

# Twin Falls Low Temperature Geothermal Moratorium Area Update, 2017

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There are 9 low-temperature (> 85 degrees Fahrenheit °F) geothermal wells in the Twin Falls Geothermal Moratorium area, plus the Filer Test well which has a reported water temperatures of 79 °F (Figure 1). Currently, six of these wells are being monitored. IDWR (Southern Region) collects operating pressure, temperature, flow rate, and totalizer readings at the Pristine Springs, Canyon Springs, and Twin Falls High School wells on a monthly basis. IDWR (Southern Region) monitors the Filer Test well through manual measurements and continual readings recorded by a pressure transducer. The College of Southern Idaho (CSI) collects operating pressure, shut-in pressure or water levels, temperature, flow rate, and totalizer readings at their two production wells on a monthly basis.

## ***Withdrawals***

The total withdrawal for the Twin Falls geothermal system in 2017 was 7,336 acre-feet, which was 165 acre-feet less (-2.5%) than the withdrawal in 2016 (Figure 2). Individual withdrawals for each geothermal user are shown in Figure 3. The changes in withdrawals (acre-feet and percentages) from 2016 to 2017 were:

Canyon Springs	-144 acre-feet	-4%
Twin Fall High School	-4 acre-feet	-3%
College of Southern Idaho <sup>1</sup>	-20 acre-feet	-2%
Pristine Springs	+3 acre-feet	<1%

Two significant changes in total withdrawals have occurred since 2008. In 2009, the State of Idaho purchased Pristine Springs and immediately reduced withdrawal about 30% at the facility. Total withdrawals for the system were uniform from 2009 to 2012. In 2013, withdrawal at Canyon Springs decreased significantly, resulting in an overall reduction in total withdrawals of about 8%. Total withdrawals from 2013 through 2017 were fairly uniform. Thus, the overall reduction in total withdrawals for the Twin Falls Geothermal system from 2008 to 2017 has been about 2,300 acre-feet (-24%).

<sup>1</sup>The total withdrawal for the two College of Southern Idaho (CSI) wells was reported incorrectly in the report for 2016. Previously, it was reported that the CSI withdrawal increased 109 acre-feet from 2015 to 2016 (+17%), but it actually increased 186 acre-feet (+28%).

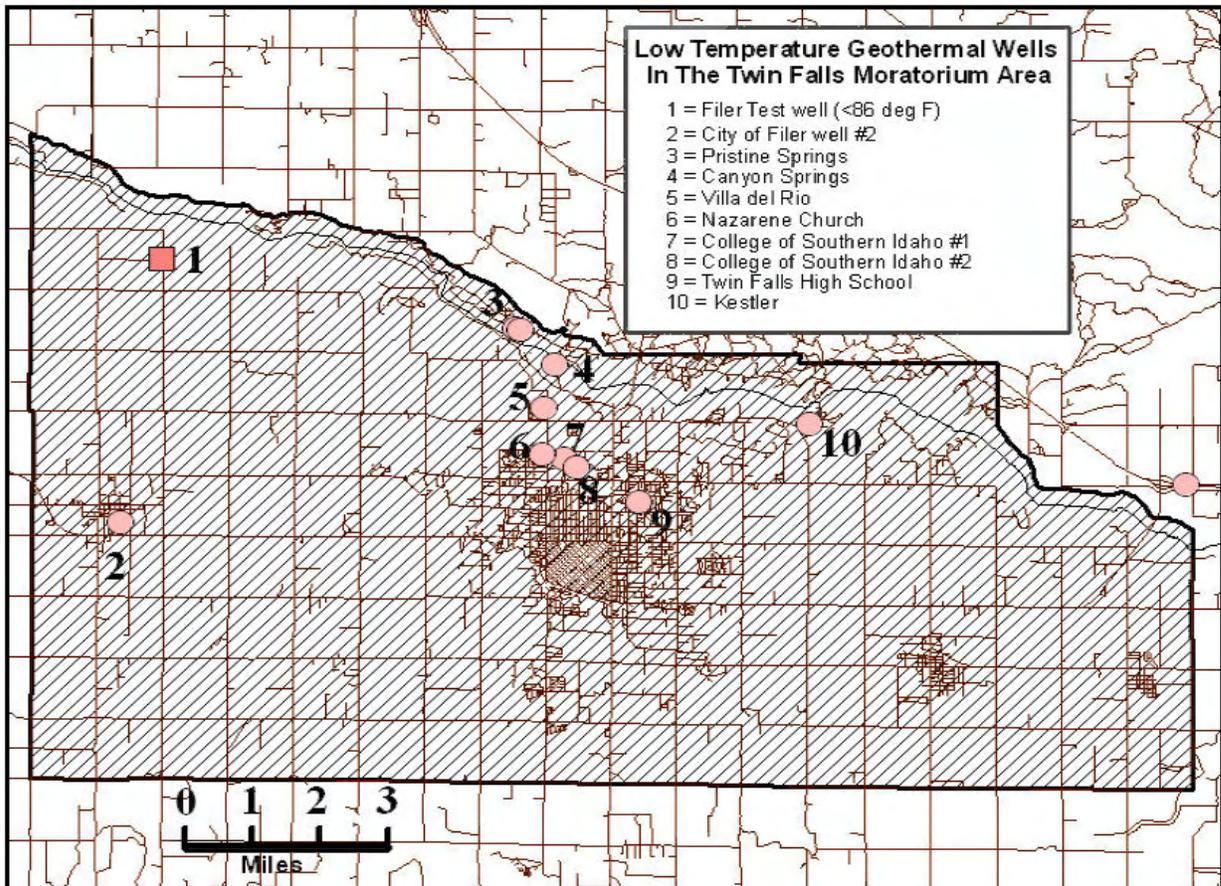


Figure 1. Low temperature geothermal wells in the Twin Falls Moratorium area.

### ***Water Level – Withdrawals Analysis***

Water level data are collected at the two CSI wells and at the Filer Test well (Figure 1). Recent analyses of the CSI hydrographs revealed that two distinct water level trends are recognizable since 1995 (Figure 4). Trend 1 occurred from 1995 thru 2008. Trend 1 had a rate of decline equal to 1.8 feet per year. In 2009, water levels in the CSI wells increased abruptly and significantly (10 to 20 feet) because of the reduction in withdrawals in the Pristine Springs well. Trend 2 began in 2009 and continues through the most recent measurements. Trend 2 has a rate of decline equal to 2.1 feet per year. The first 3-5 years of each trend are characterized by stable to very slightly declining conditions followed by years of steeper declines.

Figure 4 also shows the hydrograph for the Filer Test well. Trend 1 has the same pattern in the Filer well as in the CSI wells. However, Trend 2 is different for the Filer well, in that the large water level increase observed in the CSI wells in 2009 is not recognizable in the Filer well. Furthermore, there is a lengthy data gap beginning in late 2012 when it was discovered that the well was leaking and shut in measurements were discontinued until 2016. Still, the overall trend in the water levels in the Filer well for Trend 2 is a decline.

The water level declines in the CSI and Filer wells for Trend 1 correlate directly with a significant increase in withdrawals (+24%) during this time period (Figure 4). However, the relationship between water levels and withdrawals for Trend 2 is unusual because both withdrawals and water levels declined during this time period.

Figure 5 shows the changes in the average annual water levels in the Filer, CSI #1 and CSI #2 wells, relative to the average water levels in 1995. The average annual decline from 1995 to 2017 for the three wells is 1.2 feet per year. The average annual decline from 2000 to 2017 is 1.4 feet per year.

Figure 6 shows that the withdrawals for the CSI wells. Trend 1 is characterized by fluctuating rates of withdrawal (higher at the beginning of the time period, lower and more uniform in the middle, and slightly increasing at the end). Trend 2 shows an overall rise in withdrawals throughout the entire time period, which equates to a 56% increase from 2009 to 2017. There are two probable reasons why the water level declines are greater in the CSI wells than in the Filer Test well. First, higher withdrawals at the CSI wells in 2016 and 2017 resulted in a larger cone of depression around the wells. Second, the cones of depression associated with the Canyon Springs and Pristine Springs wells have a greater effect on the CSI wells than they do on the Filer Test well which is further away.

In summary, total withdrawal from the Twin Falls Geothermal system declined significantly in 2009, and has declined slightly since then. Water levels increased dramatically in 2009, remained stable for about three years, and have since begun to decline again. The rates of declines from 2015 to 2017 were steeper than the rates from 2011 to 2014. The declines are more severe in the two CSI wells than in the Filer Test well, most likely because withdrawals from the CSI wells were greater in 2016 and 2017 than in previous years.

### ***Future Plans***

The following action items for 2018, and the responsible parties, are:

1. In 2017, a new shelter was installed around the Filer Test well and the well head was modified in order that a transducer could be installed at the top of the well (Figures 7 and 8). IDWR Southern Region is to download the transducer quarterly.
2. IDWR Southern Region is to continue collecting monthly data at the CSI wells (CSI), and the Pristine Springs, McCullum and Twin Falls High School wells (IDWR).
3. IDWR State Office and/or IDWR Southern Region are to conduct calibration checks on all flow meters.
4. Water Users are to repair or replace any meter that fails within one month of identifying the failure.
5. The Twin Falls Geothermal Moratorium expires in May, 2018. The moratorium should be extended another five years.

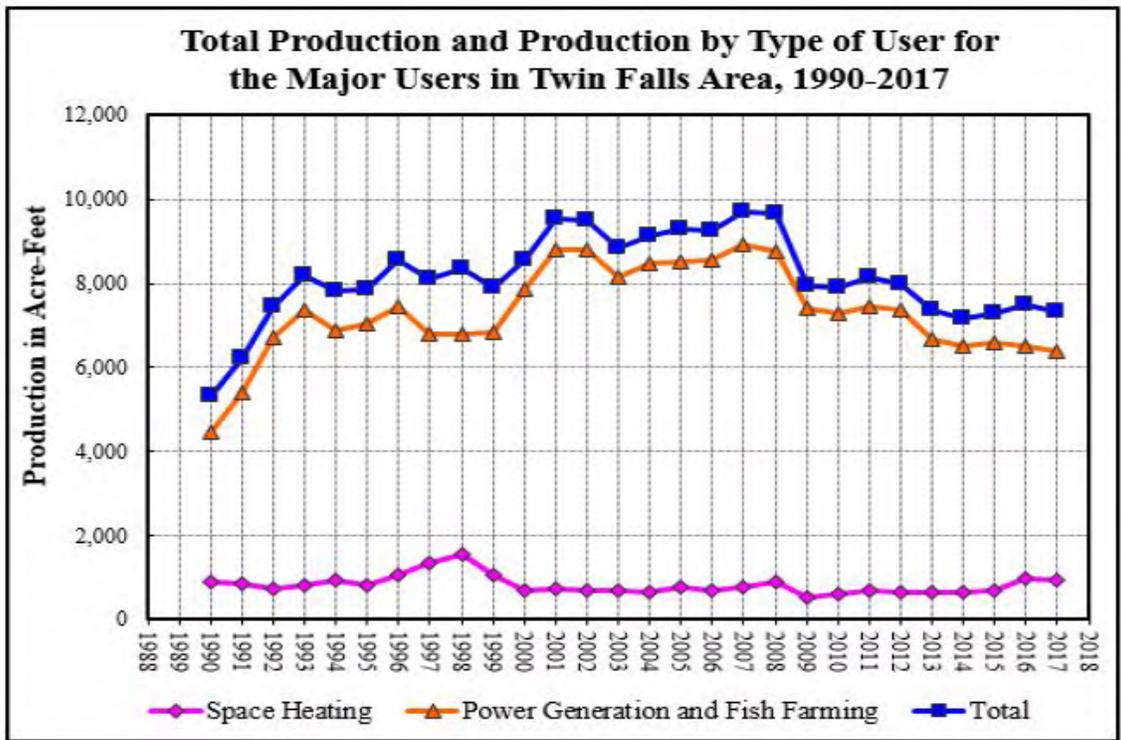


Figure 2. Total withdrawals for the Twin Falls geothermal system, and withdrawals by the two major types of uses.

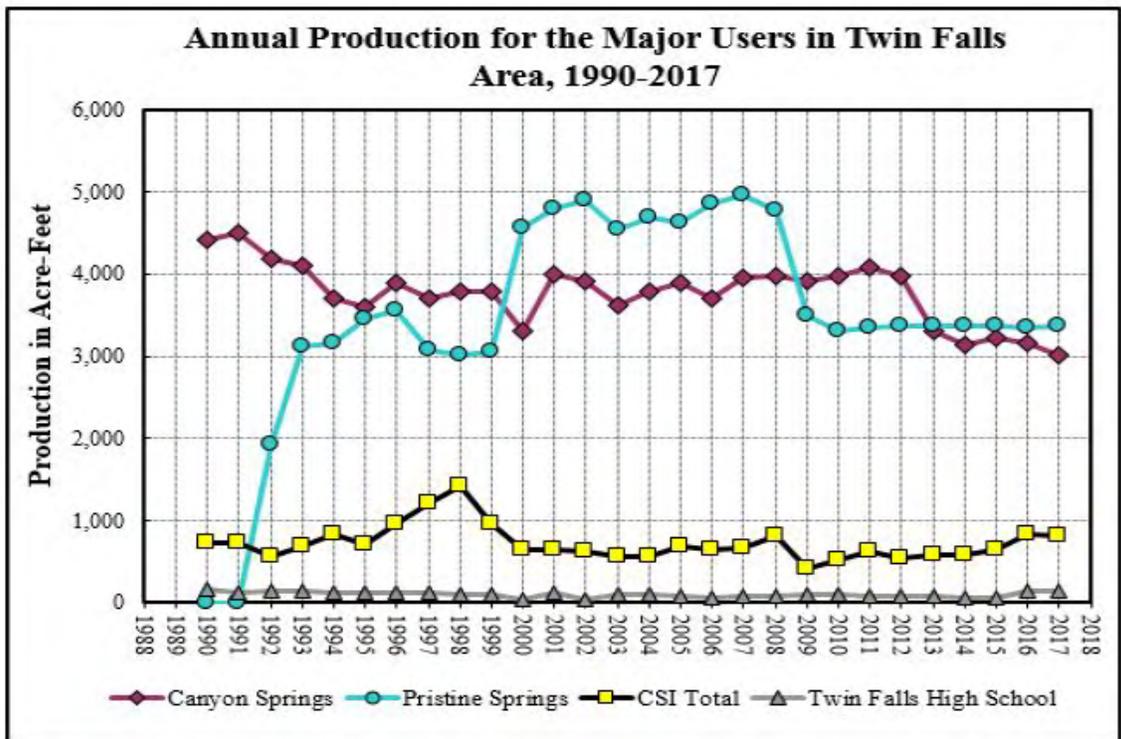


Figure 3. Annual withdrawals by individual geothermal producers in the Twin Falls system.

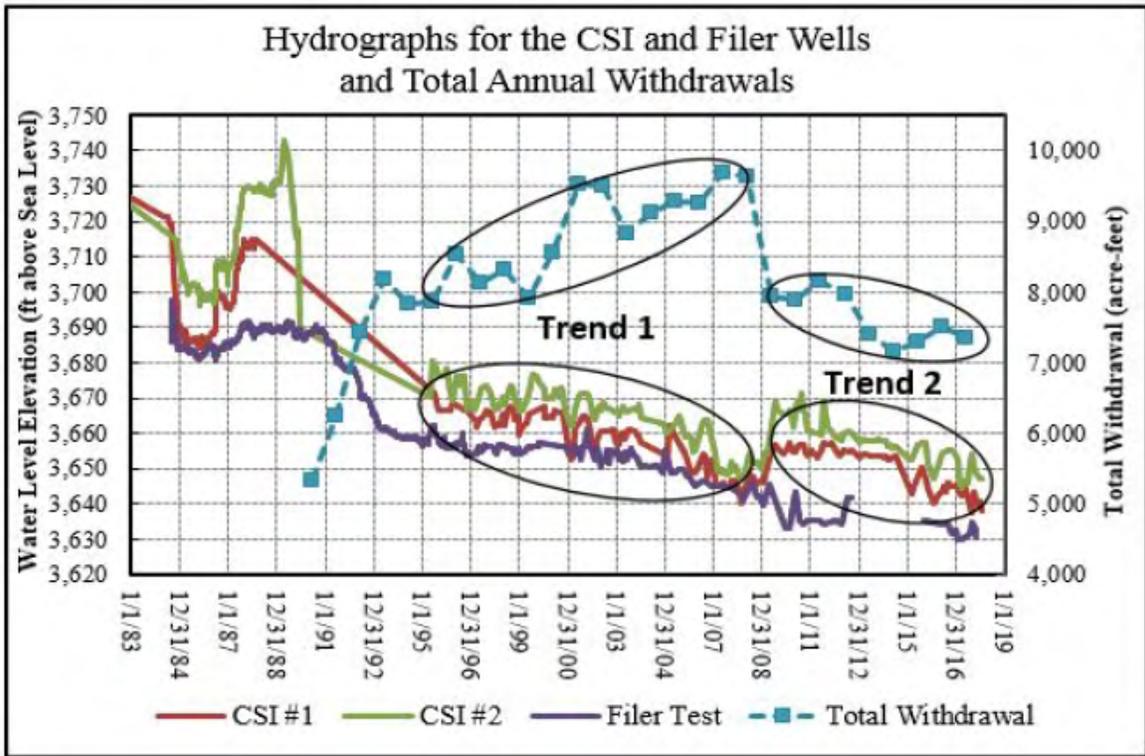


Figure 4. Hydrographs for the CSI #1 and CSI #2 wells.

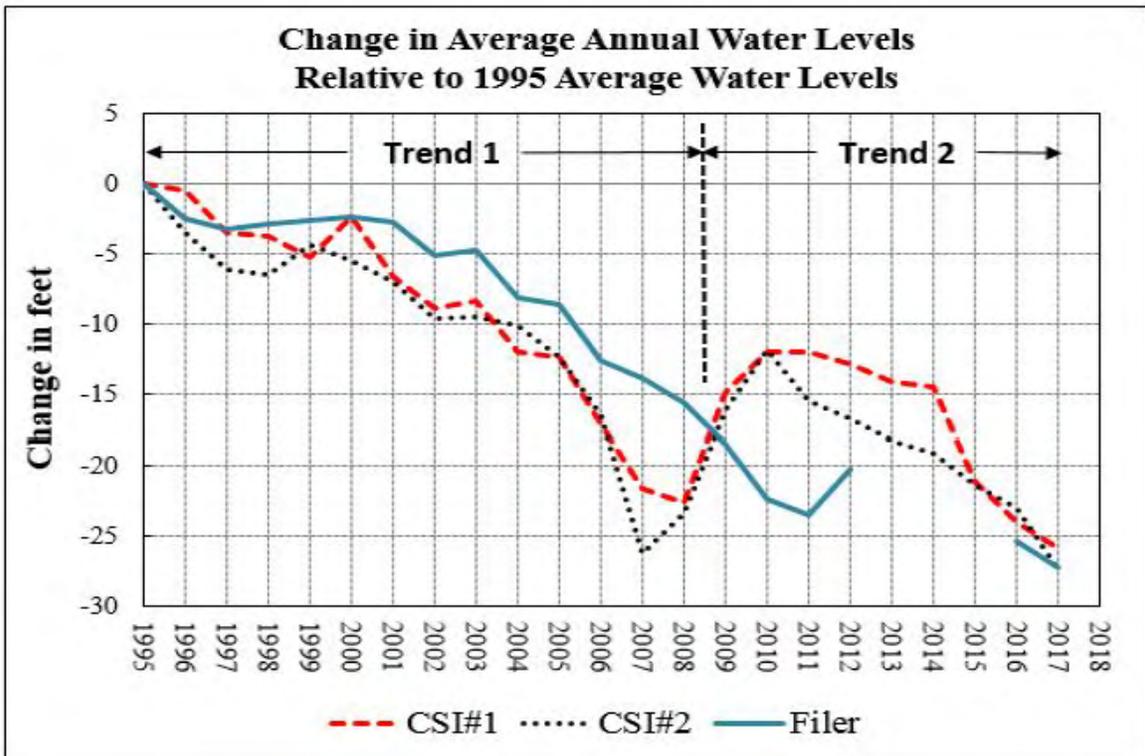


Figure 5. Changes in the average annual water levels in the Filer, CSI #1 and CSI #2 wells, relative to the average water levels in 1995.

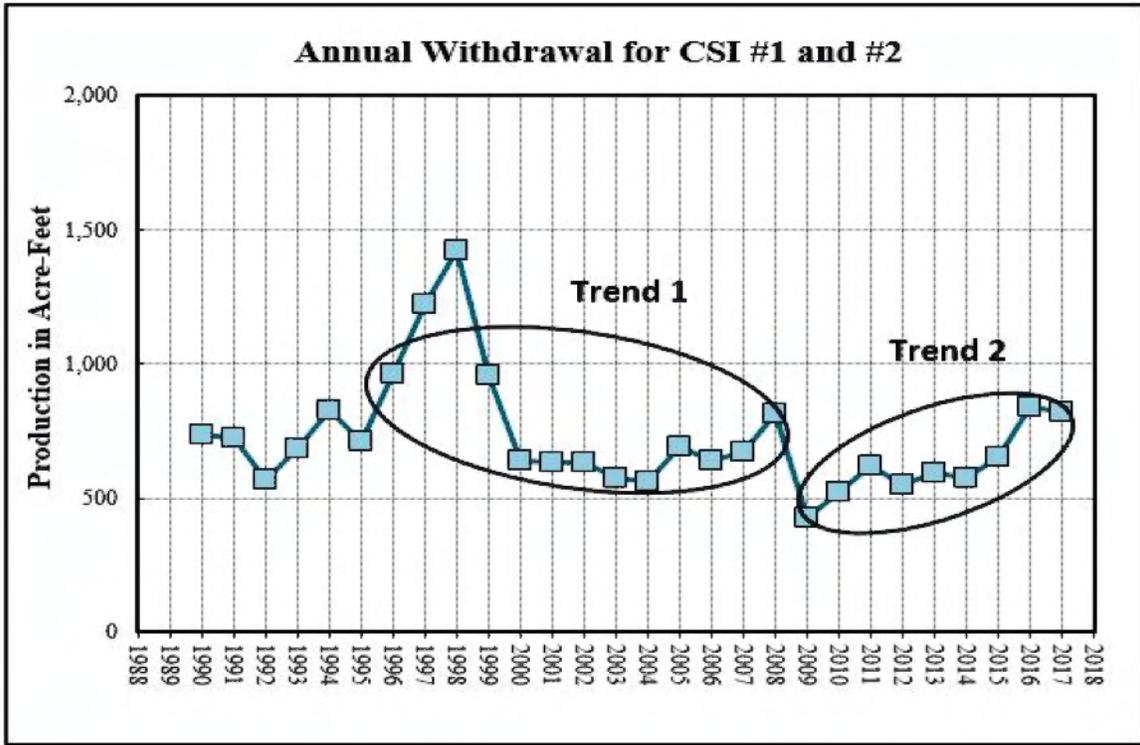


Figure 6. CSI withdrawals with trends.



Figure 7. New shelter installed at Filer Test Well in 2017.



Figure 8. Transducer installed at the top of the Filer Test Well (upper left). A second transducer is deployed in the shelter (lower right) in order to collect air temperature.