MEMORANDUM

To: **Water Right File No 61-12090**

From: **Ashley Ritter**

Date: **April 18, 2019**

Re: **Reporting Requirements Review**

Intro

On April 17, 2019 SPF Water Engineering (SPF) submitted Elk Creek 2018 Monitoring Report for Permit 61-12090. Permit 61-12090 condition six (6) requires compliance with an IDWR approved monitoring plan that was approved by the Department on March 26, 2012. The approved monitoring plan requires submission of an annual report that includes:

a) Analysis of water level trends in the production well and shallow observation well;
b) Reporting of discharge rates over time and analysis in relation to water levels;
c) Electronic records of water level and discharge data;
d) Evaluation of downward return flow from irrigation discharge water in relation to water levels; and
e) Reporting of any temporary agricultural use, including crops grown and acres irrigated during the year.

Review of report

The SPF submitted report summarizes water level data collected from the Elk Creek Village monitoring well (MW-1) and the Elk Creek Village production well (PW-1). It is reported that PW-1 is not yet being used for production, but groundwater levels are still being measured.

Analysis of water level trends in MW-1 and PW-1 from October 2011 to March 2019 suggest ground water levels at the monitoring site are relatively stable with fluctuation of less than a foot each year. It appears a very slight upward hydraulic gradient has been present during the monitoring period.

Electronic records of water level and discharge data accompanied the Elk Creek 2018 Monitoring Report. The electronic records are scanned and profiled as an Excel document. Please see PC Docs to view the spreadsheet.

Conclusions

The reporting requirement included in the approved monitoring plan for the above permit have been satisfied.

SPF WATER ENGINEERING

April 17, 2019

Shelley Keen
Idaho Department of Water Resources
322 East Front Street
Boise, ID 83720

VIA EMAIL (shelley.keen@idwr.idaho.gov)

Subject: 2018 Annual Water Level Monitoring Report (Permit 61-12090)

Dear Mr. Keen:

This report summarizes water level data collected from the Elk Creek Village monitoring well (MW-1) and the Elk Creek Village production well (PW-1) (Figure 1). Monitoring of groundwater production and groundwater levels in these wells is required under Permit 61-12090. Monitoring protocols are outlined in a monitoring plan dated February 15, 2012, which was approved by IDWR on March 26, 2012.

PW-1 is not yet being used for production, but groundwater levels have been measured in both PW-1 and MW-1 since October 3, 2011. Transducers and dataloggers have measured and recorded water levels on 6-hour intervals in both wells since that date as well (with exceptions – see Table 1). Manual water level measurements and transducer data downloads occurred every other month through the first year-and-a-half of monitoring (through June 2013), with quarterly measurements and downloads since that time.

Manual Water Level Monitoring

Prior to the January 16, 2018 monitoring event, manual water level measurements were typically made with the same Powers Electric line sounder to maintain consistency (although the sounding tape was replaced in January 2015). Due to concerns about the Powers sounder line stretching and giving inaccurate measurements, an 800-foot non-stretch Waterline electric sounder was used for water level measurements in January and March 2018 and has continued to be used for all subsequent monitoring events. Manual groundwater level measurements collected from MW-1 and PW-1 are listed in Table 1.

Table 1. Manual depth to water observations at MW-1 and PW-1

Date	MW-1 Depth to Water (ft, BTOC)	PW-1 Depth to Water[1] (ft, BTOC)
10/3/2011	354.73	343.90
12/9/2011	354.65	342.40
2/17/2012	354.18	342.26
4/6/2012	353.87	342.00
6/28/2012	353.72	342.06
8/30/2012	353.73	343.30
10/18/2012	353.76	342.28
12/27/2012	353.27	341.79
2/13/2013	353.50	341.80
3/8/2013[2]	353.50	---
4/19/2013	353.50	241.46
6/25/2013	353.15	341.61
9/26/2013	353.02	341.76
12/18/2013	353.12	341.58
3/25/2014	352.85	341.18
7/9/2014	351.62	340.40
9/4/2014	351.58	340.35
12/15/2014	351.46	340.19
3/30/2015	355.62	344.26
10/2/2015	356.90	344.50
12/23/2015	355.33	344.47
3/15/2016	354.65	344.53
6/21/2016	355.42	344.50
10/6/2016[3]	355.25	---
10/28/2016[3]	---	344.50
12/19/2016	356.25	343.75
3/1/2017	354.90	343.25
4/6/2017[3]	355.90	---
6/30/2017	354.42	343.13
9/15/2017	353.89	343.28
1/16/2018[4]	356.54	345.04
3/28/2018	356.54	344.90
6/18/2018	356.39	344.99
9/25/2018	356.57	345.23
12/27/2018	356.27	344.84
3/19/2019	356.57	344.86

[1]PW-1 depth to water measured relative to top of oil

[2]Off-cycle monitoring at MW-1 to repair the water level transducer

[3]Only one well sounded or could not sound due to oil

[4]Water levels measured with non-stretch sounder instead of Powers starting January 2018

Continuous Water Level Monitoring

Solinst Levelogger pressure transducers were installed in MW-1 and PW-1 in October 2011. A Solinst Barologger was installed in MW-1 so levelogger data could be corrected to compensate for fluctuations in atmospheric pressure. The leveloggers in MW-1 and PW-1 were each suspended on approximately 400 feet of stainless-steel cable attached to an I-bolt affixed to the top of the well casing. This setting depth submerged the leveloggers between 40 and 60 feet below the typical static water level in each well. As of October 2011, all pressure transducers are set to record data points (water column depth for leveloggers and barometric pressure for the barologger) on 6-hour intervals.

Data is downloaded from the loggers during each monitoring event. Manual water levels are measured with an electric line sounder during each monitoring event and recorded. For the 2018 annual report, monitoring events took place on March 28, June 18, September 25, and December 27, 2018 as well as March 19, 2019. The manual measurements and barometric data were used to create a calibrated time series of the recorded water level data from each well for the 2018 monitoring year (Figure 2).

As mentioned in the 2017 annual report, a correction has been applied to all transducer data prior to January 2018 to remove errors due to compensating with a stretching Powers sounder line. For the 2018 monitoring year, a non-stretch Waterline sounder was used instead of the Powers which produced much more consistent water level measurements and tracked well with the transducer data so no correction was necessary. The non-stretch sounder will continue to be used for future monitoring. A barometric efficiency (B.E.) correction has also been applied to the transducer data to remove some of the water level fluctuations caused by atmospheric pressure fluctuations. Figure 3 provides a time series of the B.E.-corrected water level data.

Analysis

Review of the manual water level measurements and corrected continuous water level recordings from October 2011 to March 2019 suggest:

(1) groundwater levels at the monitoring site are relatively stable with seasonal fluctuation of less than a foot each year, and;
(2) a very slight upward hydraulic gradient has been present during the monitoring period.

Please let me know if you have any questions regarding the data collected to date. The next quarterly sampling event is scheduled for June 2019.

Sincerely,

Sean T. Albertson, EIT

Cc: Brian Whitaker, Woods Erickson & Whitaker LLP (bwhitaker@woodserickson.com)
Norm Semanko, Parsons Behle & Latimer (nsemanko@parsonsbehle.com)

Attachment: Electronic data file (spreadsheet)

Report Figures

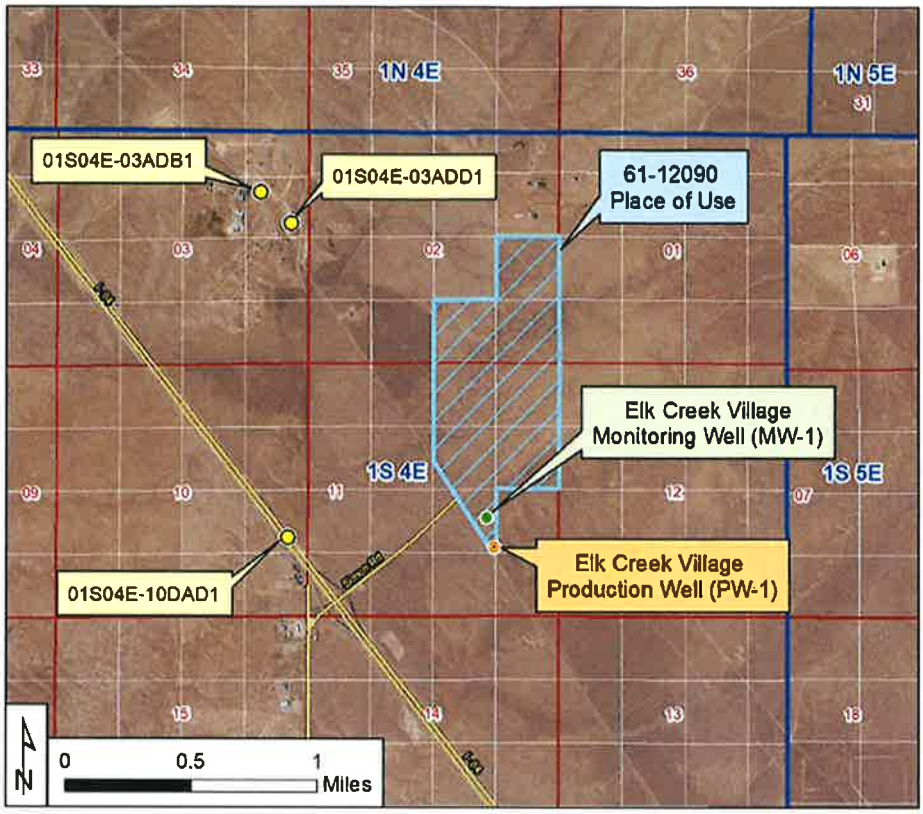

Figure 1. Elk Creek Monitoring Plan Base Map.

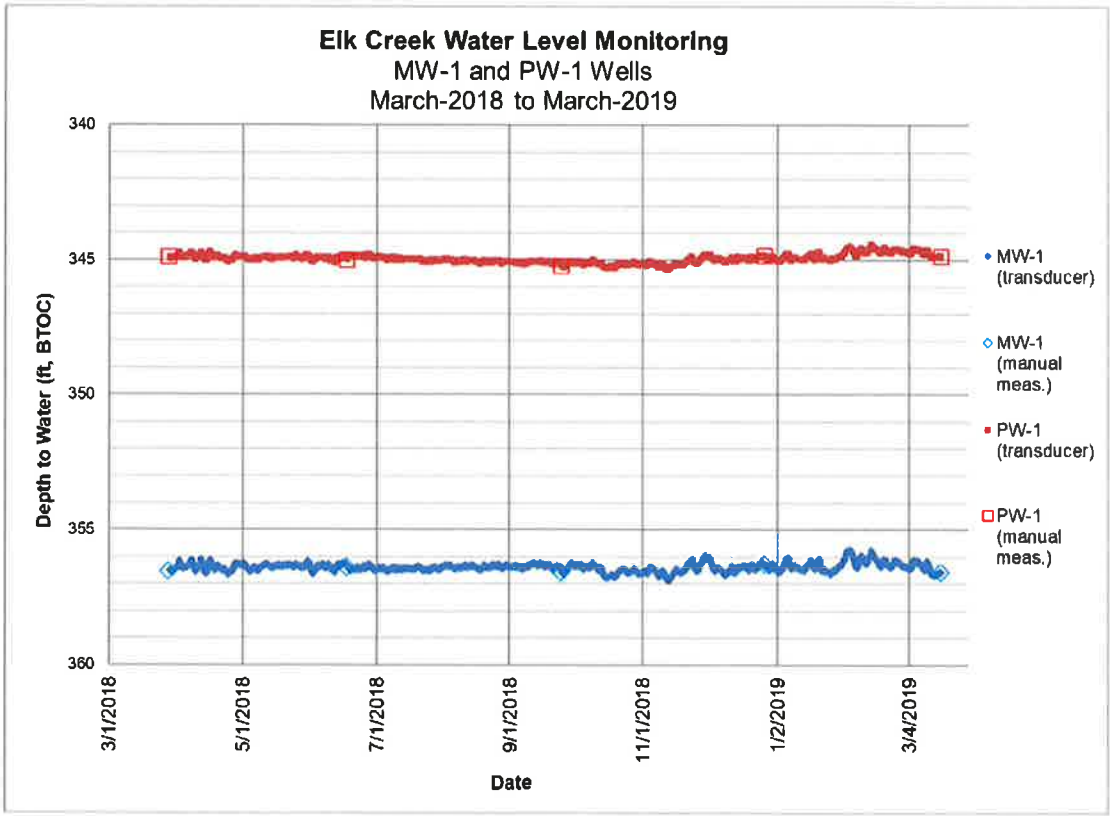

Figure 2. 2018 Annual Water Level Data

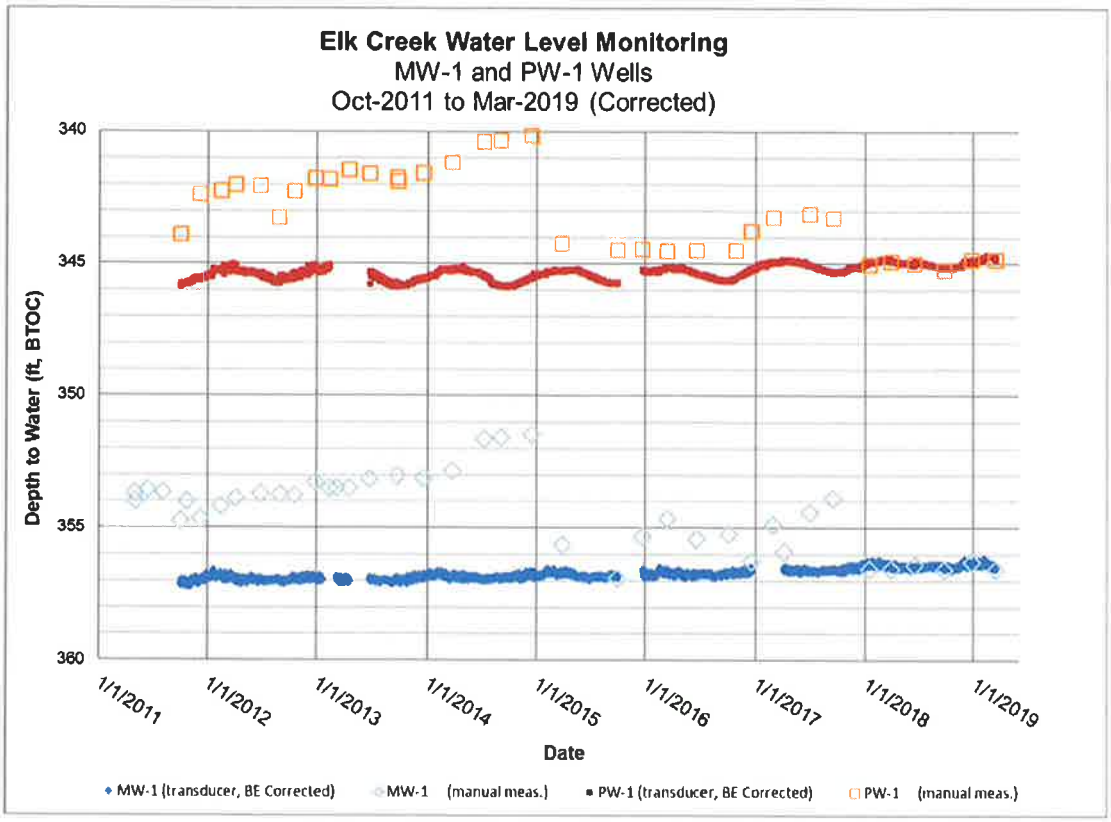

Figure 3. Corrected Water Level Data (Oct 2011 - Mar 2019)

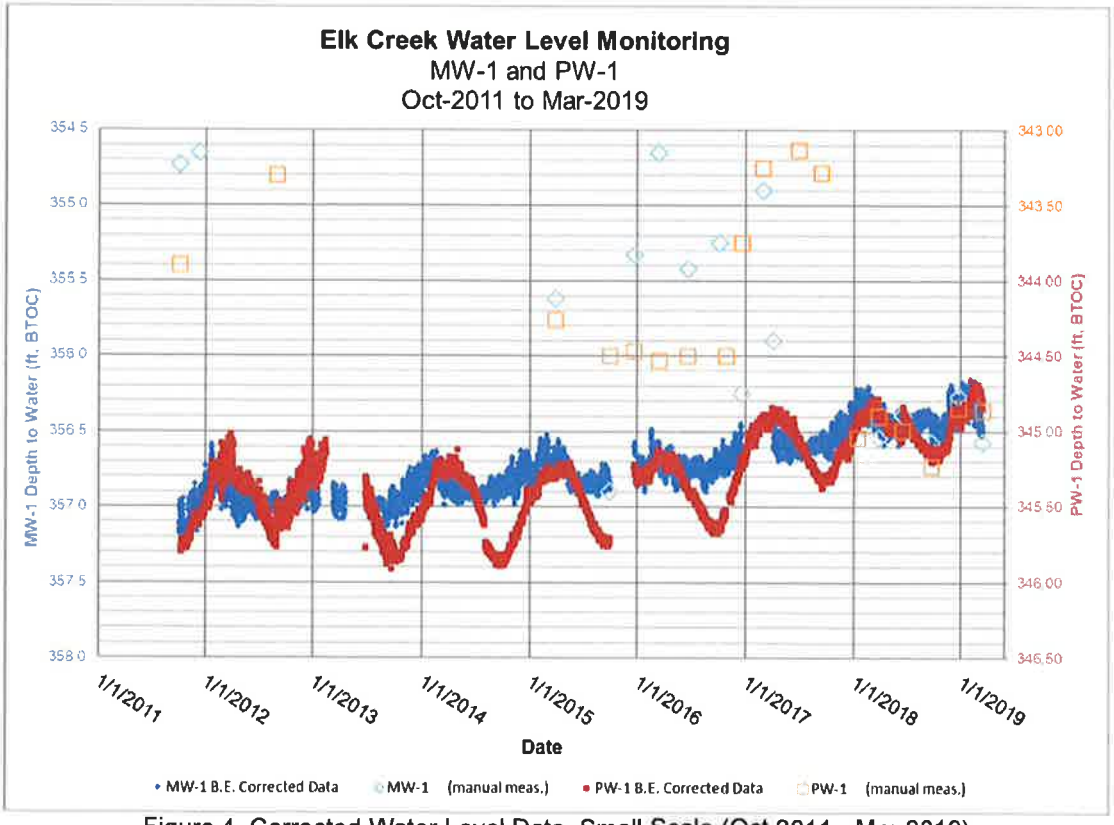

Figure 4. Corrected Water Level Data, Small Scale (Oct 2011 - Mar 2019)