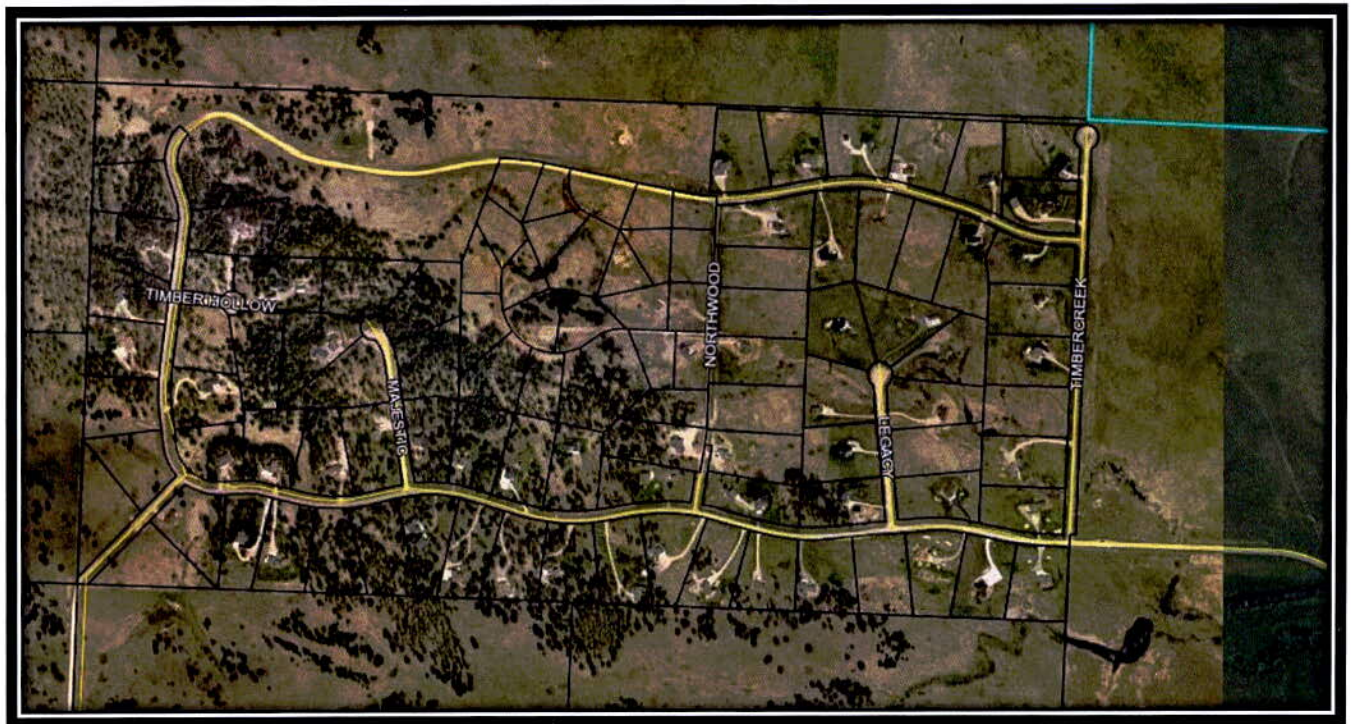
By:

Kale R. McNaboe, P.E. (SD #7198)

Introduction

Find attached report of water system demand calculations for the future expansion of Timberwood Park Estates. Phases 1 through 7 of existing Timberwood Park Estates subdivision is located in the N1/2 of Section 36, T4N, R6E, B.H.M., Meade County, South Dakota. The site is located west and northwest of the intersection of Frontier and Timbercreek roads in Meade County, South Dakota. **Figure 1** has been provided below as a vicinity map.

Figure 1



This report encompasses water system demand calculations for future expansion of Timberwood Park Estates Subdivision into immediately adjacent properties as depicted in **Figure 2** below. Note that the existing 2128± acres depicted in the figure is currently controlled by JKRC Properties, LLC and/or their affiliate companies. The 480± acres depicted is in the process of acquisition.



Background Information

Existing Timberwood Park Estates subdivision has experienced numerous phases of construction, with the original construction drawings dating back to 2005. Additional phases were brought forth in 2018, as well as Phase 7 of the subdivision representing the most current Meade County platting. Note that the bulk of the water infrastructure was installed under the 2005 plan set, including the well, reservoir and perimeter water main.

The actual water system infrastructure was designed by a separate consultant, and this system evaluation is based on as-constructed record drawings. Information regarding well data and water rights was taken from readily available public data. The system generally has the following components.

1. Existing Reservoir:
 - 26-foot diameter
 - 56-foot tall
 - 225,000 gallon capacity
 - Pressure Control calls for well to turn on when tank level drops 2-feet

2. Existing Well:

- Madison Formation Well
- Maximum Appropriation of 0.19 cfs
- Maximum Appropriation of 85 gpm
- Maximum Annual Appropriation of 137 acre-feet/year
- 10 HP Grundfos Model 85S-100-9 Pump set to discharge 85 gpm

3. Existing Water Main:

- 8" PVC Water Mains
- 6" PVC Water Mains

To evaluate potential system demand into the aforementioned 2128± acres currently controlled by JKRK Properties, LLC and/or their affiliate companies, as well as the 480± acres in the process of acquisition, the following factors must be evaluated.

1. Predicted housing density for future phases of Timberwood Park Estates
2. Developable land within the expansion area of Timberwood Park Estates
3. Water consumption within existing Timberwood Park Estates
4. System loss within existing Timberwood Park Estates
5. Water demand at full buildout for Timberwood Park Estates

Predicted Housing Density

To predict housing density, Phase 7 of Timberwood Park Estates (most recent platting) was assumed to be representative of the density level of future platting. Note that the Phase 7 platting was actually a re-platting of several original lots to increase density. Additionally, it should be noted that the roads lie within an easement on the actual lot and not within dedicated right-of-way. Phase 7 of Timberwood Park Estates included 33.02 acres subdivided into 22 single family residential lots, resulting in an average lot size of 1.50 acres. A map of Phase 7 platting, and associated calculations are included in **Appendix A** for reference.

Developable Land

Review of FEMA flood plain data for the 2128 ± acres identifies flood plain within the property boundary. For the purpose of this evaluation, FEMA flood plain was considered non-developable. To predict the total acreage of FEMA flood plain, the Meade County GIS database was used to estimate the flood plain limits. Note that this in no way constitutes a formal flood plain analysis. As part of final design and analysis, the limits of the flood plain must be established via hydraulic analysis (HIEC-RAS analysis), based upon cross-sectional data obtained by topographic survey. Based upon evaluation using the Meade County GIS database, it appears that approximately 132-acres will be impacted by the flood plain, and should be considered non-contributing.

As indicated, of the immediately adjacent land available for development, approximately 132-acres should be considered non-contributing. Discounting the non-contributing FEMA flood plain would leave approximately 2,476-acres of land available for development. Assuming a lot size of 1.50 acres per lot could result in the addition of approximately 1,651 additional lots beyond those currently within the limits of Timberwood Park Estates Subdivision. Find included in **Appendix B** a map of the anticipated non-contributing FEMA impacted property, as well as supporting calculations.

Existing System Water Consumption

Total yearly water consumption was evaluated for existing Timberwood Park Estates Subdivision Phases 1 through 7. To establish individual consumption within the system, water sales record data from Year 2020 was used. The analysis includes master meter and actual billing data, along with the number of end users and the population statistic for Meade County to predict the individual consumption rate within the sub-division. This individual consumption rate was used to predict total consumption when all the lots in the subdivision are built out. Our analysis predicts an individual consumption rate including system loss (max 14.81%) to be 125.2 gallons per day for the 67 lots built out in calendar year 2020. Supporting calculations are included in **Appendix C**.

Additional Residential Development Predicted System Water Consumption

To evaluate full build-out water demand, the total number of end users in existing Timberwood Park Estates subdivision was evaluated. The following lot density was used in this evaluation.

Timberwood Phases 1-5:	38-lots
Timberwood Phases 6:	4-lots
Timberwood Phase 7:	22-lots
<u>Future Expansion:</u>	<u>1,651-lots</u>
Total Lots at Full Buildout:	1,715-lots

Using the individual consumption rate, including system loss, to predict full buildout of all 1,715 lots predicts a total projected annual consumption of 587 acre-feet/year. Note that Permit #1887-1 for Timberwood Park Estates Subdivision allows a total annual appropriation of 137 acre-feet/year. To accommodate full buildout of Timberwood Park Estates at the predicted housing density would require an additional 450-acre feet of permitted annual appropriation. Supporting calculations are included in **Appendix D**.

Kaski Madison Well No. 2

A new Madison formation well was completed on December 22, 2021. A hydrogeology report of the new Kaski Madison Well No. 2 was performed by Engineering Associates, as summarized in their report dated December 22, 2021. Review of the report suggests that the well No. 2 is capable of producing approximately 1,200-gpm. Existing Well No. 1 is currently pumping at 85-gpm. Assuming a combined withdraw rate of 1,285-gpm, combined well run time would be 7.06-hours per day at full-buildout. A copy of the well log, referenced report, water quality report, and supporting calculations are included in **Appendix E**.

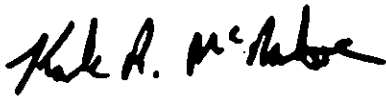
Summary

Based upon our calculations we predict that full build-out of Timberwood Park Estates could result in an additional 1,651-lots. To accommodate full buildout of Timberwood Park Estates at the predicted housing density would require an additional 450-acre feet of permitted annual appropriation. Review of the report prepared by Engineering Associates, suggests that new well No. 2 is capable of producing approximately 1,200-gpm. Existing Well No. 1 is currently pumping at 85-gpm. Assuming a combined withdraw rate of 1,285-gpm, combined well run time would be 7.06-hours per day at full-buildout.

Closure

If you have any questions or require additional information please do not hesitate to contact me at (605) 721-4040.

Sincerely;

A handwritten signature in black ink, appearing to read "Kale R. McNaboe". The signature is fluid and cursive, with the first name "Kale" being more prominent.

Kale R. McNaboe, P.E.
Longbranch Civil Engineering, Inc.

APPENDIX A – PREDICTED HOUSING DENSITY

ANTICIPATED EXPANSION - TIMBERWOOD PARK ESTATES (FULL BUILD-OUT MODEL)

FUTURE DENSITY BASED UPON THE LAST PHASE OF PLATTING TIMBERWOOD PARK ESTATES - PHASE 7	
LOT NUMBER	ACRES
110	1.8
111	1.9
112	1.85
113	1.83
114	2.26
115	2.38
116	1.28
117	1.32
118	1.28
119	1.29
120	1.3
121	1.24
122	1.25
123	1.17
124	1.22
125	1.16
126	1.21
127	1.26
128	1.28
129	1.52
130	1.61
131	1.61
SUB-TOTAL (AC) =	33.02
AVERAGE LOT SIZE (AC) =	1.50

APPENDIX B – DEVEOPABLE LAND

214 St

2128 Ac +/-

131 Existing Lots

Existing Well Lot

New Well Lot

Frontier Loop

Proposed
480 Ac +/-

McIntosh Rd

Timberwood Dr

Empire Pl



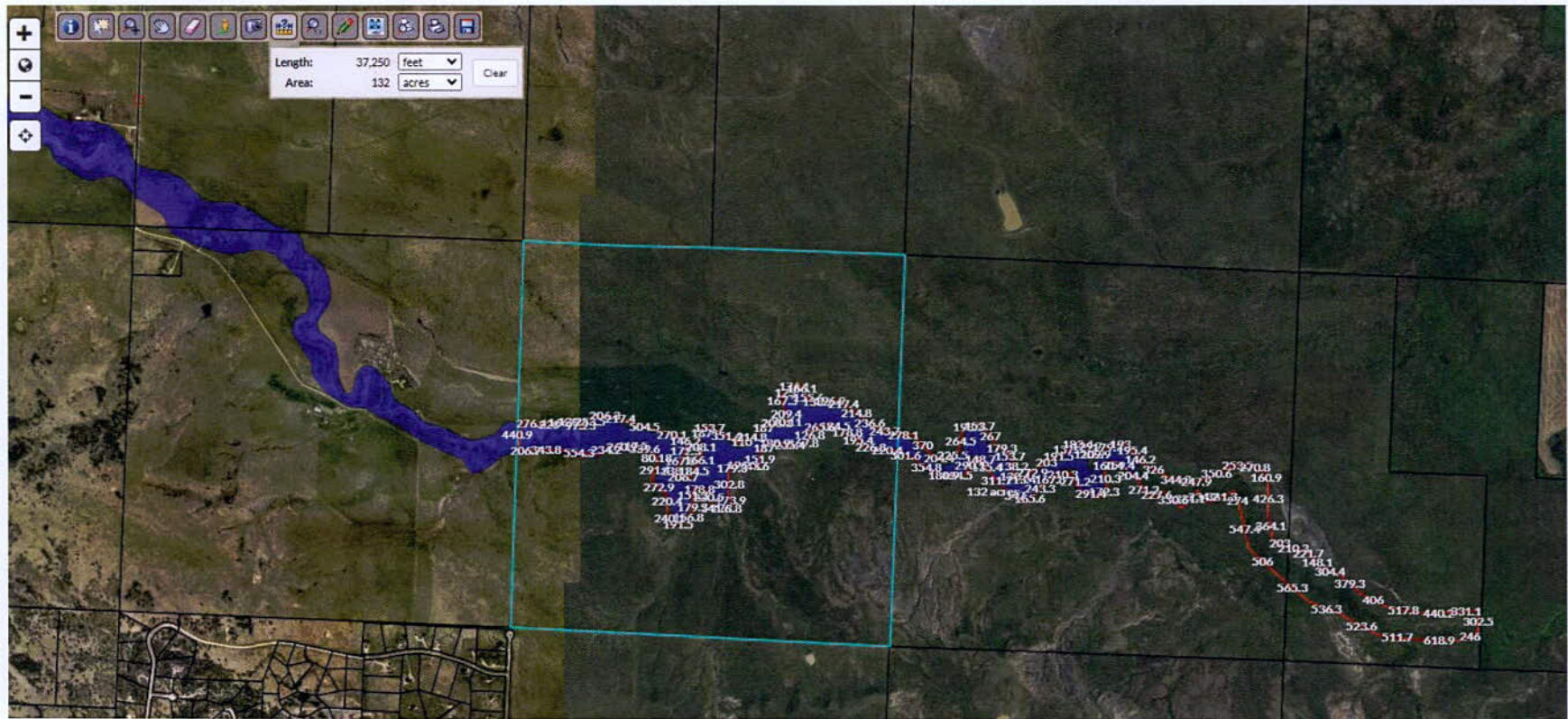
Black Hills Petrified Forest



Holt Trucking



FLOODPLAIN ON JRKR CONTROLLED PROPERTIES



ANTICIPATED EXPANSION - TIMBERWOOD PARK ESTATES (FULL BUILD-OUT MODEL)

FUTURE DENSITY BASED UPON THE LAST PHASE OF PLATTING TIMBERWOOD PARK ESTATES - PHASE 7	
LOT NUMBER	ACRES
110	1.8
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122	1.25
123	1.17
124	1.22
125	1.16
126	1.21
127	1.26
128	1.28
129	1.52
130	1.61
131	1.61
SUB-TOTAL (AC) =	33.02
AVERAGE LOT SIZE (AC)=	1.50

FUTURE DEVELOPMENT CALCULATIONS		
JKRK CONTROLLED PROPERTIES =	2128	ACRES
FLOOD PLAIN IMPACTED ACRES =	132	ACRES
DEVELOPABLE ACRES =	1996	ACRES
AVERAGE LOT SIZE INCLUDING ROAD EASEMENT =	1.50	ACRES
ANTICIPATED ADDITIONAL LOTS =	1331	LOTS
JKRK CONTINGENT PROPERTIES	480	ACRES
FLOOD PLAIN IMPACTED ACRES =	0	ACRES
DEVELOPABLE ACRES =	480	ACRES
AVERAGE LOT SIZE INCLUDING ROAD EASEMENT =	1.50	ACRES
ANTICIPATED ADDITIONAL LOTS =	320	LOTS
TOTAL ADDITIONAL LOTS =	1651	LOTS

APPENDIX C – EXISTING SYSTEM WATER CONSUMPTION

APPENDIX D – ADDITIONAL RESIDENTIAL CONSUMPTION

ADDITIONAL RESIDENTIAL DEVELOPMENT - TIMBERWOOD PARK ESTATES (PHASE 7 with Full Buildout Including Phase 6)						
Additional	Household	Household	Individual Consumption	Average Day	Peak Day	Peak Hour
	Units in Service	Avg. Residency	Avg. Based on Record Data	Demand	Demand	Demand
	(Units)	Statistic Meade County	(gpd)	(gpm) ⁻¹	(gpm) ⁻²	(gpm) ⁻³
Timberwood Park (Ph. 1-5)	38	2.44	125.2	15.20	68.40	152.00
Timberwood Park (Phase 7)	22	2.44	125.2	8.80	39.60	88.00
Timberwood Park (Phase 6)	4	2.44	125.2	1.60	7.20	16.00
Sub-Total =	64	2.44	125.2	10.40	46.80	104.00
ESTIMATED TOTAL CONSUMPTION W/ SYSTEM LOSS =		19,544	GALLONS/DAY			
ESTIMATED TOTAL CONSUMPTION W/ SYSTEM LOSS =		594,452	GALLONS/MONTH			
ESTIMATED TOTAL CONSUMPTION W/ SYSTEM LOSS =		7133426	GALLONS/YEAR			
ESTIMATED TOTAL CONSUMPTION W/ SYSTEM LOSS =		21.90	ACRE-FT/YEAR			
¹ Average Day Calculated at 0.4 gpm/du						
² Peak Day Calculated at 1.8 gpm/du						
³ Peak Hour Calculated at 4.0 gpm/du						

ESTIMATED TOTAL ANNUAL CONSUMPTION	
NAME	PROJECTED ANNUAL DEMAND (acre-feet/year)
EXISTING TIMBERWOOD PARK SUBDIVISION =	23.10
TIMBERWOOD BUILDOUT (PHASE 6 AND 7) =	21.90
TOTAL PROJECTED ANNUAL CONSUMPTION =	45.0
MAXIMUM ANNUAL APPROPRIATION =	137.1
% USEAGE OF APPROPRIATED =	32.81%

ESTIMATED DAILY CONSUMPTION	
NAME	AVERAGED PROJECTED DAILY DEMAND (gallons)
EXISTING TIMBERWOOD PARK SUBDIVISION =	20527
TIMBERWOOD BUILDOUT (PHASE 6 AND 7) =	19544
TOTAL PROJECTED DAILY CONSUMPTION =	40071
GPM PRODUCTION TO ACHIEVE ESTIMATED DAILY CONSUMPTION (GPM) =	28
% OF MAXIMUM PUMPING RATE @ 85 GPM =	32.74%
PUMP RUN TIME @ 85 GPM (HR) =	7.86

RESERVOIR SIZING	
NAME	PROJECTED DAILY DEMAND (gallons)
EXISTING TIMBERWOOD PARK SUBDIVISION =	20527
TIMBERWOOD BUILDOUT + FUTURE EXPANSION =	19544
TOTAL PROJECTED DAILY CONSUMPTION =	40071
RESERVOIR VOLUME (26' DIA. & 56' TALL, WITH 1.5' TO OVERFLOW) =	225000
% DAILY TURNOVER =	18%
DAYS OF ALLOWABLE STORAGE (DAYS) =	5.6

APPENDIX E –MADISON WELL NO. 2

Date _____

ADDITIONAL RESIDENTIAL DEVELOPMENT - TIMBERWOOD PARK ESTATES (PHASE 7 with Full Buildout Including Phase 6)						
Additional	Household Units in Service (Units)	Household Avg. Residency Statistic Meade County	Individual Consumption Avg. Based on Record Data (gpd)	Average Day Demand (gpm) ¹	Peak Day Demand (gpm) ²	Peak Hour Demand (gpm) ³
Timberwood Park (Ph. 1-5)	38	2.44	125.2	15.20	68.40	152.00
Timberwood Park (Phase 7)	22	2.44	125.2	8.80	39.60	88.00
Timberwood Park (Phase 6)	4	2.44	125.2	1.60	7.20	16.00
Sub-Total =	64	2.44	125.2	10.40	46.80	104.00
ESTIMATED TOTAL CONSUMPTION W/ SYSTEM LOSS =		19,544	GALLONS/DAY			
ESTIMATED TOTAL CONSUMPTION W/ SYSTEM LOSS =		594,452	GALLONS/MONTH			
ESTIMATED TOTAL CONSUMPTION W/ SYSTEM LOSS =		7133426	GALLONS/YEAR			
ESTIMATED TOTAL CONSUMPTION W/ SYSTEM LOSS =		21.90	ACRE-FT/YEAR			
¹ Average Day Calculated at 0.4 gpm/du						
² Peak Day Calculated at 1.8 gpm/du						
³ Peak Hour Calculated at 4.0 gpm/du						

ESTIMATED TOTAL ANNUAL CONSUMPTION	
NAME	PROJECTED ANNUAL DEMAND (acre-feet/year)
EXISTING TIMBERWOOD PARK SUBDIVISION =	23.10
TIMBERWOOD BUILDOUT (PHASE 6 AND 7) =	21.90
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MAXIMUM ANNUAL APPROPRIATION =	137.1
% USEAGE OF APPROPRIATED =	32.81%

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EXISTING TIMBERWOOD PARK SUBDIVISION =	20527
TIMBERWOOD BUILDOUT + FUTURE EXPANSION =	19544
TOTAL PROJECTED DAILY CONSUMPTION =	40071
RESERVOIR VOLUME (26' DIA. & 56' TALL, WITH 1.5' TO OVERFLOW) =	225000
% DAILY TURNOVER =	18%
DAYS OF ALLOWABLE STORAGE (DAYS) =	5.6



December 22, 2021

Nickolas Enterprise, LLC.
4625 Moon Meadows Drive
Rapid City, SD 57702
(sent via Email – Dnikolas24@gmail.com)

Attn: Mr. Devon Nikolas

Re: Kaski Madison Well #2
Well Testing Report

Dear Devon:

The following letter report summarizes a quick overview of the hydrogeology in the Kaski Madison Well No. 2 area along with a summary of the recently completed flow test.

Hydrogeology:

The Kaski Madison Well #2 is located in the SW¼ NW¼ of Section 31, Township 4 North, Range 7 East in Meade County, South Dakota. This area is on the east flank of the Black Hills Uplift with formation dips in the area ranging from 4° to 6° to the northeast. The well is located near the northern plunging nose of an anticlinal structure that parallels the general strike of the sedimentary formations.

The Kaski Madison Well #2 was spudded in the Cretaceous Fall River Formation and penetrated the following formations with their associated drill depths from ground level.

Cretaceous Fall River	Surface
Cretaceous Lakota	202 feet
Jurassic Morrison	411 feet
Jurassic Unkpapa Sandstone	577 feet
Jurassic Sundance	621 feet
Triassic/Permian Spearfish	1,015 feet
Permian Minnekahta	1,433 feet
Permian Opeche	1,487 feet
Permian/Pennsylvanian Minnelusa	1,595 feet
Mississippian Pahasapa (Madison)	2,231 feet

Approximately 460 feet of Madison was drilled without encountering the Mississippian/Devonian Englewood Limestone.

Near the very top of the Madison Formation a fracture was encountered which resulted in the loss of circulation. The presence of this fracture in conjunction with the large production



capacity demonstrated by this well indicates that the well is in good communication with a relatively well developed fracture system.

Aquifer Test:

Following the drilling, construction and development of the Kaski Madison #2 well, a three-day constant discharge flow test was conducted on the well from December 8, 2021 through December 11, 2021. Recovery data was collected at the conclusion of the drawdown test from December 11, 2021 through December 12, 2021. The discharge from the well was through two 4-inch hoses, each controlled by a gate valve. The hoses were manifolded together to a section of 7-inch casing pipe that was connected to a 6-inch McCrometer propeller flowmeter which was capable of measuring the instantaneous flow rate as well as a total volume (Figure 1). The drawdown (change in pressure) was measured and recorded using an In-Situ® Level TROLL 700 Data Logger with back-up provided with a 300 psi Weksler pressure gage.



Figure 1

The static water level (shut-in pressure) at the start of the test was 138.2 psi. Several days prior to the test, the well driller opened the 10-inch gate valve to allow the flow to cascade over the top of the valve. The measured height of this flow above the valve was approximately 14-inches (Figure 2). At this height the estimated flow would be approximately 1,925 gpm. Based on this documented flow rate, the initial flow rate for the constant-flow test was set at 1,500 gpm. The flow rate after approximately 12 hours settle in at approximately 1,200 gpm. This flow rate was held constant for the duration of the flow test. The average flow rate over the duration of the test based on the flowmeter totalizer volume was 1,180 gpm.



Figure 2

A plot of the measured aquifer pressure versus flow time is shown in Figure 3. These data were analyzed using the non-equilibrium method developed by Cooper and Jacob (1946). As shown in this figure the pressure of the aquifer within the first minute of flowing quickly drops to approximately 80 psi after the control valves on the discharge hoses are adjusted to a flow rate of 1,500 gpm. After approximately 10



ENGINEERING ASSOCIATES

CONSULTING ENGINEERS & SURVEYORS

minutes of flowing, the flow rate has settled to a rate of approximately 1,200 gpm which, as mentioned previously, was maintained for the duration of the flow test.

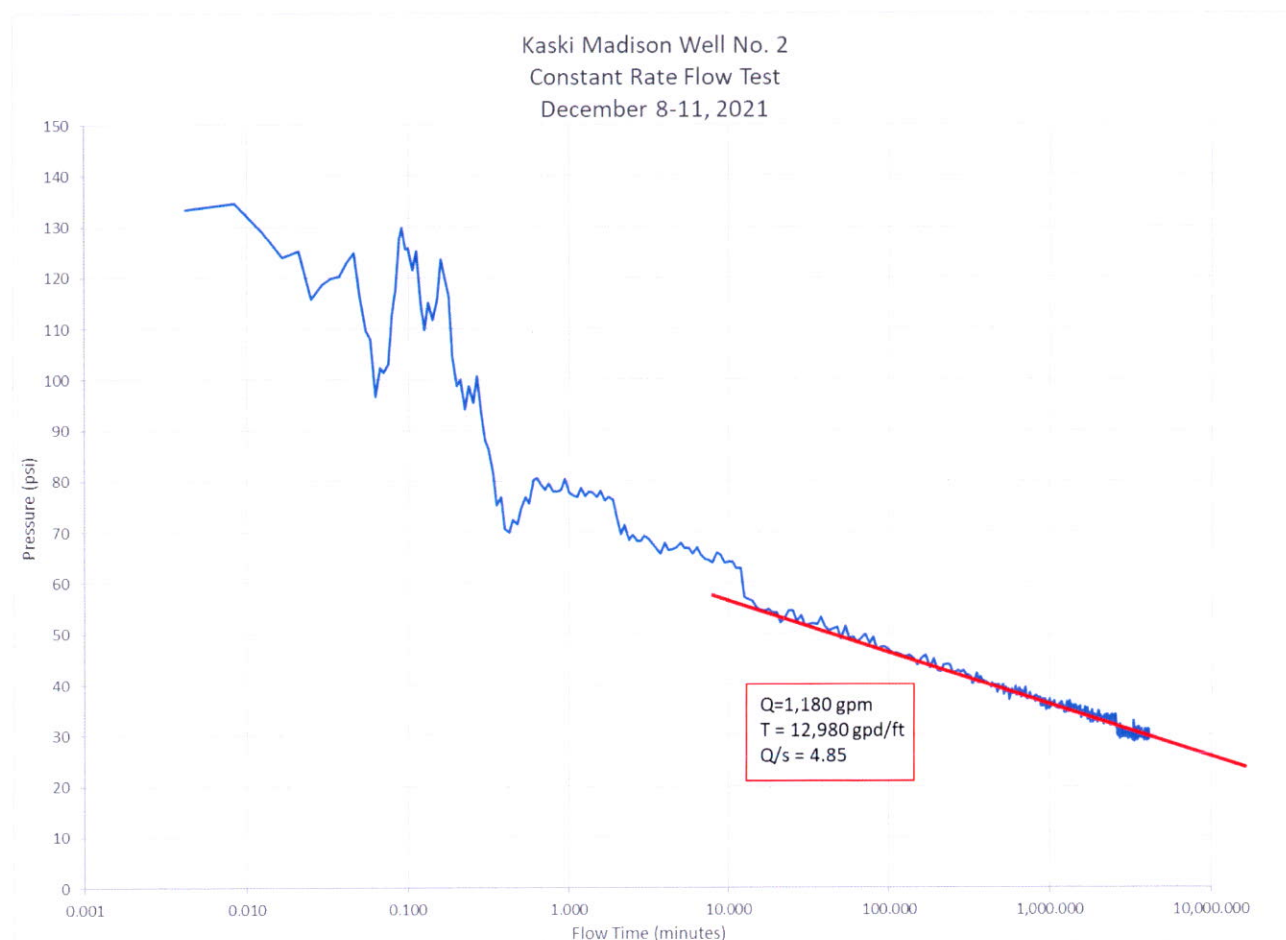


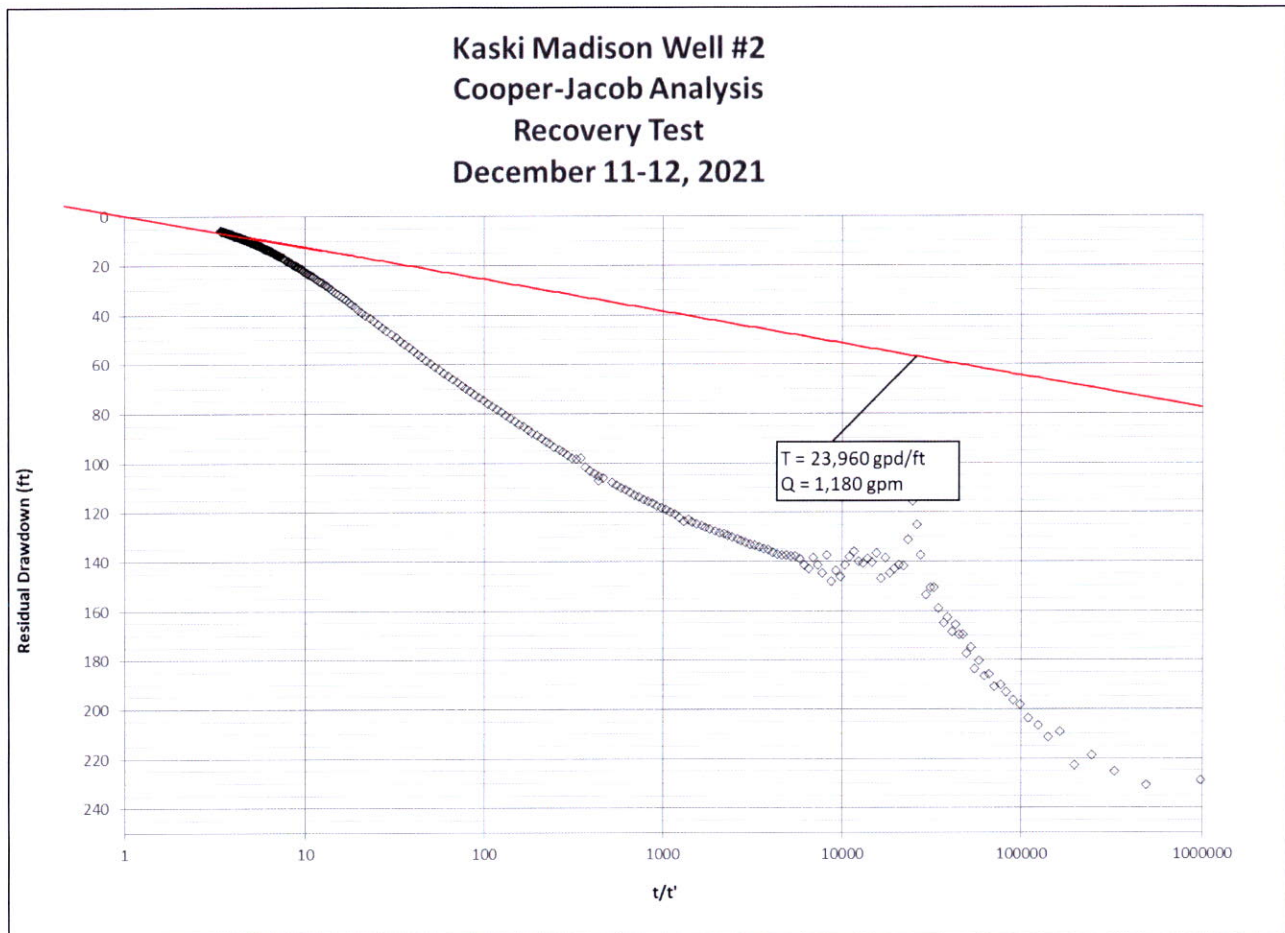
Figure 3

The calculated transmissivity of the Madison Aquifer in the area of the Kaski Madison #2 well is approximately 12,980 gallons per day per foot (gpd/ft). The specific capacity which is the flow rate divided drawdown was calculated to be 4.85 gpm per foot of drawdown. Extending the pressure data out several additional log cycles, indicates that the Kaski Madison #2 well will be capable of maintaining this flow rate continuously for over a two year period. The pressure at the surface at the end of this 2-year period would be less than 10 psi.

After approximately three days of flowing, the well was shut-in and recovery data collected. The recovery data was collected for 28.3 hours at which time the well had recovered to approximately 98% of the original static level. A semi-log plot, Cooper and Jacob (1946) analysis of the recovery data is shown in Figure 4. It should be noted that the residual drawdown is plotted against time since pumping started divided by the time since pumping



stopped. With this type of plot, the early recovery data is shown on the right portion of the plot and the later data is shown on the left portion of the plot. These recovery data indicate a transmissivity of about 23,960 gpd/ft. The variation between the flow test data transmissivity and the recovery test data transmissivity is believed due to the additional drawdown (loss of pressure) due to the headloss associated with the turbulent flow as the water moved through the fractured aquifer matrix at the 1,180 gpm rate.

**Figure 4**

Based on the calculated transmissivity from the flow test data and using the Theis nonequilibrium equation (1935) with a storativity value of 1×10^{-5} , different flow rates and flow length periods were calculated at which the artesian pressure at the well could still fill the existing subdivision storage tank. The elevation to the high water line in the tank is approximately 130 feet above the ground level at well, therefore, the artesian pressure at the well head will have to be maintained above approximately 56 psi in order to fill the storage tank. A review of Figure 3 shows that the Kaski Madison #2 well will be able to supply water to the storage tank at a rate of 1,180 gpm continuously for a period of only 14 minutes before the pressure drops below 56 psi. Table 1 shows these different flow rates and their calculated period of flow for which they could fill the existing tank.



Table 1
Kaski Madison #2 Well
Continuous Flow Duration (maintain 56 psi)

Flow Rate (gpm)	Continuous Flow Duration (Days)	Continuous Flow Duration (Hours)	Continuous Flow Duration (Years)
1,180		0.23	
1,000	0.27	6.48	
900	2.8	67.2	
800	54.8		0.15
785	90		0.25
700	2,400		6.6

As shown in Table 1, the Kaski Madison #2 well is capable of sustaining a flow of approximately 900 gpm for nearly a three day period while maintaining a pressure that is capable of feeding the existing subdivision storage tank.

The data collected during the flow test and recovery test are attached at the end of this report.

Water Quality:

Water quality constituents measured in the field during the flow test were pH, conductivity, temperature and total dissolved solids. The average temperature of the water was 13.95° C (57.11° F). The average pH value was 8.22 and the average conductivity and total dissolved solids (TDS) were 373.15 µmho/cm and 267.2 mg/L, respectively. Based on these field measured values, this is a very high quality water.

A water sample was collected on December 9, 2021 and submitted to an EPA certified laboratory (Energy Labs – Gillette) for an analysis of the full list of EPA Primary and Secondary Drinking Water Standards. The results of these analyses were not available at the time of this report.

If you have question, please do not hesitate to call or email me.

Respectfully submitted,
Engineering Associates

John Wetstein

Cc: Tim Barritt





ENGINEERING ASSOCIATES
CONSULTING ENGINEERS & SURVEYORS

References:

- Cooper, H. H. and C. E. Jacob, 1946. A generalized graphical method for evaluating formation constants and summarized well field history. American Geophysical Union Transactions, vol. 27, pp. 526-534.
- Redden, Jack A., Ed DeWitt, et. al., 2008, Maps Showing Geology, Structure, and Geophysics of the Centra Black Hills, South Dakota, USGS, Scientific Investigations Map 2777.
- Theis, C.V., 1935, The Relation between Lowering of the Piezometric Surface and the Rate and Duration of Discharge of a Well Using Ground Water Storage: Transactions, American Geophysical Union, vol. 16, pp. 518-524.

Location Properties

Location Name = Kaski Madison Well No. 2

Location ID = c8e5a385-5ec3-445a-b16f-028cd6320cf1

Report Properties

Start Time = 2021-12-08 14:41:53.377

Duration = 2.20:38:00

Readings = 549

Time Offset = -07:00:00

Instrument Properties

Device Model = Level TROLL 700

Device SN = 813078

Device Firmware = 3.06

Log Properties

Log Name = Kaski Drawdown

Log Type = Logarithmic

Log File Number = 1

Log ID = 82667ce2-9392-5919-933e-3086a2018e6d

Interval = 00:10:00

Date Time	Flow Time (minutes)	Pressure (psi)	Height Above GL (ft)	Drawdown (Feet)
12/8/21 14:41:53.377		137.2398	316.8825	0
12/8/21 14:41:53.628	0.004	133.3694	307.9457	8.9368
12/8/21 14:41:53.878	0.008	134.6912	310.9979	5.8846
12/8/21 14:41:54.128	0.013	128.9363	297.7098	19.1727
12/8/21 14:41:54.378	0.017	124.0397	286.4038	30.4787
12/8/21 14:41:54.628	0.021	125.2705	289.2456	27.6369
12/8/21 14:41:54.878	0.025	115.825	267.4364	49.4461
12/8/21 14:41:55.134	0.029	118.6068	273.8595	43.023
12/8/21 14:41:55.378	0.033	119.9349	276.9259	39.9566
12/8/21 14:41:55.628	0.038	120.2653	277.6889	39.1936
12/8/21 14:41:55.878	0.042	122.989	283.9778	32.9047
12/8/21 14:41:56.128	0.046	124.7916	288.1399	28.7426
12/8/21 14:41:56.378	0.050	116.6385	269.3148	47.5677
12/8/21 14:41:56.628	0.054	109.5167	252.8706	64.0119
12/8/21 14:41:56.878	0.058	107.9473	249.2468	67.6357
12/8/21 14:41:57.128	0.063	96.6903	223.2549	93.6276
12/8/21 14:41:57.378	0.067	102.3257	236.2668	80.6157
12/8/21 14:41:57.628	0.071	101.4894	234.3359	82.5466
12/8/21 14:41:57.878	0.075	102.9325	237.668	79.2145
12/8/21 14:41:58.128	0.079	112.7777	260.4002	56.4823
12/8/21 14:41:58.378	0.083	117.7123	271.794	45.0885
12/8/21 14:41:58.628	0.088	127.5662	294.5464	22.3361
12/8/21 14:41:58.878	0.092	129.9282	300.0003	16.8822
12/8/21 14:41:59.128	0.096	125.5657	289.9273	26.9552
12/8/21 14:41:59.378	0.100	125.7304	290.3076	26.5749

12/8/21 14:41:59.738	0.106	121.4706	280.4719	36.4106
12/8/21 14:42:00.098	0.112	125.2201	289.1292	27.7533
12/8/21 14:42:00.518	0.119	114.7453	264.9433	51.9392
12/8/21 14:42:00.937	0.126	109.8236	253.5793	63.3032
12/8/21 14:42:01.357	0.133	115.0162	265.5689	51.3136
12/8/21 14:42:01.838	0.141	111.6329	257.7568	59.1257
12/8/21 14:42:02.377	0.150	115.5713	266.8506	50.0319
12/8/21 14:42:02.857	0.158	123.5731	285.3265	31.556
12/8/21 14:42:03.458	0.168	120.2676	277.6942	39.1883
12/8/21 14:42:04.058	0.178	116.2983	268.5293	48.3532
12/8/21 14:42:04.657	0.188	104.6229	241.571	75.3115
12/8/21 14:42:05.317	0.199	98.76977	228.0564	88.8261
12/8/21 14:42:06.037	0.211	100.0709	231.0605	85.822
12/8/21 14:42:06.817	0.224	94.13717	217.3598	99.5227
12/8/21 14:42:07.598	0.237	98.77496	228.0683	88.8142
12/8/21 14:42:08.438	0.251	95.4495	220.39	96.4925
12/8/21 14:42:09.338	0.266	100.6202	232.329	84.5535
12/8/21 14:42:10.298	0.282	93.05165	214.8534	102.0291
12/8/21 14:42:11.258	0.298	88.05023	203.3053	113.5772
12/8/21 14:42:12.338	0.316	86.36591	199.4162	117.4663
12/8/21 14:42:13.478	0.335	81.69157	188.6233	128.2592
12/8/21 14:42:14.678	0.355	75.2114	173.6608	143.2217
12/8/21 14:42:15.938	0.376	76.92249	177.6116	139.2709
12/8/21 14:42:17.258	0.398	70.619	163.0571	153.8254
12/8/21 14:42:18.698	0.422	69.8608	161.3064	155.5761
12/8/21 14:42:20.198	0.447	72.38993	167.1461	149.7364
12/8/21 14:42:21.758	0.473	71.4854	165.0576	151.8249
12/8/21 14:42:23.438	0.501	74.4907	171.9967	144.8858
12/8/21 14:42:25.238	0.531	76.80161	177.3326	139.5499
12/8/21 14:42:27.098	0.562	75.70766	174.8066	142.0759
12/8/21 14:42:29.138	0.596	80.27617	185.3552	131.5273
12/8/21 14:42:31.238	0.631	80.53389	185.9503	130.9322
12/8/21 14:42:33.458	0.668	79.4015	183.3356	133.5469
12/8/21 14:42:35.858	0.708	78.35113	180.9103	135.9722
12/8/21 14:42:38.377	0.750	79.56892	183.7222	133.1603
12/8/21 14:42:41.017	0.794	77.97118	180.033	136.8495
12/8/21 14:42:43.838	0.841	77.96923	180.0285	136.854
12/8/21 14:42:46.838	0.891	78.30354	180.8004	136.0821
12/8/21 14:42:50.017	0.944	80.40434	185.6511	131.2314
12/8/21 14:42:53.377	1.000	77.78043	179.5926	137.2899
12/8/21 14:42:56.978	1.060	77.26282	178.3974	138.4851
12/8/21 14:43:00.577	1.120	76.91724	177.5995	139.283
12/8/21 14:43:04.778	1.190	78.57927	181.4371	135.4454
12/8/21 14:43:08.978	1.260	77.07684	177.968	138.9145
12/8/21 14:43:13.177	1.330	77.93996	179.961	136.9215
12/8/21 14:43:17.978	1.410	77.78221	179.5967	137.2858
12/8/21 14:43:23.377	1.500	76.86929	177.4888	139.3937
12/8/21 14:43:28.177	1.580	78.07595	180.2749	136.6076
12/8/21 14:43:34.177	1.680	76.20578	175.9568	140.9257

12/8/21 14:43:40.177	1.780	76.92522	177.618	139.2645
12/8/21 14:43:46.177	1.880	76.42535	176.4638	140.4187
12/8/21 14:43:52.777	1.990	73.10487	168.7969	148.0856
12/8/21 14:43:59.978	2.110	69.62031	160.7511	156.1314
12/8/21 14:44:07.777	2.240	71.39539	164.8497	152.0328
12/8/21 14:44:15.577	2.370	68.42179	157.9838	158.8987
12/8/21 14:44:23.978	2.510	69.42947	160.3105	156.572
12/8/21 14:44:32.978	2.660	68.18328	157.4331	159.4494
12/8/21 14:44:42.577	2.820	68.20099	157.474	159.4085
12/8/21 14:44:52.177	2.980	69.24468	159.8838	156.9987
12/8/21 14:45:02.977	3.160	68.45325	158.0565	158.826
12/8/21 14:45:14.377	3.350	67.64501	156.1902	160.6923
12/8/21 14:45:26.377	3.550	66.53697	153.6318	163.2507
12/8/21 14:45:38.977	3.760	65.66376	151.6156	165.2669
12/8/21 14:45:52.177	3.980	67.82947	156.6161	160.2664
12/8/21 14:46:06.577	4.220	66.4622	153.4592	163.4233
12/8/21 14:46:21.652	4.471	66.57732	153.725	163.1575
12/8/21 14:46:37.177	4.730	66.97884	154.6521	162.2304
12/8/21 14:46:53.977	5.010	67.79335	156.5327	160.3498
12/8/21 14:47:11.977	5.310	66.77404	154.1792	162.7033
12/8/21 14:47:30.577	5.620	66.68289	153.9687	162.9138
12/8/21 14:47:50.977	5.960	65.66063	151.6084	165.2741
12/8/21 14:48:11.977	6.310	66.83723	154.3251	162.5574
12/8/21 14:48:34.177	6.680	65.43505	151.0875	165.795
12/8/21 14:48:58.177	7.080	64.68701	149.3603	167.5222
12/8/21 14:49:23.377	7.500	64.43679	148.7826	168.0999
12/8/21 14:49:49.777	7.940	63.91151	147.5697	169.3128
12/8/21 14:50:17.977	8.410	65.82	151.9763	164.9062
12/8/21 14:50:47.977	8.910	65.506	151.2513	165.6312
12/8/21 14:51:19.777	9.440	63.90158	147.5468	169.3357
12/8/21 14:51:53.377	10.000	64.00719	147.7906	169.0919
12/8/21 14:52:29.377	10.600	64.09111	147.9844	168.8981
12/8/21 14:53:05.377	11.200	62.81902	145.0472	171.8353
12/8/21 14:53:47.377	11.900	62.89171	145.215	171.6675
12/8/21 14:54:29.377	12.600	57.17892	132.0244	184.8581
12/8/21 14:55:11.377	13.300	56.81808	131.1912	185.6913
12/8/21 14:55:59.377	14.100	56.35285	130.117	186.7655
12/8/21 14:56:53.377	15.000	55.06305	127.1389	189.7436
12/8/21 14:57:41.377	15.800	54.73845	126.3894	190.4931
12/8/21 14:58:41.377	16.800	54.42254	125.6599	191.2226
12/8/21 14:59:41.377	17.800	54.88757	126.7337	190.1488
12/8/21 15:00:41.377	18.800	54.18823	125.119	191.7635
12/8/21 15:01:47.377	19.900	54.03986	124.7764	192.1061
12/8/21 15:02:59.377	21.100	52.1302	120.367	196.5155
12/8/21 15:04:17.377	22.400	52.97428	122.316	194.5665
12/8/21 15:05:35.377	23.700	54.51982	125.8846	190.9979
12/8/21 15:06:59.377	25.100	54.56156	125.981	190.9015
12/8/21 15:08:29.377	26.600	52.29958	120.7581	196.1244
12/8/21 15:10:05.377	28.200	53.56227	123.6736	193.2089

12/8/21 15:11:41.377	29.800	51.65007	119.2584	197.6241
12/8/21 15:13:29.377	31.600	51.73959	119.4651	197.4174
12/8/21 15:15:23.377	33.500	51.97588	120.0107	196.8718
12/8/21 15:17:23.377	35.500	51.81872	119.6478	197.2347
12/8/21 15:19:29.377	37.600	53.2235	122.8914	193.9911
12/8/21 15:21:41.377	39.800	51.42861	118.7471	198.1354
12/8/21 15:24:05.377	42.200	50.64397	116.9354	199.9471
12/8/21 15:26:35.377	44.700	50.91457	117.5602	199.3223
12/8/21 15:29:11.377	47.300	51.36399	118.5978	198.2847
12/8/21 15:31:59.377	50.100	49.03637	113.2235	203.659
12/8/21 15:34:59.377	53.100	51.48768	118.8835	197.999
12/8/21 15:38:05.377	56.200	49.10145	113.3737	203.5088
12/8/21 15:41:29.377	59.600	49.34704	113.9408	202.9417
12/8/21 15:44:59.377	63.100	48.30373	111.5318	205.3507
12/8/21 15:48:41.377	66.800	49.14762	113.4803	203.4022
12/8/21 15:52:41.377	70.800	49.93836	115.3061	201.5764
12/8/21 15:56:53.377	75.000	48.1364	111.1455	205.737
12/8/21 16:01:17.377	79.400	49.39667	114.0554	202.8271
12/8/21 16:05:59.377	84.100	46.84818	108.171	208.7115
12/8/21 16:10:59.377	89.100	47.38296	109.4058	207.4767
12/8/21 16:16:17.377	94.400	47.40285	109.4517	207.4308
12/8/21 16:21:53.377	100.000	46.71185	107.8562	209.0263
12/8/21 16:27:53.377	106.000	46.17838	106.6245	210.258
12/8/21 16:33:53.377	112.000	46.21651	106.7125	210.17
12/8/21 16:40:53.377	119.000	45.79092	105.7298	211.1527
12/8/21 16:47:53.377	126.000	45.3905	104.8053	212.0772
12/8/21 16:54:53.377	133.000	45.83535	105.8324	211.0501
12/8/21 17:02:53.377	141.000	45.08468	104.0991	212.7834
12/8/21 17:11:53.377	150.000	43.88849	101.3372	215.5453
12/8/21 17:19:53.377	158.000	45.03052	103.9741	212.9084
12/8/21 17:29:53.377	168.000	45.758	105.6538	211.2287
12/8/21 17:39:53.377	178.000	43.30286	99.98496	216.89754
12/8/21 17:49:53.377	188.000	45.09354	104.1196	212.7629
12/8/21 17:59:53.377	198.000	42.72722	98.65582	218.22668
12/8/21 18:09:53.377	208.000	42.65	98.47752	218.40498
12/8/21 18:19:53.377	218.000	43.82077	101.1808	215.7017
12/8/21 18:29:53.377	228.000	43.94873	101.4762	215.4063
12/8/21 18:39:53.377	238.000	43.77127	101.0665	215.816
12/8/21 18:49:53.377	248.000	42.41847	97.94293	218.93957
12/8/21 18:59:53.377	258.000	42.33453	97.74912	219.13338
12/8/21 19:09:53.377	268.000	42.82774	98.88791	217.99459
12/8/21 19:19:53.377	278.000	42.37778	97.84897	219.03353
12/8/21 19:29:53.377	288.000	42.77734	98.77155	218.11095
12/8/21 19:39:53.377	298.000	41.89816	96.74154	220.14096
12/8/21 19:49:53.377	308.000	41.9361	96.82915	220.05335
12/8/21 19:59:53.377	318.000	41.55052	95.93886	220.94364
12/8/21 20:09:53.377	328.000	40.09331	92.57421	224.30829
12/8/21 20:19:53.377	338.000	40.75147	94.09388	222.78862
12/8/21 20:29:53.377	348.000	42.23808	97.52641	219.35609

12/8/21 20:39:53.377	358.000	40.18399	92.78358	224.09892
12/8/21 20:49:53.377	368.000	41.47553	95.76571	221.11679
12/8/21 20:59:53.377	378.000	40.87128	94.37051	222.51199
12/8/21 21:09:53.377	388.000	40.63646	93.82834	223.05416
12/8/21 21:19:53.377	398.000	40.48723	93.48376	223.39874
12/8/21 21:29:53.377	408.000	40.34605	93.15779	223.72471
12/8/21 21:39:53.377	418.000	39.96498	92.27791	224.60459
12/8/21 21:49:53.377	428.000	39.34147	90.83824	226.04426
12/8/21 21:59:53.377	438.000	40.25053	92.93722	223.94528
12/8/21 22:09:53.377	448.000	39.51918	91.24857	225.63393
12/8/21 22:19:53.377	458.000	39.83913	91.98732	224.89518
12/8/21 22:29:53.377	468.000	38.27637	88.37894	228.50356
12/8/21 22:39:53.377	478.000	39.97004	92.28958	224.59292
12/8/21 22:49:53.377	488.000	39.10153	90.28423	226.59827
12/8/21 22:59:53.377	498.000	38.95239	89.93987	226.94263
12/8/21 23:09:53.377	508.000	39.87524	92.07069	224.81181
12/8/21 23:19:53.377	518.000	37.87967	87.46299	229.41951
12/8/21 23:29:53.377	528.000	39.40172	90.97735	225.90515
12/8/21 23:39:53.377	538.000	38.42844	88.73008	228.15242
12/8/21 23:49:53.377	548.000	39.09934	90.27917	226.60333
12/8/21 23:59:53.377	558.000	36.8382	85.05825	231.82425
12/9/21 0:09:53.377	568.000	38.27708	88.3806	228.5019
12/9/21 0:19:53.377	578.000	38.99163	90.03046	226.85204
12/9/21 0:29:53.377	588.000	38.07961	87.92464	228.95786
12/9/21 0:39:53.377	598.000	38.08355	87.93373	228.94877
12/9/21 0:49:53.377	608.000	39.61124	91.46114	225.42136
12/9/21 0:59:53.377	618.000	37.80994	87.30199	229.58051
12/9/21 1:09:53.377	628.000	37.82682	87.34096	229.54154
12/9/21 1:19:53.377	638.000	39.25526	90.63918	226.24332
12/9/21 1:29:53.377	648.000	38.82336	89.64193	227.24057
12/9/21 1:39:53.377	658.000	37.39891	86.35293	230.52957
12/9/21 1:49:53.377	668.000	38.67595	89.30157	227.58093
12/9/21 1:59:53.377	678.000	37.57182	86.75217	230.13033
12/9/21 2:09:53.377	688.000	37.8937	87.49539	229.38711
12/9/21 2:19:53.377	698.000	39.31493	90.77694	226.10556
12/9/21 2:29:53.377	708.000	37.17604	85.83833	231.04417
12/9/21 2:39:53.377	718.000	37.09328	85.64725	231.23525
12/9/21 2:49:53.377	728.000	37.08174	85.62059	231.26191
12/9/21 2:59:53.377	738.000	37.41042	86.37949	230.50301
12/9/21 3:09:53.377	748.000	38.23222	88.27702	228.60548
12/9/21 3:19:53.377	758.000	37.24635	86.00066	230.88184
12/9/21 3:29:53.377	768.000	37.16567	85.81438	231.06812
12/9/21 3:39:53.377	778.000	37.46319	86.50135	230.38115
12/9/21 3:49:53.377	788.000	36.992	85.41339	231.46911
12/9/21 3:59:53.377	798.000	37.68476	87.01295	229.86955
12/9/21 4:09:53.377	808.000	36.6195	84.5533	232.3292
12/9/21 4:19:53.377	818.000	37.80552	87.29176	229.59074
12/9/21 4:29:53.377	828.000	36.9492	85.31454	231.56796
12/9/21 4:39:53.377	838.000	37.3329	86.20052	230.68198

12/9/21 4:49:53.377	848.000	36.88258	85.16074	231.72176
12/9/21 4:59:53.377	858.000	37.44495	86.45923	230.42327
12/9/21 5:09:53.377	868.000	37.0312	85.5039	231.3786
12/9/21 5:19:53.377	878.000	35.62421	82.2552	234.6273
12/9/21 5:29:53.377	888.000	36.09768	83.34842	233.53408
12/9/21 5:39:53.377	898.000	35.72308	82.48349	234.39901
12/9/21 5:49:53.377	908.000	37.11784	85.70395	231.17855
12/9/21 5:59:53.377	918.000	35.66523	82.3499	234.5326
12/9/21 6:09:53.377	928.000	37.06998	85.59344	231.28906
12/9/21 6:19:53.377	938.000	35.01965	80.85928	236.02322
12/9/21 6:29:53.377	948.000	35.0006	80.81531	236.06719
12/9/21 6:39:53.377	958.000	36.52873	84.34371	232.53879
12/9/21 6:49:53.377	968.000	35.80171	82.66504	234.21746
12/9/21 6:59:53.377	978.000	35.0527	80.93561	235.94689
12/9/21 7:09:53.377	988.000	37.15225	85.7834	231.0991
12/9/21 7:19:53.377	998.000	36.91611	85.23817	231.64433
12/9/21 7:29:53.377	1008.000	35.55265	82.08997	234.79253
12/9/21 7:39:53.377	1018.000	36.19516	83.5735	233.309
12/9/21 7:49:53.377	1028.000	36.19585	83.5751	233.3074
12/9/21 7:59:53.377	1038.000	36.37331	83.98485	232.89765
12/9/21 8:09:53.377	1048.000	36.24681	83.69277	233.18973
12/9/21 8:19:53.377	1058.000	36.75541	84.86709	232.01541
12/9/21 8:29:53.377	1068.000	35.55027	82.08447	234.79803
12/9/21 8:39:53.377	1078.000	35.43221	81.81188	235.07062
12/9/21 8:49:53.377	1088.000	35.83769	82.74812	234.13438
12/9/21 8:59:53.377	1098.000	35.43245	81.81243	235.07007
12/9/21 9:09:53.377	1108.000	35.20606	81.2897	235.5928
12/9/21 9:19:53.377	1118.000	35.87782	82.84077	234.04173
12/9/21 9:29:53.377	1128.000	35.18634	81.24418	235.63832
12/9/21 9:39:53.377	1138.000	35.57074	82.13174	234.75076
12/9/21 9:49:53.377	1148.000	36.14149	83.44958	233.43292
12/9/21 9:59:53.377	1158.000	35.58691	82.16908	234.71342
12/9/21 10:09:53.377	1168.000	35.66312	82.34504	234.53746
12/9/21 10:19:53.377	1178.000	36.5491	84.39075	232.49175
12/9/21 10:29:53.377	1188.000	35.75536	82.55801	234.32449
12/9/21 10:39:53.377	1198.000	35.45657	81.86813	235.01437
12/9/21 10:49:53.377	1208.000	35.48383	81.93106	234.95144
12/9/21 10:59:53.377	1218.000	34.37783	79.37736	237.50514
12/9/21 11:09:53.377	1228.000	35.6769	82.37686	234.50564
12/9/21 11:19:53.377	1238.000	35.11229	81.0732	235.8093
12/9/21 11:29:53.377	1248.000	35.3749	81.67954	235.20296
12/9/21 11:39:53.377	1258.000	34.45996	79.56698	237.31552
12/9/21 11:49:53.377	1268.000	36.48489	84.24249	232.64001
12/9/21 11:59:53.377	1278.000	35.07578	80.98888	235.89362
12/9/21 12:09:53.377	1288.000	34.89136	80.56306	236.31944
12/9/21 12:19:53.377	1298.000	34.52275	79.71198	237.17052
12/9/21 12:29:53.377	1308.000	35.58347	82.16113	234.72137
12/9/21 12:39:53.377	1318.000	35.35877	81.64231	235.24019
12/9/21 12:49:53.377	1328.000	36.73058	84.80978	232.07272

12/9/21 12:59:53.377	1338.000	36.1558	83.48264	233.39986
12/9/21 13:09:53.377	1348.000	35.35015	81.62241	235.26009
12/9/21 13:19:53.377	1358.000	35.15817	81.17914	235.70336
12/9/21 13:29:53.377	1368.000	35.90267	82.89815	233.98435
12/9/21 13:39:53.377	1378.000	35.43058	81.80811	235.07439
12/9/21 13:49:53.377	1388.000	35.16358	81.1916	235.6909
12/9/21 13:59:53.377	1398.000	35.16626	81.19779	235.68471
12/9/21 14:09:53.377	1408.000	35.77586	82.60535	234.27715
12/9/21 14:19:53.377	1418.000	34.93353	80.66045	236.22205
12/9/21 14:29:53.377	1428.000	34.72059	80.16876	236.71374
12/9/21 14:39:53.377	1438.000	35.76271	82.57499	234.30751
12/9/21 14:49:53.377	1448.000	35.42046	81.78473	235.09777
12/9/21 14:59:53.377	1458.000	34.69355	80.10633	236.77617
12/9/21 15:09:53.377	1468.000	34.96307	80.72865	236.15385
12/9/21 15:19:53.377	1478.000	35.28154	81.464	235.4185
12/9/21 15:29:53.377	1488.000	34.36585	79.34968	237.53282
12/9/21 15:39:53.377	1498.000	35.48587	81.93578	234.94672
12/9/21 15:49:53.377	1508.000	34.55667	79.7903	237.0922
12/9/21 15:59:53.377	1518.000	34.82714	80.41478	236.46772
12/9/21 16:09:53.377	1528.000	34.47249	79.59592	237.28658
12/9/21 16:19:53.377	1538.000	35.7205	82.47753	234.40497
12/9/21 16:29:53.377	1548.000	34.31033	79.22148	237.66102
12/9/21 16:39:53.377	1558.000	34.40522	79.44058	237.44192
12/9/21 16:49:53.377	1568.000	33.4127	77.1489	239.7336
12/9/21 16:59:53.377	1578.000	34.73922	80.21178	236.67072
12/9/21 17:09:53.377	1588.000	34.38032	79.38309	237.49941
12/9/21 17:19:53.377	1598.000	34.29606	79.18855	237.69395
12/9/21 17:29:53.377	1608.000	34.6512	80.00853	236.87397
12/9/21 17:39:53.377	1618.000	34.73941	80.21223	236.67027
12/9/21 17:49:53.377	1628.000	34.83475	80.43237	236.45013
12/9/21 17:59:53.377	1638.000	34.24526	79.07125	237.81125
12/9/21 18:09:53.377	1648.000	35.44345	81.83782	235.04468
12/9/21 18:19:53.377	1658.000	34.89801	80.57843	236.30407
12/9/21 18:29:53.377	1668.000	33.95897	78.41022	238.47228
12/9/21 18:39:53.377	1678.000	34.37836	79.37857	237.50393
12/9/21 18:49:53.377	1688.000	34.61431	79.92336	236.95914
12/9/21 18:59:53.377	1698.000	33.02565	76.2552	240.6273
12/9/21 19:09:53.377	1708.000	35.33876	81.59609	235.28641
12/9/21 19:19:53.377	1718.000	34.36413	79.34572	237.53678
12/9/21 19:29:53.377	1728.000	33.47776	77.29911	239.58339
12/9/21 19:39:53.377	1738.000	33.96745	78.42979	238.45271
12/9/21 19:49:53.377	1748.000	33.58004	77.53527	239.34723
12/9/21 19:59:53.377	1758.000	34.34061	79.29142	237.59108
12/9/21 20:09:53.377	1768.000	32.47619	74.98651	241.89599
12/9/21 20:19:53.377	1778.000	33.45014	77.23533	239.64717
12/9/21 20:29:53.377	1788.000	32.98117	76.15251	240.72999
12/9/21 20:39:53.377	1798.000	32.9884	76.16919	240.71331
12/9/21 20:49:53.377	1808.000	33.08171	76.38464	240.49786
12/9/21 20:59:53.377	1818.000	34.22366	79.02138	237.86112

12/9/21 21:09:53.377	1828.000	35.00918	80.83511	236.04739
12/9/21 21:19:53.377	1838.000	32.5252	75.09969	241.78281
12/9/21 21:29:53.377	1848.000	33.03476	76.27624	240.60626
12/9/21 21:39:53.377	1858.000	33.95509	78.40125	238.48125
12/9/21 21:49:53.377	1868.000	33.97422	78.44543	238.43707
12/9/21 21:59:53.377	1878.000	33.24752	76.7675	240.115
12/9/21 22:09:53.377	1888.000	32.86414	75.88228	241.00022
12/9/21 22:19:53.377	1898.000	33.98969	78.48114	238.40136
12/9/21 22:29:53.377	1908.000	33.85111	78.16117	238.72133
12/9/21 22:39:53.377	1918.000	33.33032	76.95869	239.92381
12/9/21 22:49:53.377	1928.000	33.54557	77.45569	239.42681
12/9/21 22:59:53.377	1938.000	32.85477	75.86064	241.02186
12/9/21 23:09:53.377	1948.000	33.5316	77.42342	239.45908
12/9/21 23:19:53.377	1958.000	33.84967	78.15784	238.72466
12/9/21 23:29:53.377	1968.000	32.90601	75.97895	240.90355
12/9/21 23:39:53.377	1978.000	32.43366	74.88831	241.99419
12/9/21 23:49:53.377	1988.000	34.74979	80.23619	236.64631
12/9/21 23:59:53.377	1998.000	33.68787	77.78424	239.09826
12/10/21 0:09:53.377	2008.000	34.62992	79.95941	236.92309
12/10/21 0:19:53.377	2018.000	33.28038	76.84338	240.03912
12/10/21 0:29:53.377	2028.000	33.97647	78.45063	238.43187
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12/10/21 0:49:53.377	2048.000	33.32957	76.95695	239.92555
12/10/21 0:59:53.377	2058.000	33.01761	76.23664	240.64586
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12/10/21 1:19:53.377	2078.000	32.54075	75.13558	241.74692
12/10/21 1:29:53.377	2088.000	32.59792	75.26759	241.61491
12/10/21 1:39:53.377	2098.000	32.92598	76.02508	240.85742
12/10/21 1:49:53.377	2108.000	32.6535	75.39591	241.48659
12/10/21 1:59:53.377	2118.000	33.49503	77.339	239.5435
12/10/21 2:09:53.377	2128.000	33.31503	76.92336	239.95914
12/10/21 2:19:53.377	2138.000	33.2569	76.78916	240.09334
12/10/21 2:29:53.377	2148.000	32.15675	74.24894	242.63356
12/10/21 2:39:53.377	2158.000	32.58614	75.24039	241.64211
12/10/21 2:49:53.377	2168.000	32.69569	75.49333	241.38917
12/10/21 2:59:53.377	2178.000	33.86727	78.19848	238.68402
12/10/21 3:09:53.377	2188.000	32.39071	74.78913	242.09337
12/10/21 3:19:53.377	2198.000	32.44747	74.9202	241.9623
12/10/21 3:29:53.377	2208.000	33.4842	77.31397	239.56853
12/10/21 3:39:53.377	2218.000	32.72186	75.55377	241.32873
12/10/21 3:49:53.377	2228.000	32.97264	76.1328	240.7497
12/10/21 3:59:53.377	2238.000	34.08872	78.70979	238.17271
12/10/21 4:09:53.377	2248.000	33.17176	76.59256	240.28994
12/10/21 4:19:53.377	2258.000	34.00465	78.51568	238.36682
12/10/21 4:29:53.377	2268.000	32.96395	76.11275	240.76975
12/10/21 4:39:53.377	2278.000	32.57642	75.21795	241.66455
12/10/21 4:49:53.377	2288.000	33.19971	76.6571	240.2254
12/10/21 4:59:53.377	2298.000	32.53006	75.11091	241.77159
12/10/21 5:09:53.377	2308.000	32.93781	76.05238	240.83012

12/10/21 5:19:53.377	2318.000	33.00808	76.21462	240.66788
12/10/21 5:29:53.377	2328.000	33.25648	76.78819	240.09431
12/10/21 5:39:53.377	2338.000	33.66239	77.72542	239.15708
12/10/21 5:49:53.377	2348.000	33.4374	77.20592	239.67658
12/10/21 5:59:53.377	2358.000	33.17086	76.59048	240.29202
12/10/21 6:09:53.377	2368.000	31.98367	73.8493	243.0332
12/10/21 6:19:53.377	2378.000	33.50073	77.35216	239.53034
12/10/21 6:29:53.377	2388.000	33.13663	76.51147	240.37103
12/10/21 6:39:53.377	2398.000	33.52126	77.39954	239.48296
12/10/21 6:49:53.377	2408.000	33.6665	77.73492	239.14758
12/10/21 6:59:53.377	2418.000	33.98463	78.46946	238.41304
12/10/21 7:09:53.377	2428.000	32.28883	74.55392	242.32858
12/10/21 7:19:53.377	2438.000	31.86525	73.57588	243.30662
12/10/21 7:29:53.377	2448.000	32.30806	74.5983	242.2842
12/10/21 7:39:53.377	2458.000	33.68726	77.78283	239.09967
12/10/21 7:49:53.377	2468.000	33.26328	76.80387	240.07863
12/10/21 7:59:53.377	2478.000	32.9722	76.13178	240.75072
12/10/21 8:09:53.377	2488.000	33.81527	78.0784	238.8041
12/10/21 8:19:53.377	2498.000	32.26437	74.49742	242.38508
12/10/21 8:29:53.377	2508.000	33.25643	76.78807	240.09443
12/10/21 8:39:53.377	2518.000	32.7029	75.50999	241.37251
12/10/21 8:49:53.377	2528.000	32.57521	75.21514	241.66736
12/10/21 8:59:53.377	2538.000	32.32521	74.63791	242.24459
12/10/21 9:09:53.377	2548.000	33.12207	76.47784	240.40466
12/10/21 9:19:53.377	2558.000	34.04815	78.61613	238.26637
12/10/21 9:29:53.377	2568.000	31.88351	73.61804	243.26446
12/10/21 9:39:53.377	2578.000	31.39931	72.50003	244.38247
12/10/21 9:49:53.377	2588.000	31.39071	72.48016	244.40234
12/10/21 9:59:53.377	2598.000	31.82773	73.48924	243.39326
12/10/21 10:09:53.377	2608.000	30.63832	70.74292	246.13958
12/10/21 10:19:53.377	2618.000	30.44876	70.30524	246.57726
12/10/21 10:29:53.377	2628.000	30.202	69.73547	247.14703
12/10/21 10:39:53.377	2638.000	29.73963	68.66788	248.21462
12/10/21 10:49:53.377	2648.000	30.70631	70.89993	245.98257
12/10/21 10:59:53.377	2658.000	29.78957	68.78319	248.09931
12/10/21 11:09:53.377	2668.000	30.27485	69.90369	246.97881
12/10/21 11:19:53.377	2678.000	30.81681	71.15506	245.72744
12/10/21 11:29:53.377	2688.000	29.58229	68.30458	248.57792
12/10/21 11:39:53.377	2698.000	30.28703	69.93182	246.95068
12/10/21 11:49:53.377	2708.000	29.28814	67.6254	249.2571
12/10/21 11:59:53.377	2718.000	30.02962	69.33746	247.54504
12/10/21 12:09:53.377	2728.000	32.00719	73.90362	242.97888
12/10/21 12:19:53.377	2738.000	30.37939	70.14507	246.73743
12/10/21 12:29:53.377	2748.000	30.03826	69.35741	247.52509
12/10/21 12:39:53.377	2758.000	29.49964	68.11376	248.76874
12/10/21 12:49:53.377	2768.000	30.1644	69.64867	247.23383
12/10/21 12:59:53.377	2778.000	31.02683	71.63998	245.24252
12/10/21 13:09:53.377	2788.000	30.54605	70.52988	246.35262
12/10/21 13:19:53.377	2798.000	29.9369	69.12338	247.75912

12/10/21 13:29:53.377	2808.000	31.18924	72.01498	244.86752
12/10/21 13:39:53.377	2818.000	29.52661	68.17603	248.70647
12/10/21 13:49:53.377	2828.000	31.17259	71.97654	244.90596
12/10/21 13:59:53.377	2838.000	30.03965	69.36061	247.52189
12/10/21 14:09:53.377	2848.000	30.40767	70.21036	246.67214
12/10/21 14:19:53.377	2858.000	29.66529	68.49625	248.38625
12/10/21 14:29:53.377	2868.000	30.3265	70.02294	246.85956
12/10/21 14:39:53.377	2878.000	29.7858	68.77448	248.10802
12/10/21 14:49:53.377	2888.000	31.01534	71.61345	245.26905
12/10/21 14:59:53.377	2898.000	29.60158	68.34913	248.53337
12/10/21 15:09:53.377	2908.000	30.37488	70.13466	246.74784
12/10/21 15:19:53.377	2918.000	29.5242	68.17047	248.71203
12/10/21 15:29:53.377	2928.000	30.05242	69.39011	247.49239
12/10/21 15:39:53.377	2938.000	30.64713	70.76328	246.11922
12/10/21 15:49:53.377	2948.000	30.04215	69.3664	247.5161
12/10/21 15:59:53.377	2958.000	30.4723	70.3596	246.5229
12/10/21 16:09:53.377	2968.000	30.6428	70.75327	246.12923
12/10/21 16:19:53.377	2978.000	31.37254	72.43823	244.44427
12/10/21 16:29:53.377	2988.000	30.42622	70.2532	246.6293
12/10/21 16:39:53.377	2998.000	29.53456	68.19439	248.68811
12/10/21 16:49:53.377	3008.000	30.57991	70.60806	246.27444
12/10/21 16:59:53.377	3018.000	30.42041	70.23977	246.64273
12/10/21 17:09:53.377	3028.000	30.90955	71.36919	245.51331
12/10/21 17:19:53.377	3038.000	30.75325	71.00831	245.87419
12/10/21 17:29:53.377	3048.000	29.58704	68.31557	248.56693
12/10/21 17:39:53.377	3058.000	30.96813	71.50445	245.37805
12/10/21 17:49:53.377	3068.000	29.31115	67.67854	249.20396
12/10/21 17:59:53.377	3078.000	30.43893	70.28255	246.59995
12/10/21 18:09:53.377	3088.000	29.54978	68.22953	248.65297
12/10/21 18:19:53.377	3098.000	30.33588	70.04461	246.83789
12/10/21 18:29:53.377	3108.000	30.96762	71.50327	245.37923
12/10/21 18:39:53.377	3118.000	29.45273	68.00545	248.87705
12/10/21 18:49:53.377	3128.000	31.04485	71.6816	245.2009
12/10/21 18:59:53.377	3138.000	30.58546	70.62087	246.26163
12/10/21 19:09:53.377	3148.000	29.49968	68.11385	248.76865
12/10/21 19:19:53.377	3158.000	29.45217	68.00415	248.87835
12/10/21 19:29:53.377	3168.000	29.74067	68.67028	248.21222
12/10/21 19:39:53.377	3178.000	30.05886	69.40497	247.47753
12/10/21 19:49:53.377	3188.000	29.79306	68.79125	248.09125
12/10/21 19:59:53.377	3198.000	29.35345	67.77622	249.10628
12/10/21 20:09:53.377	3208.000	29.53586	68.19739	248.68511
12/10/21 20:19:53.377	3218.000	30.66273	70.7993	246.0832
12/10/21 20:29:53.377	3228.000	29.25567	67.55045	249.33205
12/10/21 20:39:53.377	3238.000	30.76597	71.03767	245.84483
12/10/21 20:49:53.377	3248.000	29.6119	68.37297	248.50953
12/10/21 20:59:53.377	3258.000	28.92696	66.79144	250.09106
12/10/21 21:09:53.377	3268.000	29.61118	68.3713	248.5112
12/10/21 21:19:53.377	3278.000	29.60596	68.35925	248.52325
12/10/21 21:29:53.377	3288.000	30.48037	70.37823	246.50427

12/10/21 21:39:53.377	3298.000	30.92162	71.39706	245.48544
12/10/21 21:49:53.377	3308.000	32.78645	75.7029	241.1796
12/10/21 21:59:53.377	3318.000	31.23537	72.1215	244.761
12/10/21 22:09:53.377	3328.000	30.37527	70.13556	246.74694
12/10/21 22:19:53.377	3338.000	30.18127	69.68761	247.19489
12/10/21 22:29:53.377	3348.000	28.72367	66.32205	250.56045
12/10/21 22:39:53.377	3358.000	30.43773	70.27976	246.60274
12/10/21 22:49:53.377	3368.000	30.75107	71.00327	245.87923
12/10/21 22:59:53.377	3378.000	30.53845	70.51234	246.37016
12/10/21 23:09:53.377	3388.000	30.53433	70.50283	246.37967
12/10/21 23:19:53.377	3398.000	29.79535	68.79655	248.08595
12/10/21 23:29:53.377	3408.000	29.10202	67.19567	249.68683
12/10/21 23:39:53.377	3418.000	31.3766	72.4476	244.4349
12/10/21 23:49:53.377	3428.000	29.89515	69.02697	247.85553
12/10/21 23:59:53.377	3438.000	29.7715	68.74147	248.14103
12/11/21 0:09:53.377	3448.000	30.40939	70.21433	246.66817
12/11/21 0:19:53.377	3458.000	29.82217	68.85847	248.02403
12/11/21 0:29:53.377	3468.000	29.02393	67.01535	249.86715
12/11/21 0:39:53.377	3478.000	31.01828	71.62024	245.26226
12/11/21 0:49:53.377	3488.000	30.303	69.96868	246.91382
12/11/21 0:59:53.377	3498.000	31.57994	72.91711	243.96539
12/11/21 1:09:53.377	3508.000	29.22289	67.47475	249.40775
12/11/21 1:19:53.377	3518.000	30.24033	69.82398	247.05852
12/11/21 1:29:53.377	3528.000	31.24695	72.14824	244.73426
12/11/21 1:39:53.377	3538.000	29.27813	67.60229	249.28021
12/11/21 1:49:53.377	3548.000	31.51561	72.76855	244.11395
12/11/21 1:59:53.377	3558.000	29.95699	69.16975	247.71275
12/11/21 2:09:53.377	3568.000	29.79709	68.80056	248.08194
12/11/21 2:19:53.377	3578.000	30.75254	71.00667	245.87583
12/11/21 2:29:53.377	3588.000	30.91042	71.37119	245.51131
12/11/21 2:39:53.377	3598.000	29.79683	68.79996	248.08254
12/11/21 2:49:53.377	3608.000	30.7048	70.89642	245.98608
12/11/21 2:59:53.377	3618.000	30.46075	70.33292	246.54958
12/11/21 3:09:53.377	3628.000	30.10029	69.50064	247.38186
12/11/21 3:19:53.377	3638.000	29.79365	68.79262	248.08988
12/11/21 3:29:53.377	3648.000	29.48102	68.07077	248.81173
12/11/21 3:39:53.377	3658.000	29.88765	69.00966	247.87284
12/11/21 3:49:53.377	3668.000	29.66274	68.49036	248.39214
12/11/21 3:59:53.377	3678.000	30.56119	70.56484	246.31766
12/11/21 4:09:53.377	3688.000	31.00667	71.59344	245.28906
12/11/21 4:19:53.377	3698.000	29.75816	68.71068	248.17182
12/11/21 4:29:53.377	3708.000	29.8204	68.85439	248.02811
12/11/21 4:39:53.377	3718.000	31.17381	71.97935	244.90315
12/11/21 4:49:53.377	3728.000	29.88977	69.01456	247.86794
12/11/21 4:59:53.377	3738.000	29.38132	67.84057	249.04193
12/11/21 5:09:53.377	3748.000	29.68726	68.54696	248.33554
12/11/21 5:19:53.377	3758.000	30.08093	69.45593	247.42657
12/11/21 5:29:53.377	3768.000	30.15966	69.63771	247.24479
12/11/21 5:39:53.377	3778.000	29.89566	69.02815	247.85435

12/11/21 5:49:53.377	3788.000	29.70849	68.59599	248.28651
12/11/21 5:59:53.377	3798.000	29.63419	68.42442	248.45808
12/11/21 6:09:53.377	3808.000	30.46719	70.3478	246.5347
12/11/21 6:19:53.377	3818.000	29.29902	67.65054	249.23196
12/11/21 6:29:53.377	3828.000	29.73135	68.64877	248.23373
12/11/21 6:39:53.377	3838.000	28.92541	66.78787	250.09463
12/11/21 6:49:53.377	3848.000	29.91306	69.06834	247.81416
12/11/21 6:59:53.377	3858.000	29.62371	68.40022	248.48228
12/11/21 7:09:53.377	3868.000	29.55101	68.23238	248.65012
12/11/21 7:19:53.377	3878.000	30.73961	70.97681	245.90569
12/11/21 7:29:53.377	3888.000	30.23108	69.80263	247.07987
12/11/21 7:39:53.377	3898.000	31.12918	71.87633	245.00617
12/11/21 7:49:53.377	3908.000	30.1512	69.61819	247.26431
12/11/21 7:59:53.377	3918.000	29.81356	68.83858	248.04392
12/11/21 8:09:53.377	3928.000	29.2688	67.58076	249.30174
12/11/21 8:19:53.377	3938.000	30.5874	70.62535	246.25715
12/11/21 8:29:53.377	3948.000	30.39669	70.18503	246.69747
12/11/21 8:39:53.377	3958.000	30.42316	70.24612	246.63638
12/11/21 8:49:53.377	3968.000	29.79288	68.79083	248.09167
12/11/21 8:59:53.377	3978.000	29.23487	67.50242	249.38008
12/11/21 9:09:53.377	3988.000	29.80999	68.83035	248.05215
12/11/21 9:19:53.377	3998.000	29.80753	68.82465	248.05785
12/11/21 9:29:53.377	4008.000	30.27809	69.91117	246.97133
12/11/21 9:39:53.377	4018.000	28.83502	66.57915	250.30335
12/11/21 9:49:53.377	4028.000	31.24481	72.1433	244.7392
12/11/21 9:59:53.377	4038.000	30.07999	69.45376	247.42874
12/11/21 10:09:53.377	4048.000	30.17074	69.6633	247.2192
12/11/21 10:19:53.377	4058.000	29.93668	69.12288	247.75962
12/11/21 10:29:53.377	4068.000	30.31152	69.98835	246.89415
12/11/21 10:39:53.377	4078.000	30.91491	71.38158	245.50092
12/11/21 10:49:53.377	4088.000	30.9422	71.44458	245.43792
12/11/21 10:59:53.377	4098.000	29.75541	68.70431	248.17819
12/11/21 11:09:53.377	4108.000	29.14684	67.29914	249.58336
12/11/21 11:19:53.377	4118.000	29.84138	68.90282	247.97968

Log Notes

2021-12-08 14:41:53.317 Started

Totalizer Start:	939,800	
Totalizer End:	5,800,700	
Average Flow Rate:	1,180.40	gpm

Location Properties

Location Name = Kaski Madison Well No. 2

Location ID = c8e5a385-5ec3-445a-b16f-028cd6320cf1

Report Properties

Start Time = 2021-12-11 11:23:35.175

Duration = 1.04:18:00

Readings = 307

Time Offset = -07:00:00

Instrument Properties

Device Model = Level TROLL 700

Device SN = 813078

Device Firmware = 3.06

Log Properties

Log Name = Kaski well no. Recovery

Log Type = Logarithmic

Log File Number = 2

Log ID = e7f92959-a33a-5fbd-af7a-e1464f02757e

Interval = 00:10:00

Date Time	Time Since Flow Stopped t'	Total Time (min) t	t/t'	Residual Drawdown (feet)	Pressure (psi)
12/11/21 11:23:35.175	0.000	4121.697		238.627	33.89
12/11/21 11:23:35.426	0.004	4121.701	985267.127	228.945	38.09
12/11/21 11:23:35.676	0.008	4121.705	493617.363	230.797	37.28
12/11/21 11:23:35.926	0.013	4121.709	329297.668	225.325	39.65
12/11/21 11:23:36.176	0.017	4121.713	247055.743	218.451	42.63
12/11/21 11:23:36.426	0.021	4121.717	197684.292	222.541	40.86
12/11/21 11:23:36.676	0.025	4121.722	164759.027	208.991	46.73
12/11/21 11:23:36.926	0.029	4121.726	141235.608	211.263	45.74
12/11/21 11:23:37.176	0.033	4121.730	123590.104	206.700	47.72
12/11/21 11:23:37.426	0.038	4121.734	109864.082	203.580	49.07
12/11/21 11:23:37.676	0.042	4121.738	98882.167	198.059	51.46
12/11/21 11:23:37.926	0.046	4121.742	89896.237	196.311	52.22
12/11/21 11:23:38.176	0.050	4121.747	82407.464	192.873	53.71
12/11/21 11:23:38.426	0.054	4121.751	76070.455	190.080	54.92
12/11/21 11:23:38.676	0.058	4121.755	70638.474	190.646	54.67
12/11/21 11:23:38.926	0.063	4121.759	65930.565	185.749	56.79
12/11/21 11:23:39.176	0.067	4121.763	61810.997	186.610	56.42
12/11/21 11:23:39.426	0.071	4121.767	58175.970	180.092	59.24
12/11/21 11:23:39.676	0.075	4121.772	54944.745	183.368	57.82
12/11/21 11:23:39.926	0.079	4121.776	52053.578	174.684	61.59
12/11/21 11:23:40.176	0.083	4121.780	49451.470	177.441	60.39
12/11/21 11:23:40.426	0.088	4121.784	47097.134	169.652	63.76
12/11/21 11:23:40.676	0.092	4121.788	44956.789	169.668	63.76
12/11/21 11:23:40.926	0.096	4121.792	43002.530	165.732	65.46
12/11/21 11:23:41.176	0.100	4121.797	41211.098	168.548	64.24

12/11/21 11:23:41.536	0.106	4121.803	38878.818	162.579	66.83
12/11/21 11:23:41.895	0.112	4121.809	36801.863	164.706	65.91
12/11/21 11:23:42.315	0.119	4121.816	34637.106	159.081	68.34
12/11/21 11:23:42.735	0.126	4121.823	32712.878	150.562	72.03
12/11/21 11:23:43.155	0.133	4121.830	30991.200	150.766	71.94
12/11/21 11:23:43.635	0.141	4121.838	29232.891	153.393	70.81
12/11/21 11:23:44.175	0.150	4121.847	27478.978	137.451	77.71
12/11/21 11:23:44.655	0.158	4121.855	26087.688	124.795	83.19
12/11/21 11:23:45.255	0.168	4121.865	24534.909	115.518	87.21
12/11/21 11:23:45.855	0.178	4121.875	23156.599	131.070	80.47
12/11/21 11:23:46.455	0.188	4121.885	21924.918	141.830	75.81
12/11/21 11:23:47.115	0.199	4121.896	20713.043	141.408	76.00
12/11/21 11:23:47.835	0.211	4121.908	19535.107	142.827	75.38
12/11/21 11:23:48.615	0.224	4121.921	18401.431	144.575	74.63
12/11/21 11:23:49.395	0.237	4121.934	17392.125	138.611	77.21
12/11/21 11:23:50.236	0.251	4121.948	16421.012	146.951	73.60
12/11/21 11:23:51.135	0.266	4121.963	15496.100	136.822	77.98
12/11/21 11:23:52.095	0.282	4121.979	14616.946	140.323	76.47
12/11/21 11:23:53.055	0.298	4121.995	13832.197	139.050	77.02
12/11/21 11:23:54.135	0.316	4122.013	13044.344	140.837	76.24
12/11/21 11:23:55.276	0.335	4122.032	12303.960	140.056	76.58
12/11/21 11:23:56.476	0.355	4122.052	11610.868	136.026	78.33
12/11/21 11:23:57.736	0.376	4122.073	10962.473	137.974	77.48
12/11/21 11:23:59.055	0.398	4122.095	10357.022	141.569	75.93
12/11/21 11:24:00.496	0.422	4122.119	9767.668	146.230	73.91
12/11/21 11:24:01.996	0.447	4122.144	9221.454	143.624	75.04
12/11/21 11:24:03.555	0.473	4122.170	8714.946	147.881	73.19
12/11/21 11:24:05.236	0.501	4122.198	8227.666	137.280	77.78
12/11/21 11:24:07.035	0.531	4122.228	7763.141	144.705	74.57
12/11/21 11:24:08.895	0.562	4122.259	7334.980	141.510	75.95
12/11/21 11:24:10.936	0.596	4122.293	6916.405	138.615	77.21
12/11/21 11:24:13.035	0.631	4122.328	6533.007	143.042	75.29
12/11/21 11:24:15.255	0.668	4122.365	6171.205	141.311	76.04
12/11/21 11:24:17.656	0.708	4122.405	5822.468	139.039	77.02
12/11/21 11:24:20.175	0.750	4122.447	5496.596	137.962	77.49
12/11/21 11:24:22.815	0.794	4122.491	5192.054	137.873	77.53
12/11/21 11:24:25.635	0.841	4122.538	4901.947	137.430	77.72
12/11/21 11:24:28.635	0.891	4122.588	4626.922	137.310	77.77
12/11/21 11:24:31.815	0.944	4122.641	4367.204	136.881	77.96
12/11/21 11:24:35.175	1.000	4122.697	4122.697	136.149	78.27
12/11/21 11:24:38.775	1.060	4122.757	3889.393	135.381	78.61
12/11/21 11:24:42.375	1.120	4122.817	3681.086	134.747	78.88
12/11/21 11:24:46.575	1.190	4122.887	3464.611	134.237	79.10
12/11/21 11:24:50.775	1.260	4122.957	3272.188	133.442	79.45
12/11/21 11:24:54.975	1.330	4123.027	3100.020	132.880	79.69
12/11/21 11:24:59.775	1.410	4123.107	2924.189	132.229	79.97
12/11/21 11:25:05.175	1.500	4123.197	2748.798	131.486	80.29
12/11/21 11:25:09.975	1.580	4123.277	2609.669	130.793	80.59
12/11/21 11:25:15.975	1.680	4123.377	2454.391	130.112	80.89

12/11/21 11:25:21.975	1.780	4123.477	2316.560	129.467	81.17
12/11/21 11:25:27.975	1.880	4123.577	2193.392	128.788	81.46
12/11/21 11:25:34.575	1.990	4123.687	2072.204	128.091	81.76
12/11/21 11:25:41.775	2.110	4123.807	1954.411	127.405	82.06
12/11/21 11:25:49.575	2.240	4123.937	1841.043	126.666	82.38
12/11/21 11:25:57.375	2.370	4124.067	1740.113	126.060	82.64
12/11/21 11:26:05.775	2.510	4124.207	1643.110	125.189	83.02
12/11/21 11:26:14.775	2.660	4124.357	1550.510	124.447	83.34
12/11/21 11:26:24.375	2.820	4124.517	1462.595	123.782	83.63
12/11/21 11:26:33.975	2.980	4124.677	1384.120	122.878	84.02
12/11/21 11:26:44.775	3.160	4124.857	1305.334	123.578	83.72
12/11/21 11:26:56.175	3.350	4125.047	1231.357	121.868	84.46
12/11/21 11:27:08.175	3.550	4125.247	1162.041	120.473	85.06
12/11/21 11:27:20.775	3.760	4125.457	1097.196	119.743	85.38
12/11/21 11:27:33.975	3.980	4125.677	1036.602	118.812	85.78
12/11/21 11:27:48.375	4.220	4125.917	977.705	117.960	86.15
12/11/21 11:28:03.375	4.470	4126.167	923.080	117.208	86.48
12/11/21 11:28:18.975	4.730	4126.427	872.395	116.368	86.84
12/11/21 11:28:35.775	5.010	4126.707	823.694	115.372	87.27
12/11/21 11:28:53.775	5.310	4127.007	777.214	114.623	87.60
12/11/21 11:29:12.375	5.620	4127.317	734.398	113.703	88.00
12/11/21 11:29:32.775	5.960	4127.657	692.560	112.775	88.40
12/11/21 11:29:53.775	6.310	4128.007	654.201	111.833	88.81
12/11/21 11:30:15.975	6.680	4128.377	618.020	110.888	89.21
12/11/21 11:30:39.975	7.080	4128.777	583.161	109.936	89.63
12/11/21 11:31:05.175	7.500	4129.197	550.560	108.965	90.05
12/11/21 11:31:31.575	7.940	4129.637	520.105	107.937	90.49
12/11/21 11:31:59.775	9.410	4131.107	439.012	107.103	90.85
12/11/21 11:32:29.775	8.910	4130.607	463.592	106.103	91.29
12/11/21 11:33:01.575	9.440	4131.137	437.620	105.138	91.71
12/11/21 11:33:35.175	10.000	4131.697	413.170	104.142	92.14
12/11/21 11:34:11.175	10.600	4132.297	389.839	103.108	92.58
12/11/21 11:34:47.175	11.200	4132.897	369.009	101.561	93.25
12/11/21 11:35:29.175	11.900	4133.597	347.361	97.824	94.87
12/11/21 11:36:11.175	12.600	4134.297	328.119	98.383	94.63
12/11/21 11:36:53.175	13.300	4134.997	310.902	97.934	94.83
12/11/21 11:37:41.175	14.100	4135.797	293.319	96.752	95.34
12/11/21 11:38:35.175	15.000	4136.697	275.780	95.467	95.89
12/11/21 11:39:23.175	15.800	4137.497	261.867	94.475	96.32
12/11/21 11:40:23.175	16.800	4138.497	246.339	93.391	96.79
12/11/21 11:41:23.175	17.800	4139.497	232.556	92.192	97.31
12/11/21 11:42:23.175	18.800	4140.497	220.239	91.144	97.77
12/11/21 11:43:29.175	19.900	4141.597	208.120	90.020	98.25
12/11/21 11:44:41.175	21.100	4142.797	196.341	88.851	98.76
12/11/21 11:45:59.175	22.400	4144.097	185.004	87.690	99.26
12/11/21 11:47:17.175	23.700	4145.397	174.911	86.522	99.77
12/11/21 11:48:41.175	25.100	4146.797	165.211	85.262	100.31
12/11/21 11:50:11.175	26.600	4148.297	155.951	84.212	100.77
12/11/21 11:51:47.175	28.200	4149.897	147.159	82.986	101.30

12/11/21 11:53:23.175	29.800	4151.497	139.312	81.871	101.78
12/11/21 11:55:11.175	31.600	4153.297	131.433	80.601	102.33
12/11/21 11:57:05.175	33.500	4155.197	124.036	79.422	102.84
12/11/21 11:59:05.175	35.500	4157.197	117.104	78.251	103.35
12/11/21 12:01:11.175	37.600	4159.297	110.620	77.067	103.86
12/11/21 12:03:23.175	39.800	4161.497	104.560	75.897	104.37
12/11/21 12:05:47.175	42.200	4163.897	98.671	74.577	104.94
12/11/21 12:08:17.175	44.700	4166.397	93.208	73.426	105.44
12/11/21 12:10:53.175	47.300	4168.997	88.139	72.140	106.00
12/11/21 12:13:41.175	50.100	4171.797	83.269	70.950	106.51
12/11/21 12:16:41.175	53.100	4174.797	78.621	69.794	107.01
12/11/21 12:19:47.175	56.200	4177.897	74.340	68.479	107.58
12/11/21 12:23:11.175	59.600	4181.297	70.156	67.260	108.11
12/11/21 12:26:41.175	63.100	4184.797	66.320	66.005	108.65
12/11/21 12:30:23.175	66.800	4188.497	62.702	64.737	109.20
12/11/21 12:34:23.175	70.800	4192.497	59.216	63.392	109.79
12/11/21 12:38:35.175	75.000	4196.697	55.956	62.072	110.36
12/11/21 12:42:59.175	79.400	4201.097	52.911	60.892	110.87
12/11/21 12:47:41.175	84.100	4205.797	50.009	59.646	111.41
12/11/21 12:52:41.175	89.100	4210.797	47.259	58.217	112.03
12/11/21 12:57:59.175	94.400	4216.097	44.662	56.977	112.56
12/11/21 13:03:35.175	100.000	4221.697	42.217	55.669	113.13
12/11/21 13:09:35.175	106.000	4227.697	39.884	54.334	113.71
12/11/21 13:15:35.175	112.000	4233.697	37.801	53.051	114.26
12/11/21 13:22:35.175	119.000	4240.697	35.636	51.689	114.85
12/11/21 13:29:35.175	126.000	4247.697	33.712	50.442	115.39
12/11/21 13:36:35.175	133.000	4254.697	31.990	49.039	116.00
12/11/21 13:44:35.175	141.000	4262.697	30.232	47.726	116.57
12/11/21 13:53:35.175	150.000	4271.697	28.478	46.318	117.18
12/11/21 14:01:35.175	158.000	4279.697	27.087	45.126	117.70
12/11/21 14:11:35.175	168.000	4289.697	25.534	43.674	118.33
12/11/21 14:21:35.175	178.000	4299.697	24.156	42.387	118.88
12/11/21 14:31:35.175	188.000	4309.697	22.924	41.161	119.41
12/11/21 14:41:35.175	198.000	4319.697	21.817	39.949	119.94
12/11/21 14:51:35.175	208.000	4329.697	20.816	38.819	120.43
12/11/21 15:01:35.175	218.000	4339.697	19.907	37.768	120.88
12/11/21 15:11:35.175	228.000	4349.697	19.078	36.735	121.33
12/11/21 15:21:35.175	238.000	4359.697	18.318	35.743	121.76
12/11/21 15:31:35.175	248.000	4369.697	17.620	34.849	122.15
12/11/21 15:41:35.175	258.000	4379.697	16.976	33.986	122.52
12/11/21 15:51:35.175	268.000	4389.697	16.379	33.127	122.89
12/11/21 16:01:35.175	278.000	4399.697	15.826	32.399	123.21
12/11/21 16:11:35.175	288.000	4409.697	15.311	31.650	123.53
12/11/21 16:21:35.175	298.000	4419.697	14.831	30.894	123.86
12/11/21 16:31:35.175	308.000	4429.697	14.382	30.160	124.18
12/11/21 16:41:35.175	318.000	4439.697	13.961	29.515	124.46
12/11/21 16:51:35.175	328.000	4449.697	13.566	28.880	124.73
12/11/21 17:01:35.175	338.000	4459.697	13.194	28.174	125.04
12/11/21 17:11:35.175	348.000	4469.697	12.844	27.643	125.27

12/11/21 17:21:35.175	358.000	4479.697	12.513	27.077	125.51
12/11/21 17:31:35.175	368.000	4489.697	12.200	26.568	125.73
12/11/21 17:41:35.175	378.000	4499.697	11.904	26.024	125.97
12/11/21 17:51:35.175	388.000	4509.697	11.623	25.520	126.19
12/11/21 18:01:35.175	398.000	4519.697	11.356	24.964	126.43
12/11/21 18:11:35.175	408.000	4529.697	11.102	24.540	126.61
12/11/21 18:21:35.175	418.000	4539.697	10.861	24.003	126.84
12/11/21 18:31:35.175	428.000	4549.697	10.630	23.602	127.02
12/11/21 18:41:35.175	438.000	4559.697	10.410	23.189	127.20
12/11/21 18:51:35.175	448.000	4569.697	10.200	22.808	127.36
12/11/21 19:01:35.175	458.000	4579.697	9.999	22.389	127.54
12/11/21 19:11:35.175	468.000	4589.697	9.807	22.002	127.71
12/11/21 19:21:35.175	478.000	4599.697	9.623	21.544	127.91
12/11/21 19:31:35.175	488.000	4609.697	9.446	21.172	128.07
12/11/21 19:41:35.175	498.000	4619.697	9.276	20.812	128.23
12/11/21 19:51:35.175	508.000	4629.697	9.114	20.472	128.37
12/11/21 20:01:35.175	518.000	4639.697	8.957	20.067	128.55
12/11/21 20:11:35.175	528.000	4649.697	8.806	19.842	128.65
12/11/21 20:21:35.175	538.000	4659.697	8.661	19.481	128.80
12/11/21 20:31:35.175	548.000	4669.697	8.521	19.093	128.97
12/11/21 20:41:35.175	558.000	4679.697	8.387	18.780	129.11
12/11/21 20:51:35.175	568.000	4689.697	8.257	18.548	129.21
12/11/21 21:01:35.175	578.000	4699.697	8.131	18.187	129.36
12/11/21 21:11:35.175	588.000	4709.697	8.010	17.969	129.46
12/11/21 21:21:35.175	598.000	4719.697	7.892	17.621	129.61
12/11/21 21:31:35.175	608.000	4729.697	7.779	17.420	129.70
12/11/21 21:41:35.175	618.000	4739.697	7.669	17.115	129.83
12/11/21 21:51:35.175	628.000	4749.697	7.563	16.813	129.96
12/11/21 22:01:35.175	638.000	4759.697	7.460	16.650	130.03
12/11/21 22:11:35.175	648.000	4769.697	7.361	16.408	130.13
12/11/21 22:21:35.175	658.000	4779.697	7.264	16.117	130.26
12/11/21 22:31:35.175	668.000	4789.697	7.170	15.870	130.37
12/11/21 22:41:35.175	678.000	4799.697	7.079	15.723	130.43
12/11/21 22:51:35.175	688.000	4809.697	6.991	15.535	130.51
12/11/21 23:01:35.175	698.000	4819.697	6.905	15.262	130.63
12/11/21 23:11:35.175	708.000	4829.697	6.822	15.059	130.72
12/11/21 23:21:35.175	718.000	4839.697	6.741	14.810	130.83
12/11/21 23:31:35.175	728.000	4849.697	6.662	14.564	130.93
12/11/21 23:41:35.175	738.000	4859.697	6.585	14.454	130.98
12/11/21 23:51:35.175	748.000	4869.697	6.510	14.209	131.09
12/12/21 0:01:35.175	758.000	4879.697	6.438	14.061	131.15
12/12/21 0:11:35.175	768.000	4889.697	6.367	13.808	131.26
12/12/21 0:21:35.175	778.000	4899.697	6.298	13.643	131.33
12/12/21 0:31:35.175	788.000	4909.697	6.231	13.445	131.42
12/12/21 0:41:35.175	798.000	4919.697	6.165	13.338	131.46
12/12/21 0:51:35.175	808.000	4929.697	6.101	13.236	131.51
12/12/21 1:01:35.175	818.000	4939.697	6.039	13.002	131.61
12/12/21 1:11:35.175	828.000	4949.697	5.978	12.937	131.64
12/12/21 1:21:35.175	838.000	4959.697	5.918	12.724	131.73

12/12/21 1:31:35.175	848.000	4969.697	5.860	12.572	131.80
12/12/21 1:41:35.175	858.000	4979.697	5.804	12.393	131.87
12/12/21 1:51:35.175	868.000	4989.697	5.748	12.321	131.90
12/12/21 2:01:35.175	878.000	4999.697	5.694	12.099	132.00
12/12/21 2:11:35.175	888.000	5009.697	5.642	11.892	132.09
12/12/21 2:21:35.175	898.000	5019.697	5.590	11.803	132.13
12/12/21 2:31:35.175	908.000	5029.697	5.539	11.663	132.19
12/12/21 2:41:35.175	918.000	5039.697	5.490	11.547	132.24
12/12/21 2:51:35.175	928.000	5049.697	5.441	11.416	132.30
12/12/21 3:01:35.175	938.000	5059.697	5.394	11.311	132.34
12/12/21 3:11:35.175	948.000	5069.697	5.348	11.175	132.40
12/12/21 3:21:35.175	958.000	5079.697	5.302	11.060	132.45
12/12/21 3:31:35.175	968.000	5089.697	5.258	10.960	132.49
12/12/21 3:41:35.175	978.000	5099.697	5.214	10.760	132.58
12/12/21 3:51:35.175	988.000	5109.697	5.172	10.712	132.60
12/12/21 4:01:35.175	998.000	5119.697	5.130	10.625	132.64
12/12/21 4:11:35.175	1008.000	5129.697	5.089	10.553	132.67
12/12/21 4:21:35.175	1018.000	5139.697	5.049	10.330	132.77
12/12/21 4:31:35.175	1028.000	5149.697	5.009	10.290	132.78
12/12/21 4:41:35.175	1038.000	5159.697	4.971	10.116	132.86
12/12/21 4:51:35.175	1048.000	5169.697	4.933	10.057	132.88
12/12/21 5:01:35.175	1058.000	5179.697	4.896	9.919	132.94
12/12/21 5:11:35.175	1068.000	5189.697	4.859	9.862	132.97
12/12/21 5:21:35.175	1078.000	5199.697	4.823	9.693	133.04
12/12/21 5:31:35.175	1088.000	5209.697	4.788	9.646	133.06
12/12/21 5:41:35.175	1098.000	5219.697	4.754	9.512	133.12
12/12/21 5:51:35.175	1108.000	5229.697	4.720	9.472	133.14
12/12/21 6:01:35.175	1118.000	5239.697	4.687	9.370	133.18
12/12/21 6:11:35.175	1128.000	5249.697	4.654	9.191	133.26
12/12/21 6:21:35.175	1138.000	5259.697	4.622	9.205	133.25
12/12/21 6:31:35.175	1148.000	5269.697	4.590	9.093	133.30
12/12/21 6:41:35.175	1158.000	5279.697	4.559	9.040	133.32
12/12/21 6:51:35.175	1168.000	5289.697	4.529	8.949	133.36
12/12/21 7:01:35.175	1178.000	5299.697	4.499	8.889	133.39
12/12/21 7:11:35.175	1188.000	5309.697	4.469	8.737	133.46
12/12/21 7:21:35.175	1198.000	5319.697	4.440	8.573	133.53
12/12/21 7:31:35.175	1208.000	5329.697	4.412	8.599	133.52
12/12/21 7:41:35.175	1218.000	5339.697	4.384	8.569	133.53
12/12/21 7:51:35.175	1228.000	5349.697	4.356	8.411	133.60
12/12/21 8:01:35.175	1238.000	5359.697	4.329	8.304	133.64
12/12/21 8:11:35.175	1248.000	5369.697	4.303	8.288	133.65
12/12/21 8:21:35.175	1258.000	5379.697	4.276	8.193	133.69
12/12/21 8:31:35.175	1268.000	5389.697	4.251	8.140	133.71
12/12/21 8:41:35.175	1278.000	5399.697	4.225	8.021	133.77
12/12/21 8:51:35.175	1288.000	5409.697	4.200	7.959	133.79
12/12/21 9:01:35.175	1298.000	5419.697	4.175	7.925	133.81
12/12/21 9:11:35.175	1308.000	5429.697	4.151	7.886	133.82
12/12/21 9:21:35.175	1318.000	5439.697	4.127	7.798	133.86
12/12/21 9:31:35.175	1328.000	5449.697	4.104	7.739	133.89

12/12/21 9:41:35.175	1338.000	5459.697	4.080	7.730	133.89
12/12/21 9:51:35.175	1348.000	5469.697	4.058	7.538	133.98
12/12/21 10:01:35.175	1358.000	5479.697	4.035	7.494	133.99
12/12/21 10:11:35.175	1368.000	5489.697	4.013	7.393	134.04
12/12/21 10:21:35.175	1378.000	5499.697	3.991	7.375	134.05
12/12/21 10:31:35.175	1388.000	5509.697	3.970	7.282	134.09
12/12/21 10:41:35.175	1398.000	5519.697	3.948	7.263	134.09
12/12/21 10:51:35.175	1408.000	5529.697	3.927	7.194	134.12
12/12/21 11:01:35.175	1418.000	5539.697	3.907	7.199	134.12
12/12/21 11:11:35.175	1428.000	5549.697	3.886	7.065	134.18
12/12/21 11:21:35.175	1438.000	5559.697	3.866	7.000	134.21
12/12/21 11:31:35.175	1448.000	5569.697	3.846	6.993	134.21
12/12/21 11:41:35.175	1458.000	5579.697	3.827	6.875	134.26
12/12/21 11:51:35.175	1468.000	5589.697	3.808	6.765	134.31
12/12/21 12:01:35.175	1478.000	5599.697	3.789	6.805	134.29
12/12/21 12:11:35.175	1488.000	5609.697	3.770	6.710	134.33
12/12/21 12:21:35.175	1498.000	5619.697	3.751	6.706	134.34
12/12/21 12:31:35.175	1508.000	5629.697	3.733	6.647	134.36
12/12/21 12:41:35.175	1518.000	5639.697	3.715	6.585	134.39
12/12/21 12:51:35.175	1528.000	5649.697	3.697	6.579	134.39
12/12/21 13:01:35.175	1538.000	5659.697	3.680	6.565	134.40
12/12/21 13:11:35.175	1548.000	5669.697	3.663	6.390	134.47
12/12/21 13:21:35.175	1558.000	5679.697	3.646	6.410	134.46
12/12/21 13:31:35.175	1568.000	5689.697	3.629	6.336	134.50
12/12/21 13:41:35.175	1578.000	5699.697	3.612	6.331	134.50
12/12/21 13:51:35.175	1588.000	5709.697	3.596	6.250	134.53
12/12/21 14:01:35.175	1598.000	5719.697	3.579	6.163	134.57
12/12/21 14:11:35.175	1608.000	5729.697	3.563	6.125	134.59
12/12/21 14:21:35.175	1618.000	5739.697	3.547	6.103	134.60
12/12/21 14:31:35.175	1628.000	5749.697	3.532	6.109	134.59
12/12/21 14:41:35.175	1638.000	5759.697	3.516	6.118	134.59
12/12/21 14:51:35.175	1648.000	5769.697	3.501	5.939	134.67
12/12/21 15:01:35.175	1658.000	5779.697	3.486	5.965	134.66
12/12/21 15:11:35.175	1668.000	5789.697	3.471	5.876	134.69
12/12/21 15:21:35.175	1678.000	5799.697	3.456	5.820	134.72
12/12/21 15:31:35.175	1688.000	5809.697	3.442	5.903	134.68
12/12/21 15:41:35.175	1698.000	5819.697	3.427	5.831	134.71

Log Notes

2021-12-11 11:23:35.115 Started



ANALYTICAL SUMMARY REPORT

January 17, 2022

Engineering Associates
PO Box 2202
Laramie, WY 82073-2202

Work Order: G21120195

Project Name: Kaski Well #2

Energy Laboratories Inc. Gillette WY received the following 2 samples for Engineering Associates on 12/9/2021 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
G21120195-001	Kaski Well #2	12/09/21 10:30	12/09/21	Drinking Water	Metals by ICP/ICPMS, Drinking Water Acidity, Total as CaCO ₃ Alkalinity Anion - Cation Balance Bacteria, Iron Related Bacteria, Heterotrophic Plate Count Bacteria, SDWA Cyanide, SDWA Color Conductivity Mercury, Drinking Water Fluoride Foaming Agents 515.4-Herbicides, Chlorinated SDWA 547-Herbicides, Glyphosate SDWA Hardness Anions by Ion Chromatography Langelier Index Nitrogen, Nitrite Nitrogen, Nitrate + Nitrite Nitrogen, Nitrate as N Odor pH Drinking Water Metals Digestion by EPA 200.2 Herbicide Liquid-Liquid Microextraction Digestion, Mercury by CVAA 504.1 Microextraction 504-Microextraction VOCs, EDB and DBCP SDWA 531-Pesticides, Carbamates SDWA LSE for 549.2 549-Pesticides, Diquat SDWA Gross Alpha Calculated Gross Alpha, Gross Beta, Total Radium 226 + Radium 228 Radium 226, Total Radium 228, Total Sodium Adsorption Ratio Solids, Total Dissolved Semi-Volatile Organic Compounds Extraction 525-Semi-Volatile Organic Compounds, SDWA Endothall extraction 548-Endothall Turbidity



ANALYTICAL SUMMARY REPORT

524-Purgeable Organics, SDWA

G21120195-002	Trip Blank-3318	12/09/21 10:30	12/09/21	Trip Blank	524-Purgeable Organics, SDWA
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The analyses presented in this report were performed by Energy Laboratories, Inc., 400 W. Boxelder Rd., Gillette, WY 82718, unless otherwise noted. Any exceptions or problems with the analyses are noted in the report package. Any issues encountered during sample receipt are documented in the Work Order Receipt Checklist.

The results as reported relate only to the item(s) submitted for testing. This report shall be used or copied only in its entirety. Energy Laboratories, Inc. is not responsible for the consequences arising from the use of a partial report.

If you have any questions regarding these tests results, please contact your Project Manager.

Report Approved By:


Project Manager

Digitally signed by
Alyson T. Degnan
Date: 2022.01.17 07:20:12 -07:00



CLIENT: Engineering Associates
Project: Kaski Well #2
Work Order: G21120195

Report Date: 01/17/22

CASE NARRATIVE

Tests associated with analyst identified as ELI-B were subcontracted to Energy Laboratories, 1120 S. 27th St., Billings, MT, EPA Number MT00005.

Tests associated with analyst identified as ELI-CA were subcontracted to Energy Laboratories, 2393 Salt Creek Hwy., Casper, WY, EPA Number WY00002.



LABORATORY ANALYTICAL REPORT

Prepared by Gillette, WY Branch

Client: Engineering Associates
Project: Kaski Well #2
Client Sample ID: Kaski Well #2
Sampled By: John Wetstein
Lab ID: G21120195-001P

Report Date: 01/17/22
Collection Date: 12/09/21 10:30
Received Date: 12/09/21 14:53
Matrix: Drinking Water

Analyses	Result	Units	Safe/Unsafe	Qualifier	Method	Analysis Date / By
BACTERIA						
Bacteria, Total Coliform	Absent	per 100ml	SAFE		A9223 B	12/09/21 17:06 / blb
Bacteria, E-Coli Coliform	Absent	per 100ml			A9223 B	12/09/21 17:06 / blb
- Bacteria, Iron Related: Results are approximate. <1 - 8 CFU/ml: Non-Aggressive; 25 -2200 CFU/ml: Moderate; >9000 CFU/ml Aggressive.						

Comments: The notation "SAFE" indicates that the water was bacteriologically SAFE when sampled.
The notation "UNSAFE" indicates that the water was bacteriologically UNSAFE when sampled.

Qualifiers:

LABORATORY ANALYTICAL REPORT

Prepared by Gillette, WY Branch

Client: Engineering Associates
Project: Kaski Well #2
Lab ID: G21120195-001
Client Sample ID: Kaski Well #2

Report Date: 01/17/22
Collection Date: 12/09/21 10:30
Date Received: 12/09/21
Matrix: Drinking Water

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL CHARACTERISTICS							
Odor Measurement Temp	60	°C	H			A2150 B	12/10/21 12:27 / eli-b
Color	5	c.u.		5		A2120 B	12/10/21 11:15 / eli-b
Odor	4	T.O.N.	H			A2150 B	12/10/21 12:27 / eli-b
Surfactants, MBAS	4	mg/L		1		LaMotte DS-1	12/10/21 11:15 / eli-b
Turbidity	ND	NTU		0.5		A2130 B	12/10/21 15:16 / eli-ca
pH at Time of Color Analysis	7	s.u.				A2120 B	12/10/21 11:15 / eli-b
MAJOR IONS, DISSOLVED							
Bicarbonate as HCO ₃	254	mg/L		5		A2320 B	12/14/21 16:02 / eli-b
Carbonate as CO ₃	ND	mg/L		5		A2320 B	12/14/21 16:02 / eli-b
Chloride	ND	mg/L		1		E300.0	12/19/21 12:30 / eli-b
Sulfate	8	mg/L		1		E300.0	12/19/21 12:30 / eli-b
Calcium	50	mg/L		1		E200.7	12/13/21 11:55 / eli-b
Fluoride	0.2	mg/L		0.1	4	A4500-F C	12/13/21 12:04 / eli-b
Magnesium	22	mg/L		1		E200.7	12/13/21 11:55 / eli-b
Potassium	1	mg/L		1		E200.7	12/13/21 11:55 / eli-b
Sodium	2	mg/L		1		E200.7	12/13/21 11:55 / eli-b
INORGANIC COMPOUNDS, SDWA							
Aluminum	ND	mg/L		0.03		E200.7	12/13/21 11:55 / eli-b
Antimony	ND	mg/L		0.001	0.006	E200.8	12/13/21 15:26 / eli-b
Nitrogen, Nitrate+Nitrite as N	0.18	mg/L	D	0.02	10	E353.2	12/13/21 15:06 / eli-ca
Arsenic	0.001	mg/L		0.001	0.01	E200.8	12/16/21 03:16 / eli-b
Barium	0.17	mg/L		0.05	2	E200.7	12/13/21 11:55 / eli-b
Beryllium	ND	mg/L		0.001	0.004	E200.7	12/13/21 11:55 / eli-b
Boron	ND	mg/L		0.05		E200.7	12/13/21 11:55 / eli-b
Cadmium	ND	mg/L		0.001	0.005	E200.7	12/13/21 11:55 / eli-b
Chromium	ND	mg/L		0.005	0.1	E200.7	12/13/21 11:55 / eli-b
Copper	ND	mg/L		0.005	1.3	E200.8	12/13/21 15:26 / eli-b
Cyanide, Total	ND	mg/L		0.005	0.2	Kelada-01	12/10/21 14:55 / eli-b
Iron	ND	mg/L		0.02		E200.7	12/13/21 11:55 / eli-b
Lead	ND	mg/L		0.001	0.015	E200.8	12/13/21 15:26 / eli-b
Manganese	ND	mg/L		0.001		E200.7	12/13/21 11:55 / eli-b
Mercury	ND	mg/L		0.0001	0.002	E245.1	12/14/21 15:39 / eli-b
Nickel	ND	mg/L		0.01		E200.7	12/13/21 11:55 / eli-b
Selenium	ND	mg/L		0.001	0.05	E200.8	12/14/21 21:13 / eli-b
Silicon as SiO ₂	10.9	mg/L		0.2		E200.7	12/13/21 11:55 / eli-b
Silicon	5.1	mg/L		0.1		E200.7	12/13/21 11:55 / eli-b
Thallium	ND	mg/L		0.0005	0.002	E200.8	12/13/21 15:26 / eli-b
Zinc	ND	mg/L		0.01		E200.7	12/13/21 11:55 / eli-b
NON-METALS							
Acidity, Total as CaCO ₃	ND	mg/L	L	4		A2310 B	12/13/21 12:30 / eli-b
Alkalinity, Total as CaCO ₃	209	mg/L		5		A2320 B	12/14/21 16:02 / eli-b

Report Definitions:
 RL - Analyte Reporting Limit
 QCL - Quality Control Limit
 D - Reporting Limit (RL) increased due to sample matrix
 L - Lowest available reporting limit for the analytical method used

MCL - Maximum Contaminant Level
 ND - Not detected at the Reporting Limit (RL)
 H - Analysis performed past the method holding time

LABORATORY ANALYTICAL REPORT

Prepared by Gillette, WY Branch

Client: Engineering Associates
Project: Kaski Well #2
Lab ID: G21120195-001
Client Sample ID: Kaski Well #2

Report Date: 01/17/22
Collection Date: 12/09/21 10:30
Date Received: 12/09/21
Matrix: Drinking Water

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
NON-METALS							
Conductivity @ 25 C	398	umhos/cm		5		A2510 B	12/10/21 17:38 / eli-ca
Hardness as CaCO ₃	220	mg/L				A2340 B	12/13/21 11:55 / tif
pH	7.8	s.u.	H	0.1		A4500-H B	12/10/21 17:38 / eli-ca
pH Measurement Temp	16.9	°C				A4500-H B	12/10/21 17:38 / eli-ca
Sodium Adsorption Ratio (SAR)	0	unitless				Calculation	12/13/21 11:55 / tif
Solids, Total Dissolved TDS @ 180 C	217	mg/L		10		A2540 C	12/10/21 15:13 / eli-b
NUTRIENTS							
Nitrogen, Nitrate as N	0.18	mg/L	D	0.02		E353.2	01/07/22 16:19 / tif
Nitrogen, Nitrite as N	ND	mg/L		0.01		E353.2	12/10/21 11:15 / eli-b
RADIONUCLIDES, TOTAL							
Gross Alpha	-2	pCi/L	U		15	E900.0	12/23/21 05:46 / eli-ca
Gross Alpha precision (±)	1.3	pCi/L				E900.0	12/23/21 05:46 / eli-ca
Gross Alpha MDC	1.4	pCi/L				E900.0	12/23/21 05:46 / eli-ca
Gross Alpha - Adjusted	-2.2	pCi/L	U		15	E900.0	01/07/22 15:09 / eli-ca
Gross Alpha - Adjusted precision (±)	1.3	pCi/L				E900.0	01/07/22 15:09 / eli-ca
Gross Alpha - Adjusted MDC	1.4	pCi/L				E900.0	01/07/22 15:09 / eli-ca
Uranium	0.0012	mg/L		0.0003		E200.8	12/13/21 15:26 / eli-b
Uranium, Activity	0.8	pCi/L		0.2		E200.8	12/13/21 15:26 / eli-b
Radium 226	0.8	pCi/L			5	E903.0	12/30/21 09:18 / eli-ca
Radium 226 precision (±)	0.4	pCi/L				E903.0	12/30/21 09:18 / eli-ca
Radium 226 MDC	0.4	pCi/L				E903.0	12/30/21 09:18 / eli-ca
Radium 228	-0.3	pCi/L	U		5	RA-05	12/20/21 13:37 / eli-ca
Radium 228 precision (±)	0.7	pCi/L				RA-05	12/20/21 13:37 / eli-ca
Radium 228 MDC	0.8	pCi/L				RA-05	12/20/21 13:37 / eli-ca
Radium 226 + Radium 228	1.2	pCi/L			5	A7500-RA	12/30/21 12:37 / eli-ca
Radium 226 + Radium 228 precision (±)	0.8	pCi/L				A7500-RA	12/30/21 12:37 / eli-ca
Radium 226 + Radium 228 MDC	0.9	pCi/L				A7500-RA	12/30/21 12:37 / eli-ca
LANGELIER INDEX							
Langelier Index	0.7					A2330 B	01/07/22 16:15 / tif
DATA QUALITY							
A/C Balance	1.03	%				A1030 E	01/07/22 16:15 / tif
Anions	4.38	meq/L				A1030 E	01/07/22 16:15 / tif
Cations	4.47	meq/L				A1030 E	01/07/22 16:15 / tif
VOLATILE ORGANIC COMPOUNDS							
Benzene	ND	ug/L		0.50	5	E524.2	12/10/21 16:31 / eli-b
Bromobenzene	ND	ug/L		0.50		E524.2	12/10/21 16:31 / eli-b
Bromochloromethane	ND	ug/L		0.50		E524.2	12/10/21 16:31 / eli-b
Bromodichloromethane	ND	ug/L		0.50		E524.2	12/10/21 16:31 / eli-b
Bromoform	ND	ug/L		0.50		E524.2	12/10/21 16:31 / eli-b

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
D - Reporting Limit (RL) increased due to sample matrix
U - Not detected at Minimum Detectable Concentration (MDC)

MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)
H - Analysis performed past the method holding time

LABORATORY ANALYTICAL REPORT

Prepared by Gillette, WY Branch

Client: Engineering Associates
Project: Kaski Well #2
Lab ID: G21120195-001
Client Sample ID: Kaski Well #2

Report Date: 01/17/22
Collection Date: 12/09/21 10:30
Date Received: 12/09/21
Matrix: Drinking Water

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
Bromomethane	ND	ug/L		0.50		E524.2	12/10/21 16:31 / eli-b
n-Butylbenzene	ND	ug/L		0.50		E524.2	12/10/21 16:31 / eli-b
sec-Butylbenzene	ND	ug/L		0.50		E524.2	12/10/21 16:31 / eli-b
tert-Butylbenzene	ND	ug/L		0.50		E524.2	12/10/21 16:31 / eli-b
Carbon tetrachloride	ND	ug/L		0.50	5	E524.2	12/10/21 16:31 / eli-b
Chlorobenzene	ND	ug/L		0.50	100	E524.2	12/10/21 16:31 / eli-b
Chlorodibromomethane	ND	ug/L		0.50		E524.2	12/10/21 16:31 / eli-b
Chloroethane	ND	ug/L		0.50		E524.2	12/10/21 16:31 / eli-b
Chloroform	ND	ug/L		0.50		E524.2	12/10/21 16:31 / eli-b
Chloromethane	ND	ug/L		0.50		E524.2	12/10/21 16:31 / eli-b
2-Chlorotoluene	ND	ug/L		0.50		E524.2	12/10/21 16:31 / eli-b
4-Chlorotoluene	ND	ug/L		0.50		E524.2	12/10/21 16:31 / eli-b
1,2-Dibromo-3-chloropropane	ND	ug/L		1.0	0.2	E524.2	12/10/21 16:31 / eli-b
Dibromomethane	ND	ug/L		0.50		E524.2	12/10/21 16:31 / eli-b
1,2-Dichlorobenzene	ND	ug/L		0.50	600	E524.2	12/10/21 16:31 / eli-b
1,3-Dichlorobenzene	ND	ug/L		0.50		E524.2	12/10/21 16:31 / eli-b
1,4-Dichlorobenzene	ND	ug/L		0.50	75	E524.2	12/10/21 16:31 / eli-b
Dichlorodifluoromethane	ND	ug/L		0.50		E524.2	12/10/21 16:31 / eli-b
1,1-Dichloroethane	ND	ug/L		0.50		E524.2	12/10/21 16:31 / eli-b
1,2-Dichloroethane	ND	ug/L		0.50	5	E524.2	12/10/21 16:31 / eli-b
1,2-Dibromoethane	ND	ug/L		0.50	0.05	E524.2	12/10/21 16:31 / eli-b
1,1-Dichloroethene	ND	ug/L		0.50	7	E524.2	12/10/21 16:31 / eli-b
cis-1,2-Dichloroethene	ND	ug/L		0.50	70	E524.2	12/10/21 16:31 / eli-b
trans-1,2-Dichloroethene	ND	ug/L		0.50	100	E524.2	12/10/21 16:31 / eli-b
1,2-Dichloropropane	ND	ug/L		0.50	5	E524.2	12/10/21 16:31 / eli-b
1,3-Dichloropropane	ND	ug/L		0.50		E524.2	12/10/21 16:31 / eli-b
2,2-Dichloropropane	ND	ug/L		0.50		E524.2	12/10/21 16:31 / eli-b
1,1-Dichloropropene	ND	ug/L		0.50		E524.2	12/10/21 16:31 / eli-b
cis-1,3-Dichloropropene	ND	ug/L		0.50		E524.2	12/10/21 16:31 / eli-b
trans-1,3-Dichloropropene	ND	ug/L		0.50		E524.2	12/10/21 16:31 / eli-b
Ethylbenzene	ND	ug/L		0.50	700	E524.2	12/10/21 16:31 / eli-b
Hexachlorobutadiene	ND	ug/L		0.50		E524.2	12/10/21 16:31 / eli-b
Isopropylbenzene	ND	ug/L		0.50		E524.2	12/10/21 16:31 / eli-b
p-Isopropyltoluene	ND	ug/L		0.50		E524.2	12/10/21 16:31 / eli-b
Methyl tert-butyl ether (MTBE)	ND	ug/L		0.50		E524.2	12/10/21 16:31 / eli-b
Methylene chloride	ND	ug/L		0.50	5	E524.2	12/10/21 16:31 / eli-b
Naphthalene	ND	ug/L		0.50		E524.2	12/10/21 16:31 / eli-b
n-Propylbenzene	ND	ug/L		0.50		E524.2	12/10/21 16:31 / eli-b
Styrene	ND	ug/L		0.50	100	E524.2	12/10/21 16:31 / eli-b
1,1,1,2-Tetrachloroethane	ND	ug/L		0.50		E524.2	12/10/21 16:31 / eli-b
1,1,2,2-Tetrachloroethane	ND	ug/L		0.50		E524.2	12/10/21 16:31 / eli-b
Tetrachloroethene	ND	ug/L		0.50	5	E524.2	12/10/21 16:31 / eli-b
Toluene	ND	ug/L		0.50	1000	E524.2	12/10/21 16:31 / eli-b

Report RL - Analyte Reporting Limit
Definitions: QCL - Quality Control Limit

MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

LABORATORY ANALYTICAL REPORT

Prepared by Gillette, WY Branch

Client: Engineering Associates
Project: Kaski Well #2
Lab ID: G21120195-001
Client Sample ID: Kaski Well #2

Report Date: 01/17/22
Collection Date: 12/09/21 10:30
Date Received: 12/09/21
Matrix: Drinking Water

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
1,2,3-Trichlorobenzene	ND	ug/L		0.50		E524.2	12/10/21 16:31 / eli-b
1,2,4-Trichlorobenzene	ND	ug/L		0.50	70	E524.2	12/10/21 16:31 / eli-b
1,1,1-Trichloroethane	ND	ug/L		0.50	200	E524.2	12/10/21 16:31 / eli-b
1,1,2-Trichloroethane	ND	ug/L		0.50	5	E524.2	12/10/21 16:31 / eli-b
Trichloroethene	ND	ug/L		0.50	5	E524.2	12/10/21 16:31 / eli-b
Trichlorofluoromethane	ND	ug/L		0.50		E524.2	12/10/21 16:31 / eli-b
1,2,3-Trichloropropane	ND	ug/L		0.50		E524.2	12/10/21 16:31 / eli-b
Trihalomethanes, Total	ND	ug/L		0.50	80	E524.2	12/10/21 16:31 / eli-b
1,2,4-Trimethylbenzene	ND	ug/L		0.50		E524.2	12/10/21 16:31 / eli-b
1,3,5-Trimethylbenzene	ND	ug/L		0.50		E524.2	12/10/21 16:31 / eli-b
Vinyl chloride	ND	ug/L		0.50	2	E524.2	12/10/21 16:31 / eli-b
m+p-Xylenes	ND	ug/L		0.50		E524.2	12/10/21 16:31 / eli-b
o-Xylene	ND	ug/L		0.50		E524.2	12/10/21 16:31 / eli-b
Xylenes, Total	ND	ug/L		0.50	10000	E524.2	12/10/21 16:31 / eli-b
Surr: p-Bromofluorobenzene	115	%REC		70-130		E524.2	12/10/21 16:31 / eli-b
Surr: 1,2-Dichloroethane-d4	106	%REC		70-130		E524.2	12/10/21 16:31 / eli-b
Surr: Toluene-d8	106	%REC		70-130		E524.2	12/10/21 16:31 / eli-b
SEMI-VOLATILE ORGANIC COMPOUNDS							
Alachlor	ND	ug/L		0.10	2	E525.2	12/13/21 23:50 / eli-b
Aldrin	ND	ug/L		0.10		E525.2	12/13/21 23:50 / eli-b
Aroclor 1016	ND	ug/L		0.080		E525.2	12/13/21 23:50 / eli-b
Aroclor 1221	ND	ug/L		2.0		E525.2	12/13/21 23:50 / eli-b
Aroclor 1232	ND	ug/L		0.50		E525.2	12/13/21 23:50 / eli-b
Aroclor 1242	ND	ug/L		0.30		E525.2	12/13/21 23:50 / eli-b
Aroclor 1248	ND	ug/L		0.10		E525.2	12/13/21 23:50 / eli-b
Aroclor 1254	ND	ug/L		0.10		E525.2	12/13/21 23:50 / eli-b
Aroclor 1260	ND	ug/L		0.20		E525.2	12/13/21 23:50 / eli-b
Atrazine	ND	ug/L		0.10	3	E525.2	12/13/21 23:50 / eli-b
Benzo(a)pyrene	ND	ug/L		0.10	0.2	E525.2	12/13/21 23:50 / eli-b
bis(2-ethylhexyl)Adipate	ND	ug/L		0.50	400	E525.2	12/13/21 23:50 / eli-b
bis(2-ethylhexyl)Phthalate	ND	ug/L		0.60	6	E525.2	12/13/21 23:50 / eli-b
Butachlor	ND	ug/L		0.10		E525.2	12/13/21 23:50 / eli-b
Chlordane	ND	ug/L		1.0	2	E525.2	12/13/21 23:50 / eli-b
Dieldrin	ND	ug/L		0.10		E525.2	12/13/21 23:50 / eli-b
Endrin	ND	ug/L		0.10	2	E525.2	12/13/21 23:50 / eli-b
gamma-BHC (Lindane)	ND	ug/L		0.10	0.2	E525.2	12/13/21 23:50 / eli-b
Heptachlor	ND	ug/L		0.10	0.4	E525.2	12/13/21 23:50 / eli-b
Heptachlor epoxide	ND	ug/L		0.10	0.2	E525.2	12/13/21 23:50 / eli-b
Hexachlorobenzene	ND	ug/L		0.10	1	E525.2	12/13/21 23:50 / eli-b
Hexachlorocyclopentadiene	ND	ug/L		0.10	50	E525.2	12/13/21 23:50 / eli-b
Methoxychlor	ND	ug/L		0.10	40	E525.2	12/13/21 23:50 / eli-b
Metolachlor	ND	ug/L		0.10		E525.2	12/13/21 23:50 / eli-b

Report RL - Analyte Reporting Limit
Definitions: QCL - Quality Control Limit

MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

LABORATORY ANALYTICAL REPORT

Prepared by Gillette, WY Branch

Client: Engineering Associates
Project: Kaski Well #2
Lab ID: G21120195-001
Client Sample ID: Kaski Well #2

Report Date: 01/17/22
Collection Date: 12/09/21 10:30
Date Received: 12/09/21
Matrix: Drinking Water

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
SEMI-VOLATILE ORGANIC COMPOUNDS							
Metribuzin	ND	ug/L		0.10		E525.2	12/13/21 23:50 / eli-b
Propachlor	ND	ug/L		0.10		E525.2	12/13/21 23:50 / eli-b
Simazine	ND	ug/L		0.10	4	E525.2	12/13/21 23:50 / eli-b
Toxaphene	ND	ug/L		2.0	3	E525.2	12/13/21 23:50 / eli-b
PCBs, Total	ND	ug/L		0.50	0.5	E525.2	12/13/21 23:50 / eli-b
Surr: 1,3-Dimethyl-2-nitrobenzene	107	%REC		70-130		E525.2	12/13/21 23:50 / eli-b
Surr: Perylene-d12	104	%REC		70-130		E525.2	12/13/21 23:50 / eli-b
Surr: Pyrene-d10	94.0	%REC		70-130		E525.2	12/13/21 23:50 / eli-b
Surr: Triphenylphosphate	104	%REC		70-130		E525.2	12/13/21 23:50 / eli-b
- Note: The federal MCL for total PCB's is 0.5 ug/L as Decachlorobiphenyl (DCB). PCB screening at the reporting limits given for the individual Aroclors meets or exceeds federal and state requirements for "Total PCB" monitoring if Aroclors are not detected.							
SEMI-VOLATILE ORGANIC COMPOUNDS							
Endothall	ND	ug/L		8.0	100	E548.1	12/16/21 14:26 / eli-b
Surr: 2,4-Dichlorophenylacetic acid	117	%REC		70-130		E548.1	12/16/21 14:26 / eli-b
PESTICIDES, BY HPLC							
Aldicarb	ND	ug/L		1.0	3	E531.1	12/13/21 16:29 / eli-ca
Aldicarb sulfone	ND	ug/L		1.0	2	E531.1	12/13/21 16:29 / eli-ca
Aldicarb sulfoxide	ND	ug/L		1.0	4	E531.1	12/13/21 16:29 / eli-ca
Carbaryl	ND	ug/L		1.0		E531.1	12/13/21 16:29 / eli-ca
3-Hydroxycarbofuran	ND	ug/L		1.0		E531.1	12/13/21 16:29 / eli-ca
Carbofuran	ND	ug/L		1.0	40	E531.1	12/13/21 16:29 / eli-ca
Methiocarb	ND	ug/L		1.0		E531.1	12/13/21 16:29 / eli-ca
Methomyl	ND	ug/L		1.0		E531.1	12/13/21 16:29 / eli-ca
Oxamyl	ND	ug/L		1.0	200	E531.1	12/13/21 16:29 / eli-ca
Baygon	ND	ug/L		1.0		E531.1	12/13/21 16:29 / eli-ca
Surr: BDMC	94.0	%REC		70-130		E531.1	12/13/21 16:29 / eli-ca
VOCS BY MICROEXTRACTION-ECD							
1,2-Dibromo-3-chloropropane	ND	ug/L		0.020	0.2	E504.1	12/16/21 17:45 / eli-b
1,2-Dibromoethane	ND	ug/L		0.010	0.05	E504.1	12/16/21 17:45 / eli-b
1,2,3-Trichloropropane	ND	ug/L		0.050		E504.1	12/16/21 17:45 / eli-b
Surr: 1,1,1,2-Tetrachloroethane	101	%REC		70-130		E504.1	12/16/21 17:45 / eli-b
HERBICIDES, BY HPLC							
Glyphosate	ND	ug/L		5.0	700	E547	12/13/21 14:58 / eli-ca
PESTICIDES							
Diquat	ND	ug/L		0.40	20	E549.2	12/13/21 18:40 / eli-ca
HERBICIDES							
2,4,5-TP (Silvex)	ND	ug/L		0.25	50	E515.4	12/18/21 05:32 / eli-b
2,4-D	ND	ug/L		1.0	70	E515.4	12/18/21 05:32 / eli-b
2,4-DB	ND	ug/L		1.0		E515.4	12/18/21 06:08 / eli-b

Report RL - Analyte Reporting Limit
Definitions: QCL - Quality Control Limit

MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)



LABORATORY ANALYTICAL REPORT

Prepared by Gillette, WY Branch

Client: Engineering Associates
Project: Kaski Well #2
Lab ID: G21120195-001
Client Sample ID: Kaski Well #2

Report Date: 01/17/22
Collection Date: 12/09/21 10:30
Date Received: 12/09/21
Matrix: Drinking Water

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
HERBICIDES							
Dalapon	ND	ug/L		2.5	200	E515.4	12/18/21 05:32 / eli-b
Dicamba	ND	ug/L		1.0		E515.4	12/18/21 05:32 / eli-b
Dichlorprop	ND	ug/L		1.0		E515.4	12/18/21 05:32 / eli-b
Dinoseb	ND	ug/L		1.0	7	E515.4	12/18/21 06:08 / eli-b
Pentachlorophenol	ND	ug/L		0.10	1	E515.4	12/18/21 05:32 / eli-b
Picloram	ND	ug/L		0.50	500	E515.4	12/18/21 05:32 / eli-b
Surr: 2,4-Dichlorophenylacetic acid	100	%REC		70-130		E515.4	12/18/21 05:32 / eli-b

BACTERIA

Bacteria, Heterotrophic Plate Count	59	MPN/mL				SimPlate	12/09/21 17:15 / blb
Bacteria, Iron Related	500	CFU/ml		1.0		IRB-BART	12/09/21 17:22 / blb

- Bacteria, Iron Related: Results are approximate. <1 - 8 CFU/ml: Non-Aggressive; 25 -2200 CFU/ml: Moderate; >9000 CFU/ml Aggressive.

Report RL - Analyte Reporting Limit
Definitions: QCL - Quality Control Limit

MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)



LABORATORY ANALYTICAL REPORT

Prepared by Gillette, WY Branch

Client: Engineering Associates
Project: Kaski Well #2
Lab ID: G21120195-002
Client Sample ID: Trip Blank-3318

Report Date: 01/17/22
Collection Date: 12/09/21 10:30
Date Received: 12/09/21
Matrix: Trip Blank

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
Benzene	ND	ug/L		0.50	5	E524.2	12/10/21 15:08 / eli-b
Bromobenzene	ND	ug/L		0.50		E524.2	12/10/21 15:08 / eli-b
Bromochloromethane	ND	ug/L		0.50		E524.2	12/10/21 15:08 / eli-b
Bromodichloromethane	ND	ug/L		0.50		E524.2	12/10/21 15:08 / eli-b
Bromoform	ND	ug/L		0.50		E524.2	12/10/21 15:08 / eli-b
Bromomethane	ND	ug/L		0.50		E524.2	12/10/21 15:08 / eli-b
n-Butylbenzene	ND	ug/L		0.50		E524.2	12/10/21 15:08 / eli-b
sec-Butylbenzene	ND	ug/L		0.50		E524.2	12/10/21 15:08 / eli-b
tert-Butylbenzene	ND	ug/L		0.50		E524.2	12/10/21 15:08 / eli-b
Carbon tetrachloride	ND	ug/L		0.50	5	E524.2	12/10/21 15:08 / eli-b
Chlorobenzene	ND	ug/L		0.50	100	E524.2	12/10/21 15:08 / eli-b
Chlorodibromomethane	ND	ug/L		0.50		E524.2	12/10/21 15:08 / eli-b
Chloroethane	ND	ug/L		0.50		E524.2	12/10/21 15:08 / eli-b
Chloroform	ND	ug/L		0.50		E524.2	12/10/21 15:08 / eli-b
Chloromethane	ND	ug/L		0.50		E524.2	12/10/21 15:08 / eli-b
2-Chlorotoluene	ND	ug/L		0.50		E524.2	12/10/21 15:08 / eli-b
4-Chlorotoluene	ND	ug/L		0.50		E524.2	12/10/21 15:08 / eli-b
1,2-Dibromo-3-chloropropane	ND	ug/L		1.0	0.2	E524.2	12/10/21 15:08 / eli-b
Dibromomethane	ND	ug/L		0.50		E524.2	12/10/21 15:08 / eli-b
1,2-Dichlorobenzene	ND	ug/L		0.50	600	E524.2	12/10/21 15:08 / eli-b
1,3-Dichlorobenzene	ND	ug/L		0.50		E524.2	12/10/21 15:08 / eli-b
1,4-Dichlorobenzene	ND	ug/L		0.50	75	E524.2	12/10/21 15:08 / eli-b
Dichlorodifluoromethane	ND	ug/L		0.50		E524.2	12/10/21 15:08 / eli-b
1,1-Dichloroethane	ND	ug/L		0.50		E524.2	12/10/21 15:08 / eli-b
1,2-Dichloroethane	ND	ug/L		0.50	5	E524.2	12/10/21 15:08 / eli-b
1,2-Dibromoethane	ND	ug/L		0.50	0.05	E524.2	12/10/21 15:08 / eli-b
1,1-Dichloroethene	ND	ug/L		0.50	7	E524.2	12/10/21 15:08 / eli-b
cis-1,2-Dichloroethene	ND	ug/L		0.50	70	E524.2	12/10/21 15:08 / eli-b
trans-1,2-Dichloroethene	ND	ug/L		0.50	100	E524.2	12/10/21 15:08 / eli-b
1,2-Dichloropropane	ND	ug/L		0.50	5	E524.2	12/10/21 15:08 / eli-b
1,3-Dichloropropane	ND	ug/L		0.50		E524.2	12/10/21 15:08 / eli-b
2,2-Dichloropropane	ND	ug/L		0.50		E524.2	12/10/21 15:08 / eli-b
1,1-Dichloropropene	ND	ug/L		0.50		E524.2	12/10/21 15:08 / eli-b
cis-1,3-Dichloropropene	ND	ug/L		0.50		E524.2	12/10/21 15:08 / eli-b
trans-1,3-Dichloropropene	ND	ug/L		0.50		E524.2	12/10/21 15:08 / eli-b
Ethylbenzene	ND	ug/L		0.50	700	E524.2	12/10/21 15:08 / eli-b
Hexachlorobutadiene	ND	ug/L		0.50		E524.2	12/10/21 15:08 / eli-b
Isopropylbenzene	ND	ug/L		0.50		E524.2	12/10/21 15:08 / eli-b
p-Isopropyltoluene	ND	ug/L		0.50		E524.2	12/10/21 15:08 / eli-b
Methyl tert-butyl ether (MTBE)	ND	ug/L		0.50		E524.2	12/10/21 15:08 / eli-b
Methylene chloride	ND	ug/L		0.50	5	E524.2	12/10/21 15:08 / eli-b
Naphthalene	ND	ug/L		0.50		E524.2	12/10/21 15:08 / eli-b
n-Propylbenzene	ND	ug/L		0.50		E524.2	12/10/21 15:08 / eli-b

Report RL - Analyte Reporting Limit
Definitions: QCL - Quality Control Limit

MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)



LABORATORY ANALYTICAL REPORT

Prepared by Gillette, WY Branch

Client: Engineering Associates
Project: Kaski Well #2
Lab ID: G21120195-002
Client Sample ID: Trip Blank-3318

Report Date: 01/17/22
Collection Date: 12/09/21 10:30
DateReceived: 12/09/21
Matrix: Trip Blank

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
Styrene	ND	ug/L		0.50	100	E524.2	12/10/21 15:08 / eli-b
1,1,1,2-Tetrachloroethane	ND	ug/L		0.50		E524.2	12/10/21 15:08 / eli-b
1,1,2,2-Tetrachloroethane	ND	ug/L		0.50		E524.2	12/10/21 15:08 / eli-b
Tetrachloroethene	ND	ug/L		0.50	5	E524.2	12/10/21 15:08 / eli-b
Toluene	ND	ug/L		0.50	1000	E524.2	12/10/21 15:08 / eli-b
1,2,3-Trichlorobenzene	ND	ug/L		0.50		E524.2	12/10/21 15:08 / eli-b
1,2,4-Trichlorobenzene	ND	ug/L		0.50	70	E524.2	12/10/21 15:08 / eli-b
1,1,1-Trichloroethane	ND	ug/L		0.50	200	E524.2	12/10/21 15:08 / eli-b
1,1,2-Trichloroethane	ND	ug/L		0.50	5	E524.2	12/10/21 15:08 / eli-b
Trichloroethene	ND	ug/L		0.50	5	E524.2	12/10/21 15:08 / eli-b
Trichlorofluoromethane	ND	ug/L		0.50		E524.2	12/10/21 15:08 / eli-b
1,2,3-Trichloropropane	ND	ug/L		0.50		E524.2	12/10/21 15:08 / eli-b
Trihalomethanes, Total	ND	ug/L		0.50	80	E524.2	12/10/21 15:08 / eli-b
1,2,4-Trimethylbenzene	ND	ug/L		0.50		E524.2	12/10/21 15:08 / eli-b
1,3,5-Trimethylbenzene	ND	ug/L		0.50		E524.2	12/10/21 15:08 / eli-b
Vinyl chloride	ND	ug/L		0.50	2	E524.2	12/10/21 15:08 / eli-b
m+p-Xylenes	ND	ug/L		0.50		E524.2	12/10/21 15:08 / eli-b
o-Xylene	ND	ug/L		0.50		E524.2	12/10/21 15:08 / eli-b
Xylenes, Total	ND	ug/L		0.50	10000	E524.2	12/10/21 15:08 / eli-b
Surr: p-Bromofluorobenzene	110	%REC		70-130		E524.2	12/10/21 15:08 / eli-b
Surr: 1,2-Dichloroethane-d4	108	%REC		70-130		E524.2	12/10/21 15:08 / eli-b
Surr: Toluene-d8	105	%REC		70-130		E524.2	12/10/21 15:08 / eli-b

Report RL - Analyte Reporting Limit
Definitions: QCL - Quality Control Limit

MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)



QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Engineering Associates

Work Order: G21120195

Report Date: 12/15/21

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2130 B							Batch: 211210_1_TURB-W		
Lab ID: MBLK-1_211210	Method Blank					Run: TURB-1_211210A			12/10/21 15:13
Turbidity	ND	NTU	0.1						
Lab ID: LCS1-1_211210	Laboratory Control Sample					Run: TURB-1_211210A			12/10/21 15:14
Turbidity	1.0	NTU	0.50	101	90	110			
Lab ID: G21120195-001BDUP	Sample Duplicate					Run: TURB-1_211210A			12/10/21 15:17
Turbidity	0.13	NTU	0.50					10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)



QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Engineering Associates

Work Order: G21120195

Report Date: 12/15/21

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2510 B							Analytical Run: PHSC_101-C_211210A		
Lab ID: SC 100	Initial Calibration Verification Standard								12/10/21 15:10
Conductivity @ 25 C	105	umhos/cm	5.0	105	90	110			
Lab ID: SC 5000	Initial Calibration Verification Standard								12/10/21 15:13
Conductivity @ 25 C	5000	umhos/cm	5.0	100	90	110			
Lab ID: SC 20000	Initial Calibration Verification Standard								12/10/21 15:16
Conductivity @ 25 C	19700	umhos/cm	5.0	99	90	110			
Method: A2510 B							Batch: R277689		
Lab ID: SC 50000	Initial Calibration Verification Standard				Run: PHSC_101-C_211210A			12/10/21 15:19	
Conductivity @ 25 C	48800	umhos/cm	5.0	98	90	110			
Lab ID: MBLK	Method Blank				Run: PHSC_101-C_211210A			12/10/21 16:40	
Conductivity @ 25 C	3	umhos/cm	1						
Lab ID: C21120380-006ADUP	Sample Duplicate				Run: PHSC_101-C_211210A			12/10/21 17:18	
Conductivity @ 25 C	1010	umhos/cm	5.0				0.1	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)



QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Engineering Associates

Work Order: G21120195

Report Date: 12/15/21

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A4500-H B							Analytical Run: PHSC_101-C_211210A		
Lab ID: 6.86	Initial Calibration Verification Standard								12/10/21 15:07
pH	6.9	s.u.	0.1	100	98	102			
pH Measurement Temp	18.7	°C			0	0			
Method: A4500-H B							Batch: R277689		
Lab ID: C21120380-006ADUP	Sample Duplicate								12/10/21 17:18
pH	8.4	s.u.	0.1				0.0	1.5	
pH Measurement Temp	16.9	°C							

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)



QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Engineering Associates

Work Order: G21120195

Report Date: 12/15/21

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E353.2							Analytical Run: FIA201-C_211213A		
Lab ID: ICV	Initial Calibration Verification Standard								12/13/21 14:07
Nitrogen, Nitrate+Nitrite as N	0.992	mg/L	0.050	99	90	110			
Method: E353.2							Batch: R277751		
Lab ID: MBLK	Method Blank								12/13/21 14:08
Nitrogen, Nitrate+Nitrite as N	ND	mg/L	0.01				Run: FIA201-C_211213A		
Lab ID: LFB	Laboratory Fortified Blank								12/13/21 14:09
Nitrogen, Nitrate+Nitrite as N	0.922	mg/L	0.050	93	90	110	Run: FIA201-C_211213A		
Lab ID: C21120380-011CMS	Sample Matrix Spike								12/13/21 15:03
Nitrogen, Nitrate+Nitrite as N	0.976	mg/L	0.050	98	90	110	Run: FIA201-C_211213A		
Lab ID: C21120380-011CMSD	Sample Matrix Spike Duplicate								12/13/21 15:04
Nitrogen, Nitrate+Nitrite as N	0.973	mg/L	0.050	97	90	110	0.3	10	

Qualifiers:

RL - Analyte Reporting Limit

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QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Engineering Associates

Work Order: G21120195

Report Date: 12/27/21

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2120 B										Batch: R371536
Lab ID: MB-R371536		Method Blank					Run: MISC-WC_211210B			12/10/21 08:48
Color		ND	c.u.							
Lab ID: LCS-R371536		Laboratory Control Sample					Run: MISC-WC_211210B			12/10/21 08:48
Color		25.0	c.u.	5.0	100	90	110			
Lab ID: B21120821-002E DUP	2	Sample Duplicate					Run: MISC-WC_211210B			12/10/21 08:48
Color		1500	c.u.	500				0.0	10	
pH at Time of Color Analysis			s.u.	1.0				0.0	3	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)



QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Engineering Associates

Work Order: G21120195

Report Date: 12/27/21

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2150 B										Batch: R371866
Lab ID: MB-R371866	2	Method Blank				Run: MISC-WC_211210H				12/10/21 12:27
Odor		ND	T.O.N.							
Odor Measurement Temp		60	°C							

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)



QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Engineering Associates

Work Order: G21120195

Report Date: 12/27/21

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2310 B										Batch: R371615
Lab ID: MBLK		Method Blank					Run: METROHM 2_211213A			12/13/21 10:16
Acidity, Total as CaCO ₃		ND	mg/L	4						
Lab ID: LCS										12/13/21 10:35
Acidity, Total as CaCO ₃		141	mg/L	4.0	101	90	110			
Lab ID: B21112144-013ADUP										12/13/21 10:56
Acidity, Total as CaCO ₃		34.9	mg/L	4.0				2.1	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)



QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Engineering Associates

Work Order: G21120195

Report Date: 12/27/21

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2320 B										Batch: R371708
Lab ID: MBLK										
		Method Blank				Run: METROHM 2_211214A		12/14/21 14:07		
Alkalinity, Total as CaCO ₃		ND	mg/L	4						
Lab ID: LCS										
		Laboratory Control Sample				Run: METROHM 2_211214A		12/14/21 14:17		
Alkalinity, Total as CaCO ₃		99.1	mg/L	4.0	99	90	110			
Lab ID: B21120138-001ADUP										
		3 Sample Duplicate				Run: METROHM 2_211214A		12/14/21 14:31		
Alkalinity, Total as CaCO ₃		269	mg/L	4.0				0.2	10	
Bicarbonate as HCO ₃		320	mg/L	4.0				0.1	10	
Carbonate as CO ₃		ND	mg/L	4.0					10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)



QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Engineering Associates

Work Order: G21120195

Report Date: 12/27/21

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2540 C										Batch: 162063
Lab ID: MB-162063		Method Blank					Run: BAL #30_211210A			12/10/21 08:36
Solids, Total Dissolved TDS @ 180 C		10	mg/L							
Lab ID: LCS-162063										12/10/21 08:37
Solids, Total Dissolved TDS @ 180 C		1070	mg/L	10	107	90	110			
Lab ID: B21120854-003A DUP										12/10/21 08:37
Solids, Total Dissolved TDS @ 180 C		1970	mg/L	20				1.9	5	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)



QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Engineering Associates

Work Order: G21120195

Report Date: 12/27/21

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A4500-F C								Analytical Run: METROHM 4_211213A		
Lab ID: ICV		Initial Calibration Verification Standard								12/13/21 10:57
Fluoride		1.03	mg/L	0.10	103	90	110			
Method: A4500-F C								Batch: R371648		
Lab ID: MBLK		Method Blank								12/13/21 11:00
Fluoride		ND	mg/L	0.09						
Lab ID: LFB		Laboratory Fortified Blank								12/13/21 11:03
Fluoride		2.48	mg/L	0.10	99	90	110			
Lab ID: B21120972-001AMS		Sample Matrix Spike								12/13/21 12:15
Fluoride		2.66	mg/L	0.10	106	80	120			
Lab ID: B21120972-001AMSD		Sample Matrix Spike Duplicate								12/13/21 12:18
Fluoride		2.63	mg/L	0.10	105	80	120	1.1	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Engineering Associates

Work Order: G21120195

Report Date: 12/27/21

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.7		Analytical Run: ICP204-B_211213A								
Lab ID: ICV	15 Continuing Calibration Verification Standard								12/13/21 10:39	
Aluminum		2.46	mg/L	0.10	99	95	105			
Barium		2.48	mg/L	0.10	99	95	105			
Beryllium		1.24	mg/L	0.010	99	95	105			
Boron		2.47	mg/L	0.10	99	95	105			
Cadmium		2.47	mg/L	0.010	99	95	105			
Calcium		25.4	mg/L	1.0	101	95	105			
Chromium		2.46	mg/L	0.050	98	95	105			
Iron		2.53	mg/L	0.020	101	95	105			
Magnesium		25.5	mg/L	1.0	102	95	105			
Manganese		2.43	mg/L	0.010	97	95	105			
Nickel		2.42	mg/L	0.050	97	95	105			
Potassium		25.7	mg/L	1.0	103	95	105			
Silicon		4.99	mg/L	0.10	100	95	105			
Sodium		25.7	mg/L	1.0	103	95	105			
Zinc		2.45	mg/L	0.010	98	95	105			
Method: E200.7		Batch: R371636								
Lab ID: MB-7400DIS211213A	15 Method Blank				Run: ICP204-B_211213A				12/13/21 09:51	
Aluminum		ND	mg/L	0.02						
Barium		ND	mg/L	0.001						
Beryllium		ND	mg/L	0.0002						
Boron		ND	mg/L	0.01						
Cadmium		ND	mg/L	0.002						
Calcium		ND	mg/L	0.3						
Chromium		0.003	mg/L	0.002						
Iron		ND	mg/L	0.01						
Magnesium		ND	mg/L	0.02						
Manganese		ND	mg/L	0.001						
Nickel		0.003	mg/L	0.002						
Potassium		ND	mg/L	0.1						
Silicon		ND	mg/L	0.03						
Sodium		ND	mg/L	0.3						
Zinc		ND	mg/L	0.003						
Lab ID: LFB-7400DIS211213A	15 Laboratory Fortified Blank				Run: ICP204-B_211213A				12/13/21 09:59	
Aluminum		5.14	mg/L	0.10	103	85	115			
Barium		0.984	mg/L	0.10	98	85	115			
Beryllium		0.496	mg/L	0.010	99	85	115			
Boron		1.01	mg/L	0.10	101	85	115			
Cadmium		0.482	mg/L	0.010	96	85	115			
Calcium		50.3	mg/L	1.0	101	85	115			
Chromium		0.974	mg/L	0.050	97	85	115			
Iron		5.14	mg/L	0.020	103	85	115			
Magnesium		51.5	mg/L	1.0	103	85	115			
Manganese		4.85	mg/L	0.010	97	85	115			

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Engineering Associates

Work Order: G21120195

Report Date: 12/27/21

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.7										Batch: R371636
Lab ID: LFB-7400DIS211213A	15	Laboratory Fortified Blank		Run: ICP204-B_211213A				12/13/21 09:59		
Nickel		0.942	mg/L	0.050	94	85	115			
Potassium		52.1	mg/L	1.0	104	85	115			
Silicon		9.98	mg/L	0.10	100	85	115			
Sodium		51.0	mg/L	1.0	102	85	115			
Zinc		0.970	mg/L	0.010	97	85	115			
Lab ID: B21120762-001AMS2	15	Sample Matrix Spike		Run: ICP204-B_211213A				12/13/21 11:39		
Aluminum		5.08	mg/L	0.030	102	70	130			
Barium		1.02	mg/L	0.050	99	70	130			
Beryllium		0.487	mg/L	0.0010	97	70	130			
Boron		1.61	mg/L	0.050	101	70	130			
Cadmium		0.494	mg/L	0.0016	99	70	130			
Calcium		56.6	mg/L	1.0	100	70	130			
Chromium		0.975	mg/L	0.0050	98	70	130			
Iron		5.30	mg/L	0.020	100	70	130			
Magnesium		55.3	mg/L	1.0	102	70	130			
Manganese		4.78	mg/L	0.0010	95	70	130			
Nickel		0.954	mg/L	0.010	95	70	130			
Potassium		56.5	mg/L	1.0	106	70	130			
Silicon		16.0	mg/L	0.10	100	70	130			
Sodium		230	mg/L	1.0	100	70	130			
Zinc		1.02	mg/L	0.010	99	70	130			
Lab ID: B21120762-001AMSD	15	Sample Matrix Spike Duplicate		Run: ICP204-B_211213A				12/13/21 11:43		
Aluminum		5.05	mg/L	0.030	101	70	130	0.6	20	
Barium		1.02	mg/L	0.050	99	70	130	0.3	20	
Beryllium		0.487	mg/L	0.0010	97	70	130	0.2	20	
Boron		1.60	mg/L	0.050	100	70	130	0.4	20	
Cadmium		0.496	mg/L	0.0016	99	70	130	0.4	20	
Calcium		56.8	mg/L	1.0	101	70	130	0.5	20	
Chromium		0.979	mg/L	0.0050	98	70	130	0.4	20	
Iron		5.28	mg/L	0.020	100	70	130	0.2	20	
Magnesium		55.5	mg/L	1.0	102	70	130	0.4	20	
Manganese		4.77	mg/L	0.0010	95	70	130	0.2	20	
Nickel		0.960	mg/L	0.010	96	70	130	0.7	20	
Potassium		56.5	mg/L	1.0	106	70	130	0	20	
Silicon		15.9	mg/L	0.10	99	70	130	0.3	20	
Sodium		229	mg/L	1.0	99	70	130	0.3	20	
Zinc		1.03	mg/L	0.010	99	70	130	0.4	20	
Lab ID: MB-162083	16	Method Blank		Run: ICP204-B_211213A				12/13/21 21:32		
Aluminum		ND	mg/L	0.02						
Barium		ND	mg/L	0.001						
Beryllium		ND	mg/L	0.0002						
Boron		ND	mg/L	0.01						
Cadmium		ND	mg/L	0.002						

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)



QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Engineering Associates

Work Order: G21120195

Report Date: 12/27/21

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.7										Batch: R371636
Lab ID: MB-162083	16 Method Blank				Run: ICP204-B_211213A				12/13/21 21:32	
Calcium		ND	mg/L	0.3						
Chromium		ND	mg/L	0.002						
Iron		ND	mg/L	0.01						
Magnesium		ND	mg/L	0.02						
Manganese		ND	mg/L	0.001						
Nickel		ND	mg/L	0.002						
Potassium		ND	mg/L	0.1						
Silicon		ND	mg/L	0.03						
Sodium		ND	mg/L	0.3						
Zinc		ND	mg/L	0.003						
Silicon as SiO ₂		ND	mg/L	0.07						

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Engineering Associates

Work Order: G21120195

Report Date: 12/27/21

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.8										Analytical Run: ICPMS208-B_211213A
Lab ID: QCS	5	Initial Calibration Verification Standard								12/13/21 11:58
Antimony		0.0493	mg/L	0.050	99	90	110			
Copper		0.0523	mg/L	0.010	105	90	110			
Lead		0.0500	mg/L	0.010	100	90	110			
Thallium		0.0494	mg/L	0.10	99	90	110			
Uranium		0.0532	mg/L	0.00030	106	90	110			
Method: E200.8										Batch: R371658
Lab ID: LFB	5	Laboratory Fortified Blank								Run: ICPMS208-B_211213A 12/13/21 12:17
Antimony		0.0482	mg/L	0.050	96	85	115			
Copper		0.0499	mg/L	0.010	100	85	115			
Lead		0.0482	mg/L	0.010	96	85	115			
Thallium		0.0475	mg/L	0.10	95	85	115			
Uranium		0.0498	mg/L	0.00030	100	85	115			
Lab ID: LRB	5	Method Blank								Run: ICPMS208-B_211213A 12/13/21 12:28
Antimony		ND	mg/L	0.00005						
Copper		ND	mg/L	0.0004						
Lead		ND	mg/L	0.00004						
Thallium		ND	mg/L	0.00006						
Uranium		ND	mg/L	0.00001						
Lab ID: G21120195-001CMS	5	Sample Matrix Spike								Run: ICPMS208-B_211213A 12/13/21 15:30
Antimony		0.0454	mg/L	0.0010	91	70	130			
Copper		0.0437	mg/L	0.0050	87	70	130			
Lead		0.0429	mg/L	0.0010	86	70	130			
Thallium		0.0432	mg/L	0.00050	86	70	130			
Uranium		0.0457	mg/L	0.00030	89	70	130			
Lab ID: G21120195-001CMSD	5	Sample Matrix Spike Duplicate								Run: ICPMS208-B_211213A 12/13/21 15:34
Antimony		0.0459	mg/L	0.0010	92	70	130	1.0	20	
Copper		0.0430	mg/L	0.0050	86	70	130	1.6	20	
Lead		0.0431	mg/L	0.0010	86	70	130	0.4	20	
Thallium		0.0431	mg/L	0.00050	86	70	130	0.2	20	
Uranium		0.0457	mg/L	0.00030	89	70	130	0	20	
Lab ID: MB-162082	5	Method Blank								Run: ICPMS208-B_211213A 12/14/21 00:47
Antimony		ND	mg/L	0.00005						
Copper		ND	mg/L	0.0004						
Lead		ND	mg/L	0.00004						
Thallium		ND	mg/L	0.00006						
Uranium		ND	mg/L	0.00001						

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Engineering Associates

Work Order: G21120195

Report Date: 12/27/21

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.8 Analytical Run: ICPMS208-B_211214A										
Lab ID: QCS		Initial Calibration Verification Standard 12/14/21 17:20								
Selenium		0.0512	mg/L	0.0050	102	90	110			
Method: E200.8 Batch: R371806										
Lab ID: LRB		Method Blank Run: ICPMS208-B_211214A 12/14/21 13:43								
Selenium		ND	mg/L	0.00005						
Lab ID: LFB		Laboratory Fortified Blank Run: ICPMS208-B_211214A 12/14/21 13:47								
Selenium		0.0509	mg/L	0.0050	102	85	115			
Lab ID: B21120921-001BMS		Sample Matrix Spike Run: ICPMS208-B_211214A 12/14/21 21:21								
Selenium		0.0543	mg/L	0.0010	108	70	130			
Lab ID: B21120921-001BMSD		Sample Matrix Spike Duplicate Run: ICPMS208-B_211214A 12/14/21 21:25								
Selenium		0.0536	mg/L	0.0010	106	70	130	1.3	20	
Lab ID: MB-162082		Method Blank Run: ICPMS208-B_211214A 12/15/21 00:07								
Selenium		ND	mg/L	0.00005						
Method: E200.8 Analytical Run: ICPMS208-B_211215A										
Lab ID: QCS		Initial Calibration Verification Standard 12/16/21 01:14								
Arsenic		0.0494	mg/L	0.0050	99	90	110			
Method: E200.8 Batch: R371853										
Lab ID: LRB		Method Blank Run: ICPMS208-B_211215A 12/15/21 13:54								
Arsenic		ND	mg/L	0.00005						
Lab ID: LFB		Laboratory Fortified Blank Run: ICPMS208-B_211215A 12/15/21 13:58								
Arsenic		0.0506	mg/L	0.0050	101	85	115			
Lab ID: B21120893-001CMS		Sample Matrix Spike Run: ICPMS208-B_211215A 12/16/21 01:56								
Arsenic		0.0521	mg/L	0.0010	104	70	130			
Lab ID: B21120893-001CMSD		Sample Matrix Spike Duplicate Run: ICPMS208-B_211215A 12/16/21 02:00								
Arsenic		0.0528	mg/L	0.0010	106	70	130	1.4	20	
Lab ID: B21120874-002AMS		Sample Matrix Spike Run: ICPMS208-B_211215A 12/16/21 03:37								
Arsenic		0.0534	mg/L	0.0011	103	70	130			
Lab ID: B21120874-002AMSD		Sample Matrix Spike Duplicate Run: ICPMS208-B_211215A 12/16/21 03:41								
Arsenic		0.0521	mg/L	0.0011	100	70	130	2.5	20	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)



QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Engineering Associates

Work Order: G21120195

Report Date: 12/27/21

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E245.1										Analytical Run: HGCV202-B_211214A
Lab ID: ICV		Initial Calibration Verification Standard								12/14/21 11:47
Mercury		0.00197	mg/L	0.00010	98	90	110			
Method: E245.1										Batch: 162138
Lab ID: MB-162138		Method Blank					Run: HGCV202-B_211214A			12/14/21 15:10
Mercury		ND	mg/L	0.00003						
Lab ID: LCS-162138		Laboratory Control Sample					Run: HGCV202-B_211214A			12/14/21 15:12
Mercury		0.00179	mg/L	0.00010	89	85	115			
Lab ID: B21120906-002DMS		Sample Matrix Spike					Run: HGCV202-B_211214A			12/14/21 15:46
Mercury		0.00182	mg/L	0.00010	90	70	130			
Lab ID: B21120906-002DMSD		Sample Matrix Spike Duplicate					Run: HGCV202-B_211214A			12/14/21 15:47
Mercury		0.00183	mg/L	0.00010	90	70	130	0.6	30	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Engineering Associates

Work Order: G21120195

Report Date: 12/27/21

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E300.0										Analytical Run: IC METROHM 2_211216A
Lab ID: ICV	2	Initial Calibration Verification Standard								12/17/21 00:26
Chloride		25.8	mg/L	1.0	103	90	110			
Sulfate		104	mg/L	1.0	104	90	110			
Method: E300.0										Batch: R371954
Lab ID: B21120887-001AMS	2	Sample Matrix Spike								Run: IC METROHM 2_211216A 12/19/21 11:02
Chloride		237	mg/L	1.3	104	90	110			
Sulfate		3100	mg/L	2.6		90	110			A
Lab ID: B21120887-001AMSD	2	Sample Matrix Spike Duplicate								Run: IC METROHM 2_211216A 12/19/21 11:20
Chloride		238	mg/L	1.3	105	90	110	0.3	20	
Sulfate		3100	mg/L	2.6		90	110	0	20	A
Lab ID: ICB	2	Method Blank								Run: IC METROHM 2_211216A 12/17/21 00:44
Chloride		ND	mg/L	0.06						
Sulfate		ND	mg/L	0.3						
Lab ID: LFB	2	Laboratory Fortified Blank								Run: IC METROHM 2_211216A 12/17/21 01:36
Chloride		26	mg/L	1.0	105	90	110			
Sulfate		110	mg/L	1.0	107	90	110			

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

A - Analyte level was greater than four times the spike level - in accordance with the method, percent recovery is not calculated



QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Engineering Associates

Work Order: G21120195

Report Date: 12/27/21

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E353.2										Analytical Run: FIA203-B_211210A
Lab ID: ICV										12/10/21 11:02
Initial Calibration Verification Standard										
Nitrogen, Nitrite as N		0.517	mg/L	0.010	103	90	110			
Method: E353.2										Batch: R371537
Lab ID: MBLK										12/10/21 11:03
Method Blank										Run: FIA203-B_211210A
Nitrogen, Nitrite as N		ND	mg/L	0.007						
Lab ID: LFB										12/10/21 11:06
Laboratory Fortified Blank										Run: FIA203-B_211210A
Nitrogen, Nitrite as N		0.529	mg/L	0.010	106	90	110			
Lab ID: B21120801-001AMS										12/10/21 11:09
Sample Matrix Spike										Run: FIA203-B_211210A
Nitrogen, Nitrite as N		0.526	mg/L	0.010	99	90	110			
Lab ID: B21120801-001AMSD										12/10/21 11:11
Sample Matrix Spike Duplicate										Run: FIA203-B_211210A
Nitrogen, Nitrite as N		0.540	mg/L	0.010	102	90	110	2.6	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)



QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Engineering Associates

Work Order: G21120195

Report Date: 12/27/21

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: Kelada-01								Analytical Run: SFA-201-B_211210C		
Lab ID: ICV	Initial Calibration Verification Standard								12/10/21	14:26
Cyanide, Total		0.103	mg/L	0.0050	103	90	110			
Method: Kelada-01								Batch: R371582		
Lab ID: ICB	Method Blank					Run: SFA-201-B_211210C			12/10/21	14:28
Cyanide, Total		ND	mg/L	0.002						
Lab ID: LFB	Laboratory Fortified Blank					Run: SFA-201-B_211210C			12/10/21	14:30
Cyanide, Total		0.106	mg/L	0.0050	106	90	110			
Lab ID: LCS1-K4Fe(CN)6	Laboratory Control Sample					Run: SFA-201-B_211210C			12/10/21	14:32
Cyanide, Total		0.207	mg/L	0.0050	103	90	110			
Lab ID: G21120195-001EMS	Sample Matrix Spike					Run: SFA-201-B_211210C			12/10/21	14:57
Cyanide, Total		0.103	mg/L	0.0050	103	90	110			
Lab ID: G21120195-001EMSD	Sample Matrix Spike Duplicate					Run: SFA-201-B_211210C			12/10/21	14:59
Cyanide, Total		0.108	mg/L	0.0050	108	90	110	4.4	20	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)



QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Engineering Associates

Work Order: G21120195

Report Date: 12/27/21

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: LaMotte DS-1										Batch: R371539
Lab ID: MB-R371539		Method Blank					Run: MISC-WC_211210C			12/10/21 11:15
Surfactants, MBAS		ND	mg/L	1						

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)



QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Engineering Associates

Work Order: G21120195

Report Date: 01/07/22

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E900.0							Batch: GrDW-1576		
Lab ID: Th230-GrDW-1576	Laboratory Control Sample		Run: G542M_211216D				12/23/21 05:46		
Gross Alpha	93	pCi/L		97	80	120			
Gross Alpha precision ($\pm$)	14	pCi/L							
Gross Alpha MDC	0.84	pCi/L							
Lab ID: MB-GrDW-1576	Method Blank		Run: G542M_211216D				12/23/21 05:46		
Gross Alpha	-0.6	pCi/L							U
Gross Alpha precision ($\pm$)	0.7	pCi/L							
Gross Alpha MDC	0.8	pCi/L							
Lab ID: C21120377-004AMS	Sample Matrix Spike		Run: G542M_211216D				12/23/21 05:46		
Gross Alpha	120	pCi/L		121	70	130			
Gross Alpha precision ($\pm$)	18	pCi/L							
Gross Alpha MDC	1.8	pCi/L							
Lab ID: C21120377-004AMSD	Sample Matrix Spike Duplicate		Run: G542M_211216D				12/23/21 05:46		
Gross Alpha	93	pCi/L		97	70	130	22	20	R
Gross Alpha precision ($\pm$)	14	pCi/L							
Gross Alpha MDC	1.6	pCi/L							

- Duplicate RPD is outside of the acceptance range for this analysis. However, the RER is less than or equal to the limit of 2, the RER result is 2.0.

Qualifiers:

RL - Analyte Reporting Limit

R - Relative Percent Difference (RPD) exceeds advisory limit

ND - Not detected at the Reporting Limit (RL)

U - Not detected at Minimum Detectable Concentration (MDC)



QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Engineering Associates

Work Order: G21120195

Report Date: 01/07/22

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E903.0							Batch: RA226DW-0795		
Lab ID: LCS-RA226DW-0795	Laboratory Control Sample				Run: G542M-2_211215B				12/30/21 09:18
Radium 226	19	pCi/L		94	90	110			
Radium 226 precision (±)	3.2	pCi/L							
Radium 226 MDC	0.29	pCi/L							
Lab ID: MB-RA226DW-0795	Method Blank				Run: G542M-2_211215B				12/30/21 09:18
Radium 226	0.1	pCi/L							U
Radium 226 precision (±)	0.3	pCi/L							
Radium 226 MDC	0.3	pCi/L							
Lab ID: G21120195-001ODUP	Sample Duplicate				Run: G542M-2_211215B				12/30/21 09:18
Radium 226	0.91	pCi/L					16	20	
Radium 226 precision (±)	0.37	pCi/L							
Radium 226 MDC	0.29	pCi/L							

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

U - Not detected at Minimum Detectable Concentration (MDC)



QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Engineering Associates

Work Order: G21120195

Report Date: 01/07/22

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: RA-05							Batch: RA228DW-0774		
Lab ID: LCS-228-RA228DW-0774 Laboratory Control Sample							Run: TENNELEC-4_211215A 12/20/21 13:37		
Radium 228	7.6	pCi/L		100	80	120			
Radium 228 precision ($\pm$)	1.8	pCi/L							
Radium 228 MDC	0.77	pCi/L							
Lab ID: MB-228-RA228DW-0774 Method Blank							Run: TENNELEC-4_211215A 12/20/21 13:37		
Radium 228	-0.3	pCi/L							U
Radium 228 precision ($\pm$)	0.7	pCi/L							
Radium 228 MDC	0.8	pCi/L							
Lab ID: C21120401-001JDUP Sample Duplicate							Run: TENNELEC-4_211215A 12/20/21 13:37		
Radium 228	0.87	pCi/L					71	20	R
Radium 228 precision ($\pm$)	0.77	pCi/L							
Radium 228 MDC	0.76	pCi/L							

- Duplicate RPD is outside of the acceptance range for this analysis. However, the RER is less than the limit of 2, the RER result is 0.8.

Qualifiers:

RL - Analyte Reporting Limit

R - Relative Percent Difference (RPD) exceeds advisory limit

ND - Not detected at the Reporting Limit (RL)

U - Not detected at Minimum Detectable Concentration (MDC)

QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Engineering Associates

Work Order: G21120195

Report Date: 01/07/22

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E531.1										Analytical Run: HPLC-2030C-02_211213A
Lab ID: LCS	11 Initial Calibration Verification Standard									12/13/21 15:10
Aldicarb		7.9	ug/L	1.0	99	80	120			
Aldicarb sulfone		7.6	ug/L	1.0	95	80	120			
Aldicarb sulfoxide		8.0	ug/L	1.0	100	80	120			
Carbaryl		8.1	ug/L	1.0	102	80	120			
3-Hydroxycarbofuran		7.9	ug/L	1.0	99	80	120			
Carbofuran		8.4	ug/L	1.0	105	80	120			
Methiocarb		8.2	ug/L	1.0	103	80	120			
Methomyl		8.5	ug/L	1.0	106	80	120			
Oxamyl		8.3	ug/L	1.0	104	80	120			
Baygon		8.2	ug/L	1.0	102	80	120			
Surr: BDMC				1.0	94	70	130			
Lab ID: CCV	11 Continuing Calibration Verification Standard									12/13/21 15:49
Aldicarb		9.8	ug/L	1.0	98	80	120			
Aldicarb sulfone		10.1	ug/L	1.0	101	80	120			
Aldicarb sulfoxide		10.2	ug/L	1.0	102	80	120			
Carbaryl		9.6	ug/L	1.0	96	80	120			
3-Hydroxycarbofuran		10.1	ug/L	1.0	101	80	120			
Carbofuran		10.1	ug/L	1.0	101	80	120			
Methiocarb		9.8	ug/L	1.0	98	80	120			
Methomyl		9.9	ug/L	1.0	99	80	120			
Oxamyl		10.1	ug/L	1.0	101	80	120			
Baygon		9.9	ug/L	1.0	99	80	120			
Surr: BDMC				1.0	98	70	130			
Method: E531.1										Batch: R277787
Lab ID: MBLK	11 Method Blank									Run: HPLC-2030C-02_211213A 12/13/21 14:30
Aldicarb		ND	ug/L	0.09						
Aldicarb sulfone		ND	ug/L	0.1						
Aldicarb sulfoxide		ND	ug/L	0.1						
Carbaryl		ND	ug/L	0.08						
3-Hydroxycarbofuran		ND	ug/L	0.1						
Carbofuran		ND	ug/L	0.09						
Methiocarb		ND	ug/L	0.08						
Methomyl		ND	ug/L	0.1						
Oxamyl		ND	ug/L	0.2						
Baygon		ND	ug/L	0.08						
Surr: BDMC					99	70	130			
Lab ID: G21120195-001GMS	11 Sample Matrix Spike									Run: HPLC-2030C-02_211213A 12/13/21 17:08
Aldicarb		8.0	ug/L	1.0	100	65	135			
Aldicarb sulfone		8.0	ug/L	1.0	101	65	135			
Aldicarb sulfoxide		8.4	ug/L	1.0	105	65	135			
Carbaryl		8.0	ug/L	1.0	100	65	135			
3-Hydroxycarbofuran		8.2	ug/L	1.0	103	65	135			
Carbofuran		8.6	ug/L	1.0	107	65	135			

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)



QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Engineering Associates

Work Order: G21120195

Report Date: 01/07/22

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E531.1										Batch: R277787
Lab ID: G21120195-001GMS	11	Sample Matrix Spike				Run: HPLC-2030C-02_211213A				12/13/21 17:08
Methiocarb		8.0	ug/L	1.0	100	65	135			
Methomyl		8.5	ug/L	1.0	106	65	135			
Oxamyl		8.7	ug/L	1.0	109	65	135			
Baygon		8.3	ug/L	1.0	104	65	135			
Surr: BDMC				1.0	95	70	130			
Lab ID: G21120195-001GMSD										Batch: R277787
	11	Sample Matrix Spike Duplicate				Run: HPLC-2030C-02_211213A				12/13/21 17:48
Aldicarb		7.6	ug/L	1.0	95	65	135	5.1	20	
Aldicarb sulfone		8.0	ug/L	1.0	100	65	135	0.6	20	
Aldicarb sulfoxide		8.4	ug/L	1.0	105	65	135	0.2	20	
Carbaryl		7.5	ug/L	1.0	93	65	135	6.8	20	
3-Hydroxycarbofuran		8.2	ug/L	1.0	102	65	135	0.3	20	
Carbofuran		8.5	ug/L	1.0	106	65	135	1.3	20	
Methiocarb		7.7	ug/L	1.0	96	65	135	4.2	20	
Methomyl		8.4	ug/L	1.0	105	65	135	1.4	20	
Oxamyl		8.7	ug/L	1.0	109	65	135	0.5	20	
Baygon		8.2	ug/L	1.0	103	65	135	1.5	20	
Surr: BDMC				1.0	89	70	130			

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)



QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Engineering Associates

Work Order: G21120195

Report Date: 01/07/22

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E547 Analytical Run: HPLC-2030C-01_211213A										
Lab ID: ICV Initial Calibration Verification Standard 12/13/21 13:09										
Glyphosate	27	ug/L	5.0	107	80	120				
Lab ID: CCV Continuing Calibration Verification Standard 12/13/21 13:24										
Glyphosate	21	ug/L	5.0	104	80	120				
Method: E547 Batch: R277762										
Lab ID: MBLK Method Blank Run: HPLC-2030C-01_211213A 12/13/21 13:40										
Glyphosate	ND	ug/L	0.8							
Lab ID: C21120346-001CMS Sample Matrix Spike Run: HPLC-2030C-01_211213A 12/13/21 14:11										
Glyphosate	26	ug/L	5.0	106	70	130				
Lab ID: C21120346-001CMSD Sample Matrix Spike Duplicate Run: HPLC-2030C-01_211213A 12/13/21 14:26										
Glyphosate	27	ug/L	5.0	106	70	130	0.2	20		

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)



QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Engineering Associates

Work Order: G21120195

Report Date: 01/07/22

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E549.2										Analytical Run: HPLC-2030C-01_211213B
Lab ID: ICV		Initial Calibration Verification Standard								12/13/21 16:54
Diquat		148	ug/L	0.40	99	80	120			
Lab ID: CCV		Continuing Calibration Verification Standard								12/13/21 17:01
Diquat		94.1	ug/L	0.40	94	80	120			
Method: E549.2										Batch: 65213
Lab ID: MB-65213		Method Blank								Run: HPLC-2030C-01_211213B 12/13/21 18:00
Diquat		ND	ug/L	0.2						
Lab ID: LCS-65213		Laboratory Control Sample								Run: HPLC-2030C-01_211213B 12/13/21 18:07
Diquat		4.70	ug/L	0.40	94	70	130			
Lab ID: LCSD-65213		Laboratory Control Sample Duplicate								Run: HPLC-2030C-01_211213B 12/13/21 18:14
Diquat		4.70	ug/L	0.40	94	70	130	0.1	30	
Lab ID: C21120342-001DMS		Sample Matrix Spike								Run: HPLC-2030C-01_211213B 12/13/21 18:27
Diquat		4.46	ug/L	0.40	89	70	130			

Qualifiers:

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QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Engineering Associates

Work Order: G21120195

Report Date: 01/06/22

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E504.1										Analytical Run: 162241
Lab ID: CK2-162241	4	Continuing Calibration Verification Standard								12/16/21 11:45
1,2,3-Trichloropropane		0.0481	ug/L	0.050	96	70	130			
1,2-Dibromo-3-chloropropane		0.0535	ug/L	0.020	107	70	130			
1,2-Dibromoethane		0.0531	ug/L	0.010	106	70	130			
Surr: 1,1,1,2-Tetrachloroethane				0.020	99	70	130			
Lab ID: CK4-162241	4	Continuing Calibration Verification Standard								12/16/21 18:45
1,2,3-Trichloropropane		0.198	ug/L	0.050	99	70	130			
1,2-Dibromo-3-chloropropane		0.205	ug/L	0.020	102	70	130			
1,2-Dibromoethane		0.204	ug/L	0.010	102	70	130			
Surr: 1,1,1,2-Tetrachloroethane				0.020	105	70	130			
Method: E504.1										Batch: 162241
Lab ID: MB-162241	4	Method Blank								Run: GECD.I_211216A 12/16/21 12:05
1,2,3-Trichloropropane		ND	ug/L	0.050						
1,2-Dibromo-3-chloropropane		ND	ug/L	0.020						
1,2-Dibromoethane		ND	ug/L	0.010						
Surr: 1,1,1,2-Tetrachloroethane				0.020	106	70	130			
Lab ID: LCS-162241	4	Laboratory Control Sample								Run: GECD.I_211216A 12/16/21 12:25
1,2,3-Trichloropropane		0.236	ug/L	0.050	94	70	130			
1,2-Dibromo-3-chloropropane		0.244	ug/L	0.020	98	70	130			
1,2-Dibromoethane		0.248	ug/L	0.010	99	70	130			
Surr: 1,1,1,2-Tetrachloroethane				0.020	103	70	130			
Lab ID: LCSDUP-162241	4	Laboratory Control Sample Duplicate								Run: GECD.I_211216A 12/16/21 12:45
1,2,3-Trichloropropane		0.235	ug/L	0.050	94	70	130	0.7	20	
1,2-Dibromo-3-chloropropane		0.241	ug/L	0.020	96	70	130	1.4	20	
1,2-Dibromoethane		0.246	ug/L	0.010	98	70	130	0.8	20	
Surr: 1,1,1,2-Tetrachloroethane				0.020	103	70	130			
Lab ID: G21120195-001FMS	4	Sample Matrix Spike								Run: GECD.I_211216A 12/16/21 18:05
1,2,3-Trichloropropane		0.236	ug/L	0.050	95	65	135			
1,2-Dibromo-3-chloropropane		0.238	ug/L	0.020	95	65	135			
1,2-Dibromoethane		0.243	ug/L	0.010	97	65	135			
Surr: 1,1,1,2-Tetrachloroethane				0.020	104	65	135			

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Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E515.4										Analytical Run: 162280
Lab ID: CAL1-162280	8	Continuing Calibration Verification Standard								12/18/21 00:47
2,4,5-TP (Silvex)		0.230	ug/L	0.25	92	50	150			
2,4-D		1.08	ug/L	1.0	108	50	150			
Dalapon		1.25	ug/L	2.5	125	50	150			
Dicamba		0.645	ug/L	1.0	129	50	150			
Dichlorprop		1.03	ug/L	1.0	103	50	150			
Pentachlorophenol		0.130	ug/L	0.10	130	50	150			
Picloram		0.447	ug/L	0.50	89	50	150			
Surr: 2,4-Dichlorophenylacetic acid					100	70	130			
Lab ID: CAL3-162280	8	Continuing Calibration Verification Standard								12/18/21 11:28
2,4,5-TP (Silvex)		0.800	ug/L	0.25	107	70	130			
2,4-D		3.26	ug/L	1.0	109	70	130			
Dalapon		3.03	ug/L	2.5	101	70	130			
Dicamba		1.63	ug/L	1.0	109	70	130			
Dichlorprop		3.26	ug/L	1.0	109	70	130			
Pentachlorophenol		0.323	ug/L	0.10	108	70	130			
Picloram		1.45	ug/L	0.50	97	70	130			
Surr: 2,4-Dichlorophenylacetic acid					102	70	130			
Method: E515.4										Analytical Run: 162280
Lab ID: CAL1-162280	2	Continuing Calibration Verification Standard								12/18/21 01:23
2,4-DB		1.07	ug/L	1.0	107	50	150			
Dinoseb		1.02	ug/L	1.0	102	50	150			
Lab ID: CAL3-162280	2	Continuing Calibration Verification Standard								12/18/21 12:04
2,4-DB		3.25	ug/L	1.0	108	70	130			
Dinoseb		3.16	ug/L	1.0	105	70	130			
Method: E515.4										Batch: 162280
Lab ID: LCS-162280	8	Laboratory Control Sample				Run: CECD.I_211217A				12/18/21 01:23
2,4,5-TP (Silvex)		1.20	ug/L	0.25	96	70	130			
2,4-D		4.65	ug/L	1.0	93	70	130			
Dalapon		4.36	ug/L	2.5	87	70	130			
Dicamba		2.40	ug/L	1.0	96	70	130			
Dichlorprop		5.02	ug/L	1.0	100	70	130			
Pentachlorophenol		0.517	ug/L	0.10	103	70	130			
Picloram		2.28	ug/L	0.50	91	70	130			
Surr: 2,4-Dichlorophenylacetic acid					103	70	130			
Lab ID: MB-162280	8	Method Blank				Run: CECD.I_211217A				12/18/21 01:59
2,4,5-TP (Silvex)		ND	ug/L	0.25						
2,4-D		ND	ug/L	1.0						
Dalapon		ND	ug/L	2.5						
Dicamba		ND	ug/L	1.0						
Dichlorprop		ND	ug/L	1.0						
Pentachlorophenol		ND	ug/L	0.10						

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Report Date: 01/06/22

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E515.4										Batch: 162280
Lab ID: MB-162280	8	Method Blank					Run: CECD.I_211217A			12/18/21 01:59
Picloram		ND	ug/L	0.50						
Surr: 2,4-Dichlorophenylacetic acid					99	70	130			
Lab ID: B21121046-001AMS	8	Sample Matrix Spike					Run: CECD.I_211217A			12/18/21 04:21
2,4,5-TP (Silvex)		1.19	ug/L	0.25	95	70	130			
2,4-D		4.69	ug/L	1.0	94	70	130			
Dalapon		4.45	ug/L	2.5	89	70	130			
Dicamba		2.33	ug/L	1.0	93	70	130			
Dichlorprop		4.85	ug/L	1.0	97	70	130			
Pentachlorophenol		0.508	ug/L	0.10	102	70	130			
Picloram		2.30	ug/L	0.50	92	70	130			
Surr: 2,4-Dichlorophenylacetic acid					100	70	130			
Lab ID: B21121046-001AMSD	8	Sample Matrix Spike Duplicate					Run: CECD.I_211217A			12/18/21 04:57
2,4,5-TP (Silvex)		1.19	ug/L	0.25	95	70	130	0.4	30	
2,4-D		4.67	ug/L	1.0	93	70	130	0.4	30	
Dalapon		4.37	ug/L	2.5	87	70	130	1.9	30	
Dicamba		2.31	ug/L	1.0	92	70	130	1.0	30	
Dichlorprop		4.94	ug/L	1.0	99	70	130	1.8	30	
Pentachlorophenol		0.515	ug/L	0.10	103	70	130	1.3	30	
Picloram		2.28	ug/L	0.50	91	70	130	0.7	30	
Surr: 2,4-Dichlorophenylacetic acid					99	70	130			
Lab ID: LCS-162280	2	Laboratory Control Sample					Run: DECD.I_211217A			12/18/21 01:59
2,4-DB		4.44	ug/L	1.0	89	70	130			
Dinoseb		4.37	ug/L	1.0	87	70	130			
Lab ID: MB-162280	2	Method Blank					Run: DECD.I_211217A			12/18/21 02:34
2,4-DB		ND	ug/L	1.0						
Dinoseb		ND	ug/L	1.0						
Lab ID: B21121046-001AMS	2	Sample Matrix Spike					Run: DECD.I_211217A			12/18/21 04:57
2,4-DB		4.28	ug/L	1.0	86	70	130			
Dinoseb		4.22	ug/L	1.0	84	70	130			
Lab ID: B21121046-001AMSD	2	Sample Matrix Spike Duplicate					Run: DECD.I_211217A			12/18/21 05:32
2,4-DB		4.39	ug/L	1.0	88	70	130	2.4	30	
Dinoseb		4.32	ug/L	1.0	86	70	130	2.2	30	

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Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E524.2										Analytical Run: R371654
Lab ID: CCV121021										12/10/21 10:25
65 Continuing Calibration Verification Standard										
Benzene		4.76	ug/L	0.50	95	70	130			
Bromobenzene		5.12	ug/L	0.50	102	70	130			
Bromochloromethane		4.91	ug/L	0.50	98	70	130			
Bromodichloromethane		4.84	ug/L	0.50	97	70	130			
Bromoform		4.90	ug/L	0.50	98	70	130			
Bromomethane		4.73	ug/L	0.50	95	70	130			
n-Butylbenzene		5.58	ug/L	0.50	112	70	130			
sec-Butylbenzene		5.15	ug/L	0.50	103	70	130			
tert-Butylbenzene		5.25	ug/L	0.50	105	70	130			
Carbon tetrachloride		5.10	ug/L	0.50	102	70	130			
Chlorobenzene		4.93	ug/L	0.50	99	70	130			
Chlorodibromomethane		4.73	ug/L	0.50	95	70	130			
Chloroethane		4.50	ug/L	0.50	90	70	130			
Chloroform		4.91	ug/L	0.50	98	70	130			
Chloromethane		4.74	ug/L	0.50	95	70	130			
2-Chlorotoluene		5.12	ug/L	0.50	102	70	130			
4-Chlorotoluene		5.13	ug/L	0.50	103	70	130			
1,2-Dibromo-3-chloropropane		5.41	ug/L	1.0	108	70	130			
Dibromomethane		5.03	ug/L	0.50	101	70	130			
1,2-Dichlorobenzene		5.06	ug/L	0.50	101	70	130			
1,3-Dichlorobenzene		5.17	ug/L	0.50	103	70	130			
1,4-Dichlorobenzene		5.02	ug/L	0.50	100	70	130			
Dichlorodifluoromethane		4.87	ug/L	0.50	97	70	130			
1,1-Dichloroethane		5.07	ug/L	0.50	101	70	130			
1,2-Dichloroethane		4.83	ug/L	0.50	97	70	130			
1,2-Dibromoethane		5.10	ug/L	0.50	102	70	130			
1,1-Dichloroethene		4.88	ug/L	0.50	98	70	130			
cis-1,2-Dichloroethene		4.97	ug/L	0.50	99	70	130			
trans-1,2-Dichloroethene		4.85	ug/L	0.50	97	70	130			
1,2-Dichloropropane		4.85	ug/L	0.50	97	70	130			
1,3-Dichloropropane		4.94	ug/L	0.50	99	70	130			
2,2-Dichloropropane		5.01	ug/L	0.50	100	70	130			
1,1-Dichloropropene		4.86	ug/L	0.50	97	70	130			
cis-1,3-Dichloropropene		5.17	ug/L	0.50	103	70	130			
trans-1,3-Dichloropropene		5.38	ug/L	0.50	108	70	130			
Ethylbenzene		5.15	ug/L	0.50	103	70	130			
Hexachlorobutadiene		5.55	ug/L	0.50	111	70	130			
Isopropylbenzene		5.08	ug/L	0.50	102	70	130			
p-Isopropyltoluene		5.21	ug/L	0.50	104	70	130			
Methyl tert-butyl ether (MTBE)		5.16	ug/L	0.50	103	70	130			
Methylene chloride		5.03	ug/L	0.50	101	70	130			
Naphthalene		5.31	ug/L	0.50	106	70	130			
n-Propylbenzene		5.09	ug/L	0.50	102	70	130			
Styrene		5.28	ug/L	0.50	106	70	130			
1,1,1,2-Tetrachloroethane		5.04	ug/L	0.50	101	70	130			

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Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E524.2										Analytical Run: R371654
Lab ID: CCV121021	65 Continuing Calibration Verification Standard									12/10/21 10:25
1,1,2,2-Tetrachloroethane		5.20	ug/L	0.50	104	70	130			
Tetrachloroethene		4.88	ug/L	0.50	98	70	130			
Toluene		4.99	ug/L	0.50	100	70	130			
1,2,3-Trichlorobenzene		5.60	ug/L	0.50	112	70	130			
1,2,4-Trichlorobenzene		4.91	ug/L	0.50	98	70	130			
1,1,1-Trichloroethane		4.89	ug/L	0.50	98	70	130			
1,1,2-Trichloroethane		4.81	ug/L	0.50	96	70	130			
Trichloroethene		4.73	ug/L	0.50	95	70	130			
Trichlorofluoromethane		4.84	ug/L	0.50	97	70	130			
1,2,3-Trichloropropane		5.27	ug/L	0.50	105	70	130			
1,2,4-Trimethylbenzene		5.31	ug/L	0.50	106	70	130			
1,3,5-Trimethylbenzene		5.13	ug/L	0.50	103	70	130			
Vinyl chloride		4.84	ug/L	0.50	97	70	130			
m+p-Xylenes		10.3	ug/L	0.50	103	70	130			
o-Xylene		5.22	ug/L	0.50	104	70	130			
Trihalomethanes, Total		19.4	ug/L	0.50	97	70	130			
Xylenes, Total		15.5	ug/L	0.50	104	70	130			
Surr: p-Bromofluorobenzene				0.50	112	70	130			
Surr: 1,2-Dichloroethane-d4				0.50	107	70	130			
Surr: Toluene-d8				0.50	107	70	130			

Method: E524.2										Batch: R371654
Lab ID: LCS121021	65 Laboratory Control Sample									Run: CS5972A.I_211210A
										12/10/21 11:08
Benzene		4.80	ug/L	0.50	96	70	130			
Bromobenzene		5.18	ug/L	0.50	104	70	130			
Bromochloromethane		4.84	ug/L	0.50	97	70	130			
Bromodichloromethane		5.04	ug/L	0.50	101	70	130			
Bromoform		5.08	ug/L	0.50	102	70	130			
Bromomethane		5.35	ug/L	0.50	107	70	130			
n-Butylbenzene		5.70	ug/L	0.50	114	70	130			
sec-Butylbenzene		5.51	ug/L	0.50	110	70	130			
tert-Butylbenzene		5.14	ug/L	0.50	103	70	130			
Carbon tetrachloride		4.97	ug/L	0.50	99	70	130			
Chlorobenzene		4.96	ug/L	0.50	99	70	130			
Chlorodibromomethane		4.67	ug/L	0.50	93	70	130			
Chloroethane		4.77	ug/L	0.50	95	70	130			
Chloroform		4.78	ug/L	0.50	96	70	130			
Chloromethane		4.57	ug/L	0.50	91	70	130			
2-Chlorotoluene		5.14	ug/L	0.50	103	70	130			
4-Chlorotoluene		5.34	ug/L	0.50	107	70	130			
1,2-Dibromo-3-chloropropane		5.29	ug/L	1.0	106	70	130			
Dibromomethane		5.02	ug/L	0.50	100	70	130			
1,2-Dichlorobenzene		5.36	ug/L	0.50	107	70	130			
1,3-Dichlorobenzene		5.31	ug/L	0.50	106	70	130			
1,4-Dichlorobenzene		5.22	ug/L	0.50	104	70	130			

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Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E524.2										Batch: R371654
Lab ID: LCS121021	65 Laboratory Control Sample					Run: CS5972A.I_211210A			12/10/21 11:08	
Dichlorodifluoromethane		4.53	ug/L	0.50	91	70	130			
1,1-Dichloroethane		5.13	ug/L	0.50	103	70	130			
1,2-Dichloroethane		4.65	ug/L	0.50	93	70	130			
1,2-Dibromoethane		5.12	ug/L	0.50	102	70	130			
1,1-Dichloroethene		5.06	ug/L	0.50	101	70	130			
cis-1,2-Dichloroethene		5.04	ug/L	0.50	101	70	130			
trans-1,2-Dichloroethene		4.85	ug/L	0.50	97	70	130			
1,2-Dichloropropane		5.14	ug/L	0.50	103	70	130			
1,3-Dichloropropane		4.67	ug/L	0.50	93	70	130			
2,2-Dichloropropane		4.96	ug/L	0.50	99	70	130			
1,1-Dichloropropene		4.78	ug/L	0.50	96	70	130			
cis-1,3-Dichloropropene		5.08	ug/L	0.50	102	70	130			
trans-1,3-Dichloropropene		5.48	ug/L	0.50	110	70	130			
Ethylbenzene		5.18	ug/L	0.50	104	70	130			
Hexachlorobutadiene		5.72	ug/L	0.50	114	70	130			
Isopropylbenzene		5.33	ug/L	0.50	107	70	130			
p-Isopropyltoluene		5.64	ug/L	0.50	113	70	130			
Methyl tert-butyl ether (MTBE)		5.69	ug/L	0.50	114	70	130			
Methylene chloride		5.04	ug/L	0.50	101	70	130			
Naphthalene		5.30	ug/L	0.50	106	70	130			
n-Propylbenzene		5.02	ug/L	0.50	100	70	130			
Styrene		5.32	ug/L	0.50	106	70	130			
1,1,1,2-Tetrachloroethane		4.99	ug/L	0.50	100	70	130			
1,1,2,2-Tetrachloroethane		5.23	ug/L	0.50	105	70	130			
Tetrachloroethene		5.01	ug/L	0.50	100	70	130			
Toluene		5.06	ug/L	0.50	101	70	130			
1,2,3-Trichlorobenzene		5.48	ug/L	0.50	110	70	130			
1,2,4-Trichlorobenzene		5.06	ug/L	0.50	101	70	130			
1,1,1-Trichloroethane		4.80	ug/L	0.50	96	70	130			
1,1,2-Trichloroethane		4.89	ug/L	0.50	98	70	130			
Trichloroethene		4.97	ug/L	0.50	99	70	130			
Trichlorofluoromethane		4.81	ug/L	0.50	96	70	130			
1,2,3-Trichloropropane		5.11	ug/L	0.50	102	70	130			
1,2,4-Trimethylbenzene		5.03	ug/L	0.50	101	70	130			
1,3,5-Trimethylbenzene		5.34	ug/L	0.50	107	70	130			
Vinyl chloride		5.15	ug/L	0.50	103	70	130			
m+p-Xylenes		10.2	ug/L	0.50	102	70	130			
o-Xylene		5.32	ug/L	0.50	106	70	130			
Trihalomethanes, Total		19.6	ug/L	0.50	98	70	130			
Xylenes, Total		15.5	ug/L	0.50	103	70	130			
Surr: p-Bromofluorobenzene				0.50	107	70	130			
Surr: 1,2-Dichloroethane-d4				0.50	105	70	130			
Surr: Toluene-d8				0.50	110	70	130			

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Engineering Associates

Work Order: G21120195

Report Date: 01/06/22

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E524.2										Batch: R371654
Lab ID: MBLK121021	65	Method Blank		Run: CS5972A.I_211210A				12/10/21 12:04		
Benzene		ND	ug/L	0.50						
Bromobenzene		ND	ug/L	0.50						
Bromochloromethane		ND	ug/L	0.50						
Bromodichloromethane		ND	ug/L	0.50						
Bromoform		ND	ug/L	0.50						
Bromomethane		ND	ug/L	0.50						
n-Butylbenzene		ND	ug/L	0.50						
sec-Butylbenzene		ND	ug/L	0.50						
tert-Butylbenzene		ND	ug/L	0.50						
Carbon tetrachloride		ND	ug/L	0.50						
Chlorobenzene		ND	ug/L	0.50						
Chlorodibromomethane		ND	ug/L	0.50						
Chloroethane		ND	ug/L	0.50						
Chloroform		ND	ug/L	0.50						
Chloromethane		ND	ug/L	0.50						
2-Chlorotoluene		ND	ug/L	0.50						
4-Chlorotoluene		ND	ug/L	0.50						
1,2-Dibromo-3-chloropropane		ND	ug/L	1.0						
Dibromomethane		ND	ug/L	0.50						
1,2-Dichlorobenzene		ND	ug/L	0.50						
1,3-Dichlorobenzene		ND	ug/L	0.50						
1,4-Dichlorobenzene		ND	ug/L	0.50						
Dichlorodifluoromethane		ND	ug/L	0.50						
1,1-Dichloroethane		ND	ug/L	0.50						
1,2-Dichloroethane		ND	ug/L	0.50						
1,2-Dibromoethane		ND	ug/L	0.50						
1,1-Dichloroethene		ND	ug/L	0.50						
cis-1,2-Dichloroethene		ND	ug/L	0.50						
trans-1,2-Dichloroethene		ND	ug/L	0.50						
1,2-Dichloropropane		ND	ug/L	0.50						
1,3-Dichloropropane		ND	ug/L	0.50						
2,2-Dichloropropane		ND	ug/L	0.50						
1,1-Dichloropropene		ND	ug/L	0.50						
cis-1,3-Dichloropropene		ND	ug/L	0.50						
trans-1,3-Dichloropropene		ND	ug/L	0.50						
Ethylbenzene		ND	ug/L	0.50						
Hexachlorobutadiene		ND	ug/L	0.50						
Isopropylbenzene		ND	ug/L	0.50						
p-Isopropyltoluene		ND	ug/L	0.50						
Methyl tert-butyl ether (MTBE)		ND	ug/L	0.50						
Methylene chloride		ND	ug/L	0.50						
Naphthalene		ND	ug/L	0.50						
n-Propylbenzene		ND	ug/L	0.50						
Styrene		ND	ug/L	0.50						
1,1,1,2-Tetrachloroethane		ND	ug/L	0.50						

Qualifiers:

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QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Engineering Associates

Work Order: G21120195

Report Date: 01/06/22

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E524.2										Batch: R371654
Lab ID: MBLK121021	65	Method Blank		Run: CS5972A.I_211210A				12/10/21 12:04		
1,1,2,2-Tetrachloroethane		ND	ug/L	0.50						
Tetrachloroethene		ND	ug/L	0.50						
Toluene		ND	ug/L	0.50						
1,2,3-Trichlorobenzene		ND	ug/L	0.50						
1,2,4-Trichlorobenzene		ND	ug/L	0.50						
1,1,1-Trichloroethane		ND	ug/L	0.50						
1,1,2-Trichloroethane		ND	ug/L	0.50						
Trichloroethene		ND	ug/L	0.50						
Trichlorofluoromethane		ND	ug/L	0.50						
1,2,3-Trichloropropane		ND	ug/L	0.50						
1,2,4-Trimethylbenzene		ND	ug/L	0.50						
1,3,5-Trimethylbenzene		ND	ug/L	0.50						
Vinyl chloride		ND	ug/L	0.20						
m+p-Xylenes		ND	ug/L	0.50						
o-Xylene		ND	ug/L	0.50						
Trihalomethanes, Total		ND	ug/L	0.50						
Xylenes, Total		ND	ug/L	0.50						
Surr: p-Bromofluorobenzene				0.50	115	70	130			
Surr: 1,2-Dichloroethane-d4				0.50	108	70	130			
Surr: Toluene-d8				0.50	109	70	130			

Qualifiers:

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QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Engineering Associates

Work Order: G21120195

Report Date: 01/06/22

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E525.2										Batch: 162102
Lab ID: MB-162102	32	Method Blank		Run: SVSATURN2_211213A				12/13/21 18:04		
Alachlor		ND	ug/L	0.10						
Aldrin		ND	ug/L	0.10						
Aroclor 1016		ND	ug/L	0.080						
Aroclor 1221		ND	ug/L	2.0						
Aroclor 1232		ND	ug/L	0.50						
Aroclor 1242		ND	ug/L	0.30						
Aroclor 1248		ND	ug/L	0.10						
Aroclor 1254		ND	ug/L	0.10						
Aroclor 1260		ND	ug/L	0.20						
Atrazine		ND	ug/L	0.10						
Benzo(a)pyrene		ND	ug/L	0.10						
bis(2-ethylhexyl)Adipate		ND	ug/L	0.50						
bis(2-ethylhexyl)Phthalate		ND	ug/L	0.60						
Butachlor		ND	ug/L	0.10						
Chlordane		ND	ug/L	1.0						
Dieldrin		ND	ug/L	0.10						
Endrin		ND	ug/L	0.10						
gamma-BHC (Lindane)		ND	ug/L	0.10						
Heptachlor		ND	ug/L	0.10						
Heptachlor epoxide		ND	ug/L	0.10						
Hexachlorobenzene		ND	ug/L	0.10						
Hexachlorocyclopentadiene		ND	ug/L	0.10						
Methoxychlor		ND	ug/L	0.10						
Metolachlor		ND	ug/L	0.10						
Metribuzin		ND	ug/L	0.10						
Propachlor		ND	ug/L	0.10						
Simazine		ND	ug/L	0.10						
Toxaphene		ND	ug/L	2.0						
Surr: 1,3-Dimethyl-2-nitrobenzene				0.10	93	70	130			
Surr: Perylene-d12				0.10	99	70	130			
Surr: Pyrene-d10				0.10	101	70	130			
Surr: Triphenylphosphate				0.10	107	70	130			
Lab ID: Ar1660-162102	6	Laboratory Control Sample		Run: SVSATURN2_211213A				12/13/21 18:42		
Aroclor 1016		2.11	ug/L	0.080	105	70	130			
Aroclor 1260		2.31	ug/L	0.20	116	70	130			
Surr: 1,3-Dimethyl-2-nitrobenzene				0.10	100	70	130			
Surr: Perylene-d12				0.10	100	70	130			
Surr: Pyrene-d10				0.10	97	70	130			
Surr: Triphenylphosphate				0.10	116	70	130			
Lab ID: LCS-162102	23	Laboratory Control Sample		Run: SVSATURN2_211213A				12/13/21 19:20		
Alachlor		1.94	ug/L	0.10	97	70	130			
Aldrin		1.86	ug/L	0.10	93	70	130			
Atrazine		2.02	ug/L	0.10	101	70	130			

Qualifiers:

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QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Engineering Associates

Work Order: G21120195

Report Date: 01/06/22

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E525.2										Batch: 162102
Lab ID: LCS-162102	23	Laboratory Control Sample			Run: SVSATURN2_211213A			12/13/21 19:20		
Benzo(a)pyrene		1.74	ug/L	0.10	87	70	130			
bis(2-ethylhexyl)Adipate		2.32	ug/L	0.50	116	70	130			
bis(2-ethylhexyl)Phthalate		2.21	ug/L	0.60	110	70	130			
Butachlor		2.10	ug/L	0.10	105	70	130			
Dieldrin		1.80	ug/L	0.10	90	70	130			
Endrin		1.66	ug/L	0.10	83	70	130			
gamma-BHC (Lindane)		2.08	ug/L	0.10	104	70	130			
Heptachlor		2.04	ug/L	0.10	102	70	130			
Heptachlor epoxide		2.03	ug/L	0.10	102	70	130			
Hexachlorobenzene		1.81	ug/L	0.10	90	70	130			
Hexachlorocyclopentadiene		2.13	ug/L	0.10	107	70	130			
Methoxychlor		2.11	ug/L	0.10	105	70	130			
Metolachlor		1.94	ug/L	0.10	97	70	130			
Metribuzin		1.72	ug/L	0.10	86	70	130			
Propachlor		2.54	ug/L	0.10	127	70	130			
Simazine		2.11	ug/L	0.10	106	70	130			
Surr: 1,3-Dimethyl-2-nitrobenzene				0.10	97	70	130			
Surr: Perylene-d12				0.10	99	70	130			
Surr: Pyrene-d10				0.10	96	70	130			
Surr: Triphenylphosphate				0.10	98	70	130			
Lab ID: TOX-162102	5	Laboratory Control Sample			Run: SVSATURN2_211213A			12/13/21 21:16		
Toxaphene		43.6	ug/L	2.0	109	70	130			
Surr: 1,3-Dimethyl-2-nitrobenzene				0.10	97	70	130			
Surr: Perylene-d12				0.10	97	70	130			
Surr: Pyrene-d10				0.10	100	70	130			
Surr: Triphenylphosphate				0.10	110	70	130			
Lab ID: B21120846-001EMS	23	Sample Matrix Spike			Run: SVSATURN2_211213A			12/13/21 20:00		
Alachlor		3.77	ug/L	0.20	94	70	130			
Aldrin		3.61	ug/L	0.20	90	70	130			
Atrazine		4.15	ug/L	0.20	104	70	130			
Benzo(a)pyrene		3.53	ug/L	0.20	88	70	130			
bis(2-ethylhexyl)Adipate		4.48	ug/L	1.0	112	70	130			
bis(2-ethylhexyl)Phthalate		4.21	ug/L	1.2	105	70	130			
Butachlor		4.18	ug/L	0.20	105	70	130			
Dieldrin		3.92	ug/L	0.20	98	70	130			
Endrin		3.77	ug/L	0.20	94	70	130			
gamma-BHC (Lindane)		3.90	ug/L	0.20	98	70	130			
Heptachlor		4.54	ug/L	0.20	114	70	130			
Heptachlor epoxide		3.97	ug/L	0.20	99	70	130			
Hexachlorobenzene		3.70	ug/L	0.20	92	70	130			
Hexachlorocyclopentadiene		3.31	ug/L	0.20	83	70	130			
Methoxychlor		3.94	ug/L	0.20	99	70	130			
Metolachlor		3.82	ug/L	0.20	95	70	130			

Qualifiers:

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QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Engineering Associates

Work Order: G21120195

Report Date: 01/06/22

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E525.2										Batch: 162102
Lab ID: B21120846-001EMS	23	Sample Matrix Spike		Run: SVSATURN2_211213A				12/13/21 20:00		
Metribuzin		3.98	ug/L	0.20	99	70	130			
Propachlor		4.94	ug/L	0.20	123	70	130			
Simazine		4.39	ug/L	0.20	110	70	130			
Surr: 1,3-Dimethyl-2-nitrobenzene				0.20	98	70	130			
Surr: Perylene-d12				0.20	104	70	130			
Surr: Pyrene-d10				0.20	93	70	130			
Surr: Triphenylphosphate				0.20	106	70	130			
Lab ID: B21120846-001EMSD	23	Sample Matrix Spike Duplicate		Run: SVSATURN2_211213A				12/13/21 20:38		
Alachlor		4.02	ug/L	0.20	101	70	130	6.5	40	
Aldrin		3.88	ug/L	0.20	97	70	130	7.4	40	
Atrazine		4.42	ug/L	0.20	110	70	130	6.4	40	
Benzo(a)pyrene		3.47	ug/L	0.20	87	70	130	1.6	40	
bis(2-ethylhexyl)Adipate		4.12	ug/L	1.0	103	70	130	8.2	40	
bis(2-ethylhexyl)Phthalate		4.03	ug/L	1.2	101	70	130	4.4	40	
Butachlor		4.89	ug/L	0.20	122	70	130	16	40	
Dieldrin		3.83	ug/L	0.20	96	70	130	2.5	40	
Endrin		4.04	ug/L	0.20	101	70	130	6.9	40	
gamma-BHC (Lindane)		4.44	ug/L	0.20	111	70	130	13	40	
Heptachlor		3.78	ug/L	0.20	94	70	130	18	40	
Heptachlor epoxide		4.27	ug/L	0.20	107	70	130	7.2	40	
Hexachlorobenzene		3.47	ug/L	0.20	87	70	130	6.4	40	
Hexachlorocyclopentadiene		3.39	ug/L	0.20	85	70	130	2.2	40	
Methoxychlor		4.06	ug/L	0.20	101	70	130	3.0	40	
Metolachlor		4.25	ug/L	0.20	106	70	130	11	40	
Metribuzin		4.10	ug/L	0.20	103	70	130	3.1	40	
Propachlor		4.65	ug/L	0.20	116	70	130	6.0	40	
Simazine		4.23	ug/L	0.20	106	70	130	3.6	40	
Surr: 1,3-Dimethyl-2-nitrobenzene				0.20	96	70	130			
Surr: Perylene-d12				0.20	99	70	130			
Surr: Pyrene-d10				0.20	96	70	130			
Surr: Triphenylphosphate				0.20	112	70	130			

Qualifiers:

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QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Engineering Associates

Work Order: G21120195

Report Date: 01/06/22

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E525.2										Analytical Run: R371709
Lab ID: 525_CCV_5	23	Continuing Calibration Verification Standard								12/13/21 14:53
Alachlor		1.92	ug/L	0.10	96	70	130			
Aldrin		1.89	ug/L	0.10	95	70	130			
Atrazine		2.14	ug/L	0.10	107	70	130			
Benzo(a)pyrene		1.85	ug/L	0.10	93	70	130			
bis(2-ethylhexyl)Adipate		2.07	ug/L	0.50	103	70	130			
bis(2-ethylhexyl)Phthalate		2.03	ug/L	0.60	102	70	130			
Butachlor		1.96	ug/L	0.10	98	70	130			
Dieldrin		1.67	ug/L	0.10	83	70	130			
Endrin		1.76	ug/L	0.10	88	70	130			
gamma-BHC (Lindane)		1.89	ug/L	0.10	94	70	130			
Heptachlor		2.02	ug/L	0.10	101	70	130			
Heptachlor epoxide		2.04	ug/L	0.10	102	70	130			
Hexachlorobenzene		2.00	ug/L	0.10	100	70	130			
Hexachlorocyclopentadiene		2.14	ug/L	0.10	107	70	130			
Methoxychlor		1.84	ug/L	0.10	92	70	130			
Metolachlor		1.88	ug/L	0.10	94	70	130			
Metribuzin		2.21	ug/L	0.10	111	70	130			
Propachlor		2.22	ug/L	0.10	111	70	130			
Simazine		2.19	ug/L	0.10	110	70	130			
Surr: 1,3-Dimethyl-2-nitrobenzene				0.10	95	70	130			
Surr: Perylene-d12				0.10	96	70	130			
Surr: Pyrene-d10				0.10	93	70	130			
Surr: Triphenylphosphate				0.10	101	70	130			
Lab ID: Ar1660_CCV_5	6	Continuing Calibration Verification Standard								12/13/21 15:31
Aroclor 1016		1.77	ug/L	0.080	110	70	130			
Aroclor 1260		3.90	ug/L	0.20	98	70	130			
Surr: 1,3-Dimethyl-2-nitrobenzene				0.10	104	70	130			
Surr: Perylene-d12				0.10	107	70	130			
Surr: Pyrene-d10				0.10	104	70	130			
Surr: Triphenylphosphate				0.10	105	70	130			
Lab ID: CLD_CCV_5	5	Continuing Calibration Verification Standard								12/13/21 16:10
Chlordane		14.8	ug/L	1.0	74	70	130			
Surr: 1,3-Dimethyl-2-nitrobenzene				0.10	105	70	130			
Surr: Perylene-d12				0.10	96	70	130			
Surr: Pyrene-d10				0.10	95	70	130			
Surr: Triphenylphosphate				0.10	104	70	130			
Lab ID: TOX_CCV_5	5	Continuing Calibration Verification Standard								12/13/21 16:48
Toxaphene		43.8	ug/L	2.0	110	70	130			
Surr: 1,3-Dimethyl-2-nitrobenzene				0.10	103	70	130			
Surr: Perylene-d12				0.10	106	70	130			
Surr: Pyrene-d10				0.10	96	70	130			
Surr: Triphenylphosphate				0.10	110	70	130			

Qualifiers:

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QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Engineering Associates

Work Order: G21120195

Report Date: 01/06/22

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E548.1										Analytical Run: 161978
Lab ID: CCV-4-161978	2	Continuing Calibration Verification Standard								12/16/21 13:06
Endothall		2.20	ug/L	2.0	88	70	130			
Surr: 2,4-Dichlorophenylacetic acid				10	91	70	130			
Method: E548.1										Batch: 162201
Lab ID: MB-162201	2	Method Blank								Run: SV5975.I_211216A 12/16/21 13:46
Endothall		ND	ug/L	2.0						
Surr: 2,4-Dichlorophenylacetic acid				10	100	70	130			
Lab ID: LCS-162201	2	Laboratory Control Sample								Run: SV5975.I_211216A 12/16/21 14:06
Endothall		9.08	ug/L	2.0	91	70	130			
Surr: 2,4-Dichlorophenylacetic acid				10	114	70	130			
Lab ID: G21120195-001MMS	2	Sample Matrix Spike								Run: SV5975.I_211216A 12/16/21 14:46
Endothall		98.8	ug/L	8.0	99	70	130			
Surr: 2,4-Dichlorophenylacetic acid				100	122	70	130			
Lab ID: G21120195-001MMSD	2	Sample Matrix Spike Duplicate								Run: SV5975.I_211216A 12/16/21 15:06
Endothall		100	ug/L	8.0	100	70	130	1.6	30	
Surr: 2,4-Dichlorophenylacetic acid				100	121	70	130			

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)



Work Order Receipt Checklist

Engineering Associates

G21120195

Login completed by: Chantel S. Johnson

Date Received: 12/9/2021

Reviewed by: Misty Stephens

Received by: csj

Reviewed Date: 12/10/2021

Carrier name: Hand Del

Shipping container/cooler in good condition?	Yes ☒	No ☐	Not Present ☐
Custody seals intact on all shipping container(s)/cooler(s)?	Yes ☐	No ☐	Not Present ☒
Custody seals intact on all sample bottles?	Yes ☐	No ☐	Not Present ☒
Chain of custody present?	Yes ☒	No ☐	
Chain of custody signed when relinquished and received?	Yes ☒	No ☐	
Chain of custody agrees with sample labels?	Yes ☒	No ☐	
Samples in proper container/bottle?	Yes ☒	No ☐	
Sample containers intact?	Yes ☒	No ☐	
Sufficient sample volume for indicated test?	Yes ☒	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes ☒	No ☐	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes ☒	No ☐	Not Applicable ☐
Container/Temp Blank temperature:	12.8°C From Field		
Containers requiring zero headspace have no headspace or bubble that is <6mm (1/4").	Yes ☒	No ☐	No VOA vials submitted ☐
Water - pH acceptable upon receipt?	Yes ☒	No ☐	Not Applicable ☐

Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

Radiochemical precision results represent a 2-sigma Total Measurement Uncertainty.

Contact and Corrective Action Comments:

None



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Account Information *(Billing information)*

Company/Name ENGINEERING ASSOCIATES		
Contact JOHN WETSTEIN		
Phone 307-742-9220		
Mailing Address P.O. Box 2262		
City, State, Zip LARAMIE, WY 82073		
Email JOHN.WETSTEIN@EAENGINEERS.COM		
Receive Invoice ☐ Hard Copy ☒ Email	Receive Report ☐ Hard Copy ☒ Email	
Purchase Order	Quote	Bottle Order 2357

Report Information (if different than Account Information)

Company/Name

Contact

Phone

Mailing Address

City, State, Zip

Email

Receive Report ☐ Hard Copy ☐ Email

Special Report/Formats:

☐ LEVEL IV ☐ NELAC ☐ EDD/EDT (contact laboratory) ☐ Other _____

Comments

Project Information

Project Name, PWSID Permit, etc. KASKI WEH #2	
Sampler Name JOHN WEISTEIN	Sampler Phone 307-742-9220
Sample Origin State S.D.	EPA/State Compliance ☐ Yes ☒ No
URANIUM MINING CLIENTS MUST Indicate sample type ☐ Unprocessed Ore ☐ Processed Ore (Ground or Refined) **CALL BEFORE SENDING ☐ 11(a)2 Byproduct Material (Can ONLY be Submitted to ELI Casper Location)	

Matrix Codes

A - Air
W - Water
 S - Soils/
 Solids
 V - Vegetation
 B - Bloassay
 O - Oil
 DW - Drinking
 Water

Analysis Requested

[illegible]

ELI is REQUIRED to provide preservative traceability. If the preservatives supplied with the bottle order were **NOT** used, please attach your preservative information with this COC

Custody Record MUST be signed	Relinquished by (print) JOHN WETSTEIN	Date/Time 12-9-21 / 12:00	Signature <i>[Signature]</i>	Received by (print) ROBERT NIKOLAS	Date/Time 12-9-21 / 12:00	Signature <i>[Signature]</i>
	Relinquished by (print) <i>[Signature]</i>	Date/Time	Signature	Received by Laboratory (print) Walter Brown	Date/Time 12/9/2021 14:30	Signature <i>[Signature]</i>
LABORATORY USE ONLY						
Shipped By <i>[Signature]</i>	Cooler ID# 7	Custody Seal Y N C B	Intact Y N	Receipt Temp 12.5 C	Temp Blank Y N	On Ice Y N
Payment Type CC Cash Check			Amount \$		Receipt Number (cash/check only)	

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All subcontracted data will be clearly notated on your analytical report.

Bottle Size/Type	Bottles Per Samp	Method	Tests	Critical Hold Time	Preservative	Notes	Num of Samp
WWDC Final							
1 Liter Plastic	4	E300.0	Anions by Ion Chromatography			ok	1
		A2340 B	Sample Filtering				
		A2340 B	Hardness				
		E200.7_8	Metals by ICP/ICPMS, Dissolved				
		A2310 B	Acidity, Total as CaCO3				
		A2320 B	Alkalinity				
		A2510 B	Conductivity				
		Calculation	Corrosivity, Calculated				
		A4500-F C	Fluoride				
		A4500-NO2 B	Nitrogen, Nitrite	48.00 hrs			
		A4500-H B	pH	0.25 hrs			
		A2540 C	Solids, Total Dissolved				
		A2130 B	Turbidity	48.00 hrs			
		LaMotte DS-1	Foaming Agents	48.00 hrs			
		A2120 B	Color	48.00 hrs			
1 Liter Clear Glass Narrow Mouth	1	E140 1	Odor	48 00 hrs		ok	1
250 mL Plastic	1	E200.7_8	Metals by ICP/ICPMS, Drinking Water		☐ HNO3	ok ok ok	1
		E245.1	Mercury, Drinking Water				
250 mL Plastic	1	E353.2	Nitrogen, Nitrate + Nitrite		☐ H2SO4		1
500 mL Amber Plastic	1	Kelada-01	Cyanide, SDWA		☐ NaOH	ok	1
1 Liter Amber Glass Narrow Mouth	2	E525.2	525-Semi-Volatile Organic Compounds, SDWA		☒ NASO3 ☒ HCL	Do Not Rinse - Container is pre-preserved. ok	1
40ML-CG-VOA-NATHIO	2	E504 1	504-Microextraction VOCs, EDB and DBCP SDWA			ok	1
40 mL Clear Glass VOA	2	E531 1	531-Pesticides, Carbamates SDWA		MCA	Do Not Rinse - Container is pre-preserved. ok	1

40 mL Clear Glass VOA	3	E524.2	524-Purgeable Organics, SDWA		☒ HCL ☐ AA	Zero Headspace	OR	1
100 mL Plastic Sterile	2	IRB-BART A9223 B	Bacteria, Iron Related Bacteria, SDWA	30.00 hrs			OR	1
1 Liter Amber Plastic	1	E549.2	549-Pesticides, Diquat SDWA		NATHIO	Do Not Rinse - Container is pre-preserved	OR	1
40ML-CG-VOA-NATHIO	2	E547	547-Herbicides, Glyphosate SDWA				OR	1
1 Liter Narrow Mouth Amber Glass	2	E548.1	548-Endothall		NATHIO	Do Not Rinse - Container is pre-preserved.	OR	1
250 mL Narrow Mouth Amber Glass	1	E515.4	515.4-Herbicides, Chlorinated SDWA		NASO3	Do Not Rinse - Container is pre-preserved	OR	1
500 mL Plastic	1	E900.0	Gross Alpha, Gross Beta, Total		☒ HNO3		OR	1
1 Gallon Plastic	1	E903.0 RA-05 A7500-RA	Radium 226, Total Radium 228, Total Radium 226 + Radium 228		☒ HNO3		OR	1

☒ HNO3 - Nitric Acid ☐ H2SO4 - Sulfuric Acid ☐ NaOH - Sodium Hydroxide
☒ ZnAc - Zinc Acetate ☒ HCl - Hydrochloric Acid ☐ H3PO4 - Phosphoric Acid

We strongly suggest that the samples are shipped the same day as they are collected.

Material Safety Data Sheets(MSDS) Available @ EnergyLab.com ->Services -> MSDS Sheets

Corrosive Chemicals: Nitric, Sulfuric, Phosphoric, Hydrochloric Acids and Sodium Hydroxide. Zinc Acetate is a skin irritant.

Subcontracting of sample analyses to an outside laboratory may be required. If so, Energy Laboratories will utilize its branch laboratories or qualified contract laboratories for this service. Any such laboratories will be indicated within the Laboratory Analytical Report.



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December 22, 2021

Nickolas Enterprise, LLC.
4625 Moon Meadows Drive
Rapid City, SD 57702
(sent via Email – Dnikolas24@gmail.com)

Attn: Mr. Devon Nikolas

Re: Kaski Madison Well #2
Well Testing Report

Dear Devon:

The following letter report summarizes a quick overview of the hydrogeology in the Kaski Madison Well No. 2 area along with a summary of the recently completed flow test.

Hydrogeology:

The Kaski Madison Well #2 is located in the SW $\frac{1}{4}$ NW $\frac{1}{4}$ of Section 31, Township 4 North, Range 7 East in Meade County, South Dakota. This area is on the east flank of the Black Hills Uplift with formation dips in the area ranging from 4° to 6° to the northeast. The well is located near the northern plunging nose of an anticlinal structure that parallels the general strike of the sedimentary formations.

The Kaski Madison Well #2 was spudded in the Cretaceous Fall River Formation and penetrated the following formations with their associated drill depths from ground level.

Cretaceous Fall River	Surface
Cretaceous Lakota	202 feet
Jurassic Morrison	411 feet
Jurassic Unkpapa Sandstone	577 feet
Jurassic Sundance	621 feet
Triassic/Permian Spearfish	1,015 feet
Permian Minnekahta	1,433 feet
Permian Opeche	1,487 feet
Permian/Pennsylvanian Minnelusa	1,595 feet
Mississippian Pahasapa (Madison)	2,231 feet

Approximately 460 feet of Madison was drilled without encountering the Mississippian/Devonian Englewood Limestone.

Near the very top of the Madison Formation a fracture was encountered which resulted in the loss of circulation. The presence of this fracture in conjunction with the large production



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capacity demonstrated by this well indicates that the well is in good communication with a relatively well developed fracture system.

Aquifer Test:

Following the drilling, construction and development of the Kaski Madison #2 well, a three-day constant discharge flow test was conducted on the well from December 8, 2021 through December 11, 2021. Recovery data was collected at the conclusion of the drawdown test from December 11, 2021 through December 12, 2021. The discharge from the well was through two 4-inch hoses, each controlled by a gate valve. The hoses were manifolded together to a section of 7-inch casing pipe that was connected to a 6-inch McCrometer propeller flowmeter which was capable of measuring the instantaneous flow rate as well as a total volume (Figure 1). The drawdown (change in pressure) was measured and recorded using an In-Situ® Level TROLL 700 Data Logger with back-up provided with a 300 psi Weksler pressure gage.



Figure 1

The static water level (shut-in pressure) at the start of the test was 138.2 psi. Several days prior to the test, the well driller opened the 10-inch gate valve to allow the flow to cascade over the top of the valve. The measured height of this flow above the valve was approximately 14-inches (Figure 2). At this height the estimated flow would be approximately 1,925 gpm. Based on this documented flow rate, the initial flow rate for the constant-flow test was set at 1,500 gpm. The flow rate after approximately 12 hours settle in at approximately 1,200 gpm. This flow rate was held constant for the duration of the flow test. The average flow rate over the duration of the test based on the flowmeter totalizer volume was 1,180 gpm.



Figure 2

A plot of the measured aquifer pressure versus flow time is shown in Figure 3. These data were analyzed using the non-equilibrium method developed by Cooper and Jacob (1946). As shown in this figure the pressure of the aquifer within the first minute of flowing quickly drops to approximately 80 psi after the control valves on the discharge hoses are adjusted to a flow rate of 1,500 gpm. After approximately 10



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minutes of flowing, the flow rate has settled to a rate of approximately 1,200 gpm which, as mentioned previously, was maintained for the duration of the flow test.

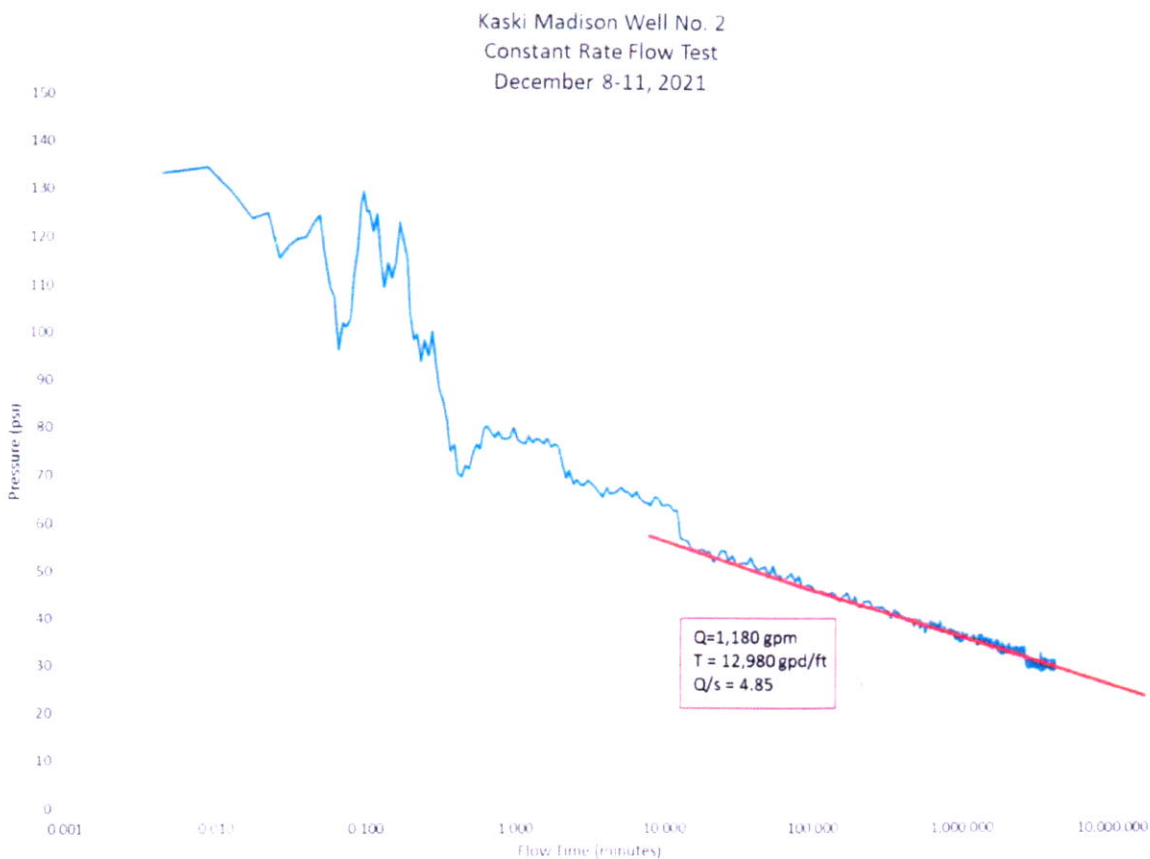


Figure 3

The calculated transmissivity of the Madison Aquifer in the area of the Kaski Madison #2 well is approximately 12,980 gallons per day per foot (gpd/ft). The specific capacity which is the flow rate divided drawdown was calculated to be 4.85 gpm per foot of drawdown. Extending the pressure data out several additional log cycles, indicates that the Kaski Madison #2 well will be capable of maintaining this flow rate continuously for over a two year period. The pressure at the surface at the end of this 2-year period would be less than 10 psi.

After approximately three days of flowing, the well was shut-in and recovery data collected. The recovery data was collected for 28.3 hours at which time the well had recovered to approximately 98% of the original static level. A semi-log plot, Cooper and Jacob (1946) analysis of the recovery data is shown in Figure 4. It should be noted that the residual drawdown is plotted against time since pumping started divided by the time since pumping



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stopped. With this type of plot, the early recovery data is shown on the right portion of the plot and the later data is shown on the left portion of the plot. These recovery data indicate a transmissivity of about 23,960 gpd/ft. The variation between the flow test data transmissivity and the recovery test data transmissivity is believed due to the additional drawdown (loss of pressure) due to the headloss associated with the turbulent flow as the water moved through the fractured aquifer matrix at the 1,180 gpm rate.

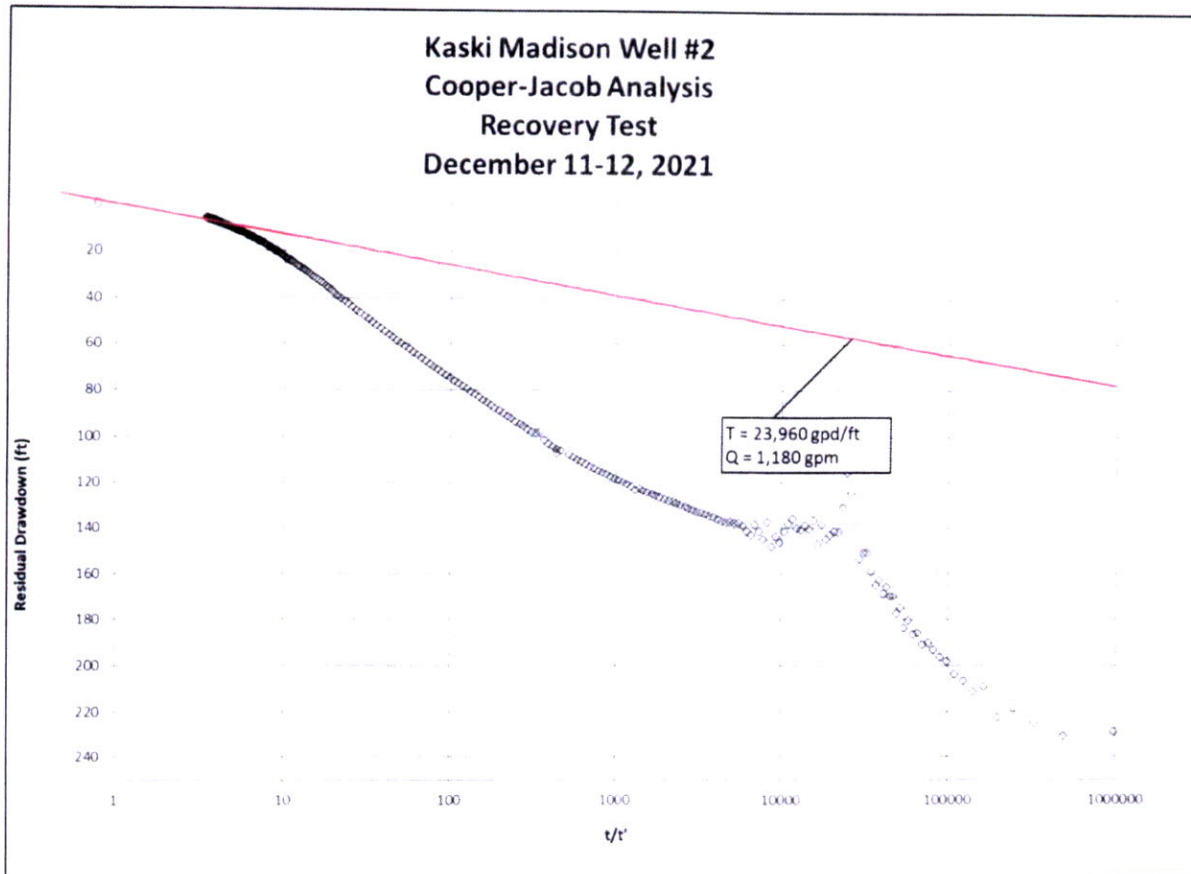


Figure 4

Based on the calculated transmissivity from the flow test data and using the Theis nonequilibrium equation (1935) with a storativity value of 1×10^{-5} , different flow rates and flow length periods were calculated at which the artesian pressure at the well could still fill the existing subdivision storage tank. The elevation to the high water line in the tank is approximately 130 feet above the ground level at well, therefore, the artesian pressure at the well head will have to be maintained above approximately 56 psi in order to fill the storage tank. A review of Figure 3 shows that the Kaski Madison #2 well will be able to supply water to the storage tank at a rate of 1,180 gpm continuously for a period of only 14 minutes before the pressure drops below 56 psi. Table 1 shows these different flow rates and their calculated period of flow for which they could fill the existing tank.



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Table 1
Kaski Madison #2 Well
Continuous Flow Duration (maintain 56 psi)

Flow Rate (gpm)	Continuous Flow Duration (Days)	Continuous Flow Duration (Hours)	Continuous Flow Duration (Years)
1,180		0.23	
1,000	0.27	6.48	
900	2.8	67.2	
800	54.8		0.15
785	90		0.25
700	2,400		6.6

As shown in Table 1, the Kaski Madison #2 well is capable of sustaining a flow of approximately 900 gpm for nearly a three day period while maintaining a pressure that is capable of feeding the existing subdivision storage tank.

The data collected during the flow test and recovery test are attached at the end of this report.

Water Quality:

Water quality constituents measured in the field during the flow test were pH, conductivity, temperature and total dissolved solids. The average temperature of the water was 13.95° C (57.11° F). The average pH value was 8.22 and the average conductivity and total dissolved solids (TDS) were 373.15 µmho/cm and 267.2 mg/L, respectively. Based on these field measured values, this is a very high quality water.

A water sample was collected on December 9, 2021 and submitted to an EPA certified laboratory (Energy Labs – Gillette) for an analysis of the full list of EPA Primary and Secondary Drinking Water Standards. The results of these analyses were not available at the time of this report.

If you have question, please do not hesitate to call or email me.

Respectfully submitted,
Engineering Associates

John Wetstein

Cc: Tim Barritt





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References:

Cooper, H. H. and C. E. Jacob, 1946. A generalized graphical method for evaluating formation constants and summarized well field history. American Geophysical Union Transactions, vol. 27, pp. 526-534.

Redden, Jack A., Ed DeWitt, et. al., 2008, Maps Showing Geology, Structure, and Geophysics of the Centra Black Hills, South Dakota, USGS, Scientific Investigations Map 2777.

Theis, C.V., 1935, The Relation between Lowering of the Piezometric Surface and the Rate and Duration of Discharge of a Well Using Ground Water Storage: Transactions, American Geophysical Union, vol. 16, pp. 518-524.

Water Well Comple

Go Back

Go Forward

SEARCH WELLS DR
INSTALLERS Disclaimer

Feet

Measurement Result

4,272.1 Feet

TRS labels ☒ label darkness ☐



Search

209626

Compl Rpt: 000
Last Name: KASI
First Name: RYAN
Business: JK-RK
County: Meade
Well Type: MUN
Township:
Range:
Section: 31
QQ: SWNW
Latitude: 44.265
Longitude: -103.
Driller No.: 205
Compl Date: "W
00:00:00 GMT"
Permit No.:
Depth: 2231

[Zoom to](#)

Streets

Water Well Comple

Go Back

Go Forward

SEARCH WELLS DR
INSTALLERS Disclaimer

Feet

Measurement Result

4,986.9 Feet

TRS labels ☒ label darkness ☐



Search

209626

Compl Rpt: 000
Last Name: KAS
First Name: RYA
Business: JK-RK
County: Meade
Well Type: MUN
Township:
Range:
Section: 31
QQ: SWNW
Latitude: 44.265
Longitude: -103
Driller No.: 205
Compl Date: "W
00:00:00 GMT"
Permit No.:
Depth: 2231

[Zoom to](#)

Streets



**DEPARTMENT of AGRICULTURE
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 E. CAPITOL AVE
PIERRE SD 57501-3182
danr.sd.gov

**RECOMMENDATION OF CHIEF ENGINEER FOR WATER PERMIT
APPLICATION NO. 2025-1, JKRK Properties LLC**

Pursuant to SDCL 46-2A-2, the following is the recommendation of the Chief Engineer, Water Rights Program, Department of Agriculture and Natural Resources concerning Water Permit Application No. 2025-1, JKRK Properties LLC, c/o Ryan Kaski, 1935 Samco Rd, Suite 102, Rapid City SD 57702.

The Chief Engineer is recommending APPROVAL of Application No. 2025-1 with a twenty-year term pursuant to SDCL 46-1-14 and 46-2A-20 because 1) although evidence is not available to justify issuing this permit without a 20 year term limitation, there is reasonable probability that there is unappropriated water available for the applicant's proposed use, 2) existing domestic water use and water rights will not be unlawfully impaired, 3) the proposed use is a beneficial use and, 4) it is in the public interest as it pertains to matters of public interest within the regulatory authority of the Water Management with the following qualifications:

1. In accordance with SDCL 46-1-14 and 46-2A-20, Permit No. 2025-1 is issued for a twenty-year term. Pursuant to SDCL 46-2A-21, the twenty-year term may be deleted at any time during the twenty-year period or following its expiration. If the twenty-year term is not deleted at the end of the term, the permit may either be cancelled or amended with a new term limitation of up to twenty years. Permit No. 2025-1 may also be cancelled for nonconstruction, forfeiture, abandonment or three permit violations pursuant to SDCL 46-1-12, 46-5-37.1 and ARSD 74:02:01:37.
2. The well will be located near domestic wells and other wells which may obtain water from the same aquifer. The well owner, under these Permits shall control withdrawals so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights.
3. The Permit holder shall report to the Chief Engineer annually the amount of water withdrawn from the Madison aquifer.
4. Water Permit No. 2025-1 appropriates up to 450 acre-feet of water annually.

See revised report on application for additional information.

Eric Gronlund, Chief Engineer
December 12, 2022

**Report to the Chief Engineer on
Water Permit App. No. 2025-1**

JKRK Properties, LLC
28 November 2022

Water Permit Application No. 2025-1 seeks to appropriate up to 450 acre-feet of water annually (ac-ft/yr) at a maximum diversion rate of 2.67 cubic feet of water per second (cfs), which is equivalent to 1,200 gallons per minute (gpm) from one well completed into the Madison aquifer (2,690 feet deep) located in the SW $\frac{1}{4}$ NW $\frac{1}{4}$ Section 31 T4N-R7E for a water distribution system located in the W $\frac{1}{2}$ NW $\frac{1}{4}$, SW $\frac{1}{4}$ Section 28, Sections 29, 30, 31, S $\frac{1}{2}$ N $\frac{1}{2}$, S $\frac{1}{2}$ Section 32; all in T4N-R7E. This site is located approximately 3.5 miles northeast of Piedmont, South Dakota.

Aquifer: Madison Limestone (MDSN)

Hydrogeologic Characteristics

The Madison Group in South Dakota is a Lower Mississippian and Upper Devonian group of formations that in the Black Hills consist of the Englewood and Pahasapa Limestone formations [1]. The Pahasapa Limestone is a “white, light-gray to tan, fine- to medium-grained limestone and dolomite containing brown to gray chert” [2]. The Englewood Limestone is a “pink to lavender to light-gray, thin- to medium-bedded, fine- to medium-grained, argillaceous, dolomitic limestone” [2]. The Madison aquifer consists of the permeable and porous portions of the Madison Group that are sufficiently saturated to deliver useful quantities of water. The Madison aquifer extends over more than 210,000 square miles in Montana, Wyoming, North Dakota, South Dakota, and Nebraska [3], although it may not be suitable as a source of water in all of those areas due to extreme depth to the aquifer and low water quality far from the outcrops [4]. It crops out in the Black Hills and is buried elsewhere in South Dakota [3]. The Madison aquifer may be hydrologically connected to the underlying Deadwood aquifer. It is also hydrologically connected to the overlying Minnelusa aquifer [5]. The Minnelusa aquifer overlies the Madison unconformably [1], which means there was a period of erosion or weathering between when the Madison Group and the Minnelusa Formation were deposited. Transmissivity in the Madison aquifer mainly comes from secondary porosity features such as solution cavities, faults, and fractures [5]. Because most of the transmissivity in the Madison aquifer comes from secondary porosity features, aquifer characteristics in the Madison aquifer vary greatly from location to location [5].

The applicant submitted a well completion report and analysis of an aquifer performance test for the well for this application [6]. The geologist reported encountering the top of the Pahasapa Formation at 2,231 feet below grade and that they drilled through approximately 460 feet of Pahasapa Formation without encountering the Englewood Limestone. The geologist reported encountering a fracture at the top of the Madison Group which resulted in loss of circulation of drilling fluid. The driller reported that the closed-in pressure of the well was 138 pounds per square inch (psi), which is equivalent to approximately 318 feet of water/hydraulic head above ground surface. Combined with the 2,231 feet of elevation between ground surface and the top of the aquifer, this means the hydraulic head of the Madison aquifer was 2,549 feet on December 22, 2021, when the applicant’s well was completed.

Aquifer Performance Test

Methods and Results

After the applicant's well was completed and developed, John Wetstein of Engineering Associates, a consultant for the applicant, conducted a three-day constant-discharge test on it [6]. The well flowed approximately 1,900 gallons per minute uncontrolled prior to it being valved down for the constant-discharge test. For the test, the initial flow rate was set for 1,500 gallons per minute, but the flow rate settled to approximately 1,200 gallons per minute [6]. The average flow rate over the duration of the test was 1,180 gallons per minute. Wetstein [6] indicated the flow rate decreased slightly over the duration of the test. Wetstein [6] collected drawdown data for the entire period of withdrawal (time allowed to flow) (68.6 hours) and recovery data for 28.3 hours after the well was closed in. Measurements of hydraulic head in the aquifer stopped when the well had recovered to approximately 98% of its original head pressure [6]. From the drawdown data, Wetstein [6] used the Cooper and Jacob [7] method to calculate a transmissivity of 12,980 gallons per day per foot (gpd/ft), which is equivalent to 1,735 square feet per day (sqft/d). From the recovery data, Wetstein used the Cooper and Jacob [7] method to calculate a transmissivity of 23,960 gpd/ft, which is equivalent to 3,203 sqft/d. Wetstein [8] indicated the portion of the recovery data used to estimate transmissivity in the aquifer was selected so that a straight line would go to the origin of the chart, as when recovery data are plotted in the method Wetstein [6] used, data should go to the origin with increasing time since withdrawals ceased. Wetstein [6] indicated the applicant plans to pipe the water from their well to a pressure tank approximately 130 feet above the ground. Drawdown data indicates the well will be able to supply water to the storage tank at the requested rate continuously for a period of 14 minutes before the pressure in the well would not be sufficient to supply water to the tank [6]. Wetstein [6] indicated that at a continuous flow rate of 700 gpm, the well would have enough pressure to supply water to the tank for 6.6 years. Wetstein used a storage coefficient of 10^{-5} in his estimations that used the Theis [9] equation.

Water Rights Staff Commentary on Test

An optimum constant-rate aquifer performance test would feature several observation wells placed at various distances and directions from the pumped well. Ideally the test would include withdrawal at a rate equal to or higher than the withdrawal rate for the project, withdrawal would be done long enough to show any boundary conditions, and measurements of recovery data would continue for an amount of time equal to the amount of time withdrawal occurred. Due to the great cost of drilling a well as deep as the one for this application, having an optimum number of wells was not likely an option for the applicant, so the only data available is from the pumped well. For a constant-rate aquifer performance test, it is important to maintain a constant flow rate and to document fluctuations in flow rate as the test is performed. Large fluctuations in flow rate can indicate that the aquifer does not perform for a long time at the rate initially set. As Wetstein [6] indicated, some fluctuations in flow occurred during the test, which could affect the results of the aquifer performance test. Sterrett [10] suggests that for wells that flow at ground level, instead of a constant-rate test, a constant head test could be performed, where the well is allowed to flow at a set pressure (such as uncontrolled, which would be at atmospheric pressure) and the change in flow is monitored over time. Jacob and Lohman [11] developed methods to determine aquifer characteristics from a constant-head aquifer performance test.

Upon receipt of the drawdown and recovery data [8], Water Rights Staff were able to recreate the transmissivity calculated by Wetstein [6] in the drawdown data. However, the recovery data never approaches a straight line when plotted on a logarithmic scale, which means transmissivity calculated by the Cooper and Jacob [11] method is not reliable. When Water Rights Staff estimated transmissivity from recovery data following the methods used by Wetstein [6], the result was a transmissivity of approximately 9,000 sqft/d. A small change in transmissivity can greatly change the drawdown characteristics in an aquifer. The storage coefficient used by Wetstein [6] is a lower boundary of reasonable values for storage coefficient in confined aquifers and was used previously by Water Rights Staff [12]. A large change in storage coefficient does not change the drawdown characteristics in an aquifer significantly. This application seeks to appropriate 450 ac-ft/yr, which is equivalent to an average flow rate of approximately 0.6 cfs, or 280 gpm. Long and Putnam [5] mapped estimated transmissivity in the Madison aquifer in the area of their study, in which this application lies. Figure 1 shows the well for this application, Water Rights observation wells [13], the outcrop of the Madison aquifer [4], and the Long and Putnam [5] study area and transmissivity estimates for the Madison aquifer. The well for this application lies on the edge of an area Long and Putnam [5] mapped as having an estimated transmissivity between 1,000 and 3,000 sqft/d (7,450 and 22,440 gpd/ft). This application is also close to an area Long and Putnam [5] mapped as having an estimated transmissivity between 500 and 1,000 sqft/d (3,740 and 7,450 gpd/ft). Given that information, Water Rights Staff consider the transmissivity calculated from the drawdown data more likely to be characteristic of the aquifer for long-term withdrawals than the transmissivity calculated from recovery data.

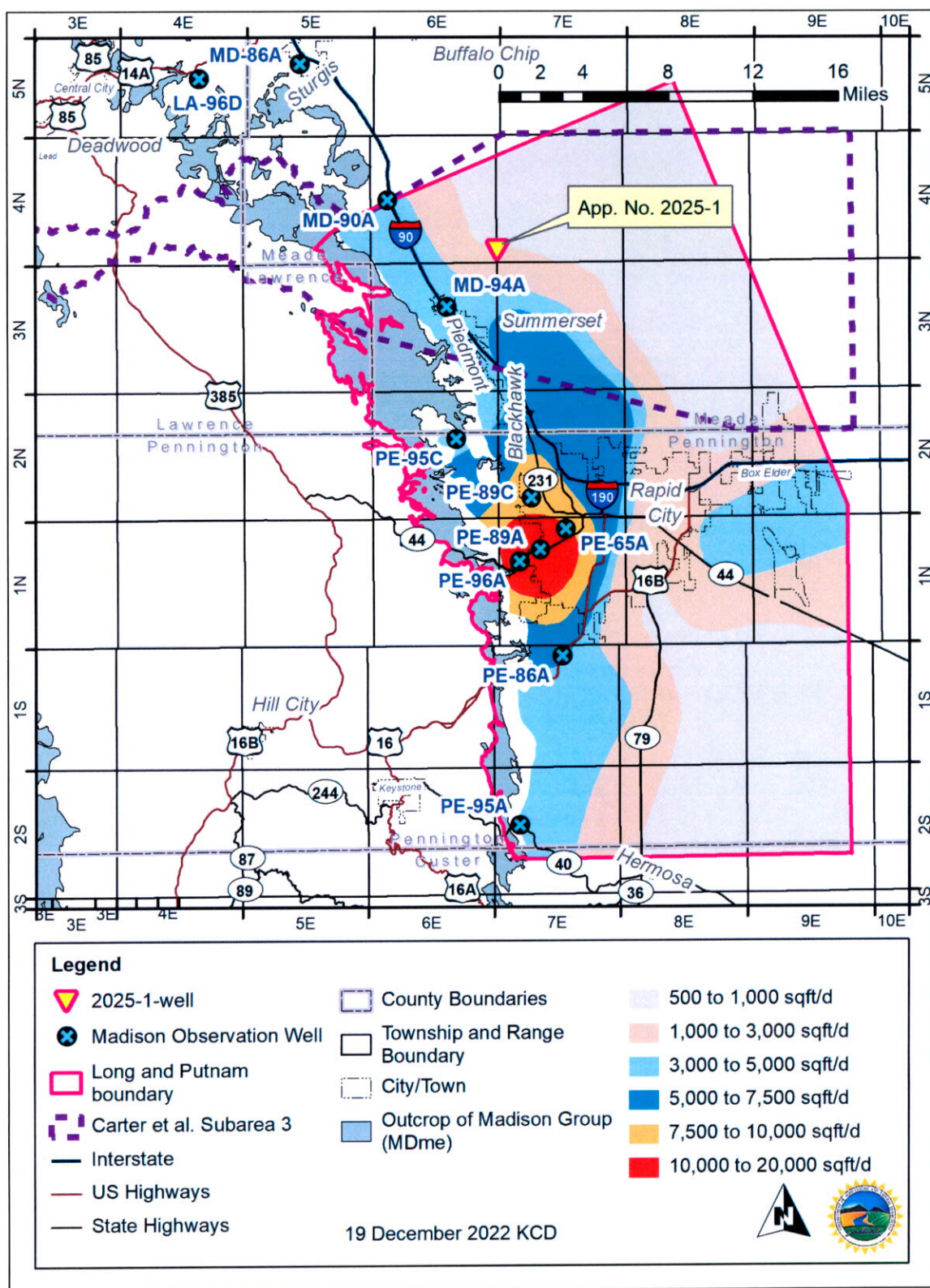


Figure 1: Outcrop of the Madison [4], study areas including this application [14], nearby Madison observation wells [13], and Madison aquifer transmissivity modified from Long and Putnam [5]

Applicable South Dakota Codified Law (SDCL)

Pursuant to SDCL 46-2A-9, a permit to appropriate water may be issued if there is reasonable probability that there is unappropriated water available for the applicant's proposed use, that the proposed diversion can be developed without unlawful impairment of existing domestic water uses and water rights, and that the proposed use is a beneficial use and in the public interest as it pertains to matters of public interest within the regulatory authority of the Water Management Board. This report will only assess the availability of water and possibility of developing this application without unlawful impairment of existing domestic water uses and water rights.

Pursuant to SDCL 46-6-3.1, no application to appropriate groundwater may be approved if, according to the best information reasonably available, it is probable that the quantity of water withdrawn annually from a groundwater source will exceed the quantity of the average estimated annual recharge of the water to the groundwater source. An exception allows water distribution systems to withdraw from groundwater sources older or stratigraphically lower than the Greenhorn Formation regardless of the results of a hydrologic budget. The applicant is a water distribution system as defined in SDCL 46-1-6(17). The Madison aquifer is older and stratigraphically lower than the Greenhorn Formation. Therefore, the Water Management Board's authority to approve this application is not restricted by whether or not recharge exceeds withdrawals. However, a statewide and local hydrologic budget is included in this report for the information of the Chief Engineer and the Water Management Board.

Pursuant to SDCL 46-2A-20:

Notwithstanding §§ 46-1-14 and 46-2A-7, no water permit for construction of works to withdraw water from the Madison formation in Butte, Fall River, Custer, Lawrence, Meade and Pennington counties may be issued for a term of more than twenty years, unless the Water Management Board determines, based upon the evidence presented at a hearing that:

(1) Sufficient information is available to determine whether any significant adverse hydrologic effects on the supply of water in the Madison formation would result if the proposed withdrawal were approved; and

(2) The information, whether provided by the applicant or by other means, shows that there is a reasonable probability that issuance of the proposed permit would not have a significant adverse effect on nearby Madison formation wells and springs.

This application proposes to withdraw water from the Madison aquifer in one of the counties listed above. Therefore, in addition to the other requirements, the Water Management Board must consider the effect this application may have on nearby Madison aquifer wells and springs and this application is subject to a 20-year term limit.

Availability of Water

Statewide Hydrologic Budget

Statewide Recharge

The Madison aquifer receives recharge from infiltration of precipitation and streamflow on the outcrop area and may also receive inflow from the underlying Deadwood aquifer [5] [15]. There are several reports available estimating recharge to the Madison aquifer.

Woodward-Clyde Consultants [16] estimated recharge to the outcrop of the Madison aquifer in the Black Hills as part of an environmental impact statement for the ETSI Coal Slurry Pipeline Project. The upper-bound estimate of recharge in the Woodward-Clyde Consultants [16] report is approximately 400,000 ac-ft/yr, assuming almost all of the precipitation that falls on the outcrop infiltrates into the aquifer. Woodward-Clyde Consultants [16] produced a lower-bound recharge estimate of 140,000 ac-ft/yr based on the Rahn and Gries [17] report. However, the Rahn and Gries [17] report estimated recharge for all Paleozoic limestone in the Black Hills, which includes the Madison Group, the Minnelusa Formation, and the Minnekahta Formation. Rahn and Gries [17] reported that 146.14 cfs was their minimum estimated recharge rate for the Paleozoic limestone from infiltration of precipitation, which converts to approximately 106,000 ac-ft/yr for all Paleozoic formations. The Woodward-Clyde Consultants [16] report did not acknowledge the fact that the Rahn and Gries [17] report estimated minimum recharge for a larger group of formations than the Woodward-Clyde Consultants [16] report covers, and therefore is likely to overestimate recharge to the Madison aquifer.

Carter, Driscoll, and Hamade [15] analyzed streamflow and precipitation data from water years 1931 to 1998 in the Black Hills area in South Dakota and Wyoming to determine the average annual recharge to the Madison and Minnelusa aquifers. They estimated a combined average annual recharge to both aquifers to be 344 cfs, or approximately 249,000 ac-ft/yr, not including possible flow from the Deadwood aquifer. Carter, Driscoll, and Hamade [15] estimated that approximately 55% of the recharge goes to the Madison aquifer, so the total estimated average recharge to the Madison aquifer from the outcrop in the Black Hills is 137,000 ac-ft/yr, not including possible inflow from adjacent aquifers. The Carter, Driscoll, and Hamade [15] report uses more years of data, more recent data, and better assumptions than the Woodward-Clyde Consultants [16] and Rahn and Gries [17] reports. Therefore, the best estimate of recharge to the Madison aquifer is based on the Carter, Driscoll, and Hamade [15] report.

Statewide Discharge

Discharge from the Madison aquifer in South Dakota is mainly by outflow to other aquifers when the hydraulic head in the Madison aquifer is higher than those aquifers, outflow to springs and seeps, and withdrawals by domestic and appropriative wells [14] [18]. Due to the presence of overlying aquifers and water distribution systems in many areas of the aquifer, domestic well withdrawals are a negligible portion of the hydrologic budget of the Madison aquifer. There are 163 water rights/permits currently authorized to withdraw from the Madison aquifer and 10 future use water rights/permits reserving water from the Madison aquifer [18]. Table 1 shows the future use permits reserving water from the Madison aquifer [18].

Of the 163 active water rights/permits, 98 are primarily for some type of water distribution system (rural water system, municipal, etc), 31 primarily for irrigation, 14 for commercial use,

11 for industrial use, four for domestic use, two for geothermal use, two for institutional use, and one for recreation [18]. Estimated withdrawals for irrigation use are shown in Table 2 [18] [19]. When there were more than 10 years of irrigation reports available, the average reported irrigation was used to estimate irrigation withdrawals. When there were fewer than 10 years of irrigation reports available, withdrawals are assumed to equal two acre-feet per acre, although actual usage is likely to be less for non-turf irrigation. Non-irrigation withdrawals from permit holders with irrigation as a permitted use are assumed to withdraw at their maximum instantaneous diversion rate 60% of the time for non-irrigation uses. For Water Right No. 1885-1, that would have caused the total estimated withdrawal to exceed the rate they were physically capable of withdrawing, so their total estimated withdrawal is 100% of their maximum instantaneous diversion rate.

Table 1: Future Use Permits from the Madison aquifer [18]

Permit No.	Name/Business	County	Use	Priority Date	Amount Reserved (ac-ft/yr)
369-1	City of Belle Fourche	LA	MUN	12/10/1958	620
2086-2	City of Rapid City	PE	MUN	05/18/1989	4,075
439-2	City of Rapid City	PE	MUN	09/22/1956	3,367
1872-1	City of Spearfish	LA	MUN	11/13/2006	2,704
2560-2	Fall River Water Users District	FR	RWS	05/16/2005	358
2560A-2	Fall River Water Users District	FR	RWS	05/16/2005	0
2560B-2	Fall River Water Users District	FR	RWS	05/16/2005	0
2580-2	Southern Black Hills Water System	FR	RWS	03/02/2006	1,474
1833-2	Weston Heights Home Owners	MD	RWS	02/18/1983	211
1995-1	Black Hawk Water User District	MD	RWS	04/15/2020	1,300
Total					14,109
FR – Fall River, LA – Lawrence, MD – Meade, PE – Pennington					
MUN – Municipal, RWS – Rural Water System					

Water Right/Permit Nos. 1096-1, 1096A-1, 1496-1, and 1670-1 are all authorized to withdraw from the same well and one dam. Water Right Nos. 1096-1, 1096A-1, 1670-1 authorize diversion of water for irrigation use and Water Right No. 1096A-1 and Water Permit No. 1496-1 authorize diversion of water for rural water system use. Documentation in the administrative file for Water Right No. 1670-1 indicates that the well is not valved such that it can be shut off when not in use for the beneficial uses listed on the permits. A letter dated September 9, 1998, indicates that when the water for that well is not being used for the beneficial uses described in the permits, it is used for fish and wildlife propagation. The person writing the letter indicated they would prefer the Water Management Board not order the well to be shut off when not used for irrigation or rural water system withdrawals. It is likely the well continues to flow uncontrolled; thus, at the flow rate listed in Water Right No. 1096A-1 of 1.33 cfs [18], that well withdraws approximately 964 ac-ft/yr from the Madison aquifer.

Water Right No. 1650-1 does not require the water right holder to report annual withdrawals and allocates no acreage. It provides supplemental water supply from a flowing well for Water Right No. 1231-1. Water Right No. 1231-1 permits a 110 ac-ft dam to provide water for a commercial livestock operation and irrigation of 134 acres. Water Right No. 1650-1 allows for direct irrigation from a Madison aquifer well of up to 2 ac-ft per acre for the land permitted by Water Right No. 1231-1. Kilts [20] estimated that Water Right No. 1650-1 withdraws 55.9 ac-ft/yr.

Report on Water Permit App. No. 2025-1

There are 40 water rights/permits that have a volume limit listed in their permit or have had their total withdrawal limited by a subsequent water right/permit held by the same person/entity. While many of those water rights/permits are required to report their withdrawals, they may develop their permits further to withdraw up to the limit on their permit, so the volume limit listed on their permits is assumed to be their total appropriation. The total volume limit listed by such permits is 22,441 ac-ft/yr [18].

Table 2: Permits with irrigation listed as one beneficial use, or are connected to an irrigation permit [18] [19]

Permit No.	Name/Business	Priority	Diversion rate (cfs)	Acres Licensed/ Permitted	Average Report (ac-ft)	Number of Years of Irrigation Reports	Estimated average irrigation (ac-ft/yr)	Est. Non-irr. Use (ac-ft/yr)	Total Est. Withdrawal (ac-ft/yr)
2773-2	Arrowhead Country Club	07/27/2017	1.110	100.00	0.0	4	200.0	0.0	200.0
1635-1	Black Hills National Cemetery	04/02/1990	0.820	54.50	94.8	26	94.8	356.4	451.2
1452-1	Black Hills State College	12/19/1988	3.330	25.44	20.3	33	20.3	1,447.5	1,467.8
1670-1	Buddy L, Peggy A, Kami S Ireland	06/09/1998	3.610	253.00	47.5	24	*	*	*
1096A-1	Butte Meade Sanitary Dist	04/16/1976	1.330	0.00	N/A	0	*	*	963.5
2458-2	City Of Rapid City	03/30/2001	0.800	107.00	104.4	21	104.4	0.0	104.4
2002-1	City Of Spearfish	12/28/2020	1.330	40.00	0.0	1	80.0	0.0	80.0
2313-2	Coca-Cola Bottling	04/08/1994	0.330	3.00	7.3	27	7.3	143.4	150.7
1899-1	Davis Ranches Inc	08/25/2008	1.430	100.00	0.0	13	0.0	0.0	0.0
1650-1	Dennis L Miller	04/03/1997	0.890	0.00	N/A	0	*	*	55.9
2673-2	Diocese Of Rapid City	05/27/2011	0.120	7.00	8.0	9	14.0	0.0	14.0
1009-1	Donald F/Ann J Brady	02/01/1974	0.780	53.73	30.4	40	30.4	0.0	30.4
1185-1		01/18/1979	0.380	22.52	110.3	40	110.3	***	110.3
2286-2	Donald Konechne	04/28/1993	0.100	38.50	10.2	28	10.2	0.0	10.2
1707A-1	Elkhorn Ridge @ Frawley Ranches LLC	01/06/2000	3.705	100.00	0.0	4	0.0	223.5	223.5
1707E-1		01/06/2000	0.000	**	9.1	15	9.1	0	9.1
1931-1		08/17/2012	0.170	3.30	3.2	9	6.6	73.9	80.5
1945-1	Frawley Ranches LLC	02/10/2014	1.110	265.00	50.7	8	530.0	0.0	530.0
1858-1	Glencoe Camp Resort II LLC	03/08/2006	0.860	34.00	0.0	16	0.0	373.8	373.8
2593-2	Hart Ranch Development	06/15/2006	0.490	72.50	19.9	15	19.9	213.0	232.9
1911-2	Hart Ranch Development Co	09/27/1984	0.880	124.00	120.1	28	120.1	382.5	502.6
1725-2	Janice R Crowser	08/20/1980	1.070	75.10	1.0	23	1.0	0.0	1.0
2012-1	Jesse Horstmann	12/23/2021	0.500	43.50	N/A	0	87.0	0.0	87.0
858-2	John & Heidi McBride	02/05/1965	9.360	655.75	6.7	38	6.7	0.0	6.7
1885-1	John T & Veronica Widdoss	04/09/2007	0.110	22.00	16.8	5	44.0	35.7	79.7
1960-1	One Diamond Inc	04/11/2016	1.280	150.00	148.9	6	300.0	556.4	856.4
1223-1	P & L Water And Hay LLP	03/10/1981	0.670	263.00	195.4	40	195.4	0.0	195.4
1923-1	Roger & Jean Ranschau	02/15/2011	0.110	3.00	1.0	10	6.0	47.8	53.8
2013-1	Santa Maria Land & Cattle Corp	01/18/2022	2.220	460.00	N/A	0	920.0	0.0	920.0
1363-1	Spearfish Canyon Cntry Cl	09/15/1986	0.900	80.10	63.3	35	63.3	0.0	63.3
2106-2	Stuart Rice	06/06/1990	0.080	2.80	0.8	30	0.8	34.8	35.6
1842-1	Tom C Davis	04/05/2005	0.440	330.00	0.0	17	0.0	0.0	0.0
2741-2	Tubbs Land & Cattle LLC	08/20/2018	3.340	567.00	149.5	3	1,134.0	0.0	1,134.0
419-2	Wind Cave National Park	12/29/1955	0.150	6.00	N/A	0	12.0	65.2	77.2
Total			43.805	4,061.74	1,219.8	568	4,127.8	3,953.9	9,101.1

* Discussed in text. **gives additional time to develop 1707A-1. *** Reports all use types in irrigation report

There are 89 non-irrigation water rights/permits that do not have a volume limit listed in their permit and are not discussed above. They are estimated to withdraw up to their maximum instantaneous diversion rate 60% of the time, for a total estimated withdrawal of 16,897 ac-ft/yr.

Based on Water Rights Staff experience, this estimate is likely to be higher than the actual withdrawals by those water rights/permits.

In addition to the potential withdrawals by future use permits described above, three other applications are deferred, held in abeyance, or pending review. Water Permit Application No. 2585-2 for Southern Black Hills Water System seeks to appropriate 1,600 ac-ft/yr but is deferred for further study. Water Permit Application No. 2685-2 for Powertech, Inc is held in abeyance pending federal permitting and seeks to appropriate 889 ac-ft/yr. As of the drafting of this report, Water Permit Application No. 2016-1 seeks to appropriate up to 1,600 ac-ft/yr and is pending completion of findings of facts, conclusions of law, and final decision on the matter by the Water Management Board.

Summary of Statewide Hydrologic Budget

The best available estimate of recharge to the Madison aquifer in South Dakota is approximately 137,000 ac-ft/yr. The estimated withdrawals as described in the Statewide Discharge section are summarized in Table 3. The total estimated withdrawal, including withdrawals reserved for future use and held, or deferred applications is approximately 66,637 ac-ft/yr. This application may withdraw up to 450 ac-ft/yr, if approved. Therefore, based on the statewide hydrologic budget, there is reasonable probability unappropriated water is available for this application.

Table 3: Summary of withdrawals from Madison aquifer rounded to the nearest 1 acre-foot.

Type	Count	Est. Rate (ac-ft/yr)
Irrigation (Table 2)	34	9,101
Volume limit	40	22,441
Diversion Rate limit	89	16,897
<i>Subtotal (authorized to withdraw)</i>	<i>163</i>	<i>48,439</i>
Future use (Table 1)	10	14,109
Deferred/held/pending	3	4,089
Grand total	176	66,637

Local Hydrologic Budgets

There are two studies which performed a local hydrologic budget in the area of this application. Local hydrologic budgets in bedrock aquifers are not management units. Information regarding local hydrologic budgets in bedrock aquifers is provided for the information of the Chief Engineer and Water Management Board.

Carter et al. [14]

Carter, et al. [14] used streamflow, precipitation, spring flow, estimated ground water flow, and well withdrawal data from 1987 to 1996 for the hydrologic budgets. This application is in Subarea 3 of their report. The boundaries of the Carter et al. [14] subareas were selected to minimize flow across subarea boundaries. Carter et al. [14] estimated the total recharge to the Madison and Minnelusa aquifers in Subarea 3 was 12.3 cfs. Assuming 55% of the recharge goes to the Madison aquifer, the estimated recharge in Subarea 3 is 6.77 cfs, or approximately 4,900 ac-ft/yr [15] [14]. Carter, et al. [14] do not provide values for the recharge area of the Madison and Minnelusa formations for each subarea in their report, so it is possible the proportion of

recharge area to those two aquifers is different within each subarea. There are 13 water rights/permits authorized to withdraw, and 4 future use permits reserving water, from the Madison aquifer in Subarea 3 [18]. Domestic well withdrawals are negligible on the scale of this hydrologic budget. Using the same methods as in the Statewide Discharge section, estimated withdrawals within Carter, et al. Subarea 3 are 11,326 ac-ft/yr. This application may withdraw up to 450 ac-ft/yr, if approved. It is possible that the withdrawal estimates are higher than the true average annual withdrawal and the recharge estimates (including induced recharge from outside the study area or subarea) are lower than actual recharge to the subarea of the Madison aquifer. Therefore, based on the local hydrologic budget in combination with other information available, there is reasonable probability unappropriated water is available for this application.

Table 4: Estimated withdrawals in Carter et al. Subarea 3

Type	Count	Est. Use (ac-ft/yr)
Irrigation	0	0
Volume Limit	6	1,931
Sixty Percent	7	442
Subtotal (authorized to withdraw)	13	2,373
Future Use	4	8,953
Pending/Deferred/held	0	0
Grand total	17	11,326

Long and Putnam [5]

Long and Putnam [5] analyzed groundwater flow of the Madison and Minnelusa aquifers in the area near Rapid City, including the area for this application. One product of that analysis was a hydrologic budget for water years 1988 through 1997. Long and Putnam [5] estimated that in their study area, streamflow recharge was 38.8 cfs, precipitation recharge as 16.1 cfs, and groundwater inflow from the Deadwood aquifer was 6.3 cfs, for a total of 61.2 cfs flowing into the Madison and Minnelusa aquifers. Assuming 55% of that value goes to the Madison aquifer, recharge to the Madison aquifer in the area of the Long and Putnam study is 33.7 cfs, equivalent to approximately 24,400 ac-ft/yr. The estimated withdrawal from the Madison aquifer in the Long and Putnam study area, including appropriations reserved for future use and other pending applications is 31,273 ac-ft/yr. This application seeks to appropriate up to 450 ac-ft/yr. Observation well data suggests that hydraulic head in the Madison aquifer remains relatively stable in nearby observation wells, so it is possible the potentiometric surface of the aquifer changed after the Long and Putnam [5] study was completed. Based on Water Rights Staff experience, it is also likely that annual withdrawals estimated by assuming the permit holder withdraws at 60% of their maximum licensed/permitted rate is higher than the true value. Therefore, based on the local hydrologic budget, there is reasonable probability unappropriated water is available for this application.

Table 5: Estimated withdrawals in Long and Putnam [5] study area

Type	Count	Est. Use (ac-ft/yr)
Irrigation	8	1,250
Volume Limit	17	13,004
Sixty Percent	37	6,466
Subtotal (authorized to withdraw)	62	20,720
Future Use	4	8,953
Pending/Deferred/held	1	1,600
Grand total	67	31,273

Observation Wells

Administrative Rule of South Dakota 74:02:05:07 requires that the Water Management Board rely upon the record of observation wells, in addition to other information, to determine that recharge exceeds withdrawals to approve an application. The Water Rights Program maintains 25 observation wells completed into the Madison aquifer [13]. The nearest observation well to this application is MD-94A, located approximately 3.6 miles southwest of this application [13]. Water levels in Observation Well MD-94A from 2004 through 2013 are likely to be inaccurate due to a leak in the well's casing which was subsequently repaired. The next nearest observation wells to this application are Observation Wells MD-90A and PE-95C, located approximately 5.7 miles northwest and 9.1 miles southwest of this application, respectively [13]. Figure 2 shows water levels in those three observation wells over the period of record. Given the distance between this application and the observation wells, water levels in the observation wells are unlikely to represent the specific conditions of the Madison aquifer at the site of this application. However, they do represent the general behavior of the Madison aquifer. In general, water levels rise during periods of higher-than-average rainfall and decline during periods of lower-than-average rainfall [21]. This means that recharge and natural discharge are the dominant effects in the aquifer and natural discharge is available for capture. Therefore, based on observation well analysis, there is reasonable probability unappropriated water is available for this application.

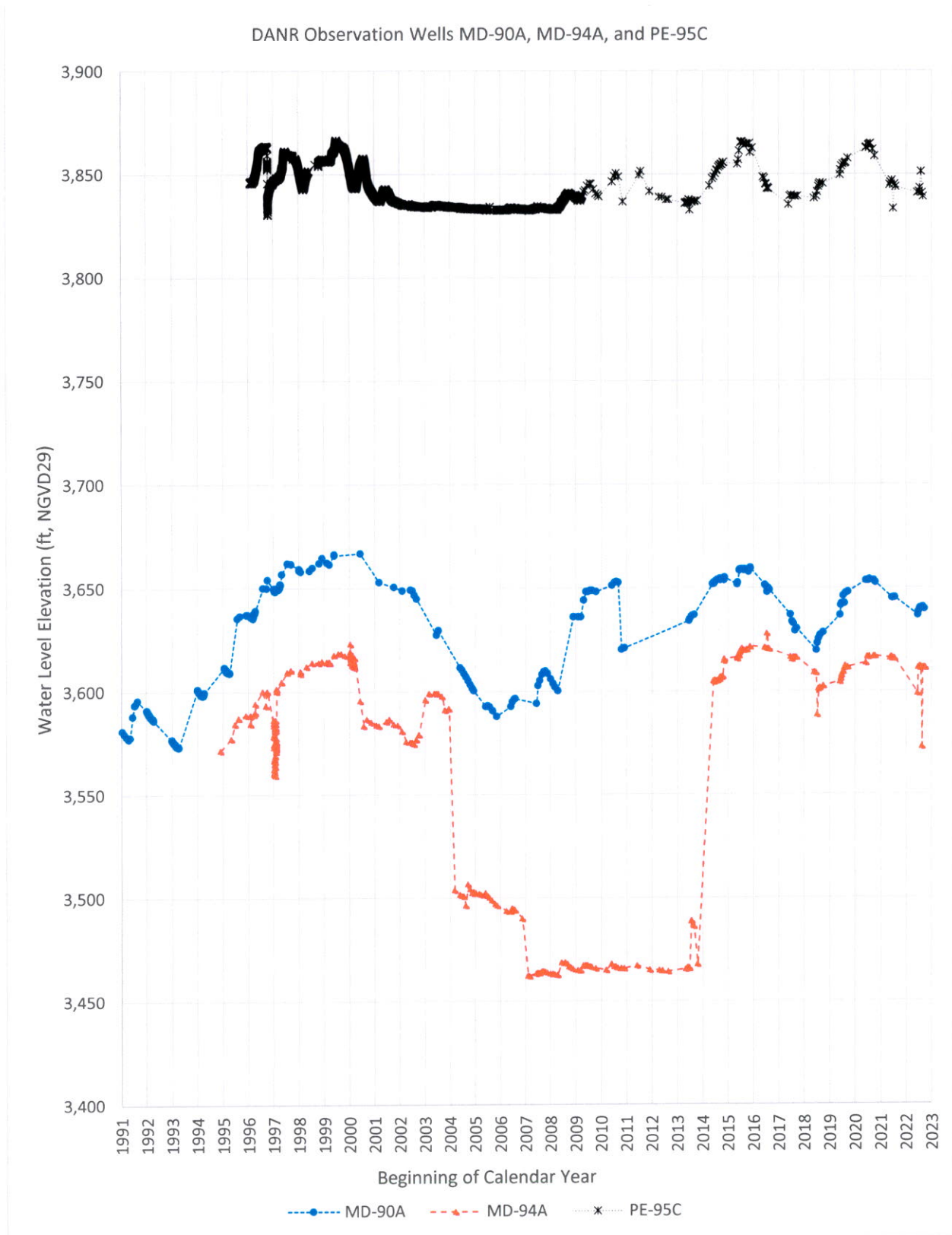


Figure 2: Observation well water level elevations [13]

Possibility of Unlawful Impairment of Existing Water Rights

The nearest water right or permit to this application is Water Right No. 1887-1, located approximately one mile west of this application [18]. The nearest domestic well on file with the Water Rights Program is located approximately three miles south of this application [22]. The Water Rights Program has historically interpreted an unlawful impairment of existing water rights to occur if a junior water right/permit causes a nearby adequate well with a senior water right/permit to become unable to withdraw at the rate it is entitled to or, if a domestic well is impacted, a water right/permit causes an adequate domestic well to be unable to withdraw at the rate needed to supply reasonable domestic use of water. Administrative Rule of South Dakota (ARSD) 74:02:04:20(6) defines an adequate well as:

...a well constructed or rehabilitated to allow various withdrawal methods to be used, to allow the inlet to the pump to be placed not less than 20 feet into the saturated aquifer or formation material when the well is constructed, or to allow the pump to be placed as near to the bottom of the aquifer as is practical if the aquifer thickness is less than 20 feet

This application is likely to cause some drawdown in the aquifer, if it is approved. Precise drawdown effects caused by a well cannot be known without an aquifer performance test that includes an observation well at the location of concern. Madison aquifer characteristics vary greatly from location to location. Numerical solutions for the Theis [9] equation [23] can be used to estimate drawdown in an aquifer assuming even aquifer characteristics, no recharge to the aquifer, and other conditions. Using the highest average withdrawal rate the applicant could withdraw (0.6 cfs) a storage coefficient of 10^{-5} and a transmissivity of 1,700 sqft/d, the drawdown 0.9 miles away from the applicant's well is estimated to be approximately 29 feet after 30 years of use [23]. Using the same variables except a transmissivity of 1,000 sqft/d, the drawdown is estimated to be approximately 48 feet after 30 years of use. At a point three miles from the well for this application, using storage coefficient of 10^{-5} , 30 years of pumping, 0.6 cfs, and using a transmissivity of 1,000 or 1,700 sqft/d, the Theis [9] equation returns an estimated drawdown of approximately 38 feet or 24 feet, respectively [23]. There was approximately 2,500 feet of hydraulic head above the top of the Madison aquifer at the time the applicant's well was drilled. In the hearing for Water Permit Application No. 2313-2 for Coca-Cola Bottling Company, the Water Management Board determined that to put the waters of the state to maximum beneficial use, hydraulic head would not be protected as a means of water delivery [24]. In the event that hydraulic head in the aquifer declines below the placement of a pump or outlet of a flowing well, well owners may be required to lower their pumps or install pumps to maintain their withdrawal rate. As long as the well does not meet the definition of an adversely impacted adequate well (ARSD 74:02:04:20(7)), the Water Management Board has not historically considered it an unlawful impairment of existing water rights. There is no record of well interference complaints from the Madison aquifer in Meade County [25]. Observation wells completed into this aquifer near larger appropriative wells show limited drawdown when the large appropriative wells are in use. Given the lack of well interference complaints in this aquifer in Meade County, the availability of approximately 2,500 feet of hydraulic head, and limited drawdown shown in observation wells completed near large appropriations, there is reasonable probability this application can be developed without unlawful impairment of existing water rights.

Impact to Springs

The nearest major springs to this application are Elk Creek Springs, located approximately 4 miles west of the proposed well for this application [26]. Upon considering the deferral of Water Permit Application No. 2585-2 for Southern Black Hills Water System, the Water Management Board adopted a conclusion of law stating in part, "... The only protection South Dakota law provides when considering an application for an underground water permit for flow from an artesian spring is under the public interest criteria" [27]. Given the distance between the proposed well site and the nearest springs, there is reasonable probability this application can be developed without noticeably impacting flow from the springs.

Conclusions

1. Water Permit Application No. 2025-1 seeks to appropriate up to 450 ac-ft/yr at a maximum diversion rate of 2.67 cfs from one well completed into the Madison aquifer located in the SW $\frac{1}{4}$ NW $\frac{1}{4}$ Section 31 T4N-R7E for a water distribution system located in the W $\frac{1}{2}$ NW $\frac{1}{4}$, SW $\frac{1}{4}$ Section 28, Sections 29, 30, 31, S $\frac{1}{2}$ N $\frac{1}{2}$, S $\frac{1}{2}$ Section 32; all in T4N-R7E.
2. Based on the hydrologic budget and observation well analysis, there is reasonable probability unappropriated water is available for this application.
3. There is reasonable probability this application can be developed without unlawful impairment of existing water rights.
4. This application is subject to a 20-year term limit.



Kimberly C. Drennon, E.I.

Natural Resources Engineer II – DANR Water Rights Program

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- [27] South Dakota Water Management Board. *Finding of Facts, Conclusions of Law, and Final Decision on the Matter of Water Permit Application No. 2585-2*, 1997.

RECEIVED

JAN 20 2023

Form 8

OFFICE OF
WATER

PROOF OF PUBLICATION

STATE OF SOUTH DAKOTA)
) SS
County of Meade)

I, Kris Stocklin-Johnson
certify that the attached printed Notice was taken
from the Faith Independent

printed and published in Faith
County of Meade and
state of South Dakota. The notice was published
in the newspaper on the following date:

12/28/2022

Cost of Printing \$40.14

Kris Stocklin-Johnson
(Signature)

Editor

(Title)

01/19/2023

(Date Signed)

NOTICE OF APPLICATION NO. 2025-1 to Appropriate Water

Notice is given that JKRC Properties LLC, c/o Ryan Kaski, 1935 Samco Rd, Suite 102, Rapid City SD 57702 has filed an application for a water permit to appropriate up to 450 acre-feet of water annually at a maximum diversion rate of 2.67 cubic feet of water per second from one well completed into the Madison Aquifer (2,690 feet deep) located in the SW 1/4 NW 1/4 (Gov't Lot 2) Section 31-T4N-R7E for a water distribution system located in the W 1/2 NW 1/4, SW 1/4

Section 28, Sections 29, 30, 31, S 1/2 N 1/2, S 1/2 Section 32; all in T4N-R7E. This site is located approximately 3 1/2 miles northeast of Piedmont SD.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 2025-1 with a twenty-year term pursuant to SDCL 46-1-14 and 46-2A-20 because 1) although evidence is not available to justify issuing this permit without a 20 year term limitation, there is reasonable probability that there is unappropriated water available for the applicant's proposed use, 2) existing domestic water use and water rights will not be unlawfully impaired, 3) the proposed use is a beneficial use and, 4) it is in the public interest as it pertains to matters of public interest within the regulatory authority of the Water Management. The Chief Engineer's recommendation with qualifications, the application, and staff report are available at <https://danr.sd.gov/public> or contact Ron Duvall for this information, or other information, at the Water Rights Program address provided below.

Any person interested in opposing this application or recommendation shall allege that the application, upon approval, will cause injury to the person that is unique from any injury suffered by the public in general. The injury must concern a matter either within the regulatory authority found in SDCL 46-2A-9 for approval or denial of the application, or other matter concerning the application within the regulatory authority of the board to act upon as defined by SDCL 46-2-9 and 46-2-11, or both. Any person meeting the petitioner requirements and wishing to be a party of record in a contested case hearing shall file a written petition to oppose the application with BOTH the applicant and Chief Engineer. A petition opposing the application shall be filed on a form provided by the Chief Engineer. The petition form is available online at <https://danr.sd.gov/public> or by contacting the Chief Engineer. The Chief Engineer's address is "Water Rights Program, Foss Building, 523 E Capitol, Pierre SD 57501" or call (605) 773-3352. The applicant's mailing address is given above. If contesting the Chief Engineer's recommendation, the applicant shall also file a petition. A petition filed by either an interested person or the applicant must be filed by January 16, 2023.

The petition shall include a statement describing the unique injury upon approval of the application on the petitioner, the petitioner's reasons for opposing the application, and the name and mailing address of the petitioner or the petitioner's legal counsel, if legal counsel is obtained.

Any interested person may file a comment on the application with the Chief Engineer. The comment shall be filed on a form provided by the Chief Engineer and is available online at <https://danr.sd.gov/public> or by calling (605) 773-3352 or writing the Chief Engineer at the address provided above. Filing a comment does not make the commenter a party of record or a participant in any hearing that may be held. Any comment must be filed by January 16, 2023.

If the applicant does not contest the recommendation of the Chief Engineer and no petition to oppose the application is received, the Chief Engineer shall act on the application pursuant to the recommendation with no hearing held before the Water Management Board. If a petition opposing the application or contesting the recommendation is filed, then a hearing will be scheduled, and the Water Management Board will consider this application. Notice of the hearing will be given to the applicant and any person filing a petition.

Published December 28, 2022 at the approximate cost of \$40.14 and may be viewed free of charge at www.sdpublishing.com.

*** Proof of Publication ***

STATE OF SOUTH DAKOTA)

County of Pennington)

S.D. DANR - GROUND WATER

523 E CAPITOL AVE

PIERRE SD 57501

ORDER NUMBER 53175

RECEIVED

JAN 06 2023

OFFICE OF
WATER

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2025-1 to Appropriate Water

Notice is given that JKRK Properties LLC, c/o Ryan Kaski, 1935 Samco Rd, Suite 102, Rapid City SD 57702 has filed an application for a water permit to appropriate up to 450 acre-feet of water annually at a maximum diversion rate of 2.67 cubic feet of water per second from one well completed into the Madison Aquifer (2,690 feet deep) located in the SW 1/4 NW 1/4 (Gov't Lot 2) Section 31-T4N-R7E for a water distribution system located in the W 1/2 NW 1/4, SW 1/4 Section 28, Sections 29, 30, 31, S 1/2 N 1/2, S 1/2 Section 32; all in T4N-R7E. This site is located approximately 3 1/2 miles northeast of Piedmont SD.

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(Published January 4, 2022 for a total approximate cost of \$96.54 and may be viewed for free at www.sdpublicnotices.com)
Legal No: 52175

The undersigned, being duly sworn, upon his/her oath says: That he/she is now and was at all time hereinafter mentioned, a clerk of the RAPID CITY JOURNAL, a corporation of Rapid City, South Dakota, a legal and daily newspaper printed and published in Rapid City, in said County of Pennington, and has full and personal knowledge of all the facts herein stated as follows: that said newspaper is and at all of the times herein mentioned has been a legal and daily newspaper with a bonafide paid circulation of at least Two Hundred copies daily, and has been printed and published for at least one year prior to the first date of the published notice.

This affidavit is a true and corrected copy of notice which appeared

in said newspaper once each day for 1
successive day, the first publication there of being on the
4 day of January, 2023.
Rapid City

Section: Legal

Category: 0072 Public Notices

PUBLISHED ON: 01/04/2023

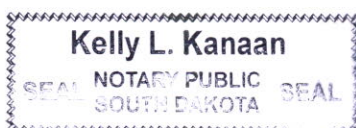
TOTAL AD COST: 96.54

FILED ON: 1/4/2023

Subscribed and sworn to before me this

4th day of January, 2023.
Kelly L Kanaan Notary Public

My commission expires Jan 17, 2025



Schlaak, Karen

From: Schlaak, Karen
Sent: Tuesday, December 20, 2022 9:39 AM
To: RCY Legals (legals@rapidcityjournal.com)
Subject: 2025-1, JKRR Properties LLC
Attachments: 2025-1public.short_final.docx; FORM8.FRM.doc

Attached is a notice to be published on January 4, 2023.

JKRR Properties LLC, c/o Ryan Kaski, 1935 Samco Rd, Suite 102, Rapid City SD 57702 (605 342-9606 or 605 381-0727) has been notified to contact you to authorize publication and arrange for payment.

Please send the affidavit or return the attached Proof of Publication form ASAP to the Water Rights Program, 523 E Capitol, Pierre SD 57501.

Let me know if you have questions. Please acknowledge receipt of this email.

Karen Schlaak

DANR - Water Rights Program
(605) 773-3352
Website: <https://danr.sd.gov>



Schlaak, Karen

From: Schlaak, Karen
Sent: Tuesday, December 20, 2022 9:39 AM
To: 'faithind@faithsd.com'
Subject: 2025-1, JKRK Properties LLC
Attachments: 2025-1public.short_final.docx; FORM8.FRM.doc

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Karen Schlaak

DANR - Water Rights Program
(605) 773-3352
Website: <https://danr.sd.gov>





**DEPARTMENT of AGRICULTURE
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 E CAPITOL AVE
PIERRE SD 57501-3182
danr.sd.gov

**NOTE: TO BE SURE OF PUBLICATION ON
THE CORRECT DATES, CONTACT
THE NEWSPAPERS RIGHT AWAY.**

December 20, 2022

JKRK Properties LLC
c/o Ryan Kaski
1935 Samco Rd, Suite 102
Rapid City SD 57702

Dear Mr. Kaski:

Water Permit Application No. 2025-1 for water distribution use have been examined and found to comply with the South Dakota Water Laws and applicable rules. A notice has been sent to the Faith Independent printed at Faith (Ph # 605 967-2161) and the Rapid City Journal printed at Rapid City (Ph # 307-266-0554). You will need to contact the newspapers and authorize publication of this notice. For your information, a copy of the notice, the recommendation of the Chief Engineer and report on the application are enclosed. Please review the notice prior to publication and notify this office, if you have any corrections or questions.

Be sure to contact the above newspapers to authorize publication of your Notice and to arrange for payment. Early contact with the papers can eliminate delays. Upon receiving authorization from you, the publishers have been instructed to publish your notice. The newspapers have also been instructed to send us the Proof of Publication. We must receive Proof of Publication before action can be taken on the application.

Sincerely,

Karen Schlaak
Water Rights Program
(605) 773-3352

enclosures

NOTE: If you plan to contest any part of the Chief Engineer's recommendation, you must file a petition pursuant to the procedures outlined in the attached notice of hearing. The Water Management Board will then consider your concerns during a hearing on the application.

NOTICE OF APPLICATION NO. 2025-1 to Appropriate Water

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Published once at the total approximate cost of_



**DEPARTMENT of AGRICULTURE
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 E. CAPITOL AVE
PIERRE SD 57501-3182
danr.sd.gov

FEB 17 2023

JKRK Properties LLC
c/o Ryan Kaski
1935 Samco Road, Suite 102
Rapid City SD 57702

Dear Mr. Kaski:

Enclosed is Water Permit No. 2025-1 authorizing construction of the water diversion system and beneficial use of the water, not exceeding the limits as specified in the Water Permit.

Form 10, *Notice of Completion of Works and Application of Water to Beneficial Use*, is enclosed. Please return this completed form after you have finished the system and have put the water to beneficial use. An investigation can then be scheduled so the water license may be issued, thus completing the acquisition of a water right.

An informational sheet *Common Water Right Questions?* is also enclosed. This sheet is intended to answer some of the questions associated with obtaining and keeping a water right.

Sincerely,

Eric Gronlund, Chief Engineer
Water Rights Program
(605) 773-3352

enclosures

email: Kale R McNaboe, Longbranch Civil Engineering Inc

Schlaak, Karen

From: Schlaak, Karen
Sent: Friday, February 17, 2023 8:36 AM
To: 'Kale McNaboe'
Subject: Water Permit No. 2025-1, JKRK Properties LLC
Attachments: 0009.pdf

Attached is a copy of Water Permit No. 2025-1 for JKRK Properties LLC as approved.

Karen Schlaak

DANR - Water Rights Program
(605) 773-3352
Website: <https://danr.sd.gov>





**DEPARTMENT of AGRICULTURE
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 E. CAPITOL AVE
PIERRE SD 57501-3182
danr.sd.gov

STATE OF SOUTH DAKOTA)
) SS
COUNTY OF HUGHES)

**Affidavit of Public Notice
on DANR Website**

Pursuant to SDCL § 46-2A-4, public notice of the following application was posted on the DANR web site at <https://danr.sd.gov/public>. The posted public notice is the same notice as published in the pertinent newspaper(s) and a copy of the public notice is maintained in the application file. If the application is contested, the posting is moved to the DANR contested case website at <https://danr.sd.gov/public/ContestedCase.aspx> until final action is taken on the application pursuant to SDCL § 46-2A-4.

Application No.: 2025-1

Name of Applicant: JK RK Properties, c/o Ryan Kaski

Date of Posting: 1/4/2023

Date of Removal: 2/17/2023



Ron Duvall, Water Rights Permitting Administrator

2/17/23

Date

Subscribed and sworn to before me, a notary public, this 17th day of February, 2023.



Notary Public - South Dakota
My commission expires: 4/1/2025

