

Edl, Michele

From: Christian Petrich <CPetrich@spfwater.com>
Sent: Monday, March 12, 2018 8:06 PM
To: Edl, Michele
Cc: Howie Royal; Lori Prime
Subject: Permit 37-22545
Attachments: MEMO from CRP to Michele Edl re 37-22545 (3-8-2018).pdf; ATT00001.htm
Categories: Red Category

Michele,

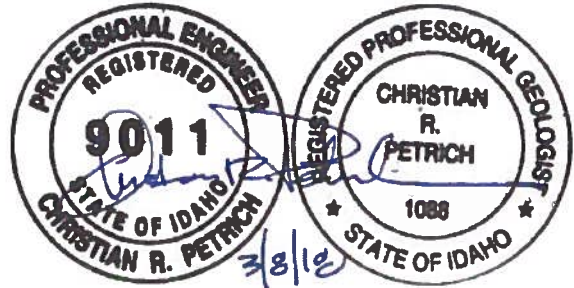
Please see the attached memo in response to your February 23, 2018 letter. You can reach me on my cell phone (see below) if you have any questions. Thanks!!

Regards,
Christian

Christian R. Petrich, Ph.D., P.E., P.G.
Principal Engineer/Hydrologist (Emeritus)
SPF Water Engineering, LLC
300 E Mallard Drive, Suite 350 | Boise, ID 83706
Tel: 208.383.4140
Fax: 208.383.4156
Cell: 208.869.4569

MEMORANDUM

DATE: March 8, 2018
TO: Michele Edl, IDWR
FROM: Christian R. Petrich, Ph.D., P.E., P.G.
CC: Howie Royal, Blaine County School District
RE: *Permit 37-22545 Monitoring Data*



A. Introduction

This memorandum provides groundwater-usage and groundwater-level data requested in your February 23, 2018 letter regarding Permit 37-22545.

B. Heating/Cooling System Production

The accompanying spreadsheet contains (1) totalizer readings (recorded daily when school is in session), (2) the number of pumps operating at the time when the totalizer was read, and (3) the observed flow at the time that the totalizer was read. Totalizer values are read and recorded by District personnel. The spreadsheet also contains estimates of daily volumes and average daily flows calculated using the reported data. Annual volumes in the 3 water years¹ with complete heating- and cooling-production data (Table 1) ranged from 95 AF (2015-2016) to 185 AF (2014-2015).

The heating and cooling system has no bypass.² All of the water pumped flows through the heating and cooling system heat exchanger.

C. Injection-Well Water Levels

Water-level measurements in wells are taken by District personnel. Most of these measurements were taken at times when there are two or less pumps in operation.

Injection-well water levels since October 2015 ranged from 57 to 68.5 feet below ground surface (Table 2). Injection-well water levels are consistent with those measured in

¹ Defined as October 1 through September 31.

² Scott Davis, BCSD, May 4, 2017.

Irrigation Well 8, which is located roughly between Injection Well 2 and Injection Well 3 (Figure 2). Well 8 is not in use during the winter months; groundwater levels in this well reflect local static groundwater levels.

Hydrographs from the injection and irrigation wells (Figure 3 and Figure 4) show seasonally-high groundwater levels in April through June (in response to regional, seasonal recharge) and seasonally-low groundwater levels during the fall and winter months. The data do not show evidence of a perched water table caused by heating-and cooling-system injection.

The measurements are consistent with injection-well water levels measured under controlled conditions with 1, 2, or 3 wells in operation in December 2013 (Table 3).³ Under controlled conditions with 2 or 3 pumps in operation, measured water levels may be as shallow as in 9 or 10 feet below ground surface (see also attached data sheets). However, as the attached datasheet show, water levels drop to static levels within minutes of injection cessation. Shallow injection-well water levels during active operation illustrate well inefficiency and do not reflect surrounding groundwater levels. This is also illustrated in the irrigation well measurements recorded on February 23, 2018, which show no changes associated with short-term injection operations (see attached datasheet).

D. Summary

To date, annual volumes under Permit 37-22545 have been 185 AF/year or less. However, the heating/cooling system has capacity for substantially greater annual volumes during particularly cold winters or hot summers.

Static groundwater-level data from injection wells and a nearby irrigation well (which is not used during winter months) ranged from approximately 57 to 69 feet below ground surface. These groundwater levels do not reflect the presence of a perched aquifer or broad groundwater-level increases caused by heating/cooling system injection. Groundwater levels during peak-season injection (i.e., winter) are lower than spring and early summer groundwater levels.

E. Recommendation

Following up on my email of September 5, 2017, I recommend that the District continue to collect production data in support of licensing (maintaining a Proof of Beneficial Use date of October 1, 2020), but discontinue groundwater monitoring. I believe that the

³ Some of the groundwater level measurements with 3 well in operation almost certainly reflect borehole storage and/or well inefficiency – not groundwater levels in the aquifer outside of the wells.

groundwater-level data collected to date have confirmed that heating/cooling system injection have not led to broad groundwater-level increases in the vicinity of the injection wells. In advance, thank you for considering this request.

F. Figures and Tables

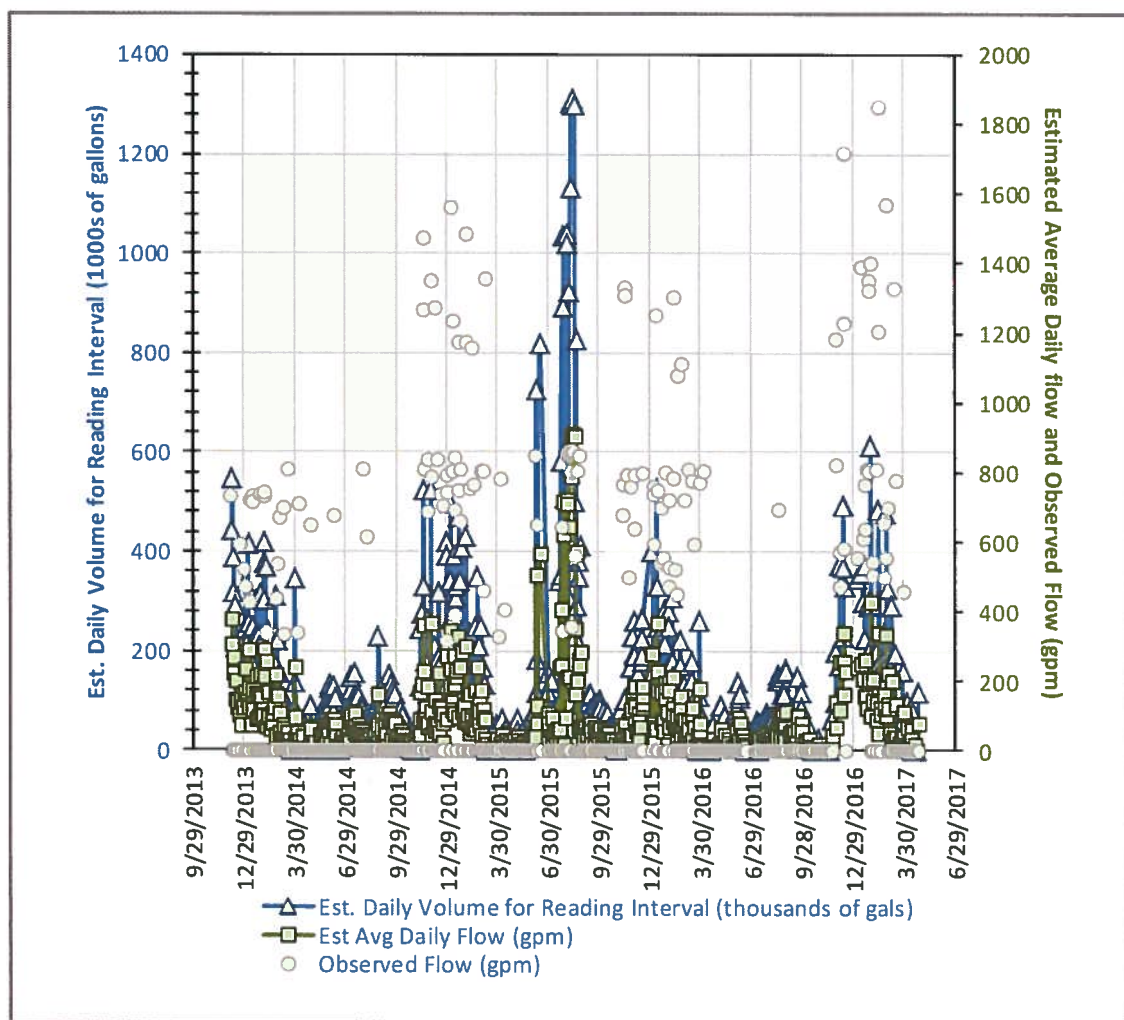


Figure 1. Hailey Fox Acres Campus estimated daily heating/cooling volume, estimated average daily flow, and observed flow (12/5/2013 through 4/26/2017).

Hailey Fox Acres Campus Annual Heating and Cooling Volumes		
Heating Year (Oct 1 - Sep 31)	Estimated Volume (AF)	Comment
2013-2014	87	Incomplete data
2014-2015	185	
2015-2016	95	
2016-2017	125	
2017-2018	82	Incomplete data

Table 1. Hailey Fox Acres Campus heating/cooling volumes.

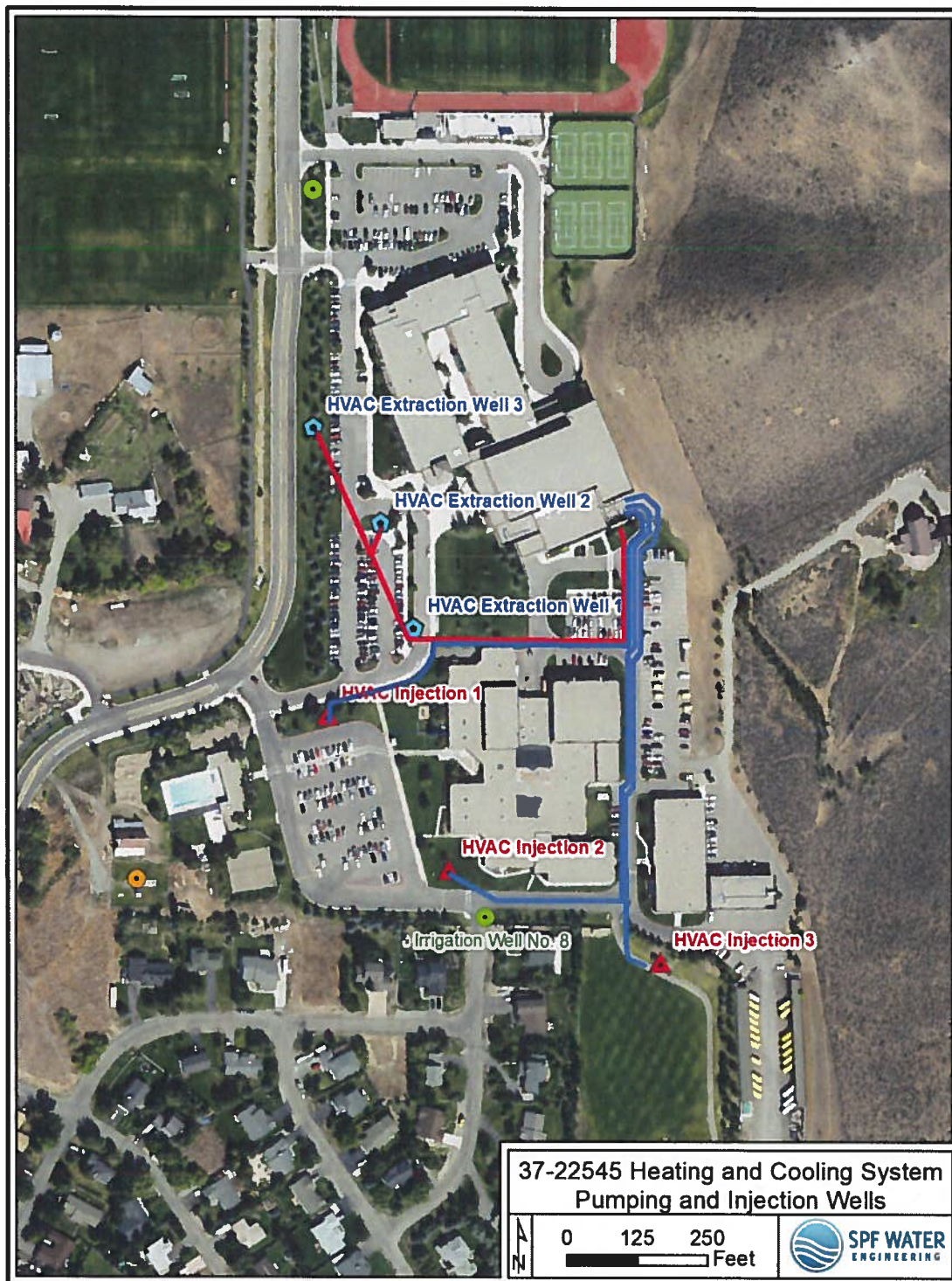


Figure 2. Fox Acres Campus Heating and Cooling Wells.

Blaine County School District Fox Acres Campus (Hailey High School) Injection Well Depths to Water (ft)					
Date	Injection Well #1	Injection Well #2	Injection Well #3	Irrigation Well #8	Temperature
	D0058709	D0058710	D0058711	D0016722	
10/2/2015	66.83	67.83	62.50	64.00	54 F
11/3/2015	66.33	67.17	61.75	63.75	31 F
12/1/2015	66.67	67.42	62.25	64.00	32 F
1/4/2016	67.17	67.67	62.58	64.25	34 F
2/2/2016	67.17	67.83	62.58	65.25	10 F
3/1/2016	67.00	67.83	62.17	65.00	37 F
4/1/2016	64.17	65.00	59.50	62.00	38 F
5/2/2016	63.25	64.00	58.92	61.75	46 F
6/6/2016	62.25	63.33	58.00	59.50	80 F
7/1/2016	65.00	65.83	60.33	61.00	85 F
8/31/2016	67.83	68.50	63.50	63.75	66 F
10/3/2016	66.50	67.33	62.17	64.00	43 F
11/1/2016	65.25	66.00	60.67	62.50	37 F
12/7/2016	65.58	66.08	60.33	62.67	11 F
1/5/2017	66.17	67.00	61.75	63.50	12 F
2/3/2017	66.00	67.00	61.08	63.17	32 F
3/1/2017	64.08	64.83	59.50	61.33	32 F
10/10/2017	61.00	62.00	57.00		
11/13/2017	63.00	64.00	59.00		
12/11/2017	63.50	64.00	59.50		
1/11/2018	64.00	64.00	59.50		
2/23/2018	63.00	65.00	60.00	62.00	
Average	65.08	65.89	60.66	62.97	
Max	67.83	68.50	63.50	65.25	
Min	61.00	62.00	57.00	59.50	

Table 2. Depths to water in injection wells and Irrigation Well #8, October 2015 through March 2017.

Injection Well Water Level Measurements, 12/12-13/2013					
	Date	Time	Number of Wells in Operation	Aggregate pumping Rate (gpm) ⁽¹⁾	Depth to Water (feet)
Injection Well No. 1 (North Well)	12/12/2013	1:59 PM	0	0	67.5
	12/12/2013	2:22 PM	1	818	60.0
	12/12/2013	2:51 PM	2	1740	52.0
	12/13/2013	2:53 PM	3	2026	9.3 ⁽²⁾
Injection Well No. 2 (Middle Well)	12/13/2013	1:32 PM	0	0	68.5
	12/13/2013	2:07 PM	1	819	59.0
	12/13/2013	2:32 PM	2	1480	28.5 ⁽²⁾
	12/13/2013	2:53 PM	3	2026	27.6
Injection Well No. 3 (South Well)	12/13/2013	11:50 AM	0	0	63.0
	12/13/2013	12:20 PM	1	823	25 ⁽²⁾
	12/13/2013	12:45 PM	2	1473	49.0
	12/13/2013	1:09 PM	3	2020	24.5
Notes: 1. Pumping began immediately after static measurements. 2. These measurements likely reflect borehole storage and/or well inefficiency (near-well groundwater levels are likely lower than these measurements indicate).					

Table 3. Injection well water level measurements.

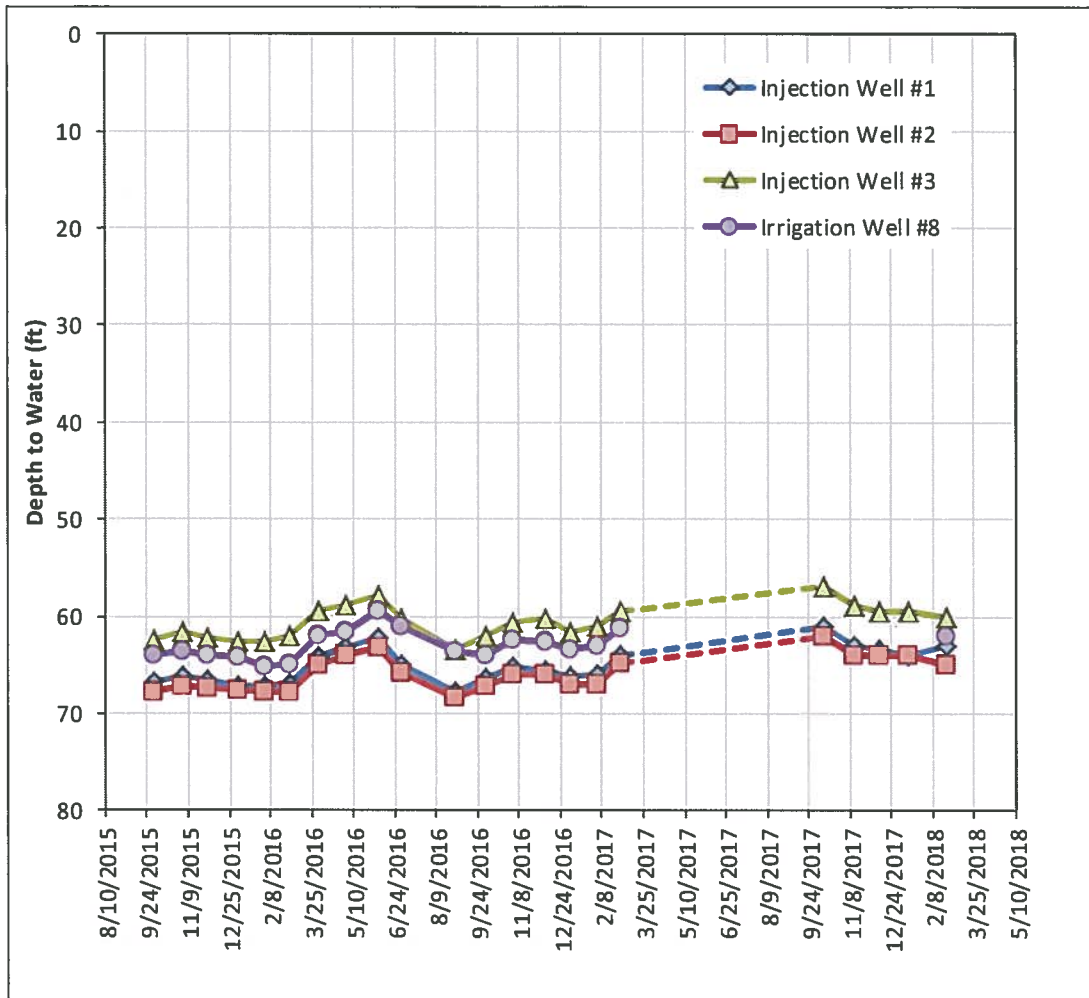


Figure 3. Injection-well water-level measurements (full scale).

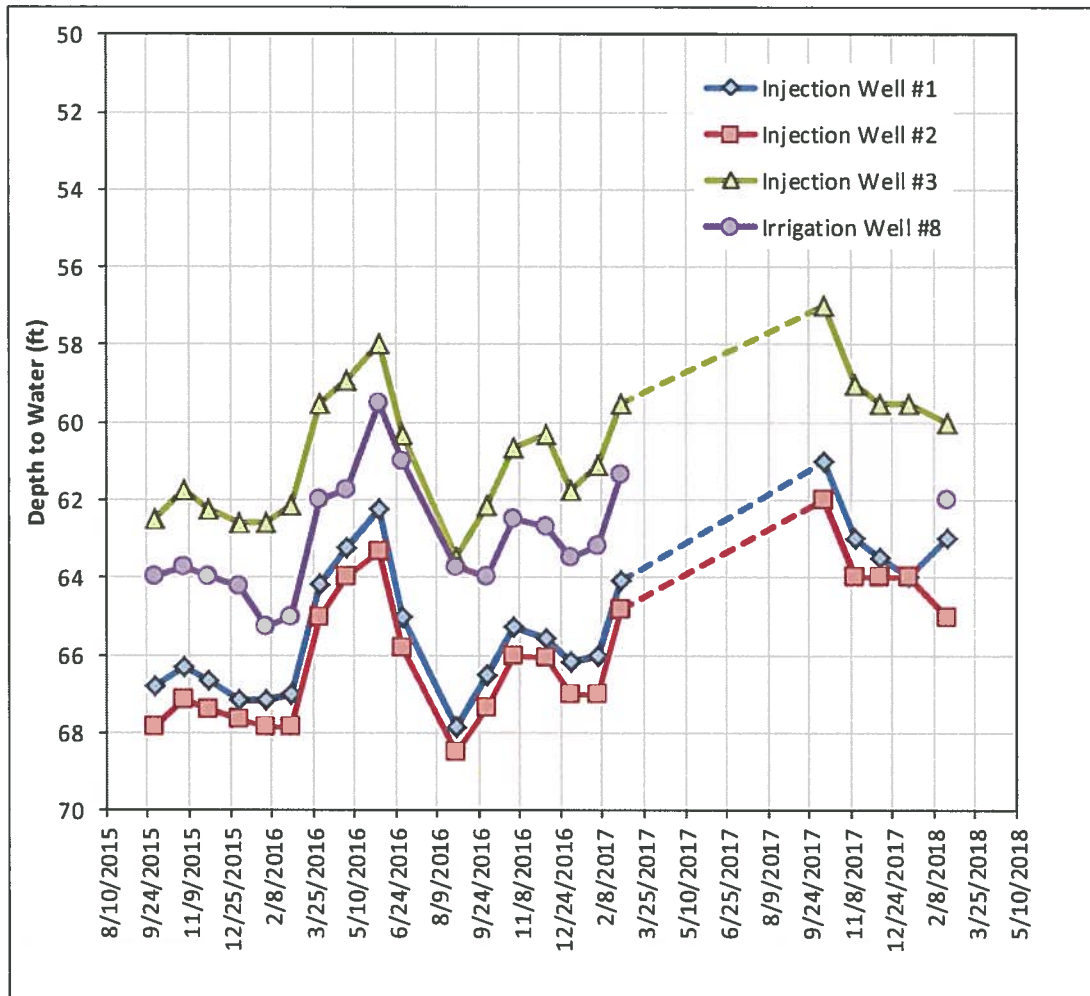


Figure 4. Injection-well water-level measurements (partial scale).