

MAY 22 2018**WATER RESOURCES
WESTERN REGION****MEMORANDUM**

DATE: May 22, 2018

TO: Nick Miller – Western Region Manager, Idaho Department of Water Resources
Charles Honsinger – Attorney for Protestant The Terteling Company, Inc.

FROM: Terry Scanlan, P.E., P.G.

CC: Zeke Johnson – ZWJ Properties, LLC

RE: Winsome Road Well Pumping Test and Post-Construction Temperature Profile

Summary. A pumping test was conducted on May 9, 2018, for the Winsome Road Well #2 in the NE quarter of the SW quarter of Section 27 in Township 4 North, Range 2 East (Figure 1) for ZWJ Properties, LLC, in accordance with the conditions of approval for water right No. 63-34242.

The results of testing indicated the well was capable of producing a sustained rate of 71 gallons per minute (gpm) with 29.56 feet of drawdown over the test duration of 6 hours.

On May 17, 22018 water temperature readings were collected at various depth in the completed well to verify that the bottom-hole temperature was below 85°F. A bottom-hole temperature of 75°F was measured.



Figure 1. Winsome Road Well Location Map

IDWR Water Permit Conditions. The Winsome Road well is authorized to divert water under water permit 63-34242 (Attachment A). The permit allows a total diversion of 0.16 cfs (72 gpm) for the irrigation of 8 acres within the parcels owned by ZWJ Properties (identified in Figure 1) between March 1 and November 15 of each year. The Idaho Department of Water Resources (IDWR) approval of permit 63-34242 included the follow conditions.

- Permit holder shall provide IDWR with a temperature log of any well borehole (prior to casing and constructing such well), together with a subsequent temperature log for any well constructed as a point of diversion for permit no. 63-34242.
- The well used as a point of diversion for this water right shall be drilled using the direct mud rotary drilling method and shall be constructed and maintained with unperforated casing and sealed over the full length of the casing to a depth of 200 feet or more below ground surface.
- Permit holder shall test pump any well that is constructed as a point of diversion for permit no. 63-34242. Permit holder shall:
 - (1) notify IDWR of the testing date and time a minimum of 48 hours prior to testing;
 - (2) conduct test pumping for at least six hours at a constant pumping rate of no less than 75% of the nominal pumping rate selected for the permanent pump;
 - (3) measure static water level prior to testing;
 - (4) measure pumping water level, water temperature, and pumping rate at intervals of no less than once per hour; and
 - (5) measure recovery water level for a minimum of one hour following the end of pumping.Water levels shall be measured with an accuracy of 0.1 feet or better. Pumping rate shall be measured with a calibrated flow meter or a volumetric means with an accuracy of 5% or better. The pumping test shall be conducted under the supervision of a professional engineer or geologist registered in the state of Idaho. IDWR may observe the pump test if desired. The engineer or geologist shall submit a stamped pumping test report to IDWR within 30 days of the completion of testing.

With the submittal of this memo to IDWR, all of these permit conditions have been met.

Well Description. Well construction was completed by Andy Clark of Coonse Well Drilling on May 3, 2018. A 12-inch borehole was drilled to 228 feet below ground surface (bgs). Drilling was conducted using the mud-rotary method. A temperature log was conducted on April 27, 2018 and submitted to IDWR and the protestant's representative by email on that date.

The well was constructed with 8-inch steel casing to 210 feet and 8-inch stainless steel well screen to from 210 to 220 feet. The annular space outside the casing and screen was filled with No. 8-12 silica sand below 207 feet, bentonite chips from 200 to 207 feet, and cement-bentonite grout above 207 feet.

Static water level at the time of well completion was 107 feet bgs, which rose to 105.5 feet bgs by the time of the pumping test on May 9th. The measured static level was about 105 feet bgs at the start of the temperature data collection on May 17th.

A Well Driller's Report is provided as Attachment B.

Pumping Test. The pumping test occurred on May 9, 2018. IDWR and the protestant's representative were notified of the test schedule by email on May 3, more than 48-hours prior to the start of test.

The test utilized a generator-powered electric submersible pump placed at a depth of approximately 189 feet bgs. Depth to water (DTW) measurements were made using an electric-line well sounder. Discharge from the test was pumped through a 2-inch hose, and a 2-inch Octave AWWA C750 flow meter was used to monitor the flow.

The pump was turned on at 9:00 AM and the instantaneous flow rate was measured at 74 gallons per minute (gpm). The flow rate was immediately adjusted to approximately 72 gpm, and the rate was held at approximately 71 gpm for the remainder of the pumping test. DTW measurements were collected at a maximum interval of 15 minutes. The pumping test was run at a constant rate for 6 hours. Instantaneous flow rate, pH, and temperature measurements were collected throughout the pump test. Well water level recovery was monitored after turning off the pump by taking several DTW measurements for a period of one hour.

Over the course of the pumping test, discharge rate was ranged between 70 to 73 gpm and averaged 71.2 gpm. Average water temperature and pH were about 20°C (68°F) and 7.28, respectively. Initially, discharge water was slightly turbid with some sand visible, but cleared as the test progressed. Little to no sand was visible in the discharge water by the end of the test. DTW in the well at the end of the pumping test was measured at 135.02 feet bgs, which corresponds to a drawdown of 29.56 feet (Figure 2). Water levels recovered to 106.57 feet bgs, or 1.11 feet of residual drawdown, within an hour of the pump being shut off. A table of pumping test measurements is provided as Attachment C.

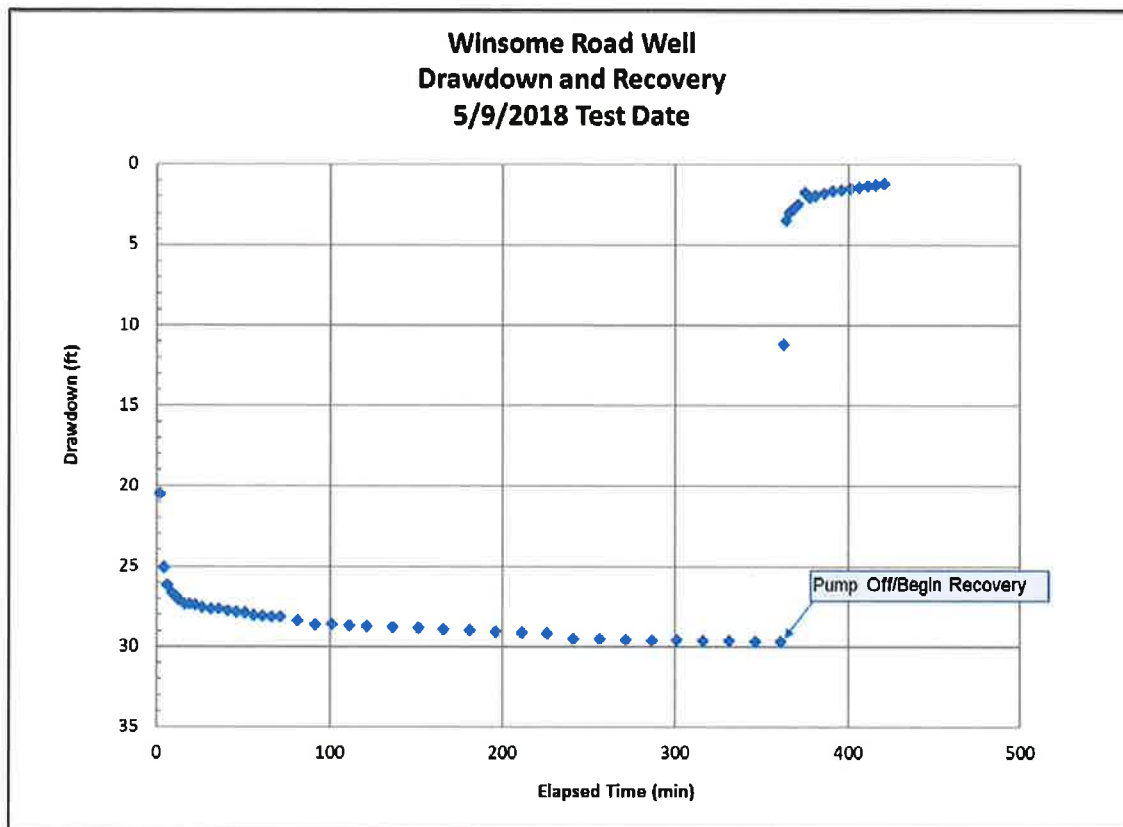


Figure 2. Pump Test Results

Water Temperature Profile. Water temperature data was collected from the completed well using a Solinst Levellogger Edge water pressure and temperature data logger on May 17, more than one week following completion of test pumping. The data logger collected a temperature reading every 2 seconds for the duration of the logging period. Temperature readings were collected at below top of casing depths of 110 feet, 130 feet, 150 feet, 170 feet, 190 feet, 210 feet, and at the bottom of the well. The logger recorded temperature at each depth interval for approximately 5 minutes to allow for partial stabilization of the temperature readings.

In order to be considered low-temperature geothermal groundwater, the water temperature must reach at least 85°F. The highest recorded temperature in the water was approximately 66.34°F at the well bottom (Figure 3), far below the low-temperature geothermal threshold.

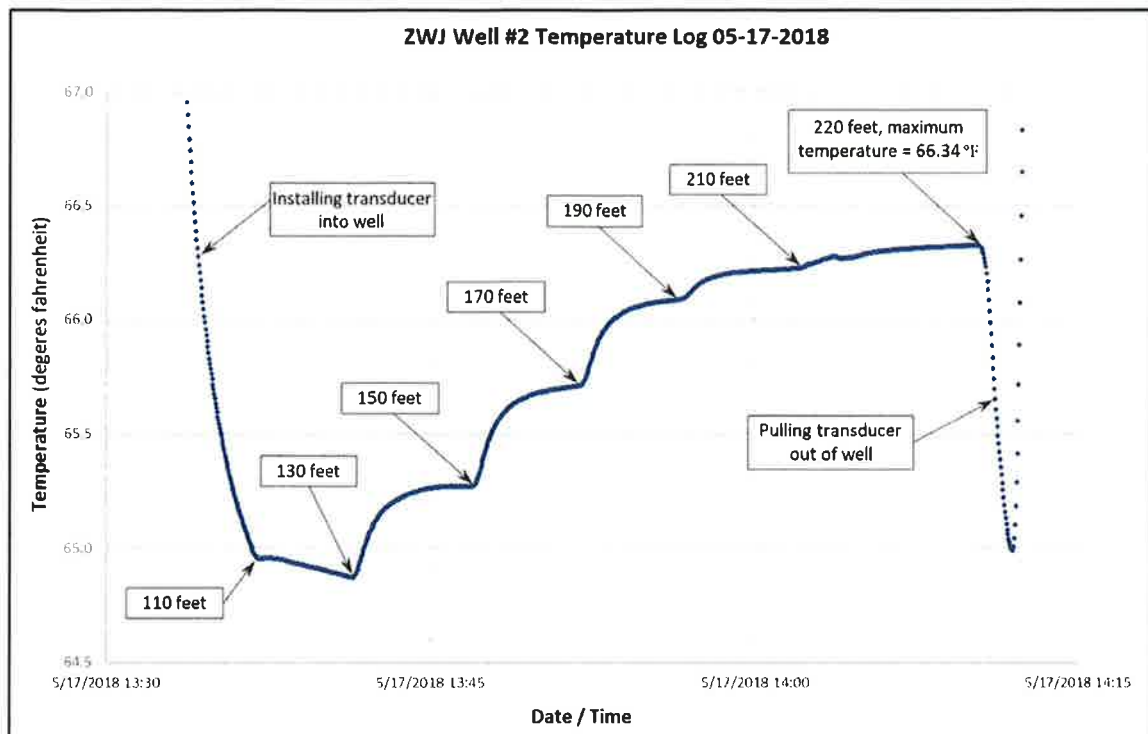
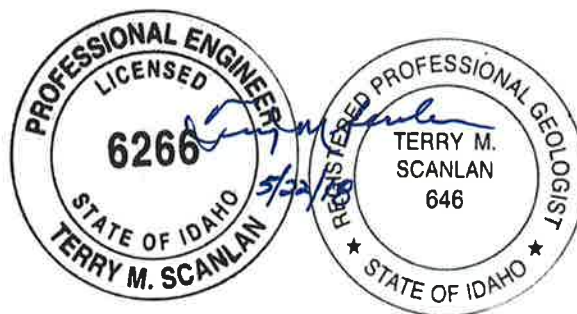


Figure 3. Well Temperature Profile Data

Conclusions

1. Productivity of Winsome Road Well #2 is adequate to supply the 0.16 cfs diversion rate authorized under permit 63-34242. Pumping water level under sustained pumping at 0.16 cfs will likely range from 135 to 140 feet below ground surface. A pump setting depth of 189 feet is recommended.
2. Bottom-hole temperature and produced water temperature were both less than 70°F.
3. Winsome Road Well No. 1 is not needed as a point of diversion under permit 63-34242. Well No. 1 could be maintained as an exempt domestic well for Win Hollow Subdivision Lot 5 or abandoned in accordance with Idaho Department of Water Resources rules.



ATTACHMENT A – WATER PERMIT 63-34242

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State of Idaho
Department of Water Resources**Permit to Appropriate Water**

NO. 63-34242

Priority: June 03, 2016

Maximum Diversion Rate: 0.16 CFS

This is to certify, that ZWJ PROPERTIES LLC
ZEKE JOHNSON
333 ROSSI ST STE 200
BOISE ID 83706

has applied for a permit to appropriate water from:

Source: GROUND WATER

and a permit is APPROVED for development of water as follows:

<u>BENEFICIAL USE</u>	<u>PERIOD OF USE</u>	<u>RATE OF DIVERSION</u>
IRRIGATION	03/01 to 11/15	0.16 CFS

LOCATION OF POINT OF DIVERSION:

GROUND WATER NE¼SW¼ Sec. 27, Twp 04N, Rge 02E, B.M., ADA County

PLACE OF USE: IRRIGATION

Twp	Rge	Sec	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
04N	02E	27									31.0			4.0					35.0

Total Acres: 35

CONDITIONS OF APPROVAL

1. Proof of application of water to beneficial use shall be submitted on or before **August 01, 2022**.
2. Subject to all prior water rights.
3. This right is limited to the irrigation of 8.0 acres within the authorized place of use in a single irrigation season.
4. Water bearing zone to be appropriated is 200 to 600 feet.
5. This right when combined with all other rights shall provide no more than 0.02 cfs per acre nor more than 4.5 afa per acre at the field headgate for irrigation of the place of use.
6. Diversion and use of water with a temperature greater than 85 degrees Fahrenheit is not authorized under this right.
7. The point of diversion identified in this right is located within the boundaries of the Boise Front Low Temperature Geothermal Resource Groundwater Management Area. The well driller shall monitor water temperatures while drilling the well. If water with a temperature greater than 85 degrees Fahrenheit is encountered by the driller, drilling must immediately cease, and the Department must be notified. Drilling shall not resume until the Department has reviewed the drilling conditions, and established standards for construction with the driller.
8. The well used as a point of diversion for this water right shall be drilled using the direct mud rotary drilling method and shall be constructed and maintained with unperforated casing and sealed over the full length of the casing to a depth of 200 feet or more below ground surface.

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State of Idaho
Department of Water Resources

Permit to Appropriate Water

NO. 63-34242

9. Permit holder shall provide IDWR with a temperature log of any well borehole (prior to casing and constructing such well), together with a subsequent temperature log for any well constructed as a point of diversion for permit no. 63-34242.
10. Permit holder shall test pump any well that is constructed as a point of diversion for permit no. 63-34242. Permit holder shall: (1) notify IDWR of the testing date and time a minimum of 48 hours prior to testing; (2) conduct test pumping for at least six hours at a constant pumping rate of no less than 75% of the nominal pumping rate selected for the permanent pump; (3) measure static water level prior to testing; (4) measure pumping water level, water temperature, and pumping rate at intervals of no less than once per hour; and (5) measure recovery water level for a minimum of one hour following the end of pumping. Water levels shall be measured with an accuracy of 0.1 feet or better. Pumping rate shall be measured with a calibrated flow meter or a volumetric means with an accuracy of 5% or better. The pumping test shall be conducted under the supervision of a professional engineer or geologist registered in the state of Idaho. IDWR may observe the pump test if desired. The engineer or geologist shall submit a stamped pumping test report to IDWR within 30 days of the completion of testing.
11. Permit holder shall permit IDWR an opportunity to measure the temperature of water pumped from any well that is a constructed as a point of diversion for permit no. 63-34242 upon reasonable request.
12. The diversion and use of water described in this right may be subject to additional conditions and limitations agreed to by the protestant and the right holder under a separate agreement to which the Department is not a party. Because the Department is not a party, the Department is not responsible for enforcement of any aspect of the agreement not specifically addressed in other conditions herein. Enforcement of those portions of the agreement not specifically addressed in other conditions shall be the responsibility of the protestant and the water right holder.
13. Right holder shall comply with the drilling permit requirements of Section 42-235, Idaho Code and applicable Well Construction Rules of the Department.
14. After specific notification by the Department, the right holder shall install a suitable measuring device or shall enter into an agreement with the Department to use power records to determine the amount of water diverted and shall annually report the information to the Department.
15. Project construction shall commence within one year from the date of permit issuance and shall proceed diligently to completion unless it can be shown to the satisfaction of the Director of the Department of Water Resources that delays were due to circumstances over which the permit holder had no control.
16. The Director retains jurisdiction to require the right holder to provide purchased or leased natural flow or stored water to offset depletion of Lower Snake River flows if needed for salmon migration purposes. The amount of water required to be released into the Snake River or a tributary, if needed for this purpose, will be determined by the Director based upon the reduction in flow caused by the use of water pursuant to this permit.

This permit is issued pursuant to the provisions of Section 42-204, Idaho Code.

Signed this 17th day of July, 2017.

Nick Miller
Manager, IDWR Western Region

State of Idaho
Department of Water Resources
Attachment to Permit to Appropriate Water
63-34242

This map depicts the IRRIGATION place of use boundary for this water right at the time of this approval and is attached to the approval document solely for illustrative purposes.



- Point of Diversion
- Place Of Use Boundary
- Townships
- PLS Sections

0 0.05 0.1 0.2 Miles



ATTACHMENT B – WELL DRILLERS REPORT

Form 238-7
8/07IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

1. WELL TAG NO. D 0077574
 Drilling Permit No. 63-34242
 Water right or injection well # _____

2. OWNER:
 Name ZWJ Properties
 Address 333 Rossi St STE
 City Boise State ID Zip 83706

3. WELL LOCATION:
 Twp 4 North ☒ or South ☐ Rge 2 East ☒ or West ☐
 Sec 27 1/4 SE 1/4 SW 1/4

Gov't Lot _____ County Ada
 Lat. 43 39.182 (Deg and Decimal minutes)
 Long. 116 12.272 (Deg and Decimal minutes)
 Address of Well Site End of Winsome Rd off Bogus Basin Rd.
 City Boise

4. USE:
☐ Domestic ☐ Municipal ☐ Monitor ☒ Irrigation ☐ Thermal ☐ Injection
☐ Other _____

5. TYPE OF WORK:
☒ New well ☐ Replacement well ☐ Modify existing well
☐ Abandonment ☐ Other _____

6. DRILL METHOD:
☒ Air Rotary ☒ Mud Rotary ☐ Cable ☐ Other _____

7. SEALING PROCEDURES:

Seal material	From (ft)	To (ft)	Quantity (lbs or ft)	Placement method/procedure
ben/cem	5	200	70.5	tremie
3/4 bentonite	0	5	200lbs	dry pour

8. CASING/LINER:

Diameter (nominal)	From (ft)	To (ft)	Gauge/Schedule	Material	Casing Liner	Threaded	Welded
8"	+3	210	.250	steel	☒	☐	☐
8"	220	221	.250	steel	☒	☐	☐

Was drive shoe used? ☐ Y ☒ N Shoe Depth(s) _____

9. PERFORATIONS/SCREENS:
 Perforations ☐ Y ☒ N Method _____
 Manufactured screen ☒ Y ☐ N Type Johnson
 Method of installation placed

From (ft)	To (ft)	Slot size	Number/ft	Diameter (nominal)	Material	Gauge or Schedule
210	220	.02	---	8"	stainless	

Length of Headpipe _____ Length of Tailpipe _____
 Packer ☐ Y ☒ N Type _____

10. FILTER PACK:

Filter Material	From (ft)	To (ft)	Quantity (lbs or ft)	Placement method
8/12 silica	207	221.5	1350lbs	tremie

11. FLOWING ARTESIAN:
 Flowing Artesian? ☐ Y ☒ N Artesian Pressure (PSIG) _____
 Describe control device _____

12. STATIC WATER LEVEL and WELL TESTS:
 Depth first water encountered (ft) 185 Static water level (ft) 107
 Water temp (°F) _____ Bottom hole temp (°F) 75 Deg F
 Describe access point well cap

Well test:

Drawdown (feet)	Discharge or yield (gpm)	Test duration (minutes)
150+		180

Water quality test or comments: _____

13. LITHOLOGIC LOG and/or repairs or abandonment:

Elev (ft)	From (ft)	To (ft)	Remarks, lithology or description of repairs or abandonment, water temp.	Water	
				Y	N
12"	0	2	top soil		X
"	2	16	sandy brown clay		X
"	16	28	tan clay		X
"	28	30	black shale		X
"	30	42	fine brown sand		X
"	42	68	tan clay		X
"	68	75	tan sandstone		X
"	75	108	tan clay		X
"	108	197	blue clay w/ cracks	X	
"	197	208	coarse gray sand	X	
"	208	210	blue clay		X
"	210	221	medium fine gray sand	X	
"	221	228	blue clay		X

Completed Depth (Measurable) 221
 Date Started Apr 19, 2018 Date Completed May 2, 2018

14. DRILLER'S CERTIFICATION:
 I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Company Name Coonse Well Drilling Co No 409
 *Principal Driller David Coonse Date May 3, 2018
 *Driller AS Bend Date May 3, 2018
 *Operator II _____ Date _____
 Operator I Brandon Heldman Date May 3, 2018
 *Signature of Principal Driller and rig operator are required

Bentonite chip
 seal 207 to 200
 feet, per email
 from Andy Clark
 dated 5/22/18
 (TS)

ATTACHMENT C – PUMPING TEST MEASUREMENTS

Winsome Road Well #2 71 GPM Constant Rate Discharge Test								
5/9/2018								
Tested by Gene Wright (Coonse Well Drilling & Pump). Supervised by Sean Albertson (SPF Water Engineering).								
Pump type: Grundfos 15 hp submersible set at 189 feet. Powered by 150 hp Whisperwatt Diesel AC Generator.								
Flow rates and totalizer recorded from 2" Octave Ultrasonic Water Meter (AWWA C750).								
Flow target: At least 70 gpm								
Water level measured with 300-foot non-stretch Water Line sounder.								
Measurement point top of 8-inch casing = 2.9 feet above ground surface								
Time (MST)	t (min)	t' (min)	t/t'	DTW (ft BMP)	DTW (ft bgs)	Drawdown (ft)	Q (gpm)	Remarks
8:55				108.36	105.46		0	Static water level.
9:00	0						~74	Pump on. Totalizer start = 910 gal.
9:01	1			128.71	125.81	20.35		
9:03	3			133.32	130.42	24.96	72	Temperature readout flow meter shows 66F.
9:05	5			134.40	131.50	26.04	71.5	
9:08	8			134.91	132.01	26.55	70	Rossum start. Quick influx of sand at start.
9:10	10			135.15	132.25	26.79	72	
9:12	12			135.33	132.43	26.97	71	Rossum 0.2 mL.
9:15	15			135.59	132.69	27.23	72	
9:18	18			135.61	132.71	27.25	72	
9:21	21			135.66	132.76	27.30	70	
9:25	25			135.82	132.92	27.46	73	Rossum ~0.23 mL.
9:28	28							Rossum off. ~0.27 mL.
9:30	30			135.92	133.02	27.56	72	7.28 pH, 344 EC, 382 SC, 19.8C
9:35	35			135.90	133.00	27.54	72	
9:40	40			135.98	133.08	27.62	72	
9:45	45			136.10	133.20	27.74	71	
9:50	50			136.12	133.22	27.76	72	
9:55	55			136.28	133.38	27.92	71	Rossum on.
10:00	60			136.35	133.45	27.99	70	Collected discharge sample in bucket. Washout from previous flows has dug some trenches in hill.
10:05	65			136.39	133.49	28.03	72	
10:10	70			136.41	133.51	28.05	71	Slight sulfur smell at discharge. 7.27 pH, 335 EC, 373 SC, 19.7C
10:20	80			136.60	133.70	28.24	71	Trace sand in bucket. Rossum <0.1mL.
10:30	90			136.83	133.93	28.47	73	Flow meter temp readout = 68F
10:40	100			136.85	133.95	28.49	72	
10:50	110			136.90	134.00	28.54	73	
11:00	120			136.94	134.04	28.58	72	
11:15	135			137.00	134.10	28.64	72	
11:30	150			137.04	134.14	28.68	72	
11:45	165			137.12	134.22	28.76	71	
12:00	180			137.19	134.29	28.83	72	
12:15	195			137.27	134.37	28.91	72	
12:30	210			137.31	134.41	28.95	72	
12:45	225			137.36	134.46	29.00	73	
13:00	240			137.71	134.81	29.35	72	
13:15	255			137.74	134.84	29.38	72	
13:30	270			137.76	134.86	29.4	72	
13:45	285			137.80	134.90	29.44	72	
14:00	300			137.82	134.92	29.46	71	
14:15	315			137.85	134.95	29.49	72	
14:30	330			137.89	134.99	29.53	72	7.28 pH, 337 EC, 373 SC, 20.0C (68F on meter readout)
14:45	345			137.90	135.00	29.54	71	Rossum off. ~0.16 mL sand. 0.28 ppm.
15:00	360	0.00		137.92	135.02	29.56	71.2	Discharge off. Totalizer end = 26,530 gal. Avg. flow = 71.2 gpm.
15:01	361	1.00	361.00	119.45	116.55	11.09		
15:03	363	3.00	121.00	111.73	108.83	3.37		
15:05	365	5.00	73.00	111.24	108.34	2.88		
15:07	367	7.00	52.43	111.05	108.15	2.69		
15:10	370	10.00	37.00	110.73	107.83	2.37		
15:14	374	14.00	26.71	109.98	107.08	1.62		
15:17	377	17.00	22.18	110.29	107.39	1.93		
15:20	380	20.00	19.00	110.21	107.31	1.85		
15:25	385	25.00	15.40	110.06	107.16	1.70		
15:30	390	30.00	13.00	109.92	107.02	1.56		
15:35	395	35.00	11.29	109.83	106.93	1.47		
15:40	400	40.00	10.00	109.74	106.84	1.38		
15:45	405	45.00	9.00	109.68	106.78	1.32		
15:50	410	50.00	8.20	109.59	106.69	1.23		
15:55	415	55.00	7.55	109.54	106.64	1.18		
16:00	420	60.00	7.00	109.47	106.57	1.11		