EXHIBIT 905

Data Selection Process

- Dennis Owsley requested that I review water levels in 17 North Ada County Wells.
- Wells are in the State Ground Water Level Database.
- Analyses compared water levels from different wells to each other.
- Attempt to identify any water level pattern that would differentiate Pierce Gulch wells from other wells.

I would like to thank the hearing officer for this opportunity to provide testimony narrating the water level analyses which I performed.

In January of 2009, Dennis Owsley requested that I perform a water level analysis of 17 North Ada County area wells. All of the wells are part of the State of Idaho Groundwater Level Database. These <u>are</u> the historical water level data for this area.

In particular, Dennis asked me to look at the data in an attempt to identify any water level patterns that would allow for the differentiation of wells completed in the Pierce Gulch sands from wells completed in other water bearing strata. Restated, this analysis was conducted to compare water levels from the different wells, to each other, in an effort to identify Pierce Gulch completions from other wells - based on water level behavior. This undertaking was not intended to determine the periods of rising and declining water levels in individual wells

Data Selection Process

- Data span different time periods.
- Data collected on variable sampling frequencies.
- Necessary to use similar time-spans and similar sampling frequencies to compare the wells to one another.

When I plotted the available water level data, it was apparent that the data span different time periods and were collected on variable sampling frequencies. Therefore, it seemed most appropriate to find a time period that allowed for the comparison of the largest number of wells over the longest period of time. For the first analysis, I chose the general time period of 1996-2003 because this is the longest period of time in which all wells have data.

For the second analysis, I chose the general time period of 1996 -2008.

Table 1. Variable length and continuity of data collection periods.

Well ID	Date Ranges for Water Level Data
04N01E-03DAD1	1972,1989-2008
04N01E-10ACB2	1964,1986,1991-2002
04N01E-11BBB1	1962,1969-1970,1986,1991,1993-2008
04N01W-13AACC1	1996,1998,2000-2003
04N01W-17BBDB1	1991,1996-2005,2008
04N02W-06CDD1	1996-2005,2007,2008
05N01E-26DCD1	1996-2002
05N01E-35ACA1	1991-2004,2006-2008
05N01E-36AAB1	1970,1992-2004,2006-2008
05N01W-36ABB1	1969-2008
05N02W-22CAD1	1957,1967-2003
05N03W-12CCA1	1979,1993,1996-1998,2000-2002,2004-2008
04N02W-07AAC1	1994,1996-2008
05N03W-15DDC1	1994,1996-2008
05N01E-34DBB1	1966-2008
04N01W-17BBDC1	1996-2008

As illustrated in the this table, the data for the 17 wells span different time periods. Since I was trying to compare the wells to each other, I wanted to compare the wells over a common time period. Because some of the wells do not have data until 1996, I chose it as the earliest year in the data set. Similarly, I did not conduct the first analysis up to present, because several of the wells did not have current data.

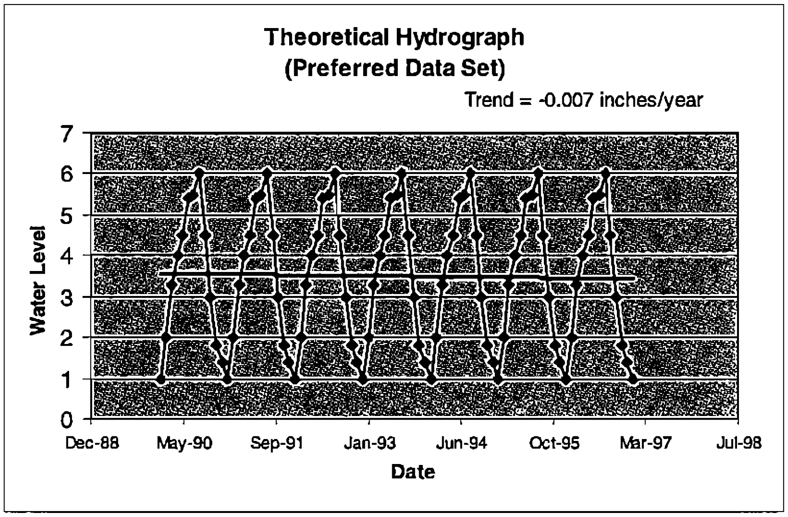


Figure 1

In any time series analysis, the data need to be collected or analyzed for equal time-steps (Davis, 1986). Since the historical monitoring network data had been collected on variable sampling frequencies, I felt it was necessary to filter data to roughly equal time-steps. Often the same general time period each year is chosen to determine the long-term trend in water levels. Indeed, this is the current procedure employed in trend determination and model trend calibration for the Eastern Snake River Plain Aquifer (Allan Wylie, personal communication; Shaub, 2001; Cosgrove, D.M., Contour, B.A., and Johnson, G.S., 2006).

One reason for filtering to equal time-steps is to avoid artifact trends that misrepresent the data set. This concept is illustrated with synthesized hypothetical data in the following figures.

This figure illustrates synthetic water level data collected monthly over the entire time-span. This hypothetical plot displays seasonal variation and a stable long-term trend of -0.007 inches/year.

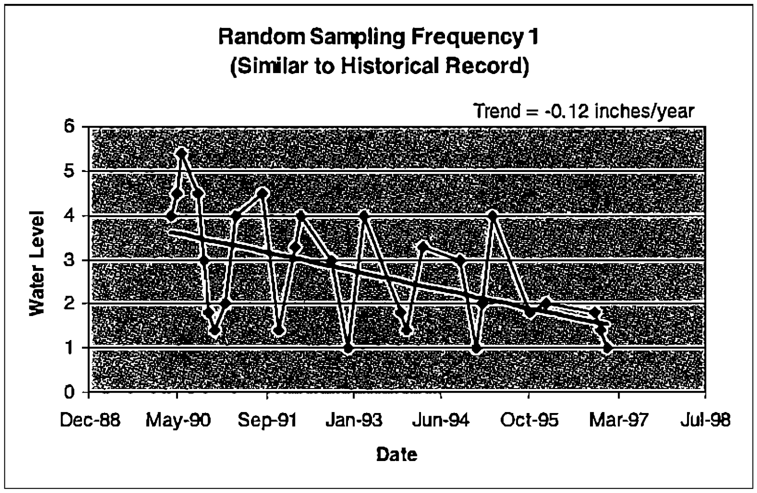


Figure 2

To simulate the effects of non-uniform sampling frequency, I created subsets of data from the data used in Figure 1 by instituting random sampling frequencies. First I picked a random starting date, and used the RAND function in EXCEL to generate random numbers from 1-12. These random numbers represented the amount of time (in months) between sampling dates.

This figure utilizes the same data population as in Figure 1, with the data collected on a random frequency. The plot illustrates how variable sampling frequencies can create false or artifact trends. Note the apparent trend is two orders of magnitude different from the trend in the previous plot.

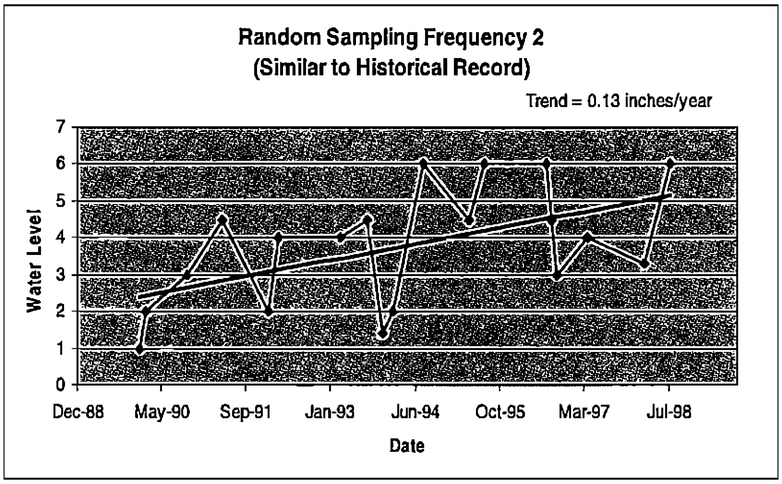


Figure 3

This figure is another random sampling frequency plot created using the RAND function in EXCEL. I created several of these graphs to illustrate the artifact concept. Note the trend in this data is two order of magnitude different that the trend in Figure 1. It also has a different sign.

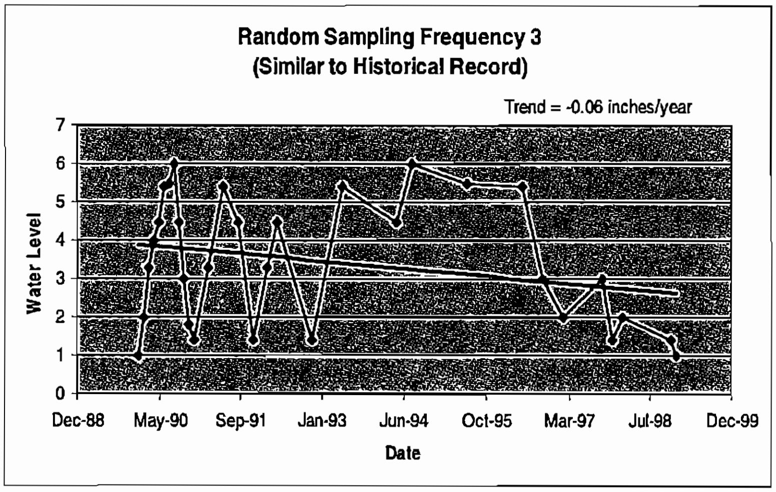


Figure 4

This figure is another random sampling frequency plot. Note the periods of different apparent trends. Note also that the long-term trend of this data is one order of magnitude different than the trend in Figure 1.

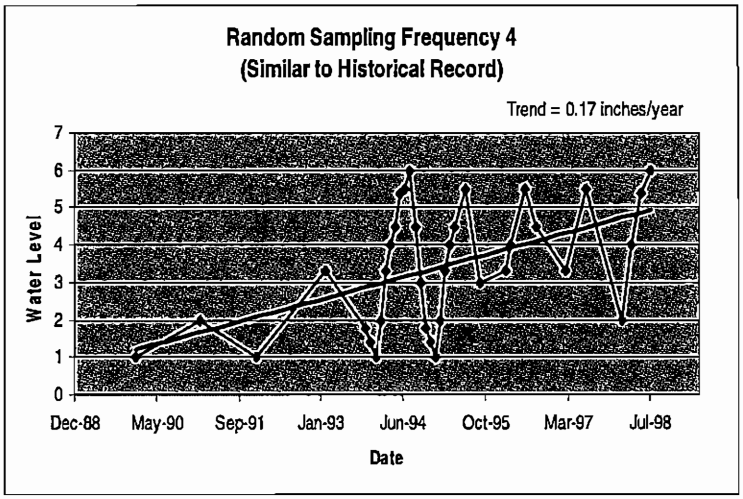


Figure 5

This is another figure illustrating trends associated with random sampling frequencies. Note that the trend of this data is two orders of magnitude different, (and has the opposite sign) than the data set from Figure 1.

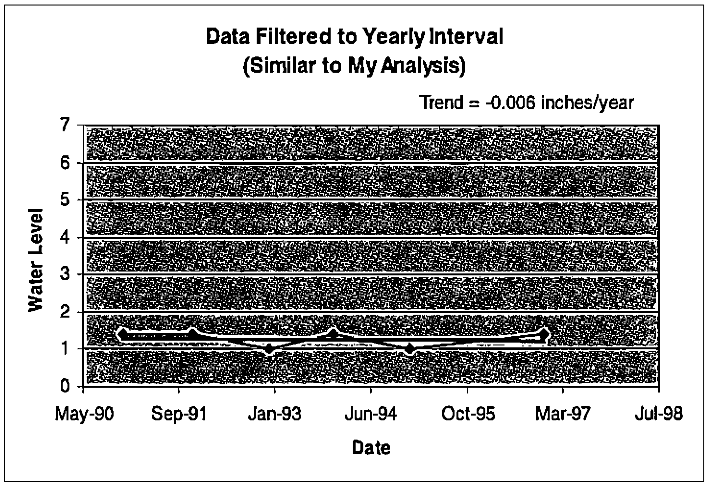


Figure 6

This final figure illustrates how filtering to yearly values can assist in eliminating artifact trends that result from variable sampling frequencies. This data was filtered from the Figure 2 data set using a 2-month window for data capture. Note the similarity in trend values between Figure 1 and this figure.

Data Selection Process

- Yearly filtering to remove seasonal variability
- Best case is to choose the same date each year that is before or after seasonal (or irrigation) effects
- Beginning of irrigation effects hard to assess
- Often only relative high water levels are recorded, not seasonal or yearly high water levels

Another reason for filtering to yearly data is to reduce the variability associated with short-term trends, i.e., seasonal fluctuations. The best case scenario is to pick the same date during the most stable period of every year – in short, try to pick a date before or after the irrigation season. The variable sampling frequencies present in the historical monitoring network data set create two issues that forced me to deviate from the best case filtering scenario. First, the beginning of the irrigation season is difficult to assess. Since data is collected sporadically, there is not a good record of when water levels begin to drop each year, in each well, and often only *relative* high water levels are recorded.

Table 2. Variable average high water level dates in historic monitoring network data set.

Well ID	Average High Water Level Date
04N01E-03DAD1	14-Mar
04N01E-10ACB2	1-Oct
04N01E-11BBB1	30-Mar
04N01W-13AACC1	2-Jul
04N01W-17BBDB1	10-Jul
04N02W-06CDD1	19-Mar
05N01E-26DCD1	26-Apr
05N01E-35ACA1	24-Apr
05N01E-36AAB1	18-May
05N01W-36ABB1	25-Sep
05N02W-22CAD1	22-Mar
05N03W-12CCA1	22-Jul
04N02W-07AAC1	29-May
05N03W-15DDC1	14-Oct
05N01E-34DBB1	13-Sep
04N01W-17BBDC1	19-Mar

* red indicates the average date is a function of alternating fall and spring high water levels

As can be seen in this table, a common high water level date is hard to assess. The date of the highest yearly water level varied over the period of record, and the table displays the average of these dates for each well. The dates in red are the results of averaging spring and fall high water level dates, and as such they offer little meaning.

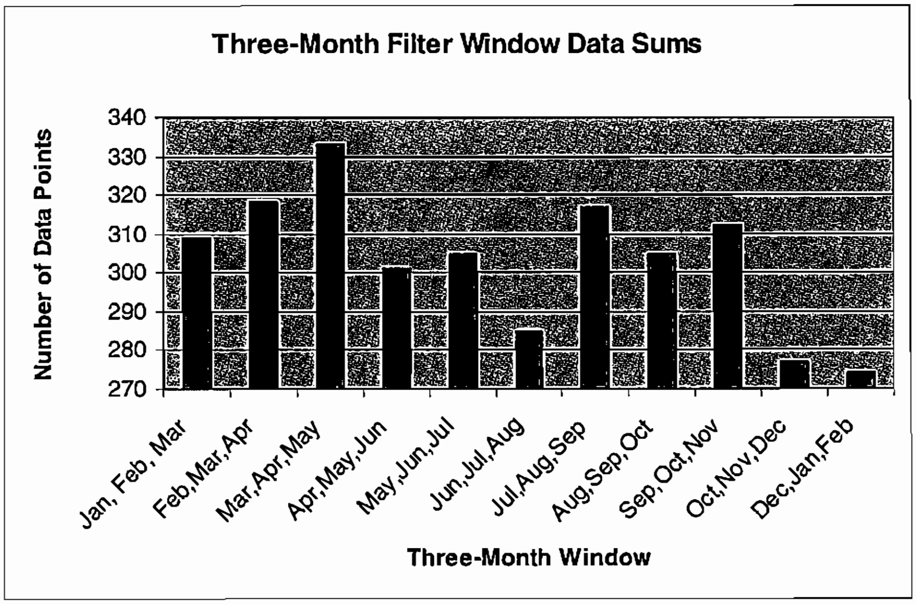


Figure 7

The second reason it is not possible to pick the same pre-irrigation date is because there are data gaps that make selecting the same date, or even same month, impossible for all wells. Therefore, to assemble a large enough record to analyze, I chose a three-month window with which to capture the data. The most frequent data measurements occurred in the March-April-May window which allowed me to compare the largest number of wells.

04N01E-030AD1

Date	Grpher Year	Grpher WL
3/31/1996	1996	2640.1
3/26/1997	1997	2639.8
3/19/1998	1998	2639.7
3/22/1999	1999	2639.9
3/21/2000	2000	2639.4
3/13/2001	2001	2639.2
4/4/2002	2002	2639.0
3/17/2003	2003	2639.0
4/22/2004	2004	2638.1
4/14/2005	2005	2637.9
4/18/2006	2006	2638.5
4/25/2007	2007	2638.4
4/26/2007		2643.8
5/20/2008		2639.3

mistaken values used in original

04N01E-10ACB2

Date	Grpher Year	Grpher WL
4/10/1996	1996	2568.6
3/27/1997	1997	2569.3
	1998	
	1999	
3/21/2000	2000	2569.0
3/13/2001	2001	2569.2
3/11/2002	2002	2567.2

04N01E-11BBB1

Date	Grpher Year	Grpher WL
3/19/1996	1996	2581.5
3/25/1997	1997	2581.9
3/19/1998	1998	2582.8
3/22/1999	1999	2582.8
3/21/2000	2000	2582.4
3/13/2001	2001	2582.5
3/11/2002	2002	2582.0
3/18/2003	2003	2578.2
3/25/2004	2004	2582.0
3/28/2005	2005	2582.8
3/28/2006	2006	2582.6
3/19/2007	2007	2584.6
3/24/2008	2008	2584.0

04N01W-13AACC1

Date	GrpherYear	Grpher WL
3/21/1996	1996	2535.9
3/20/1998	1998	2535.7
3/22/2000	2000	2535.4
3/21/2001	2001	2536.0
3/14/2002	2002	2532.9
3/27/2003	2003	2535.1

04N01W-17BBDB1

Date	GrpherYear	Grpher WL
4/26/1997	1997	2472.2
4/21/1998	1998	2471.2
4/30/1999	1999	2471.7
4/11/2000	2000	2471.2
4/17/2001	2001	2470.8
4/3/2002	2002	2470.8
3/4/2003	2003	2471.3

04N01W-17BBDC1

Date	Grpher Year	Grpher WL
4/5/1996	1996	2511.0
3/20/1997	1997	2512.0
3/20/1998	1998	2510.1
3/22/1999	1999	2511.0
3/21/2000	2000	2511.0
4/17/2001	2001	2510.7
3/4/2003	2003	2509.6

04N02W-06CDD1

Date	GrpherYear	Grpher WL
3/18/1996	1996	2424.0
3/26/1997	1997	2423.2
3/18/1998	1998	2422.7
3/22/1999	1999	2424.1
3/21/2000	2000	2424.0
3/13/2001	2001	2423.0
4/2/2002	2002	2421.4

05N01E-26DCD1

Date	GrpherYear	Grpher WL
3/18/1996	1996	2735.6
2/20/1997	1997	2737.4
3/26/1997		2738.0
3/19/1998	1998	2730.8
3/22/1999	1999	2741.4
3/21/2000	2000	2739.7
3/13/2001	2001	2735.8
4/4/2002	2002	2737.6

erroneously picked February data

05N01E-35ACA1

Date	Grpher Year	Grpher WL
4/3/1996	1996	2744.8
4/29/1997	1997	2744.4
3/18/1998	1998	2746.9
3/11/1999	1999	2751.1
3/9/2000	2000	2752.4
4/20/2001	2001	2748.7
3/15/2002	2002	2748.7
5/23/2003	2003	2748.7
5/8/2004	2004	2747.8
4/6/2005	2005	2749.0
3/7/2007	2007	2747.8
4/3/2008	2008	2743.9

Figure 8

Although it was not possible for me to choose a date for each well that is absolutely before seasonal changes take effect, it is important to note that every effort was made to select the earliest, and most similar dates, in each well. For most of the wells, I was able to pick very similar dates which reduce the variability associated with seasonal water level changes.

This table illustrates the dates chosen for each well.

05N01E-36AAB1

Date	Grpher Year	Grpher WL
3/19/1996	1996	2757.2
3/26/1997	1997	2760.6
3/18/1998	1998	2762.5
3/11/1999	1999	2764.2
3/9/2000	2000	2762.8
4/20/2001	2001	2761.8
3/15/2002	2002	2760.2
5/23/2003	2003	2759.2
5/6/2004	2004	2758.9
4/7/2006	2006	2759.0
3/7/2007	2007	2759.0
4/3/2008	2008	2758.8

05N02W-22CAD1

Date	Grpher Year	Grpher WL
4/3/1996	1996	2426.1
3/26/1997	1997	2426.0
3/18/1998	1998	2426.3
3/22/1999	1999	2426.2
3/21/2000	2000	2424.2
3/13/2001	2001	2424.8
3/11/2002	2002	2430.1
3/18/2003	2003	2422.6

05N03W-12CCA1

Date	Grpher Year	Grpher WL
3/22/1996	1996	2430.1
3/18/1998	1998	2426.2
3/21/2000	2000	2428.5
4/22/2004	2004	2426.4
4/14/2005	2005	2425.5
4/24/2006	2006	2426.6
4/25/2007	2007	2426.0
2/18/2008	2008	2425.7
5/19/2008		2423.0

erroneously picked February data

05N03W-15DDC1

Date	Grpher Year	Grpher WL
3/22/1996	1996	2442.4
3/26/1997	1997	2442.2
4/21/1998	1998	2441.2
3/22/1999	1999	2441.5
3/21/2000	2000	2441.0
3/13/2001	2001	2440.8
4/2/2002	2002	2438.5
3/4/2003	2003	2439.9
4/22/2004	2004	2437.8
4/14/2005	2005	2437.4
4/24/2006	2006	2437.3
4/26/2007	2007	2437.2
5/19/2008	2008	2437.6

04N02W-07AAC1

Date	Grpher Year	Grpher WL
3/16/1996	1996	2390.8
4/29/1997	1997	2391.4
4/21/1998	1998	2390.9
4/30/1999	1999	2391.4
4/11/2000	2000	2390.9
3/13/2001	2001	2391.4
4/2/2002	2002	2391.5
3/4/2003	2003	2391.7
4/22/2004	2004	2390.6
4/14/2005	2005	2390.2
4/24/2006	2006	2390.7
4/26/2007	2007	2390.1

05N01W-36ABB1

Date	Grpher Year	Grpher WL
3/19/1996	1996	2541.8
4/28/1997	1997	2541.1
3/19/1998	1998	2542.0
3/22/1999	1999	2541.0
3/21/2000	2000	2540.7
3/13/2001	2001	2539.8
3/11/2002	2002	2538.6
3/18/2003	2003	2538.5
3/25/2004	2004	2538.4
3/28/2005	2005	2538.6
3/28/2006	2006	2537.8
3/19/2007	2007	2538.1
3/26/2008	2008	2537.0

05N01E-34DBB1

Date	Grpher Year	Grpher WL
3/19/1996	1996	2649.0
3/26/1997	1997	2649.6
3/19/1998	1998	2648.6
3/22/1999	1999	2649.6
3/21/2000	2000	2649.4
3/13/2001	2001	2648.5
3/11/2002	2002	2647.9
3/18/2003	2003	2647.1
3/25/2004	2004	2646.9
3/28/2005	2005	2647.5
3/28/2006	2006	2648.1
3/19/2007	2007	2647.8
3/24/2008	2008	2647.1

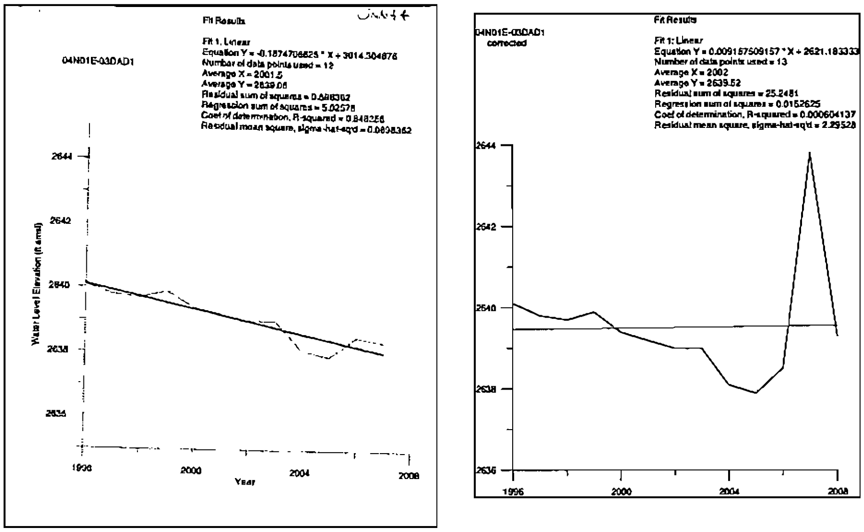
05N01E-32DBD1

Date	Grpher Year	Grpher WL
8/1/1996	1996	2581.0
7/22/1997	1997	2581.8
7/1/1998	1998	2579.7
8/26/1999	1999	2580.8
8/1/2000	2000	2577.4
7/16/2001	2001	2575.7
6/24/2002	2002	2574.0
7/9/2004	2004	2573.3
6/29/2005	2005	2572.6
8/14/2006	2006	2573.9
6/6/2007	2007	2571.4
7/28/2008	2009	2567.0

Figure 9

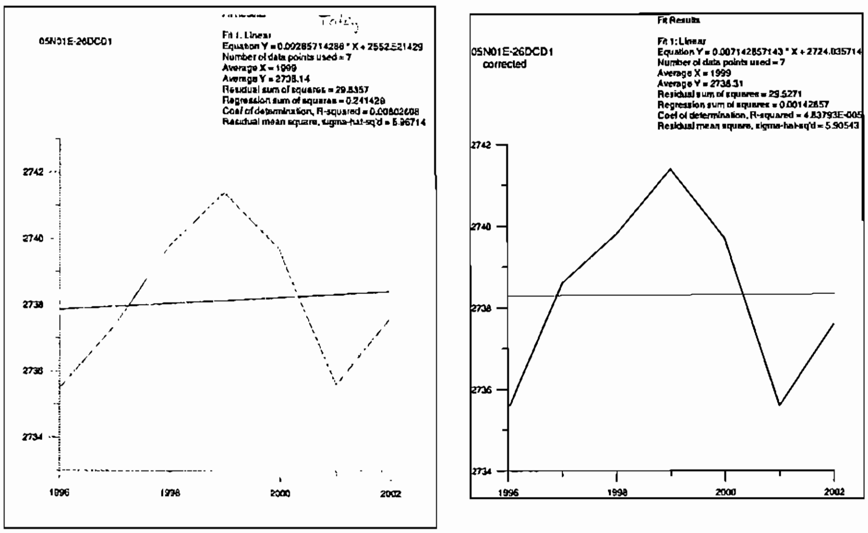
As shown in red text, I found three data selection errors in the water level data that I chose.

Figure 10



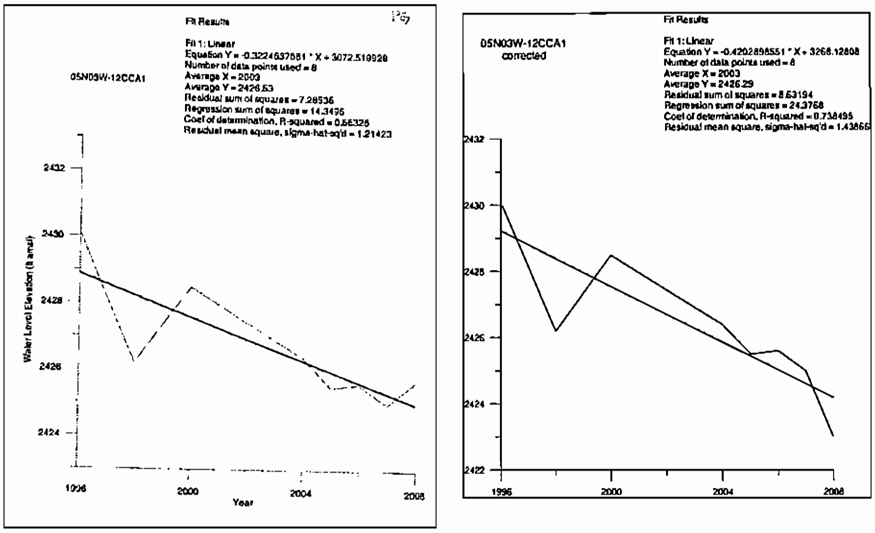
The most significant error was in well 04N01E03DAD1. An apparent copy and past error led me to report an incorrect water level for 2007 and completely omit the information for 2008. Instead of a declining water level, this well now appears stable with a slight rise of 0.009 ft/yr. I classified this well as undifferentiated, and HLI classified it as Terteling Springs in their response memo. I would defer classification to HLI.

Figure 11



There was also an error in graphing well 05N01E26DCD1. I erroneously chose the February date in 1997 instead of the March date. This did not change the conclusions about this well. This well still groups with other Dry Creek area wells based on water level behavior.

Figure 12



There was another an error in graphing well 05N03E12CCA1. Again I erroneously chose the February date in 2008 instead of the May date. The trend changed from -0.32 ft/yr to -0.42 ft/yr. This did not change the conclusions about this well. This well still exhibits a slight downward trend during the period analyzed.

Process

- Select time period
- Filter to yearly spring measurements
- Plot data
- Visually compare the graphs
  - Linear Regression lines added as a reference to facilitate comparison

After selecting a generally similar time span, and filtering the data to yearly spring measurements, I graphed the data.

I then visually compared the graphs looking for similarities and differences that would allow me to classify wells based on water level behavior. I placed linear regression approximations on the graphs to facilitate comparison of wells by linear trends.

Submittals

- Two memos (Memo 1 and Memo 2).
- Memo 1 general data comparison period 1996 – 2003.
- Memo 2 data comparison period 1996 – 2008.
- Well 05N01E32DBD1 fall data only.

Once I completed the analysis, I submitted my results to Dennis Owsley and Sean Vincent. This occurred twice as Dennis asked me to re-review any wells with more current data. The second analysis utilized fewer wells because fewer wells had data beyond 2003. Therefore, two memos were submitted to Dennis and Sean. The first memo dated January 28, 2009 (Memo 1) included 17 wells; however, well 05N01E32DBD1 had only fall data and was not included in the analysis. Therefore, 16 wells were evaluated for the general data comparison period of 1996 – 2003. Due to the data constraints (lack of measurements) four wells were evaluated for the time period of 1996 – 2002 and one well was evaluated for the time period 1996 – 2004. The graph for well 05N01E32DBD1 was included in the figures for completeness of record.

Submittals

- Mistakenly included trend from well 05N01E32DBD1 in Memo 2.
- Reported water level trend range
  - -0.11 ft/yr to -1.06 ft/yr
- Correct water level trend range (including adjustments to 04N01E03DAD1 and 05N03E12CCA1)
  - 0.13 ft/yr to -0.49 ft/yr
- Reported average water level trend
  - -0.29 ft/yr
- Correct average water level trend (including adjustments to 04N01E03DAD1 and 05N03E12CCA1)
  - -0.20 ft/yr

The second memo dated March 2, 2009 (Memo 2) included 10 wells; however, well 05N01E32DBD1 had only fall data and was not included in the analysis. Regrettably, I included this well in the calculation of the average trend, and in the presented range of trends. The range that I should have reported is 0.13 ft/year to -0.49 ft/year (instead of -0.11 ft/year to -1.06 ft/year), and the average trend for the wells should have been -0.20 ft/year (instead of -0.29 ft/year). These adjusted trend values also reflect changes associated with correcting data selection errors in wells 04N01E03DAD1 and 05N03E12CCA1.

Conclusions

1. Wells in the Dry Creek area exhibit a similar water level pattern that is different from the other wells reviewed.
2. There is no water level pattern that allows for the differentiation of water level fluctuations in the Pierce Gulch aquifer from non-Pierce Gulch water level behavior in the wells reviewed (except for those in Dry Creek).
3. Memo 1: All non-Dry Creek wells that I reviewed (except for 04N02W07AAC1) display negative water level trends, over the period analyzed, of -0.21 ft/year to -0.49 ft/year with an average trend of -0.27 ft/year.
4. Memo 2: All non-Dry Creek wells that I reviewed (except for 04N01E11BBB1 and 04N01E03DAD1) display negative water level trends, over the period analyzed. The non Dry Creek wells displayed trends ranging from 0.13 ft/year to -0.49 ft/year with an average trend of -0.20 ft/year.

The conclusions form these analyses are

1 Wells in the Dry Creek area exhibit a similar water level pattern that is different from the other wells reviewed.

2 There is no water level pattern that allows for the differentiation of water level fluctuations in the Pierce Gulch aquifer from non-Pierce Gulch water level behavior in the wells reviewed (except for those in Dry Creek).

3 Memo 1: All non-Dry Creek wells that I reviewed (except for 04N02W07AAC1) display negative water level trends, over the period analyzed, of -0.21 ft/year to -0.49 ft/year with an average trend of -0.27 ft/year.

4 Memo 2: All non-Dry Creek wells that I reviewed (except for 04N01E11BBB1 and 04N01E03DAD1) display negative water level trends, over the period analyzed. The non Dry Creek wells displayed trends ranging from 0.13 ft/year to -0.49 ft/year with an average trend of -0.20 ft/year.

It is interesting to note that both 04N01E11BBB1 and 04N01E03DAD1 are classified as Terteling Springs by HLI.

Reply to comments in Exhibit 45 – Final Technical Memorandum Response to IDWR

- Final paragraph page 29 through first sentence page 30

HLI asserts that "...all but one of the wells analyzed by HLI and McVay show increasing water levels over the past 6-12 years"

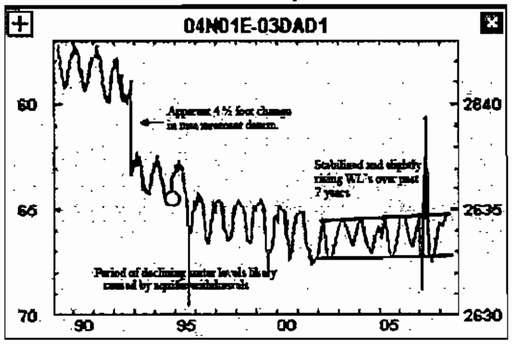
- IDWR Reply

I do not agree with this statement. As discussed earlier, it is important to pick equal time intervals for analysis. The data records for these wells analyzed were collected on different and varying time schedules. By using the records as-is, HLI may have incorporated apparent trends caused by variable collection frequencies. Furthermore, this statement is based on hand-drawn lines that encompass different data periods. The choice of different data periods in an attempt to illustrate rising water levels is not, in my opinion, an objective, unbiased method of water level analysis. Also, my analyses were not intended to assign a water level trend to any aquifer, only to compare water levels in an effort to identify aquifers.

Next I would like to address some of the comments provided by HLI in the Final Technical Memorandum Response to IDWR Staff Memo, or Exhibit 45.

I do not agree with this statement. As discussed earlier, it is important to pick equal time intervals for analysis. The data records for these wells were collected on different and varying time schedules. By using the records as-is, HLI may have incorporated apparent trends caused by variable collection frequencies. Furthermore, this statement is based on hand-drawn lines that encompass different data periods. The choice of different data periods in an attempt to illustrate rising water levels is not, in my opinion, an objective, unbiased method of water level analysis. My analyses were not intended to assign a water level trend to any aquifer, only to compare water levels in an effort to identify aquifers.

Reply to comments in Exhibit 45 – Final Technical Memorandum Response to IDWR



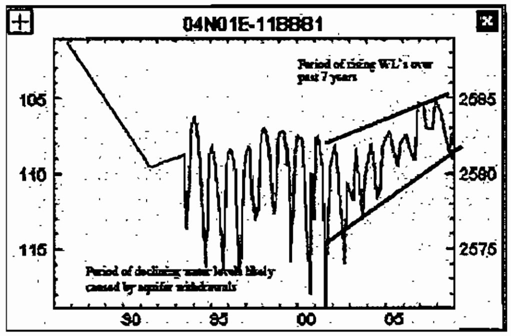
Screen capture of HLI Response Figure 8. Hand-drawn lines are superimposed on the hydrograph to illustrate recent trend. Data that were collected during the time span illustrated by the blue lines were collected on varying frequencies. Local minima/maxima in data set can not be assumed to be water level inflection points, only data inflection points. Note the HLI trend is applied to approximately the last 7 years.

The next several slide depict the HLI analysis of water levels using the entire data set for each well.

This figure is a screen capture of HLI Response Figure 8. Hand-drawn lines are superimposed on the hydrograph to illustrate recent trend. Data that were collected during the time span illustrated by the blue lines were collected on frequencies different than the data preceding this period, which may produce artifact trends, as previously discussed. Local minima/maxima in data set can not be assumed to be water level inflection points, only data inflection points. Note the HLI trend is applied to approximately the last 7 years.

Also note that the lines cut through some of the data.

Reply to comments in Exhibit 45 – Final Technical Memorandum Response to IDWR



Screen capture of HLI Response Figure 9. Hand-drawn lines are superimposed on the hydrograph to illustrate recent trend. Data that were collected during the time span illustrated by the blue lines were collected on varying frequencies. Local minima/maxima in data set can not be assumed to be water level inflection points, only data inflection points. Note the HLI trend is applied to approximately the last 7 years.

This figure is a screen capture of HLI Response Figure 9. Hand-drawn lines are superimposed on the hydrograph to illustrate recent trend. Data that were collected during the time span illustrated by the blue lines were collected on varying frequencies. Notice how the amplitude and frequency of the latter data are different than the preceding data, which may indicate artifact trends due to changes in sample frequency. Local minima/maxima in the data set can not be assumed to be water level inflection points, only data inflection points. Note the HLI trend is applied to approximately the last 7 years.

Also note that the lines cut through some of the data.

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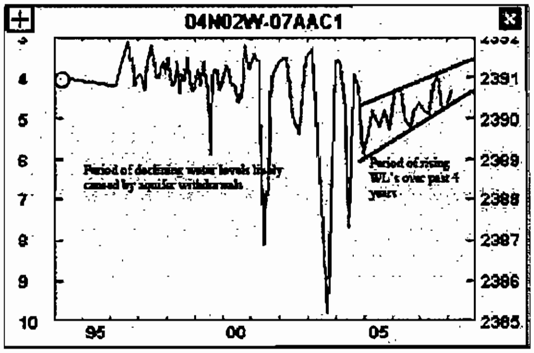

Screen capture of HLI Response Figure 10. Hand-drawn lines are superimposed on the hydrograph to illustrate recent trend. Data were collected on varying frequencies which may produce artifact trends. Local minima/maxima in data set can not be assumed to be water level inflection points, only data inflection points. Note the HLI trend is applied to approximately the last 4 years.

This figure is a screen capture of HLI Response Figure 10. Hand-drawn lines are superimposed on the hydrograph to illustrate recent trend. Data were collected on varying frequencies which may produce artifact trends. Local minima/maxima in data set can not be assumed to be water level inflection points, only data inflection points. Note the HLI trend is applied to approximately the last 4 years.

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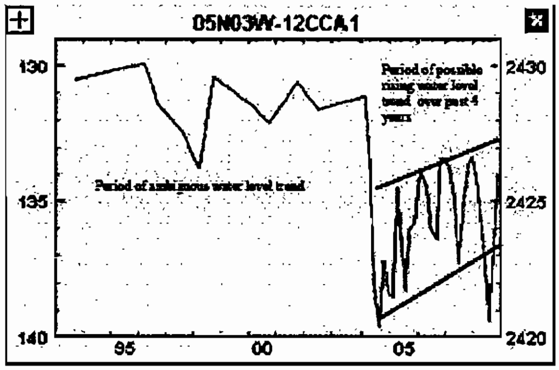

Screen capture of HLI Response Figure 11. Hand-drawn lines are superimposed on the hydrograph to illustrate recent trend. Data were collected on varying frequencies which may produce artifact trends. Local minima/maxima in data set can not be assumed to be water level inflection points, only data inflection points. Note the HLI trend is applied to the last 4 years.

This figure is a screen capture of HLI Response Figure 11. Hand-drawn lines are superimposed on the hydrograph to illustrate recent trend. Data were collected on varying frequencies which may produce artifact trends. Local minima/maxima in data set can not be assumed to be water level inflection points, only data inflection points. Note the HLI trend is applied to the last 4 years.

Note also how the lines cut through some of the data.

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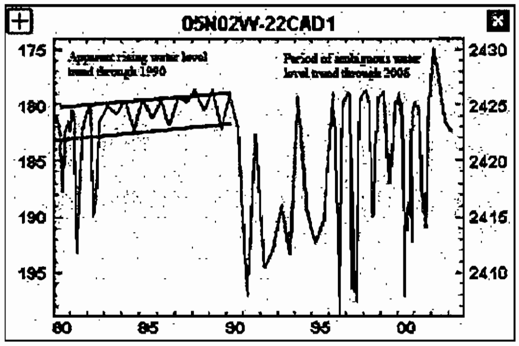

Screen capture of HLI Response Figure 12. Hand-drawn lines are superimposed on the hydrograph to illustrate recent trend. Data were collected on varying frequencies which may produce artifact trends. Local minima/maxima in data set can not be assumed to be water level inflection points, only data inflection points. Note the HLI trend is applied approximately to the years 1980 - 1990.

This figure is a screen capture of HLI Response Figure 12. Hand-drawn lines are superimposed on the hydrograph to illustrate recent trend. Data were collected on varying frequencies which may produce artifact trends. Local minima/maxima in data set can not be assumed to be water level inflection points, only data inflection points. Note the HLI trend is applied approximately to the years 1980 - 1990.

Note also how the lines cut though much of the data.

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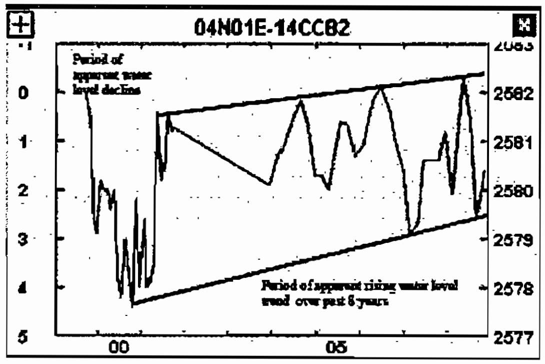

Screen capture of HLI Response Figure 13. Hand-drawn lines are superimposed on the hydrograph to illustrate recent trend. Data were collected on varying frequencies which may produce artifact trends. Local minima/maxima in data set can not be assumed to be water level inflection points, only data inflection points. Note the HLI trend is applied to the last 8 years.

This figure is a screen capture of HLI Response Figure 13. Hand-drawn lines are superimposed on the hydrograph to illustrate recent trend. Data were collected on varying frequencies which may produce artifact trends. Local minima/maxima in data set can not be assumed to be water level inflection points, only data inflection points. Note the HLI trend is applied to the last 8 years.

As can be seen in these figures, the analysis proposed by HLI appear to be based solely on judgment, as evidenced by the analysis of different time periods and time spans, as well as allowing the lines to cross data that do not fit the trend being illustrated. Furthermore, the chance exists that artifact trends are present in the data plotted in these figures, as evidenced by the changes in amplitude and frequency observable in the graphs.

I believe filtering to yearly data is a more objective approach.

Reply to comments in Exhibit 45 – Final Technical Memorandum Response to IDWR

- HLI Critique
  - Lack of statistical rigor
  - Use of linear regression
  - Discrepancies due to two memos
- IDWR Reply
  - Data constraints precluded statistical rigor
  - Linear regression utilized to compare wells over the time period
  - Access to both memos clarifies discrepancies

In the response, HLI criticizes the lack of statistical rigor in the analyses. As discussed previously, the data constraints inherent with sporadic sampling frequencies prevented me from using more rigorous approaches. HLI also contends that filtering the data to yearly time-steps incorporated unintentional bias into the analyses. I believe that filtering in this manner is the only way to avoid the bias associated with artifact trends. I also feel that picking variable time-spans during different time periods, as was done in the response memo, invokes much more bias than filtering.

HLI further disagrees with the use of linear regression lines across the entire time period for which I analyzed, stating that this approach masks periods of rising and falling water levels. The purpose was not to identify periods of different water level behavior in each well, it was to compare the wells to each other, and as such, a linear regression estimation was employed to compare the wells over the entire time-span. Indeed, part of the reason for utilizing the linear regression was to remove the effects of the shorter-term trends.

HLI also expresses concern over the dates selected for each well, and concern about discrepancies in the number of wells used in the analyses. HLI states, "A review of IDWR online record, however, indicates that most of these data were not collected within the March 1 – May 31 timeframe." A review of dates presented earlier in figures 8 and 9 indicate that most of the data were collected in the spring filtering window. HLI also expresses confusion about the number of wells used and the time periods that were chosen. This confusion appears to be based on the fact that two memos were submitted, but only one was included in the Staff Memorandum.

Reply to comments in Exhibit 45 – Final Technical Memorandum Response to IDWR

- HLI Critique
  - Did not analyze wells 04N01W11DDA1 or 04N01E14CCB2
  - Lack of applicability to Peirce Gulch aquifer

- IDWR Reply
  - Did not analyze wells beyond the 17 given to me
  - Analyses not intended to characterize trend in Pierce Gulch aquifer

HLI also expresses concern that wells 04N01W11DDA1 and 04N01E14CCB2 were not analyzed. They state that these wells are a better representation of the Pierce Gulch aquifer than the wells that were analyzed. They further disagree with many of the wells used in the analysis because they are not completed in the Peirce Gulch aquifer.

It is important to remember that these analyses were not intended to assign a trend value to the Perce Gulch aquifer, only to compare the wells that I was given to assess similarities and differences. I did not review any other wells beyond the 17 that I was given.

Thank You

I appreciate the opportunity to narrate my testimony.