SPF WATER ENGINEERING

April 27, 2017

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

VIA EMAIL

Subject: 2016 Annual Water Level Monitoring Report (Permit 61-12090)

Dear Mr. Keen,

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

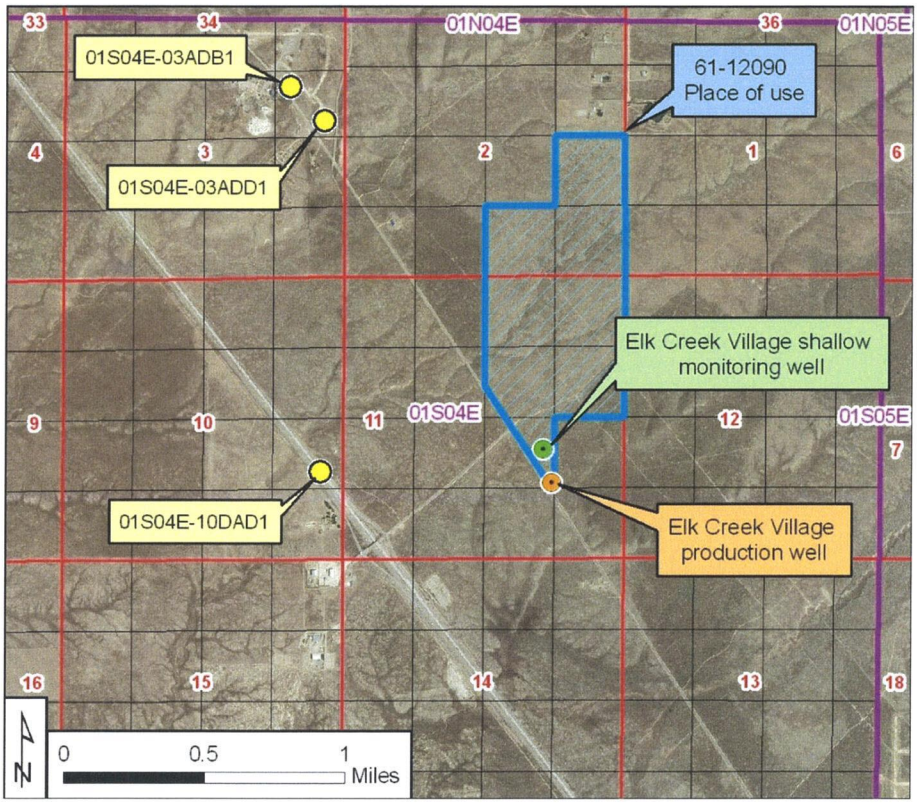

Figure 1. Elk Creek Monitoring Plan Base Map.

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PW-1 is not yet being used for production. However, groundwater levels have been measured in both MW-1 and PW-1 since October 3, 2011. Transducers and dataloggers have measured and recorded water levels on 6-hour intervals (with exceptions – see below). Manual measurements coinciding with datalogger downloads have occurred on a bimonthly or quarterly basis since October 2011.

Manual Water Level Monitoring

Manual groundwater-level measurements collected in MW-1 and PW-1 are listed in Table 1. These readings were made with the same Powers Electric line sounder to ensure consistency from measurement to measurement (although the sounding tape was replaced in January 2015).

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

[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

Continuous Water Level Monitoring

Solinst Levelogger pressure transducers were installed in MW-1 and PW-1 in October 2011. A single Solinst Barologger was installed in MW-1 to compensate recorded water level observations for fluctuations in atmospheric pressure. The Leveloggers in MW-1 and PW-1 were suspended via approximately 400 feet of stainless steel cable attached to an I-bolt affixed to the top of the well casing, which submerged the Leveloggers between 40 and 60 feet below static water level conditions. As of October 2011, all Levelogger and Barologger pressure transducers were set to record water levels (or barometric pressure for the Barologger) at 6 hour intervals.

At each data download, a calibrated electric line sounder was used to manually measure the depth to water (DTW) relative to the top of the well casing. The manually recorded DTW, along with barometric data, was used to generate a calibrated time series of groundwater level relative to the top of the casing (Figure 2). Electronic records of continuous DTW measurements at MW-1 and PW-1, from October 2011 to March 2017, are included as an attachment with this report.

The levelogger in MW-1 was missing when retrieved on March 1, 2017, and is believed to have come undone from the transducer cable. A replacement levelogger was reinstalled in MW-1 in conjunction with a new transducer cable on April 6, 2017. PW-1 received a new transducer cable on March 1, 2017, as preventative maintenance.

Analysis

Review of manual water level measurements and continuous water level recordings from October 2011 to March 2017 suggest that (1) groundwater levels are relatively stable and (2) a continuous upward vertical 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 2017.

Sincerely,

Cameron Carlson

Cameron Carlson,

Associate Geologist

Cc: Brian Whitacker, Woods Erickson Whitaker & Maurice LLP
Norm Semanko, Moffatt Thomas Barrett Rock & Fields, Chtd.
Christian Petrich, SPF Water Engineering, LLC

SPF File No. 591.0050

Attachment: Electronic data file (spreadsheet)

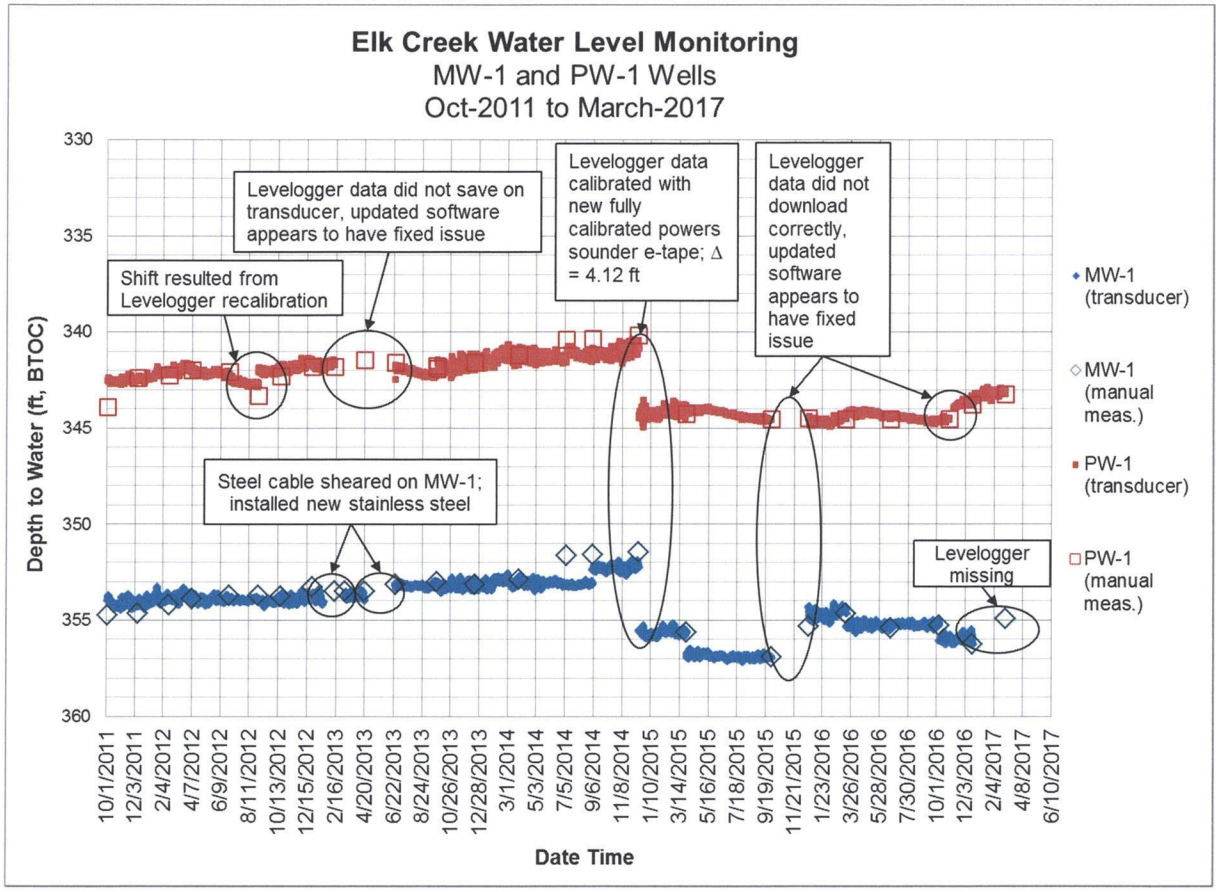

Figure 2. Continuous water level monitoring results.