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Department of Water Resources
Eastern Region

August 1, 2015

Mr. James Cefalo
Idaho Department of Water Resources
900 North Skyline Drive, Suite A
Idaho Falls, ID 83402-1718

RE: AQUIFER TEST FOR TAYLOR BOWEN WATER RIGHTS APPLICATION -15-7409

Dear Mr. Cefalo:

A groundwater impact assessment is provided in this letter report for Taylor Bowen 'sWater Right Application, 15-7409. He has approximately 39 acres of land northwest of Malad City, Idaho (Figure 1) and his application is for 0.80 cfs. Results of two different pumping tests were used as the basis for this evaluation. The Jeff Thomas pumping test was conducted on June 20-24, 2005 in a well about 1.2 miles south southwest of the proposed drill site and a test of the Malad Well #4 on April 23, 2011 2.5 miles southeast of the propose drill site (Figure 1). The parameters from the aquifer test are used in a computer simulation to predict the potential impacts to neighboring wells within ½ mile of the proposed point of diversion (POD). The results of the computer analysis show that the proposed diversion rate will have a minimal or negligible impact on neighboring wells.

Nearby PODs

The proposed well location is 14S, 36E, 7 SW SW as shown in Figure 2. A search was made for all existing points of diversions (PODs), i.e. water rights near Bowen's property. In Figures 3 through 6, a blue circle is shown with a ½ mile radius centered on the proposed Bowen well location. The circle encompasses portions of sections 12, and 13 T14S, R35E and sections 7 and 18 of T 14S 36E. A search of the IDWR on-line database for PODs in these sections indicates there are four surface water rights in section 12 of T14S R35E, no surface water rights in section 13 of T14S R35E, one surface water right in section 7 of T14S R36E, and one surface water right in section 18 of T14S R36E. However, none of the surface water rights in any of these sections are within a ½ mile radius of Mr. Bowen's proposed POD. The results of the water right search are provided in Tables 1 through 4.

Nearby Wells

A search was performed of the IDWR drillers' log database for wells within ½ mile of the proposed well location. 17 wells were found in section 12 of T14S, R35E; 21 wells were found in section 13 of T14S, R35E; 25 wells were found in section 18 of T14S, R36E; and 19 wells were found in section 7 of T14S, R356E. The results of the well log search are provided in Tables 5 through 8. Ten representative well logs are provided in Attachment 1 to show the local hydrogeology. The average depth of the wells in these sections is 256 ft and the average depth to water is 161 ft.



Hydrogeology

The Malad Valley is surrounded by mountains made of old marine sedimentary rock (metasediments). Normal faulting caused by Basin and Range extension up-lifted the mountains and formed a deep valley, including the Salt Lake Basin and the Malad Valley. During the ice ages, the entire Salt Lake Basin was filled with water forming a vast inland lake on several occasions. The water extended into the area of the subject property. During periods of high water fine sediment and sand were deposited. During periods of low water the sediments were incised by surface streams, which also deposited coarse sands and gravels. Two of the most prominent lake levels were the Bonneville at about 5200 ft and the Provo at about 4800 ft above mean sea level. The elevation of the subject property is about 4710 ft, so it is expected that fine lake bed sediments from the Provo and Bonneville Lake Levels exist in the shallow subsurface below the property. In this area the lake bed sediments may have been cut by the ancestral Malad River. This stream also may have deposited sands and gravels as reported on the well drillers logs.

The lithology in this area is a series of unconsolidated sands, gravels and clays. There is not a marker layer or geologic unit that can be correlated over distances between wells, at least, as described in the lithology on the well logs. The inability to correlate geologic layers is consistent with the area being situated in a cut and fill sequence of the Malad River. It is further complicated by waxing and waning cycles of ancient Lake Bonneville. The aquifer thickness is assumed to 220 ft in this area. This is based on driller log for the Jeff Thomas Test Well, the Malad City #4 Well and regional considerations of the hydrogeology. The aquifer may be thicker, but this is the approximate length of perforations in deep high yield wells. It should be noted that the aquifer is a sequence of permeable lens of sand and gravel stringers, which are primarily confined or semi-confined. Locally the aquifer may be unconfined.

Pumping Tests

An irrigation well, (1.25 miles southwest of Bowen) was completed to a depth of 489 feet on the Thomas Property, T14S, 35E, Section 24, on May 20, 2005. It is perforated from 280 ft to 481 feet in order to draw water from a deeper part of the aquifer. The well log is provided in Attachment 1, Figure 1-1. The geology beneath the Jeff Thomas property consists of interlayered sediment ranging from unconsolidated sands and gravel to brown sticky clay. With depth, the layers of sand are reported to be lithified into harder more competent sandstone intervals.

The four-day pumping test was conducted June 20-24, 2005 at a rate of 1,000 gpm. Water levels were monitored in nine surrounding wells, using electronic pressure transducers. The radial distance between the Thomas Well and the observation wells ranged from 528 feet to 3,168 feet. On the basis of the depth to water measurements, there appears to be at least three sub-units to the aquifer: 1) a shallow zone with depth to water between 7 and 10 feet, 2) a middle aquifer sub-unit with depth to water measurements between 73 and 76 feet and a deeper sub-unit with depth to water measuring between 97 and 104 feet.

Drawdown plots for the observation wells can be found in Attachment 2. The effects of pumping the Jeff Thomas well could not be seen in any of the observation wells. The pumping test was conducted when other nearby irrigation wells were pumping, which tended to make the



aquifer data “noisy”. Nevertheless, if drawdown from pumping the Jeff Thomas well impacted the observation wells, it was minimal and could not be defined.

Aquifer test analyses could only be performed on the pumped well because drawdown was not observed in any of the observation wells. Attachment 3 contains the aquifer test analyses performed using the AQTESOLV computer program for a leaky confined aquifer (Hantush, 1960). The first two plots are the drawdown and recovery curves. The transmissivity is 1392 ft²/day using the leaky confined aquifer solution. In the third plot, a match to the Theis solution for a confined aquifer is provided in Attachment 3. As can be noted, the match to the confined Theis solution is not as good as the match to the leaky confined solution. Below the plots in Attachment 3 are listed the residual statistics for each match using the automatic curve matching option in AQTESOLV. The objective function that is minimized during automatic curve matching is the sum of the squared residuals. Automatic curve matching seeks to minimize the residual sum of squares, residual variance and standard deviation and obtain a residual mean close to zero. As can be seen by the residual statistics, the variance and the standard error are significantly less for the leaky confined match than for the confined solution. This indicates that in this area the aquifer is under leaky confined conditions.

The City of Malad Well #4 is located 2.5 miles southeast of the location of the proposed Bowen POD (see Figure 1). The Malad Municipal #4 well is 530 ft deep, having a cased completion in clayey sand and gravel at 530 ft. The well log is provided in Attachment 1, Figure 1-2. A 24 hour, 750 gpm constant rate pump test was conducted in May of 2009 on Well 4 for the Malad City water system. A graph of drawdown is in Attachment 2. The semi-log plot of time-drawdown results was used to calculate the transmissivity of the aquifer using the modified non-equilibrium equation described by Driscoll (1986). This equation is:

$$T = \frac{264Q}{\Delta s}$$

Where T = transmissivity in gallons per day per foot, Q=pumping rate, in gallons per minute (gpm), and Δs = change in drawdown between one log cycle of the time-drawdown graph. The red line in Attachment 2 semi-log plot represents the straight line trend of the data between 10 and 900 minutes. The slope of this line is 3 ft per log cycle. Thus, the calculated value of transmissivity is 66,000 gpm/ft or 8,800 ft²/day. This analysis is for a confined aquifer. The raw data is not available so it is not possible to perform a detailed analysis to determine if the aquifer test data would better match a leaky confined solution. Because the geology of the two locations is similar it is assumed that an average transmissivity for the two pumping tests represents the aquifer conditions at the Bowen Site. Thus, the impact calculations employ a leaky confined aquifer with a transmissivity of 6,000 ft²/day.

Because there was no observation well for either test, the aquifer storativity could not be accurately calculated. The storativity in this location was assumed from values found in a well-respected reference textbook (Freeze and Cherry, 1979). It is estimated to be 0.01.

Impact Assessment

Mr. Bowen wishes to irrigate 39 acres per IDWR estimates of usage this should require 0.02 cfs per acre or 359 gpm or 0.80 cfs. To estimate the long-term drawdown and impact to neighboring wells from pumping of the proposed Bowen POD, the forward solution capabilities



of the AQTESOLV program were employed. The input parameters to the model are listed in Table 4-1 (see Attachment 4). Boundaries in AQTESOLV were enabled as shown in Figure 4-1 to represent Malad Valley. As depicted in Figure 4-1 and listed in Table 4-2 the model is 30,700 ft wide and 40,200 ft long. Because the Malad Valley is bounded by mountains consisting of Paleozoic and Mesozoic sedimentary rock that do not provide much water compared to the unconsolidated valley fill, the west and north boundaries are set as impermeable or “no flow” boundaries. The southern end of the domain has no barrier (This assumption of an infinite aquifer). The east boundary of the domain is defined as constant head boundary.

In the model domain the proposed POD well is located 18,075 ft east of the west boundary and 23,500 ft north of the south boundary. This represents the proximity of the proposed POD to the nearby mountains, which will have the effect of increasing drawdown.

Figure 4-2 shows the AQTESOLV[®] output plot of the forward calculation for the proposed well pumping at 0.80 cfs (359 gpm) constantly for 7 months (April 1 to Oct 31). At the end of the time period the predicted drawdown is estimated to be 8 feet in the proposed POD. The drawdown for well at ½ mile distance in any direction from the POD is predicted to not be measurable. For a well 200 ft south of the POD the predicted drawdown is less than 0.01 ft. The prediction of minimal measurable drawdown in nearby wells is consistent with the Jeff Thomas aquifer test where no drawdown was observed in any nearby wells.

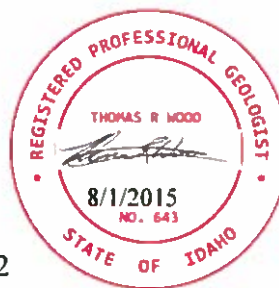
It is my professional opinion that Mr. Bowen’s water right application will not excessively impact their neighbors’ right to divert water. I believe that the calculated drawdown over estimates the actual drawdown to be expected for the following reasons: 1) Mr. Bowen will not pump continuously at the maximum rate for 210 days to consume 333 acre – ft in a single year; and 2) the Paleozoic/Mesozoic rocks of the mountains are not totally impermeable and will provide some water to the system, thus reducing drawdown. These factors will reduce the predicted drawdown presented here.

Please do not hesitate to call me if you have any questions about this letter or the calculations.

Respectfully,

Thomas R. Wood, PhD, PG

cc
Taylor Bowen 2787 W 2000 N Malad City Idaho 83252



References

Freeze, R.A. and J.A. Cherry, 1979, Groundwater, ISBN 0-13-365312-9, Prentice-Hall, Inc., Englewood Cliffs, New Jersey 07632.

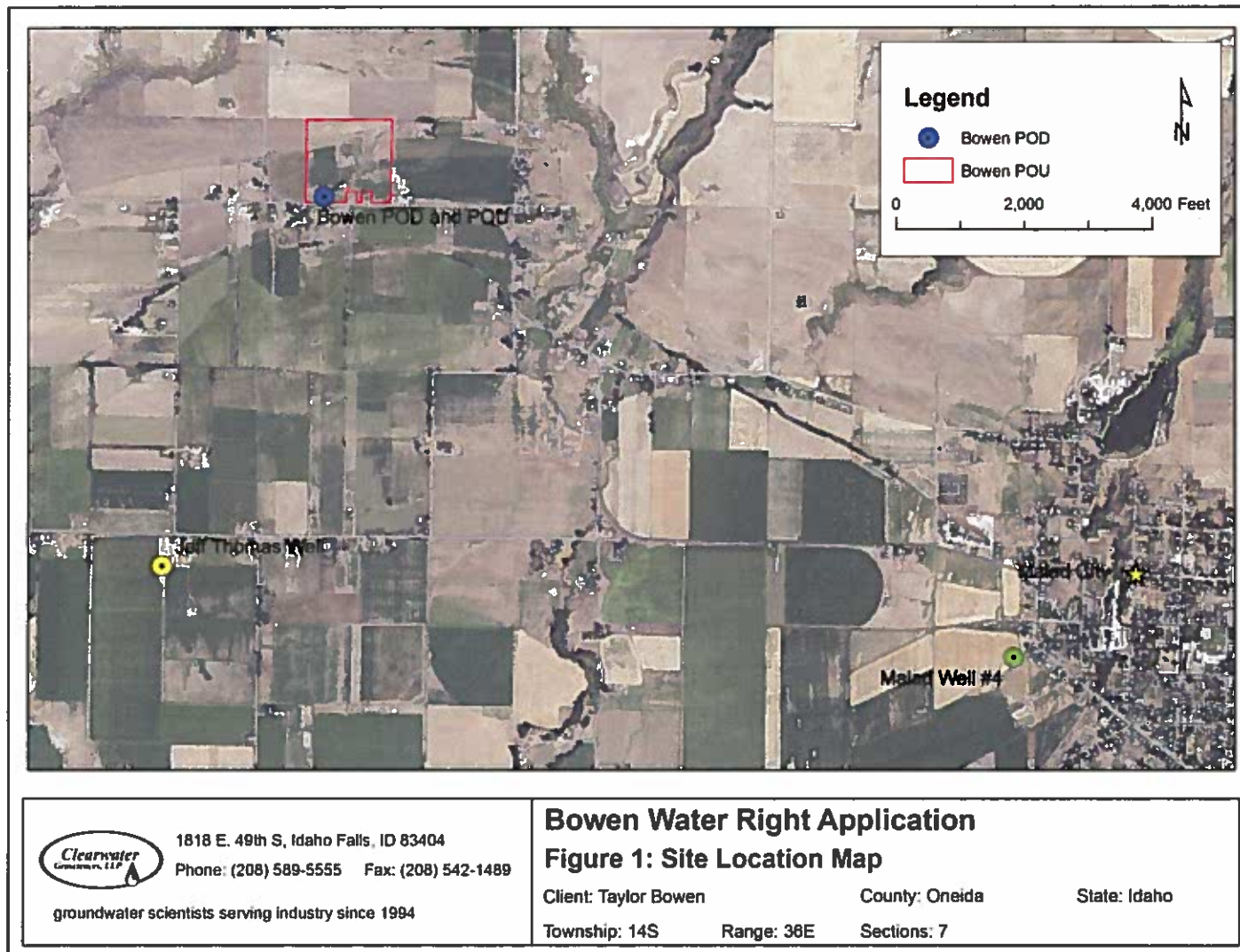


Figure 1. Map showing locations of the Proposed Bowen’s POD and pump tested wells of Jeff Thomas Well and Malad #4 Well.

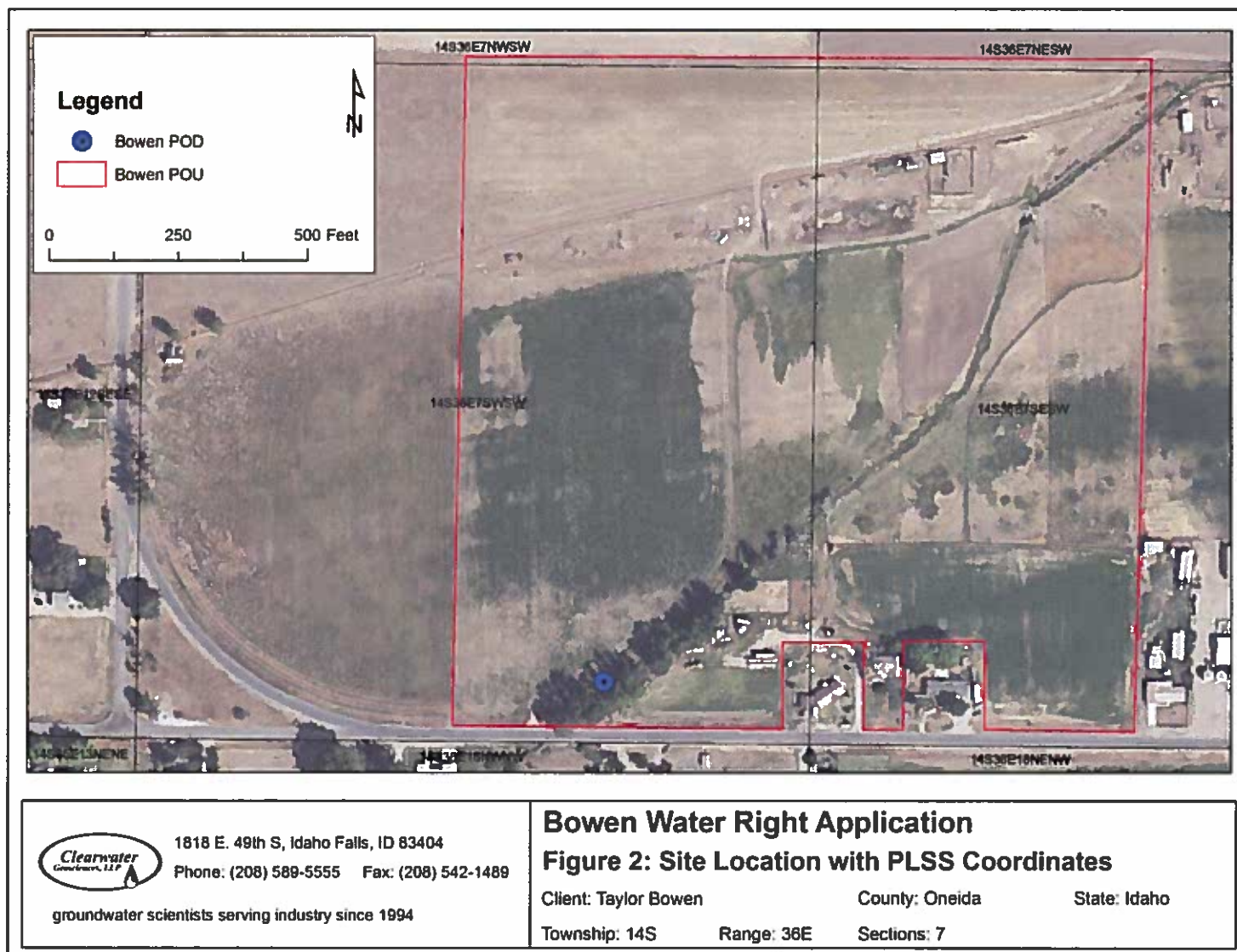


Figure 2 IDWR map area showing the township range section coordinates and the proposed well location as a blue dot.

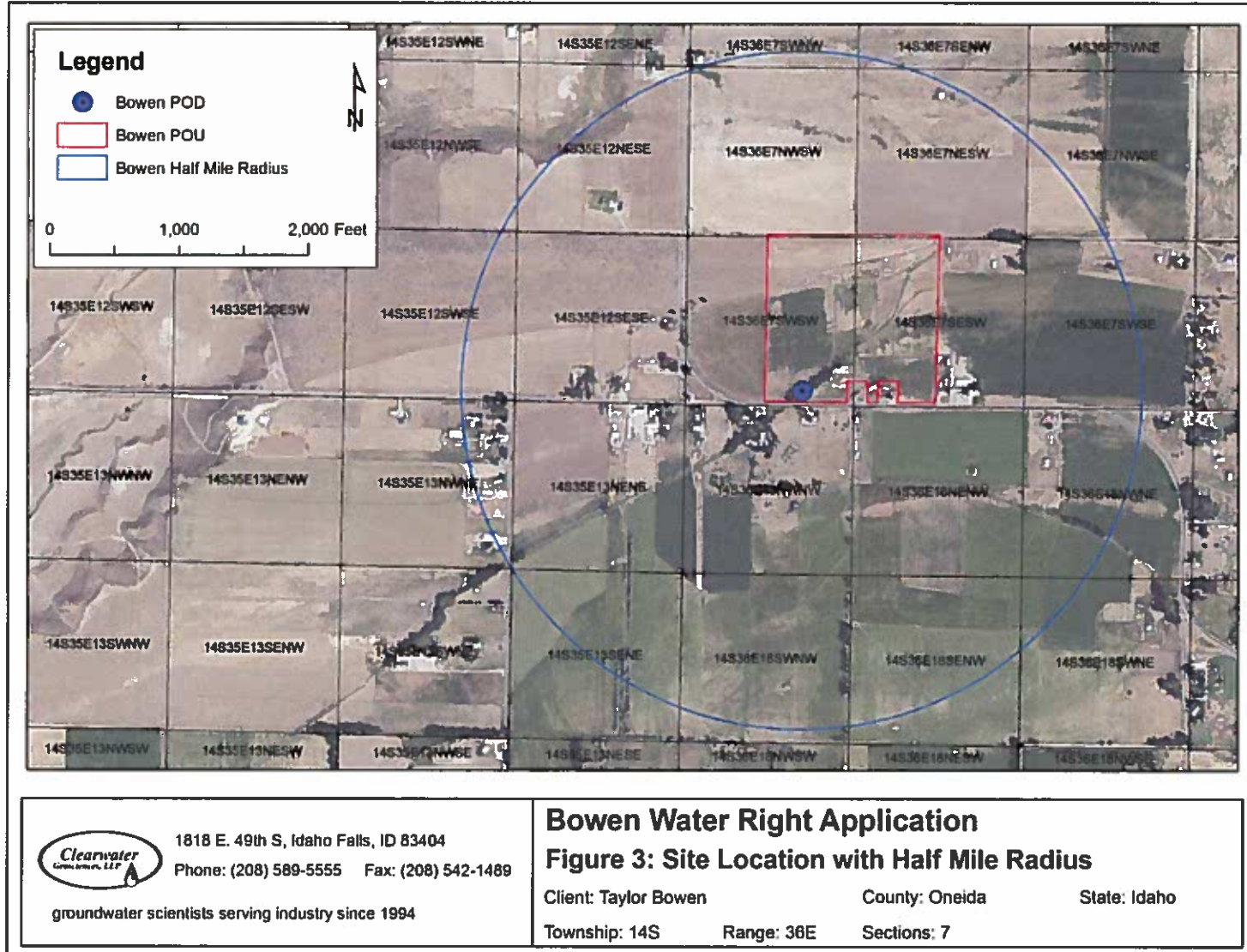


Figure 3 Bowen's property with blue circle showing approximate 1/2 mile radius.

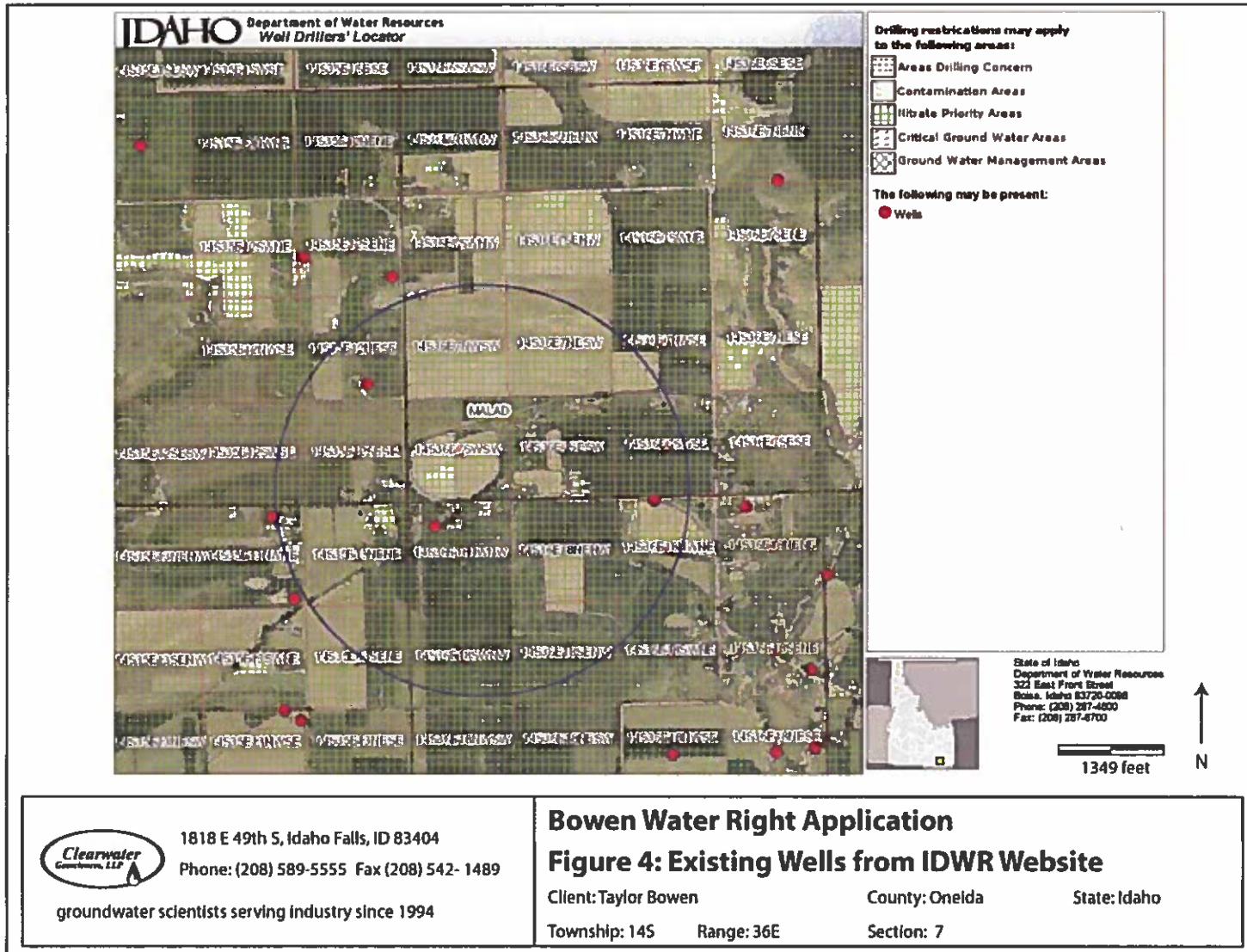


Figure 4 Existing Wells; from IDWR website and blue circle 1/2 mile diameter.

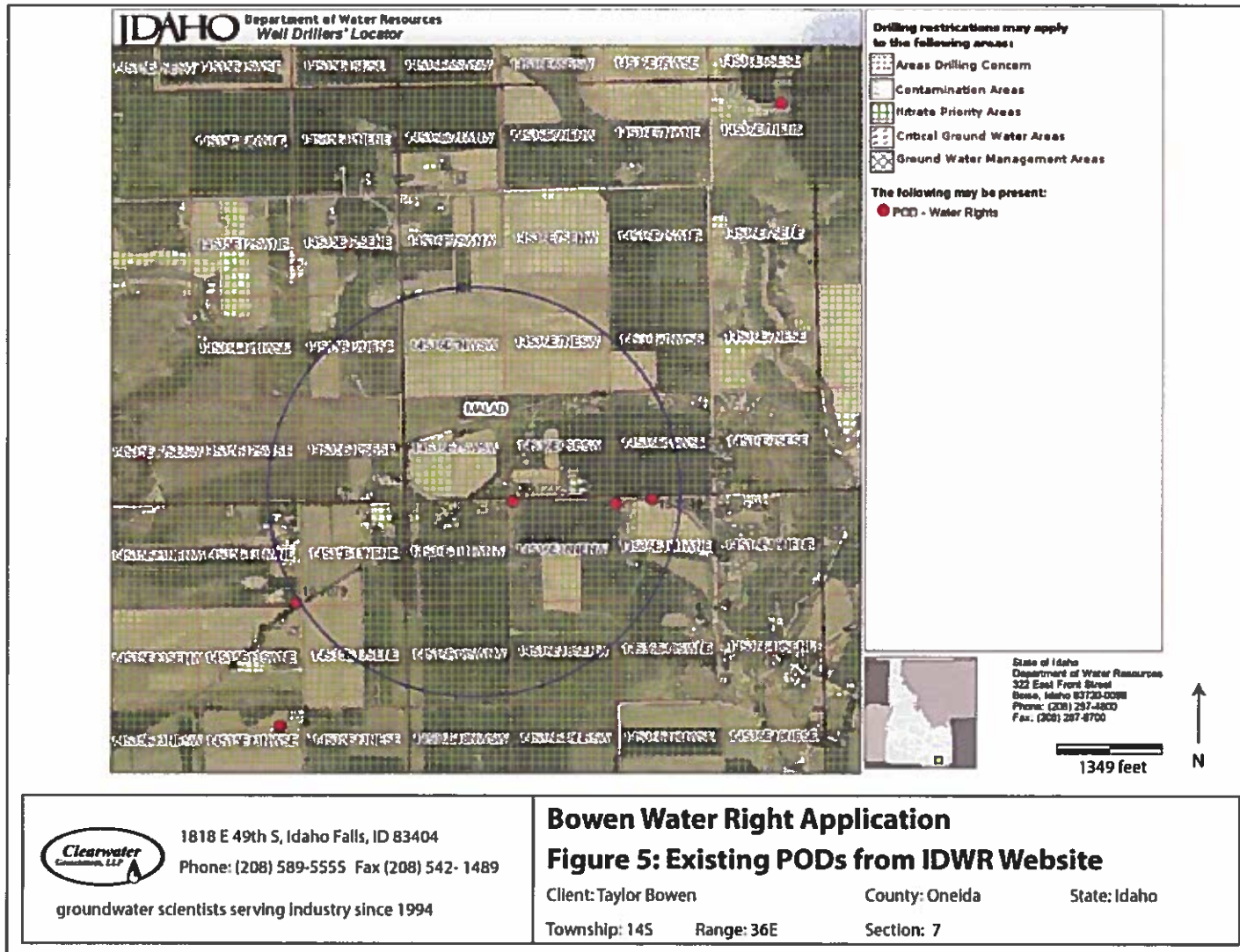


Figure 5 Existing Water Rights; from IDWR website and blue circle 1/2 mile diameter.

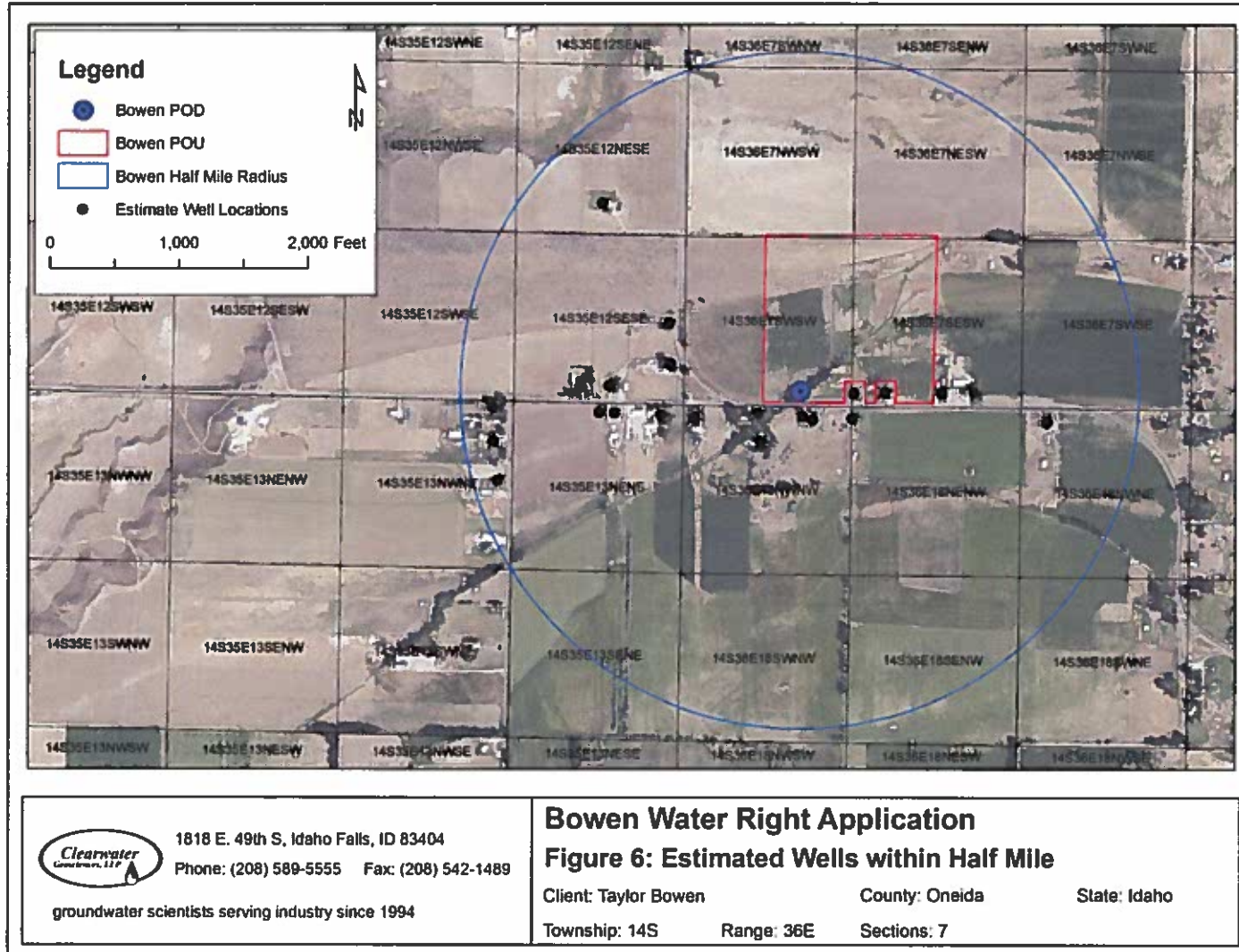


Figure 6 Estimated well locations within 1/2 mile of Bowen's proposed location. Bowen's POD is shown as a blue dot and estimated locations are shown as black dots.



Table 1 IDWR Search results for point of diversions in T14S, R35E, Section 12

Type	Basin	Sequence	Application Number	Basis	Status	Priority Date	Div. Rate (cfs)	Source	Water Use	Owner
Water Right	15	4052		Statutory Claim	Active	10/31/1922	0.3	SMALL CREEK	IRRIGATION	JENSEN, MARY W; JENSEN, WELDON P
Water Right	15	4090		Statutory Claim	Active	4/1/1969	0.05	SPRING	STOCKWATER	MC DANIEL, BUFORD R; MC DANIEL, HELEN H
Water Permit	15	7281			Active	8/18/2006	0.2	SPRING	DIVERSION TO STORAGE, IRRIGATION, IRRIGATION FROM STORAGE, IRRIGATION STORAGE	STONE, BOYD MARK
Water Permit	15	7283			Active	8/28/2006	0.04	SPRING	DOMESTIC, STOCKWATER	STONE, BOYD MARK
Water Application	15	7394	79760		Active	12/31/2014	1.6	GROUND WATER	IRRIGATION	CHET, KEETCH; JILL, KEETCH

Table 2 IDWR Search results for point of diversions in T14S, R35E, Section 13

Type	Basin	Sequence	Basis	Status	Priority Date	Div. Rate (cfs)	Source	Water Use	Owner
Water Right	15	2022	License	Active	13906	2.5	GROUND WATER	DOMESTIC, IRRIGATION	PROGRESS IRRIGATING CO INC
Water Right	15	7079	License	Active	41960	0.72	GROUND WATER	IRRIGATION	WEEKS, BILL; WEEKS, JALYN
Water Right	15	7089	License	Active	30449	0.03	GROUND WATER	DOMESTIC, STOCKWATER	JOHN, ELDON



Table 3 IDWR Search results for point of diversions in T14S, R36E, Section 18

Type	Basin	Sequence	Basis	Status	Priority Date	Div. Rate (cfs)	Source	Water Use	Owner
Water Right	15	4161	Statutory Claim	Active	15867	0.08	GROUND WATER	DOMESTIC, IRRIGATION	CHURCH OF JESUS CHRIST OF THE LATTER DAY SAINTS
Water Right	15	7033	License	Active	27977	0.13	UNNAMED DRAIN	IRRIGATION, STOCKWATER	TUTTLE, DELL T
Water Right	15	7228	License	Active	37414	0.3	GROUND WATER	IRRIGATION	DANIELS, OWEN
Water Right	15	7232	License	Active	37502	0.1	GROUND WATER	DOMESTIC, IRRIGATION, STOCKWATER	DAWSON, KATHRYN
Water Right	15	7247	License	Active	37788	0.7	GROUND WATER	IRRIGATION	TUBBS, AUSTIN

Table 4 IDWR Search results for point of diversions in T14S, R36E, Section 7

Type	Basin	Sequence	Basis	Status	Priority Date	Div. Rate (cfs)	Source	Water Use	Owner
Water Right	15	4161	Statutory Claim	Active	15867	0.08	GROUND WATER	DOMESTIC, IRRIGATION	CHURCH OF JESUS CHRIST OF THE LATTER DAY SAINTS
Water Right	15	7033	License	Active	27977	0.13	UNNAMED DRAIN	IRRIGATION, STOCKWATER	TUTTLE, DELL T
Water Right	15	7228	License	Active	37414	0.3	GROUND WATER	IRRIGATION	DANIELS, OWEN
Water Right	15	7232	License	Active	37502	0.1	GROUND WATER	DOMESTIC, IRRIGATION, STOCKWATER	DAWSON, KATHRYN
Water Right	15	7247	License	Active	37788	0.7	GROUND WATER	IRRIGATION	TUBBS, AUSTIN



Table 5 IDWR Search results for wells in T14S, R35E, Section 12

Contact	Use	Twp	Rng	Sec	Tract	Address	GPM	Static Water Level	Total Depth	Csg Dia.	Const. Date
ERMA CLARK RANCH(Owner/Operator)		14S	35E	12	SESE	2112 NORTH 3100 WEST	30	210	299	6	3/9/2001
D KENT BEETON(Owner/Operator)		14S	35E	12	NENW	2839 N. 3400 W.	20	207	288	6	6/7/1999
SETH BRIGGS(Owner/Operator)	Domestic-Single Residence	14S	35E	12	NESE	3100 W 1/4 MI NORTH OF INT. 2000 N; THEN W 400 FT		196	274	6	4/30/2007
DALE DAVIS(Owner/Operator)	Domestic-Single Residence	14S	35E	12	SENE	2672 N 3100 W	30	235	319	6	8/2/2003
CALVIN DREDGE(Owner/Operator)		14S	35E	12	NENE	2636 N 3100 W	15	143	240	6	7/15/1998
JOHN FACER(Owner/Operator)	Domestic-Single Residence	14S	35E	12	SWNE	UPPER ST JOHN RD	25	218	280	6	4/17/2003
MARTY HILL(Owner/Operator)		14S	35E	12	SESE	3225 W 2000 N	30	205	290	6	2/22/2001
CHET KECTCH(Owner/Operator)	Domestic-Single Residence	14S	35E	12	SENE	3450 W 2800 N	30	179	250	6	5/17/2007
ERIC J LEAVITT(Owner/Operator)		14S	35E	12	SWNW	HERB RD	20	185	260	6	9/23/1995
BYRON MARSHALL(Owner/Operator), RUTH MARSHALL(Owner/Operator)		14S	35E	12	NWNE	339 W UPPER ST JOHN RD	0	202	280	6	1/16/1995
TERRY MURPHY(Owner/Operator)	Domestic-Single Residence	14S	35E	12	NWNW	3975 W 2800 N	25	219	300	6	8/30/2004
BRETT ROSE(Owner/Operator)		14S	35E	12	NWNW		0	167	300	6	12/19/1994



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EARL ROSE(Owner/Operator)		14S	35E	12	NENE	DANNIELS ROAD	30	75	231	6	11/11/1998
BOYD STOKES(Owner/Operator)	Domestic	14S	35E	12		2526 N 3100 W APPROX 4M WEST OF MALAD		137	240	8	3/11/2011
DALE THOMAS(Owner/Operator)	Domestic-Single Residence	14S	35E	12	SESE	2030 NORTH 3100 WEST	50	200	276	6	12/23/1999
DON YOUNG(Owner/Operator)	Domestic-Single Residence	14S	35E	12	NWNW	NOT GIVEN ON START CARD	50	120	205	6	8/10/2000
DON YOUNG(Owner/Operator)	Domestic-Single Residence	14S	35E	12	NWNW	ONEIDA COUNTY	30	230	340	6	7/25/2003

Table 6 IDWR Search results for wells in T14S, R35E, Section 13

Contact	Use	Twp	Rng	Sec	Tract	Address	GPM	Static Water Level	Total Depth	Csg. Dia.	Const. Date
MARY BLAISDELL(Owner/Operator)	Domestic-Single Residence	14S	35E	13	SESE	3135 W 1000 N		75	113	5	2/23/2014
SCOTT D BLAISDELL(Owner/Operator)		14S	35E	13	SESW	368 W ST JOHN RD	100	106	200	6	10/8/1993
LEANNA BOSWORTH(Owner/Operator)	Domestic-Single Residence	14S	35E	13	SWSE	1086 N 3400 W	15	50	120	6	6/20/2005
GARY T DAVIS(Owner/Operator)		14S	35E	13	SENE	WEST HARRISON RD	100	140	220	6	5/11/1993
GARY T DAVIS(Owner/Operator)		14S	35E	13	NENE	HARRISON RD	20	200	260	6	7/11/1997
JOE DAVIS(Owner/Operator)		14S	35E	13	NENE	311 HARRISON RD	30	205	280	6	10/27/2001
STEVE DREDGE(Owner/Operator)	Domestic-Single Residence	14S	35E	13	NWNE	1918 N 3400 W		170	320	6	8/28/2012
RAMOND EVANS(Owner/Operator)	Domestic-Single Residence	14S	35E	13	NWNE	1950 W 3400 W	25	227	295	6	6/29/2007



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STEVE FINDER(Owner/Operator)	Domestic-Single Residence	14S	35E	13	NWN E	3560 W 2000 N	40	220	295	6	6/16/2004
RONE GAMBLE(Owner/Operator)	Domestic-Single Residence	14S	35E	13	NWN E	1970 N 3400 W	35	213	290	6	9/21/2004
MIKE MADSEN(Owner/Operator)	Domestic-Single Residence	14S	35E	13	SEN W	NONE GIVEN		181	275	5	11/7/2014
TIM MORRIS(Owner/Operator)		14S	35E	13	NENE	1950 N. 3400 W.	20	157	200		9/21/1998
STEVEN STAYNER(Owner/Operator), JACKIE STAYNER(Owner/Operator)	Domestic-Single Residence	14S	35E	13	NENE	3130 WEST 2000 NORTH	30	200	290	6	12/20/2000
SETH SWEETEN(Owner/Operator)	Domestic-Single Residence	14S	35E	13	SWS W	TALBOT RD 1212 NORTH	30	150	210	6	5/13/2002
DAVE TALBOT(Owner/Operator)	Domestic-Single Residence	14S	35E	13	NWS E	3400 WEST		78	145	6	9/23/2014
DAVID D TALBOT(Owner/Operator)		14S	35E	13	SENE	1444 NORTH 3400 WEST	25	75	135	6	9/10/1999
DOYLE TULBAT(Owner/Operator)	Domestic-Single Residence	14S	35E	13	NWS E	1444 N 3440 W		106	412	10	7/2/2012
RICHARD VAN BEBBER(Owner/Operator)		14S	35E	13	SWSE		42	85	205	8	11/7/1989
BILL WEEKS(Owner/Operator)	Domestic-Single Residence	14S	35E	13	NWN E	1800 N 3400 W	40	175	315	6	4/20/2010
GRANT WEEKS(Owner/Operator)		14S	35E	13	NWN E		0	12	320		8/20/1981
SIDNEY WILLIAMS(Owner/Operator)		14S	35E	13	NENE	3250 WEST 2000 NORTH ST.JOHN	35	198	290	6	2/28/2001



Table 7 IDWR Search results for wells in T14S, R36E, Section 18

Contact	Use	Twp	Rng	Sec	Tract	Address	GPM	Static Water Level	Total Depth	Csg. Dia.	Const. Date
L DALE ATKINSON(Owner/Operator)	Domestic- Single Residence	14S	36E	18	NENE	1885 N 2400 W	30	190	271	6	11/6/20 03
JOSEPH D BARNES(Owner/Operator)		14S	36E	18	SENE	206 UPPER ST JOHN RD	25	154	200	6	10/12/1 992
DAN DANIELS(Owner/Operator)		14S	36E	18	NWN E			197	280	6	2/20/19 97
DAN DANIELS(Owner/Operator)	Domestic- Single Residence	14S	36E	18	NWN E	2585 W 2000 N		197	280	6	1/16/20 14
OWEN DANIELS(Owner/Operator)	Irrigation	14S	36E	18	SWSE	2585 W 2000 N	300	180	278	10	2/13/20 03
KATHRYN DAWSON(Owner/Operator)	Domestic- Single Residence	14S	36E	18	NWN W	2870 N 2000 W	50	200	316	8	10/1/20 02
KEVIN DEGN(Owner/Operator)	Domestic- Single Residence	14S	36E	18	SESW	2075 W 1000 N	30	110	257	6	11/12/2 003
GREG GALLOGUS(Owner/Operator)	Domestic- Single Residence	14S	36E	18	NESE	3130 N 2100 W	30	139	200	6	2/12/20 09
DIANA L GROVER(Owner/Operator)	Domestic- Single Residence	14S	36E	18	NENE	1983 N 2400 W	30	120	287	6	7/11/20 02
JOHN HARDING(Owner/Operator)	Domestic- Single Residence	14S	36E	18	SENE	UPPER ST JOHN RD	40	210	240	6	1/11/20 09
GLENNA ILLUM(Owner/Operator)	Domestic- Single Residence	14S	36E	18	NWN W	3010 W 2000 N	8	15	40	6	12/6/20 02
DAVE ISAACSON(Owner/Operator)	Domestic- Single Residence	14S	36E	18	NENE	2255 W 1500 N	30	165	226	6	4/18/20 05
BRAD JACOBS(Owner/Operator)		14S	36E	18	NWN W	UPPER ST.JOHN RD	40	175	240	6	6/11/19 99
GENE JONES(Owner/Operator)	Domestic- Single Residence	14S	36E	18	NWN W	160 E 100 N	30	205	318	6	5/20/20 02
JAMES JONES(Applicant)		14S	36E	18	NESE		0	110	235		9/1/197 2
KHALIL MONSON(Owner/Operator)	Domestic- Single Residence	14S	36E	18	SESW	258 S 1000 N	15	64	180	8	11/1/20 04
VAN PRICE(Owner/Operator)	Irrigation	14S	36E	18	NWN E	1730 N 2400 W	600	207	340	10	4/11/20 05



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SCOTT RAY(Owner/Operator)	Domestic- Single Residence	14S	36E	18	NENE	CEMETER Y RD	30	207	280	10	3/27/20 07
SYLVESTER REED(Owner/Operator)		14S	36E	18	SWN W		30	146	200	6	10/22/1 996
KRISTINE SMITH(Owner/Operator)	Domestic- Single Residence	14S	36E	18	NESE	2100 W 1600	50	128	265	6	10/5/20 07
DALE TUTTLE(Owner/Operator)		14S	36E	18	NWN E		0	70	135		9/26/19 79
STEVE WARD(Owner/Operator)	Domestic- Single Residence	14S	36E	18	NENE	1847 N 2400 W	30	190	267	6	9/16/20 04
WILLIAM JEDD WARD(Owner/Operator)	Domestic- Single Residence	14S	36E	18	NWS E	1331 N 2600 W	40	127	240	6	3/24/20 06
STEVE WORKMAN(Owner/Operator)	Domestic- Single Residence	14S	36E	18	NWN W	2998 W 2000 N	10	15	40	6	10/21/2 002
RALPH YEARSLY(Owner/Operator)		14S	36E	18	SWN E		18	120	150		9/5/197 3

Table 8 IDWR Search results for wells in T14S, R36E, Section 7

Contact	Use	Twp	Rng	Sec	Tract	Well Address	GPM	Static Water Level	Total Depth	Csg. Dia.	Const. Date
DAVID BECK(Owner/Operator)	Domestic- Single Residence	14S	36E	7	SWSE	UPPER ST. JOHN ROAD	25	250	288	6	12/12/ 2001
CHRIS BOWEN(Owner/Operator)		14S	36E	7	SESW	2787 WEST 8000 NORTH	20	183	240	6	9/11/1 999
CHRIS BOWEN(Owner/Operator)	Domestic- Single Residence	14S	36E	7	SESW	2787 WEST 8000 NORTH	25	196	280	6	8/19/2 000
STEVE DREDGE(Owner/Operator)	Domestic- Single Residence	14S	36E	7	SESE	ST JOHNS RESEVOIR RD		252	350	8	11/23/ 2007
TOM HAWKINS(Owner/Operator)	Domestic- Single Residence	14S	36E	7	NWSE	2230 N 2400 W	20	227	307	6	1/23/2 003
LEE HOGAN(Owner/Operator)	Domestic- Single Residence	14S	36E	7	SESE	2121 N 2400 W	30	223	280	6	12/28/ 2001
CINDY JOHNSON(Owner/Operator), ROY JOHNSON(Owner/Operator)		14S	36E	7	NWNW	3100 W 2800 N	40		200	6	1/11/1 997



Clearwater Geosciences, LLP
Ground Water Development and Exploration

J MARLA LEWIS(Owner/Operator)	Domestic-Single Residence	14S	36E	7	SESW	2741 W 2000 N	30	193	384	6	8/5/2004
MARLO J LEWIS(Owner/Operator)		14S	36E	7	SWSE		0	115	235	8	11/29/1989
DANEL MADSEN(Owner/Operator)	Domestic-Single Residence	14S	36E	7	SESW	2845 W 2000 N	30	200	316	6	5/29/2002
JERRY ROSE(Owner/Operator)		14S	36E	7	NWNW		20	145	205	6	8/20/1998
NATHAN RUF(Owner/Operator)		14S	36E	7	SWNW		20	140	197	6	5/29/1997
LAWRENCE SCHOW(Owner/Operator)	Domestic-Single Residence	14S	36E	7	SWNW	ST. JOHN	35	145	240	6	10/17/2005
DAVID D TALBOT(Owner/Operator)	Domestic-Single Residence	14S	36E	7	NENE	ST JOHNS RES.	30	115	273	6	1/18/2003
DAVID D TALBOT(Owner/Operator)	Irrigation	14S	36E	7	NENE	1444 N 3400 W	17	140	520	20	10/10/2003
JEFFERY J THOMAS(Owner/Operator)	Domestic-Single Residence	14S	36E	7	SESW	2705 W 2000 W	30	205	320	6	6/7/2003
JOHN THOMAS(Owner/Operator)		14S	36E	7	SWNW	ST JOHN RD	40	124	200	6	10/7/1996
BART WILLIAMS(Owner/Operator)		14S	36E	7	SESE	2400 W 2081 N	20	207	280	6	4/15/1999
DEAN L WILLIAMS(Owner/Operator)		14S	36E	7	SWSW		30	190	250	6	6/3/1997



Attachment 1

**REPRESENTATIVE
WELL LOGS**



Clearwater Geosciences, LLP
Ground Water Development and Exploration

Form 238
8/02
DMD

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

15

Office Use Only
Well ID No. _____
Inspected by _____
Twp _____ Rge _____ Sec _____
1/4 _____ 1/4 _____ 1/4 _____
Lat: _____ Long: _____

1. WELL TAG NO. D 0935149
DRILLING PERMIT NO. _____
Water Right or Injection Well No. _____

2. OWNER:
Name Jeff Thomas
Address 2705 W 2000 N
City Malad State ID Zip 83252

3. LOCATION OF WELL by legal description:
You must provide address or Lot, Blk, Sub, or Directions to well.
Twp 14 North or South
Rge 35 East or West
Sec 24 1/4 1/4 1/4 1/4
Gov't Lot _____
County Carida
Lat: _____ Long: _____
Address of Well Site 3410 W 1000 N
City Malad

4. USE:
 Domestic Municipal Monitor Irrigation
 Thermal Injection Other _____

5. TYPE OF WORK check all that apply (Replacement etc.)
 New Well Modify Abandonment Other _____

6. DRILL METHOD:
 Air Rotary Cable Mud Rotary Other _____

7. SEALING PROCEDURES

Seal Material	From	To	Weight / Volume	Seal Placement Method
<u>Bestonite</u>	<u>0</u>	<u>120</u>		<u>concrete</u>

Was drive shoe used? Y N Shoe Depth(s) 489
Was drive shoe seal tested? Y N How? _____

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
<u>20</u>	<u>0</u>	<u>489</u>	<u>250</u>	<u>steel</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Length of Headpipe _____ Length of Tailpipe _____
Packer Y N Type _____

9. PERFORATIONS/SCREENS PACKER TYPE

Perforation Method Machine Department of Water Resources Eastern Region
Screen Type & Method of Installation _____

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
<u>280</u>	<u>481</u>	<u>1/8-4</u>	<u>489</u>	<u>20</u>	<u>steel</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

10. FILTER PACK

Filter Material	From	To	Weight / Volume	Packer Method

11. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
15 ft. below ground Artesian pressure _____ lb.
Depth flow encountered _____ ft. Describe access port or control devices _____

12. WELL TESTS:
 Pump Bailer Air Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time

Water Temp. cold Bottom hole temp. cold
Water Quality test or comments: good Depth first Water Encounter 70

13. LITHOLOGIC LOG: (Describe repairs or abandonment)

Blow	From	To	Remarks: Lithology Water Quality & Temperature	Y	N
24	0	30	Brown clay		X
24	30	70	Blue clay		X
24	70	80	Blue clay quick sand		X
24	80	90	Blue clay & sand	X	
24	90	100	Gravel Blue clay	X	
24	100	110	Gravel	X	
24	110	115	Gravel, Blue clay	X	
20	115	120	Gravel	X	
20	120	140	Brown clay		X
20	140	150	Brown clay		X
20	150	155	Gravel clay	X	
20	155	175	Brown clay		X
20	175	210	Gravel	X	
20	210	215	Gravel clay		X
20	215	220	Gravel	X	
20	220	230	Sand gravel		X
20	230	240	Sandy clay		X
20	240	250	Sand shale		X
20	250	260	Sand stone		X
20	260	320	Gravel Brown clay		X
20	320	330	Gr. Br. clay		X
20	330	350	Clay & gravel		X
20	350	355	Clay		X
20	355	370	Gravel clay		X
20	370	380	Clay sand stone		X
20	380	400	Clay		X
20	400	410	Gravel & clay		X
20	410	441	Br. clay & sand		X
20	441	460	Lt. Br. clay		X
20	460	472	Lt. Br. clay gravel		X
20	472	475	Gravel	X	
20	475	481	Br. sticky clay		X
20	481	489	Gravel sand	X	

Completed Depth 489 (Measurable)
Date Started 10-6-04 Completed 5-20-05

14. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Company Name Mt. West Well Drilling Firm No. 5413
Principal Driller Michael Anderson Date 6-4-05
Driller or Operator II _____ Date _____
Operator I _____ Date _____
Principal Driller and Rig Operator Required.
Operator I must have signature of Driller/Operator II

Figure I-1 Jeff Thomas irrigation well (aquifer pumping test well).



Clearwater Geosciences, LLP
Ground Water Development and Exploration

Form 238-7
6/02

DMD

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

15

Office Use Only			
Well ID No.	_____		
Inspected by	_____		
Twp	Page	Sec	
1/4	1/4	1/4	
Lat:	:	Long:	:

1. WELL TAG NO. D 0051336
DRILLING PERMIT NO. _____
Water Right or Injection Well No. _____

2. OWNER:
Name City of Malad
Address 591 Barnack St.
City Malad State ID Zip 83252

3. LOCATION OF WELL by legal description:
You must provide address or Lot, Blk. Sub. or Directions to well.
Twp. 14 North or South
Rge. 36 East or West
Sec. 21 1/4 SW 1/4 NW 1/4
Gov't Lot _____
County Ada
Lat: _____ Long: _____
Address of Well Site 595 Barnack St # 200'
West City Malad

4. USE:
 Domestic Municipal Monitor Irrigation
 Thermal Injection Other

5. TYPE OF WORK check all that apply (Replacement etc.)
 New Well Modify Abandonment Other

6. DRILL METHOD:
 Air Rotary Cable Mud Rotary Other

7. SEALING PROCEDURES

Seal Material	From	To	Weight / Volume	Seal Placement Method
Heat cement grout	0	100	15 ft ³	direct to annulus

Was drive shoe used? Y N Shoe Depth(s) 3/3'
Was drive shoe seal tested? Y N How? _____

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
18"	71.5	313.5	2375	Steel	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10"	222	530	2315	Steel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Length of Headpipe _____ Length of Tailpipe _____
Packer Y N type centralized by steel tabs

9. PERFORATIONS/SCREENS PACKER TYPE
Perforation Method Teech
Screen Type & Method of Installation

From	To	SA	Size	Number	Diameter	Material	Casing	Liner
3/4	530	3/16"	600	8"	Steel	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

10. FILTER PACK

Filter Material	From	To	Weight / Volume	Placement Method
3/8" washed pea gravel	290	530	12 yds ³	from surface

11. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
92 ft. below ground Artesian pressure _____ lb.
Depth flow encountered _____ ft. Depth across port or control devices _____

12. WELL TESTS:

Yield gal./min.	Drawdown	Pumping Level	Time
750	35'	127'	25 hrs.

Water Temp. 56°F Bottom hole temp. 56°F
Water Quality test or comments: dark, tasteless, apparent good. Depth first Water Encounter 92'

13. LITHOLOGIC LOG: (Describe repairs or abandonment) Water

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Y	N
22	0	2	Duck bear top soil		X
22	2	18	Tan clay		X
22	18	33	Sand + gravel w/ tan clay		X
22	33	40	Tan to lt. brown clay shale		X
22	40	50	lt. brown sandy clay w/ gravel		X
22	50	57	lt. brown clayey sand w/ gravel		X
22	57	62	Brown clay w/ gravel		X
22	62	97	lt. brown clayey gravel and sand, well consolidated/abrasive		X
22	97	100	Tan clay		X
18	100	110	lt. brown clayey gravel w/ sand		X
18	110	128	lt. brown grey clay, some gravel		X
18	128	162	lt. brown clayey sandstone w/ gravel / abrasives		X
18	162	172	lt. brown grey clay w/ gravel		X
18	172	387	lt. brown clayey sandstone w/ gravel. Various degree of consolidation		X
18	387	390	lt. brown clay w/ coarse gravel		X
16	390	415	lt. brown sandy clay, some gravel		X
16	415	420	clay + coarse gravel		X
16	420	464	lt. brown sandy clay, some gravel		X
16	464	472	Consolidated clayey sand/gravel		X
16	472	488	Clayey sand + gravel		X
16	488	500	Sticky clay w/ gravel + sand		X
16	500	530	clayey sand + gravel		X

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JUN 02 2009

Department of Water Resources
Eastern Region

Completed Depth 530' (Measurable)
Date: Started 9/10/08 Completed 5/20/09

14. DRILLER'S CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Company Name Stan Lloyd Drilling LLC Firm No. 294
Principal Driller Alan Lloyd Date 5/28/09
and Driller or Operator II _____ Date _____
Operator I _____ Date _____

Principal Driller and Rig Operator Required.
Operator I must have signature of Driller/Operator II.

ENDWATER RIGHTS PROPERTY TO WATER RESOURCES

Figure 1-2 Well log for City of Malad Municipal Well (aquifer pumping test well).



Clearwater Geosciences, LLP
Ground Water Development and Exploration

Manufactured by
Alexander Clark Printing
Bosco, Idaho (208) 322-0811

Form 238-7
6/02 IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Office Use Only
Well ID No. _____
Inspected by _____
Twp _____ Rge _____ Sec _____
1/4 1/4 1/4
Lat _____ Long _____

1. WELL TAG NO. D 0045883
DRILLING PERMIT NO. _____
Water Right or Injection Well No. _____

2. OWNER:
Name Seth + Christina Briggs
Address 830 N 500W Apt A
City Malad State ID Zip 83252

3. LOCATION OF WELL by legal description:
You must provide address or Lot, Blk, Sub. or Directions to well.
Twp 14 North or South
Rge 35 East or West
Sec 12 SE 1/4 NE 1/4 SE 1/4
Gov't Lot _____ County Blaine
Lat: _____ Long: _____
Address of Well Site 3100 W. 1/4 mile of Indu/2000 N. Hwy W 5100 City Malad
City _____ State _____
Lt. _____ Blk. _____ Sub. Name N/A

4. USE:
 Domestic Municipal Monitor Irrigation
 Thermal Injection Other _____

5. TYPE OF WORK check all that apply (Replacement etc.)
 New Well Modify Abandonment Other _____

6. DRILL METHOD:
 Air Rotary Cable Mud Rotary Other _____

7. SEALING PROCEDURES

Seal Material	From	To	Weight / Volume	Seal Placement Method
Bentonite	0	20	9 bags	overcure

Was drive shoe used? Y N Shoe Depth(s) 274
Was drive shoe seal tested? Y N How? _____

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Linear	Welded	Threaded
6	0	274	250	steel	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Length of Headpipe _____ Length of Tailpipe _____
Packer Y N Type _____

9. PERFORATIONS/SCREENS PACKER TYPE
Perforation Method torch
Screen Type & Method of Installation

From	To	Slot Size	Number	Diameter	Material	Casing	Linear
258	274	1/4-60	45	6	steel	<input checked="" type="checkbox"/>	<input type="checkbox"/>

10. FILTER PACK

Filter Material	From	To	Weight / Volume	Placement Method

11. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
196 ft. below ground Artesian pressure _____ lb.
Depth flow encountered _____ ft. Describe access port or control devices: _____

12. WELL TESTS:

Pump Bailor Air Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time
33			

Water Temp. cold Bottom hole temp. cold
Water Quality test or comments: good
Depth first Water Encounter 185

13. LITHOLOGIC LOG: (Describe repairs or abandonment)

Stave Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Y	N
10	0	20	Br. Clay gravel		X
6	20	50	Br. clay		X
6	50	110	Grey clay		X
6	110	115	gravel clay		X
6	115	125	Tan clay		X
6	125	187	Gravel	X	
6	187	193	Tan Clay gravel	X	
6	193	195	Gravel clay	X	
6	195	200	Br. clay		X
6	200	203	gravel		X
6	203	208	Grey Br. clay		X
6	208	210	gravel		X
6	210	212	Br. Clay		X
6	212	228	gravel Br. clay	X	
6	228	235	Br. clay		X
6	235	240	Gravel Br. clay	X	
6	240	250	Br. clay		X
6	250	274	Gravel Br. clay	X	

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AUG 24 2014
Department of Water Resources
Eastern Region

Completed Depth: 274 (Measurable)
Date Started: 4-26-07 Completed: 4-30-07

14. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Company Name Malad Well Drilling Firm No. 543
Principal Driller Michael Frandson Date 5-8-07
and Driller or Operator II Mike Frandson Date 5-8-07

Figure 1-3 Well log for Seth Briggs Domestic Well



Clearwater Geosciences, LLP
Ground Water Development and Exploration

Form 238-7
 11/98

DMD
Pump # 700529

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Office Use Only
 Inspected by _____
 Twp _____ Rge _____ Sec _____
 1/4 _____ 1/4 _____
 Lat: _____ Long: _____
 Pump Sailer Air Flowing Artesian

1. WELL TAG NO. D 0011465
 DRILLING PERMIT NO. 15-99 E 0041
 Other IDWR No. _____

2. OWNER:
 Name Dale Thomas
 Address 2030 N 3100 W
 City Malad State ID Zip 83252

3. LOCATION OF WELL by legal description:
 Sketch map location must agree with written location.

N		Twp. <u>14</u> North <input type="checkbox"/> or South <input checked="" type="checkbox"/>	
E		Rge. <u>35</u> East <input checked="" type="checkbox"/> or West <input type="checkbox"/>	
S		Sec. <u>12</u> SE 1/4 SE 1/4 SE 1/4 SE 1/4	
W		Gov't Lot _____ County <u>Oneida</u>	
E		Lat: _____ Long: _____	
S		Address of Well Site <u>Same as above</u>	
W		City <u>Malad</u>	

(Circle all road names of road - Distance to Road or Landmark)

Lt. _____ Blk. _____ Sub. Name _____

4. USE:
 Domestic Municipal Monitor Irrigation
 Thermal Injection Other _____

5. TYPE OF WORK check all that apply (Replacement etc.)
 New Well Modify Abandonment Other _____

6. DRILL METHOD
 Air Rotary Cable Mud Rotary Other _____

7. SEALING PROCEDURES

SEAL/FILTER PACK	AMOUNT	METHOD
Material	From To Sacks or Pounds	
<u>Bentonite</u>	<u>0 20</u>	<u>Overbore</u>

Was drive shoe used? Y N Shoe Depth(s) _____
 Was drive shoe seal tested? Y N How? _____

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Clear	Welded	Threaded
<u>6"</u>	<u>0</u>	<u>276</u>	<u>250</u>	<u>Steel</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Length of Headpipe _____ Length of Tailpipe _____

9. PERFORATIONS/SCREENS
 Perforations Method _____
 Screens Screen Type _____

From	To	Slot Size	Number	Diameter	Material	Casing	Clear
<u>None</u>						<input type="checkbox"/>	<input type="checkbox"/>

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
200' ft. below ground Artesian pressure _____ lb.
 Depth flow encountered _____ ft. Describe access port or control devices: _____

11. WELL TESTS:

Yield gal/min	Drawdown	Pumping Level	Time
<u>50</u>			

Water Temp. Cold Bottom hole temp. Cold
 Water Quality test or comments: _____
 Depth first Water Encounter 20'

12. LITHOLOGIC LOG: (Describe repairs or abandonment) Water:

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	T	H
<u>6"</u>	<u>0</u>	<u>20</u>	<u>Sandy Clay</u>		<input checked="" type="checkbox"/>
<u>6"</u>	<u>20</u>	<u>30</u>	<u>Sandy Clay</u>		<input checked="" type="checkbox"/>
<u>6"</u>	<u>30</u>	<u>35</u>	<u>Brown Clay</u>		<input checked="" type="checkbox"/>
<u>6"</u>	<u>35</u>	<u>180</u>	<u>Blue Clay</u>		<input checked="" type="checkbox"/>
<u>6"</u>	<u>180</u>	<u>190</u>	<u>Blue shale</u>		<input checked="" type="checkbox"/>
<u>6"</u>	<u>190</u>	<u>213</u>	<u>Gravel</u>		<input checked="" type="checkbox"/>
<u>6"</u>	<u>213</u>	<u>240</u>	<u>Brown clay</u>		<input checked="" type="checkbox"/>
<u>6"</u>	<u>240</u>	<u>250</u>	<u>Gravel + Clay</u>		<input checked="" type="checkbox"/>
<u>6"</u>	<u>250</u>	<u>255</u>	<u>Gravel +</u>		<input checked="" type="checkbox"/>
<u>6"</u>	<u>255</u>	<u>260</u>	<u>Clay + Gravel</u>		<input checked="" type="checkbox"/>
<u>6"</u>	<u>260</u>	<u>272</u>	<u>Brown clay</u>		<input checked="" type="checkbox"/>
<u>6"</u>	<u>272</u>	<u>276</u>	<u>Gravel</u>		<input checked="" type="checkbox"/>

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 MAR 1 - 2000

Department of Water Resources

Completed Depth 276' (Measurable)
 Date Started 12-17-99 Completed 12-23-99

13. DRILLER'S CERTIFICATION
 We certify that all minimum well construction standards were complied with at the time the rig was removed.
 Company Name Mountain Well Drilling Firm No. 543
 Firm Official Michael Friedman Date 12-20-99
 and
 Driller or Operator _____ Date _____
 (Sign once if Firm Official & Operator)

FORWARD WHITE COPY TO WATER RESOURCES

Figure 1-4 Well log for Dale Thomas Domestic Well



Clearwater Geosciences, LLP
Ground Water Development and Exploration

Form 238-7
 2-85
 C DMN

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT
 Use Typewriter or Ballpoint Pen **66434**

Office Use Only
 Inspected by _____
 Twp _____ Rge _____ Sec _____
 1/4 _____ 1/4 _____ 1/4 _____
 Lat: _____ Long: _____

1. DRILLING PERMIT NO. 15-92-E-0222-000
 Other DWR No. _____

2. OWNER:
 Name Dean Williams
 Address 3534 Valley Rd
 City Pocatello State EO Zip 83201

3. LOCATION OF WELL by legal description:
 Sketch map location must agree with written location.

N		Twp <u>14</u> North <input type="checkbox"/> or South <u>S</u>	
E		Rge <u>36</u> East <u>E</u> or West <input type="checkbox"/>	
S		Sec. <u>2</u> 1/4 <u>SW</u> 1/4 <u>SW</u> 1/4	
W		Gov't Lot _____ County <u>Oneida</u>	
E		Lat: _____ Long: _____	

Address of Well Site _____ City _____
 (Give at least name of road + Distance to Point or Landmark)

Lt. _____ Blk. _____ Sub. Name _____

4. USE:
 Domestic Municipal Monitor Irrigation
 Thermal Injection Other _____

5. TYPE OF WORK check all that apply (Replacement etc.)
 New Well Modify Abandonment Other _____

6. DRILL METHOD
 Air Rotary Cable Mud Rotary Other _____

7. SEALING PROCEDURES

BEAL/FILTER PACK		AMOUNT		METHOD
Material	From	To	Sacks or Pounds	
Bentonite	0	30	6 Sack	Older Bore

Was drive shoe used? Y N Shoe Depth(s) _____
 Was drive shoe seal tested? Y N How? _____

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6"	0	220	1.375	ST-11	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Length of Headpipe _____ Length of Tailpipe _____

9. PERFORATIONS/SCREENS
 Perforations Method _____
 Screens Screen Type _____

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
None							

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
180 ft. below ground Artesian pressure _____ lb.
 Depth flow encountered _____ ft. Describe access port or control devices: _____

11. WELL TESTS:
 Pump Bailor Air Flowing Artesian

Yield gal. min.	Drawdown	Pumping Level	Time
30			

Water Temp. cold Bottom hole temp. _____
 Water Quality test or comments: cold

Depth first Water Encountered 20

12. LITHOLOGIC LOG: (Describe repairs or abandonment) Water

Bore Dia	From	To	Remarks: Lithology, Water Quality & Temperature	Y	N
8 1/2"	0	5	clay		X
8 1/2"	5	30	clay + Gravel		X
6"	20	42	Gravel + Sand	X	
6"	42	90	Sand + Blue clay	X	
6"	90	195	Blue clay	X	
6"	195	215	Gravel		X
6"	215	216	Sand	X	
6"	216	218	clay Brown		X
6"	218	230	Gravel + Sand	X	
6"	230	245	Brown clay		X
6"	245	250	Gravel + Water	X	

RECEIVED

JUL 28 1997

Department of Water Resources
 Eastern Region

RECEIVED

AUG 08 1997

Department of Water Resources

Completed Depth 220 (Measurable)
 Date Started 5-30-97 Completed 6-3-97

13. DRILLER'S CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name Mountain West Drilling Firm No. 543

Firm Official Mike Franzen Date 6-4-95

and Supervisor or Operator _____ Date _____
 (Sign once if Firm Official & Operator)

FORWARD WHITE COPY TO WATER RESOURCES

Figure 1-5 Well log for Dean Williams Domestic Well



Clearwater Geosciences, LLP
Ground Water Development and Exploration

Form 238-7
 11/97

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Office Use Only
 Inspected by _____
 Twp _____ Rge _____ Sec _____
 _____ 1/4 _____ 1/4 _____ 1/4
 Lat: _____ Long: _____
 Air Flowing Artesian

1. WELL TAG NO. D 0006948
 DRILLING PERMIT NO. 15 99 R 0027.000
 Other IDWR No. _____

11. WELL TESTS:
 Pump Bailor
 59404

2. OWNER:
 Name Chris Bowen
 Address 2787 W. 800 N.
 City Mald State ID Zip 83252

Yield gal/min	Diameter	Pumping Level	Time
0			

3. LOCATION OF WELL by legal description:
 Sketch map location must agree with written location.

Map grid showing location with 'X' in the bottom-left cell.

Twp 14 N North or South
 Rge 36 E East or West
 Sec 7 1/4 SE 1/4 SW 1/4
 Gov'l Lot _____ County Oneida
 Lat _____ Long _____

Address of Well Site _____
 City _____
 (One of four roads at road + Subline to Road or Landmark)
 Lt. _____ Blk. _____ Sub. Name _____

4. USE:
 Domestic Municipal Monitor Irrigation
 Thermal Injection Other _____

5. TYPE OF WORK check all that apply (Replacement etc.)
 New Well Modify Abandonment Other _____

6. DRILL METHOD
 Air Rotary Cable Mud Rotary Other _____

7. SEALING PROCEDURES

SEAL/FILTER PACK			AMOUNT	METHOD
Material	From	To	Sacks or Pounds	
Bentonite	0	20	4	OverBore

Was drive shoe used? Y N Shoe Depth(s) _____
 Was drive shoe seal tested? Y N How? _____

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6"	0	240	29	Steel	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Length of Headpipe _____ Length of Tailpipe _____

9. PERFORATIONS/SCREENS
 Perforations _____ Method _____
 Screens _____ Screen Type _____

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
					None	<input type="checkbox"/>	<input type="checkbox"/>

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
183 ft. below ground Artesian pressure _____ lb.
 Depth flow encountered _____ ft. Describe access port or control devices: _____

Water Temp cold Bottom hole temp. cold
 Water Quality test or comments: _____
 Depth first Water Encounter 20

12. LITHOLOGIC LOG: (Describe repairs or abandonment) Water

Bore Dia	From	To	Remarks: Lithology, Water Quality & Temperature	Y	N
8 1/2"	0	20	Brown clay		<input checked="" type="checkbox"/>
6"	20	21	Gravel	<input checked="" type="checkbox"/>	
6"	21	40	Brown & Blue clay		<input checked="" type="checkbox"/>
6"	40	41	Gravel & sand	<input checked="" type="checkbox"/>	
6"	41	148	Blue clay		<input checked="" type="checkbox"/>
6"	148	150	Brown Clay		<input checked="" type="checkbox"/>
6"	150	180	Green clay		<input checked="" type="checkbox"/>
6"	180	200	Brown clay		<input checked="" type="checkbox"/>
6"	200	220	Gravel & Brown clay	<input checked="" type="checkbox"/>	
6"	220	240	Gravel & Brown Clay	<input checked="" type="checkbox"/>	

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 NOV 1 - 1999
 Department of Water Resources

RECEIVED
 OCT 22 1999
 Department of Water Resources
 Permit # _____

MICROFILM
 11/1/99

Completed Depth 240 (Measurable)
 Date Started 9-8-99 Completed 9-11-99

13. DRILLER'S CERTIFICATION
 (We certify that all minimum well construction standards were complied with at the time the rig was removed.)
 Company Name Mountain West Well Drilling No. 543
 Firm Official Michael Zaudian Date 9-19-99
 and
 Driller or Operator _____ Date _____
 (Sign once if Firm Official & Operator)

FORWARD WHITE COPY TO WATER RESOURCES

Figure 1-6 Well log for Chris Bowen Domestic Well



Clearwater Geosciences, LLP
Ground Water Development and Exploration

Form 38-7
1/78

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

USE TYPEWRITER OR
BALLPOINT PEN

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

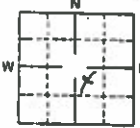
<p>1. WELL OWNER Department of Water Resources Name <u>MARLO LEWIS</u> Address <u>MALAD IDA</u> Owner's Permit No. <u>15-89-F008</u></p>	<p>7. WATER LEVEL Static water level <u>115</u> feet below land surface. Flowing? <input type="checkbox"/> Yes <input type="checkbox"/> No G.P.M. flow _____ Artesian closed-in pressure _____ p.s.i. Controlled by: <input type="checkbox"/> Valve <input type="checkbox"/> Cap <input type="checkbox"/> Plug Temperature <u>60.0</u>F. Quality _____</p>																																			
<p>2. NATURE OF WORK <input checked="" type="checkbox"/> New well <input type="checkbox"/> Deepened <input type="checkbox"/> Replacement <input type="checkbox"/> Abandoned (describe method of abandoning) _____</p>	<p>8. WELL TEST DATA <input type="checkbox"/> Pump <input type="checkbox"/> Bailor <input type="checkbox"/> Air <input type="checkbox"/> Other _____ Discharge G.P.M. _____ Pumping Level _____ Hours Pumped _____</p>																																			
<p>3. PROPOSED USE <input checked="" type="checkbox"/> Domestic <input type="checkbox"/> Irrigation <input type="checkbox"/> Test <input type="checkbox"/> Municipal <input type="checkbox"/> Industrial <input type="checkbox"/> Stock <input type="checkbox"/> Waste Disposal or Injection <input type="checkbox"/> Other _____ (specify type)</p>	<p>9. LITHOLOGIC LOG <u>023469</u></p> <table border="1"> <thead> <tr> <th>Hole Diam.</th> <th>Depth From</th> <th>To</th> <th>Material</th> <th>Water Yes/No</th> </tr> </thead> <tbody> <tr> <td>8"</td> <td>0</td> <td>30</td> <td>BROWN CLAY</td> <td>X</td> </tr> <tr> <td></td> <td>20</td> <td>35</td> <td>BROWN CLAY & SAND</td> <td>Y</td> </tr> <tr> <td></td> <td>35</td> <td>142</td> <td>GRAY CLAY</td> <td>Y</td> </tr> <tr> <td></td> <td>142</td> <td>175</td> <td>GREEN CLAY</td> <td>X</td> </tr> <tr> <td></td> <td>175</td> <td>202</td> <td>GREEN CLAY SAND & GRAVEL</td> <td>X</td> </tr> <tr> <td></td> <td>202</td> <td>225</td> <td>GRAY LAMINATED CLAY SAND</td> <td>X</td> </tr> </tbody> </table>	Hole Diam.	Depth From	To	Material	Water Yes/No	8"	0	30	BROWN CLAY	X		20	35	BROWN CLAY & SAND	Y		35	142	GRAY CLAY	Y		142	175	GREEN CLAY	X		175	202	GREEN CLAY SAND & GRAVEL	X		202	225	GRAY LAMINATED CLAY SAND	X
Hole Diam.	Depth From	To	Material	Water Yes/No																																
8"	0	30	BROWN CLAY	X																																
	20	35	BROWN CLAY & SAND	Y																																
	35	142	GRAY CLAY	Y																																
	142	175	GREEN CLAY	X																																
	175	202	GREEN CLAY SAND & GRAVEL	X																																
	202	225	GRAY LAMINATED CLAY SAND	X																																
<p>4. METHOD DRILLED <input type="checkbox"/> Rotary <input type="checkbox"/> Air <input type="checkbox"/> Hydraulic <input type="checkbox"/> Reverse rotary <input checked="" type="checkbox"/> Cable <input type="checkbox"/> Dug <input type="checkbox"/> Other _____</p>	<p>DEC 11 1989 Department of Water Resources</p>																																			
<p>5. WELL CONSTRUCTION Casing schedule: <input checked="" type="checkbox"/> Steel <input type="checkbox"/> Concrete <input type="checkbox"/> Other Thickness <u>250</u> inches Diameter <u>8</u> inches From <u>1</u> foot To <u>224</u> feet Was casing drive shoe used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Was a packer or seal used? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Perforated? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No How perforated? <input type="checkbox"/> Factory <input type="checkbox"/> Knife <input checked="" type="checkbox"/> Torch Size of perforation <u>12</u> inches by <u>12</u> inches Number <u>5</u> perforations From <u>214</u> feet To <u>204</u> feet Well screen installed? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Manufacturer's name _____ Type _____ Slot size _____ feet to _____ feet Diameter _____ Slot size _____ feet to _____ feet Gravel packed? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Size of gravel _____ Placed from _____ feet to _____ feet Surface seal depth <u>18</u> Material used in seal: <input type="checkbox"/> Cement grout <input checked="" type="checkbox"/> Puddling clay <input checked="" type="checkbox"/> Well cuttings Sealing procedure used: <input type="checkbox"/> Slurry pit <input type="checkbox"/> Temp. surface casing <input checked="" type="checkbox"/> Overbore to seal depth Method of joining casing: <input type="checkbox"/> Threaded <input checked="" type="checkbox"/> Welded <input type="checkbox"/> Solvent <input type="checkbox"/> Weld <input type="checkbox"/> Cemented between strata Describe access port <u>TOP OF HOLE</u></p>	<p>10. Work started <u>11-14-89</u> finished <u>11-29-89</u></p>																																			
<p>6. LOCATION OF WELL Sketch map location must agree with written location.  Subdivision Name _____ Lot No. _____ Block No. _____ County <u>ONEIDA</u> <u>S1W</u> 1/4 <u>SE</u> 1/4 Sec. <u>7</u> T. <u>14</u> N.S. R. <u>36</u> E.W.</p>	<p>11. DRILLERS CERTIFICATION I/We certify that all minimum well construction standards were complied with at the time the rig was removed. Firm Name <u>Charles Frank</u> Firm No. <u>106</u> Address <u>LAWA IDAHO</u> Date <u>12-4-89</u> Signed by (Firm Official) <u>Charles Frank</u> and (Operator) <u>Charles Frank</u></p>																																			

Figure 1-7 Well log for Marlo Lewis Domestic Well



Clearwater Geosciences, LLP
Ground Water Development and Exploration

Form 231-7
6/92 *OMD*

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

15

Office Use Only
Well ID No. _____
Inspected by _____
Twp _____ Rge _____ Sec _____
1/4 _____ 1/4 _____ 1/4 _____
Lat: _____ Long: _____

1. WELL TAG NO. D 0036085
DRILLING PERMIT NO _____
Water Right or Injection Well No. _____

2. OWNER:
Name Van + Tari Price
Address 1730 W 2400 W
City Malad City State ID Zip 83252

3. LOCATION OF WELL by legal description:
You must provide address or Lot, Blk, Sub. or Directions to well.
Twp 14 North or South
Rge 2E East or West
Sec 18 1/4 NE 1/4
Gov'l Lot _____ County Blaine
Lat: _____ Long: _____
Address of Well Site _____
City _____

4. USE:
 Domestic Municipal Monitor Irrigation
 Thermal Injection Other _____

5. TYPE OF WORK check all that apply (Replacement etc.)
 New Well Modify Abandonment Other _____

6. DRILL METHOD:
 Air Rotary Cable Mud Rotary Other _____

7. SEALING PROCEDURES

Seal Material	From	To	Weight / Volume	Seal Placement Method
Bentonite	0	20	5 bags	scribble

Was drive shoe used? Y N Shoe Depth(s) 340
Was drive shoe seal tested? Y N How? _____

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
10	0	340	280	steel	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Length of Headpipe _____ Length of Tailpipe _____
Packer Y N Type _____

9. PERFORATIONS/SCREENS PACKER TYPE

Perforation Method machine
Screen Type & Method of Installation _____

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
200	340	1/4"	3000	6	steel	<input checked="" type="checkbox"/>	<input type="checkbox"/>

10. FILTER PACK

Filter Material	From	To	Weight / Volume	Placement Method

11. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
207 ft. below ground Artesian pressure _____ lb.
Depth flow encountered _____ ft. Describe access port or control devices: _____

12. WELL TESTS:

Pump Bailor Air Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time
500-6000			

Water Temp. cold Bottom hole temp. cold
Water Quality test or comments: _____

13. LITHOLOGIC LOG: (Describe repairs or abandonment) Water

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Y	N
14	0.30		Brown sandy clay	X	
10	30	50	Brown sandy clay	X	
10	50	150	grey clay		X
10	150	155	gravel Brown clay		X
10	155	165	Brown clay hard part		X
10	165	175	gravel clay Brown		X
10	175	180	Brown clay hard part		X
10	180	205	gravel Brown clay	X	
10	205	215	Brown clay gravel		X
10	215	245	gravel	X	
10	245	250	clay gravel	X	
10	250	255	gravel	X	
10	255	260	clay gravel		X
10	260	327	gravel	X	
10	327	340	clay		X

RECEIVED
MAY 04 2005
Department of Water Resources
Eastern Region

Completed Depth 340 (Measurable)
Date: Started 3-29-05 Completed 4-11-05

14. DRILLER'S CERTIFICATION
We certify that all minimum well construction standards were complied with at the time the rig was removed.
Company Name Mt West Wood Drilling Firm No. 543
Principal Driller Michael Frandsen Date 4-13-05
and Driller or Operator II Mike Frandsen Date 4-13-05
Operator I _____ Date _____
Principal Driller and Rig Operator Required.
Operator I must have signature of Driller/Operator II.

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Figure I-8 Well log for Van Price Domestic Well (0.4 miles to east of Bowen site).



Clearwater Geosciences, LLP
Ground Water Development and Exploration

RECEIVED IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT
 Use Typewriter or Ballpoint Pen

Office Use Only
 Inspected by _____
 Twp _____ Rge _____ Sec _____
 1/4 _____ 1/4 _____ 1/4 _____
 Lat: _____ Long: _____
 Air Flowing Artesian

Department of Water Resources
 1. DRILLER'S PERMIT NO. 15-97-E-0004-000
 Other IDWR No. _____

11. WELL TESTS: 068710
 Pump Baller

2. OWNER:
 Name Dan Daniels
 Address 2005 W 1500 N
 City Malad City State ID Zip 83252

Yield gal./min	Drawdown	Purging Level	Time
<u>20</u>			

3. LOCATION OF WELL by legal description:
 Sketch map location must agree with written location.

Water Temp. cold Bottom hole temp. cold
 Water Quality test or comments: good
 Depth first Water Encountered _____

Twp 14 North or South
 Rge 36 East or West
 Sec 18 1/4 NW 1/4 NE 1/4
 Gov't Lot _____ County Oneida
 Lat: _____ Long: _____

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Shoe Dia	From	To	Remarks: Lithology, Water Quality & Temperature	Y	N
8 1/2"	0	20	Brown clay		X
6"	20	30	Brown clay		X
6"	30	40	Blue clay & Quicksand	X	
6"	40	78	Blue clay		X
6"	78	90	Blue clay & Gravel		X
6"	90	110	Dark Brown clay		X
6"	110	120	Brown clay		X
6"	120	135	Dark Brown clay		X
6"	135	130	Gravel & sand	X	
6"	130	145	Dark Brown clay		X
6"	145	180	cobble, stone & gravel	X	

Address of Well Site _____ City _____
 (Give at least name of road - Different to Road or Landmark)
 Lt. _____ Bk. _____ Sub. Name _____

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 MAR 17 1997
 Department of Water Resources

Completed Depth 180 (Measurable)
 Date: Started 2-17-97 Completed 2-20-97

4. USE:
 Domestic Municipal Monitor Irrigation
 Thermal Injection Other _____

5. TYPE OF WORK check all that apply (Replacement etc.)
 New Well Modify Abandonment Other _____

6. DRILL METHOD
 Air Rotary Cable Mud Rotary Other _____

7. SEALING PROCEDURES

Material	BEAL/FILTER PACK		AMOUNT Sacks or Pounds	METHOD
	From	To		
Bentonite	0	20	4	OverBore

Was drive shoe used? Y N Shoe Depth(s) 180'
 Was drive shoe seal tested? Y N How? _____

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6"	0	180	32	Steel	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Length of Headpipe _____ Length of Tailpipe _____

9. PERFORATIONS/SCREENS
 Perforations Method Machine
 Screens Screen Type _____

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
145	175	1/2"	110	3/4"	Steel	<input type="checkbox"/>	<input type="checkbox"/>

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
135 ft. below ground Artesian pressure _____ lb
 Depth flow encountered _____ ft. Describe access port or control devices: _____

13. DRILLER'S CERTIFICATION
 I/We certify that all minimum well construction standards were complied with at the time the rig was removed.
 Firm Name Mountain West Drilling Firm No 543
 Firm Official Mike Frandsen Date 2-20-97
 and
 Supervisor or Operator _____ Date _____
 (Sign once if Firm Official & Operator)

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Figure 1-9 Well log for Dan Daniels Domestic Well

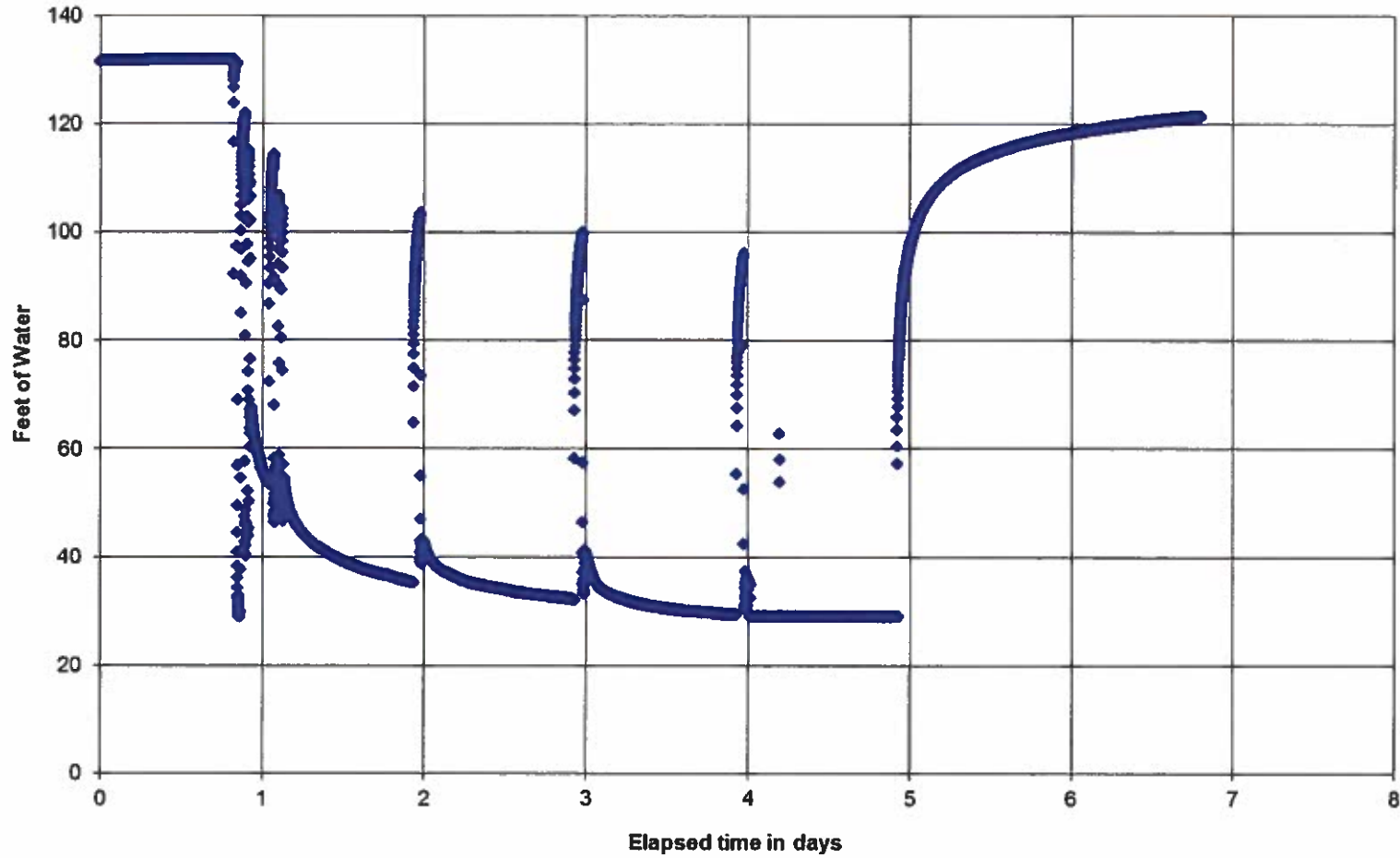


Attachment 2

DATA PLOTS

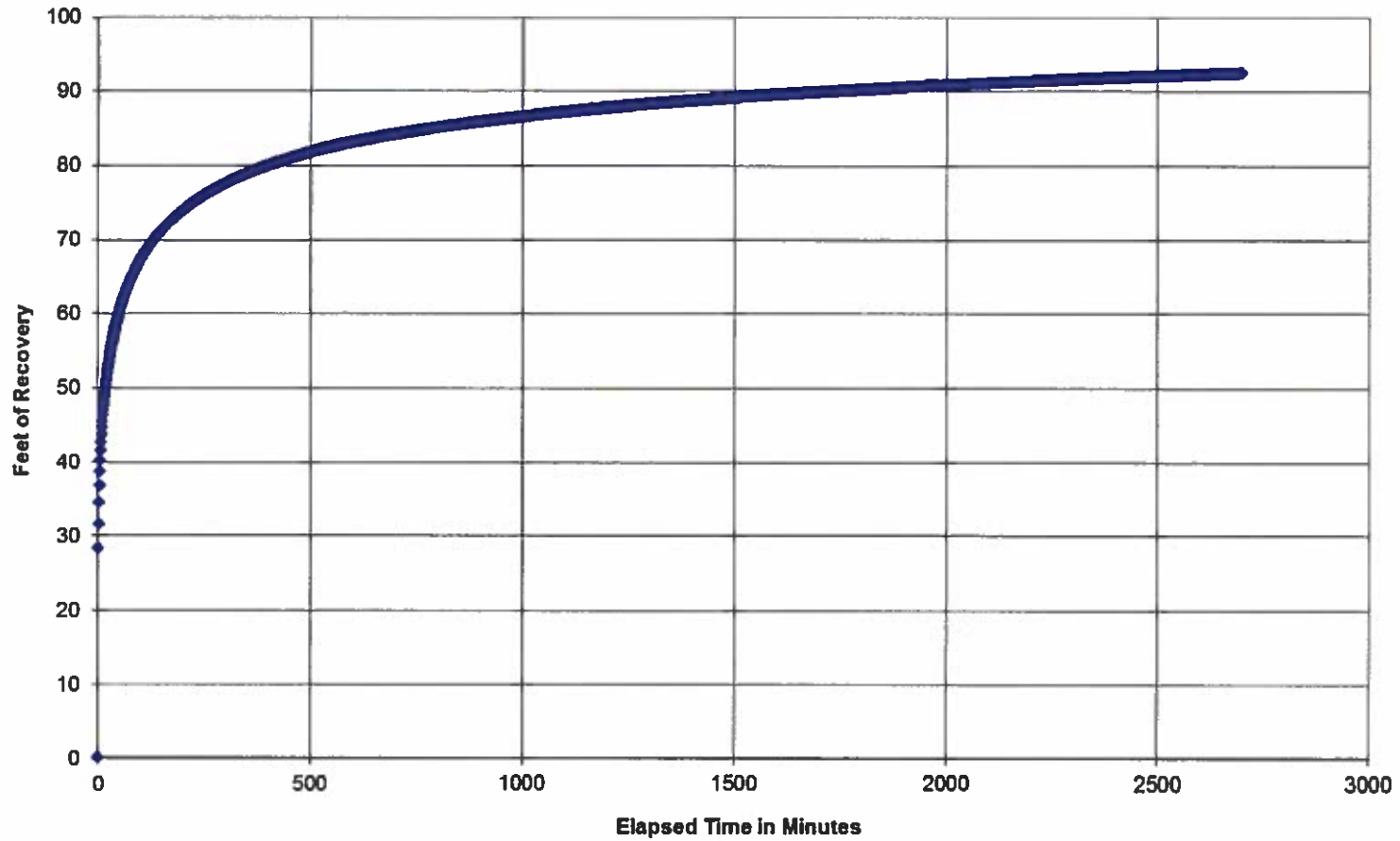


**Jeff Thomas 2005 Irrigation Well Response to Pumping at 1000 gpm,
June 18 through June 25, 2005**





Recovery Test Jeff Thomas Well 1000 gpm





Attachment 3

AQTESOLV PLOTS

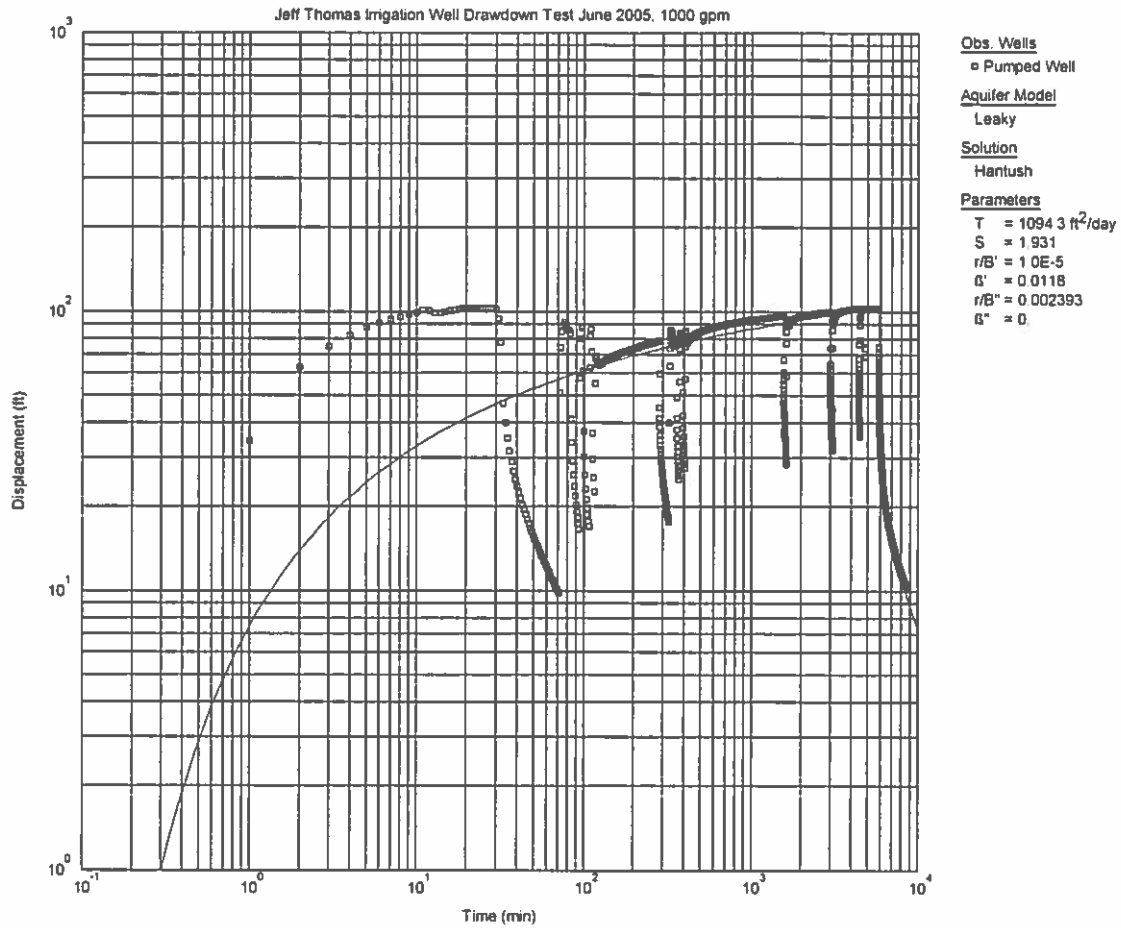


Figure 3-1 leaky confined match to drawdown data.

Residual statistics:

Mean = -0.008229

Var. = 134.9

S.E. = 11.61

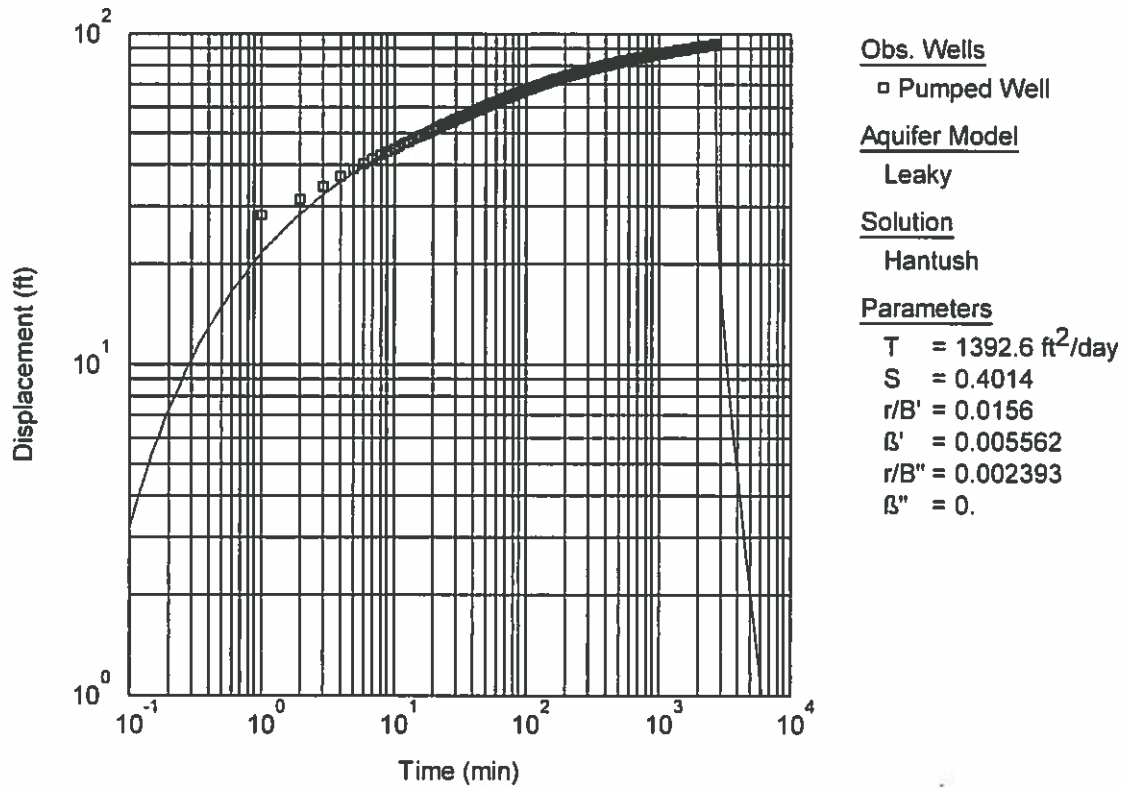
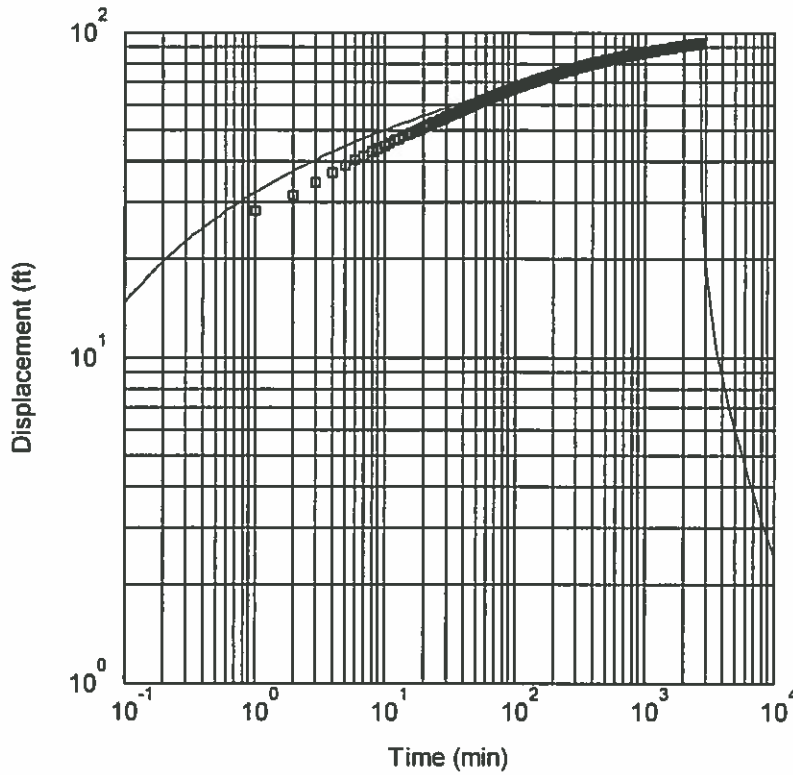


Figure 3-2 leaky confined match to recovery data.

Residual statistics:
Mean = -0.0001279
Var. = 0.08975
S.E. = 0.2996



Obs. Wells

□ Pumped Well

Aquifer Model

Confined

Solution

Theis

Parameters

T = 1958.5 ft²/day

S = 0.06398

Kz/Kr = 0.1023

b = 220. ft

Figure 3-3 Theis confined match to recovery data.

Residual statistics:
Mean = -0.0005663
Var. = 1.046
S.E. = 1.023

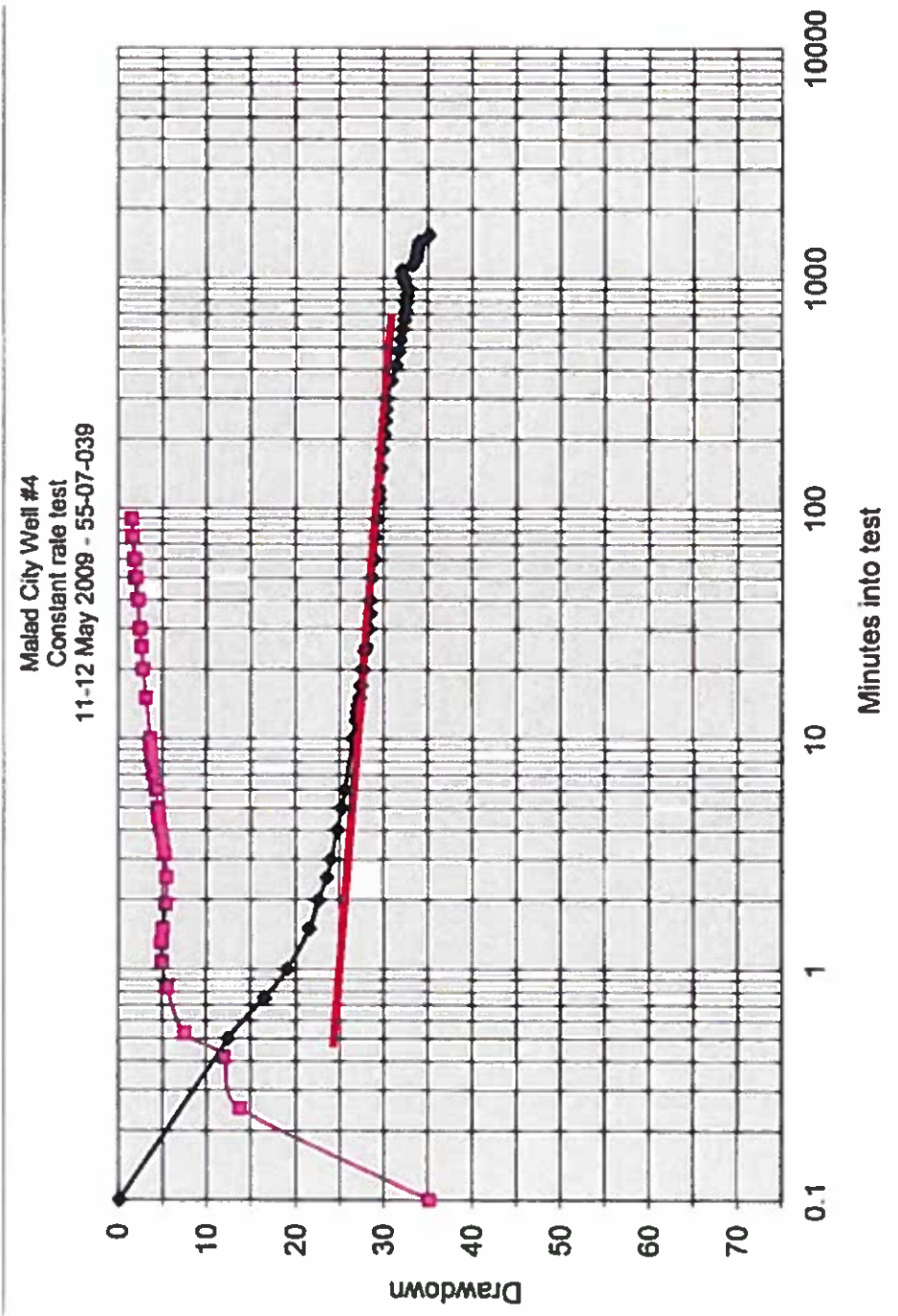


Figure 3-4. Plot of data set for pumping test Malad City Well #4. The red line represents the straight line trend of the data used for calculating transmissivity.



Attachment 4

AQUIFER IMPACT ANALYSIS



Table 4-1 Table of values used in AQTESOLV simulation.

Parameter	Value	Unit
Tranmissivity	6,000	ft ² /d
Storativity	0.05	unitless
Flow Rate	359	gpm
Duration	302,400	min
Total volume	333	ac-ft
aquifer thickness (b)	220	ft
kz/Kr	0.1	unitless

Table 4-2. Table of locations for various boundary corners and wells used in the AQESOLV simulation.

Location	x	y
Northwest Corner	0	40,200
Northeast Corner	30,700	40,200
Southwest Corner	0	0
Southeast Corner	30,700	0
Bowen POD	18,075	23,500
Well 0.5 mile East	20,715	23,500
Well 0.5 mile West	15,435	23,500
Well 0.5 mile North	18,075	26,140
Well 0.5 mile South	18,075	20,860

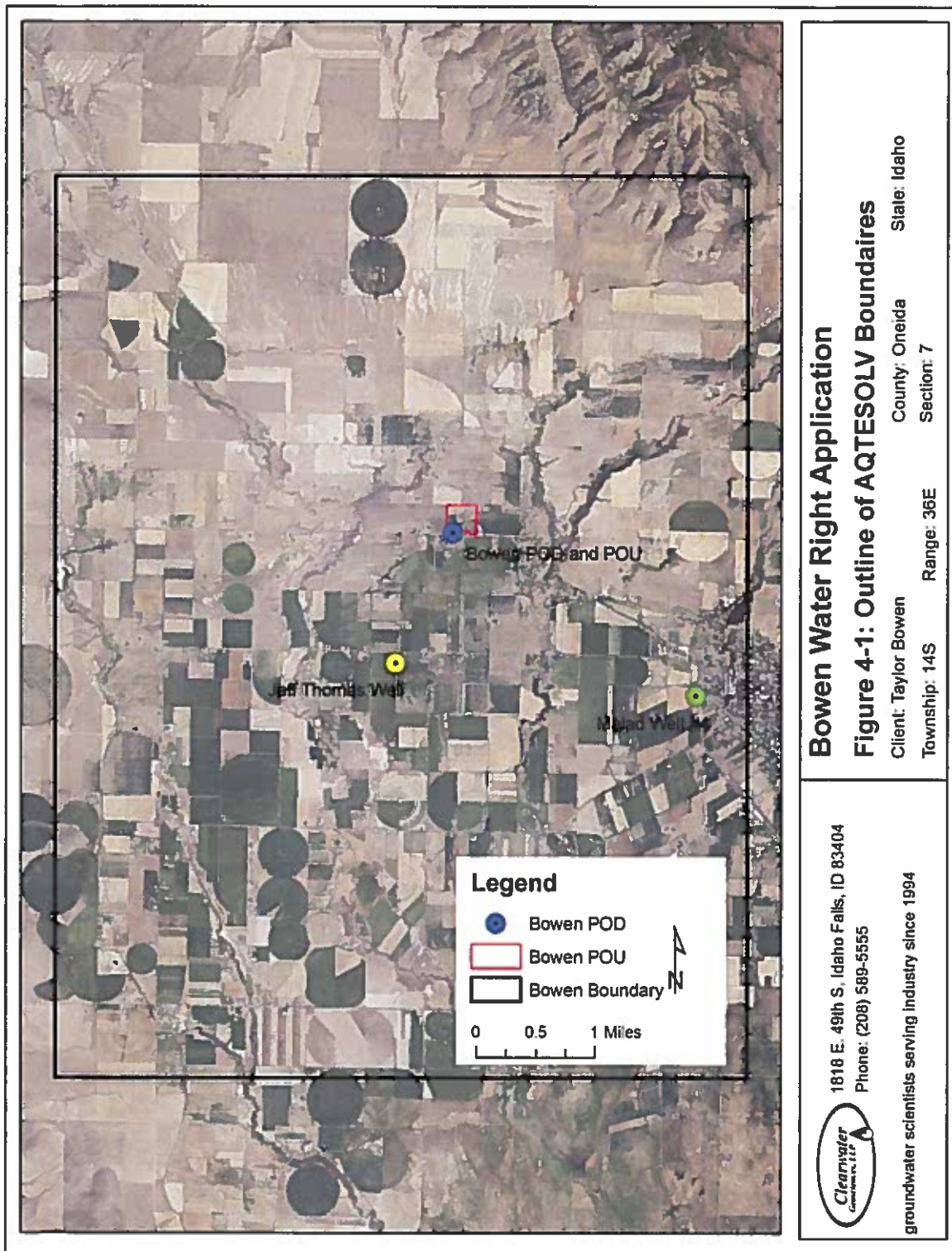


Figure 4-1 Outline of the boundaries used in the AQTESOLV forward solution calculation.

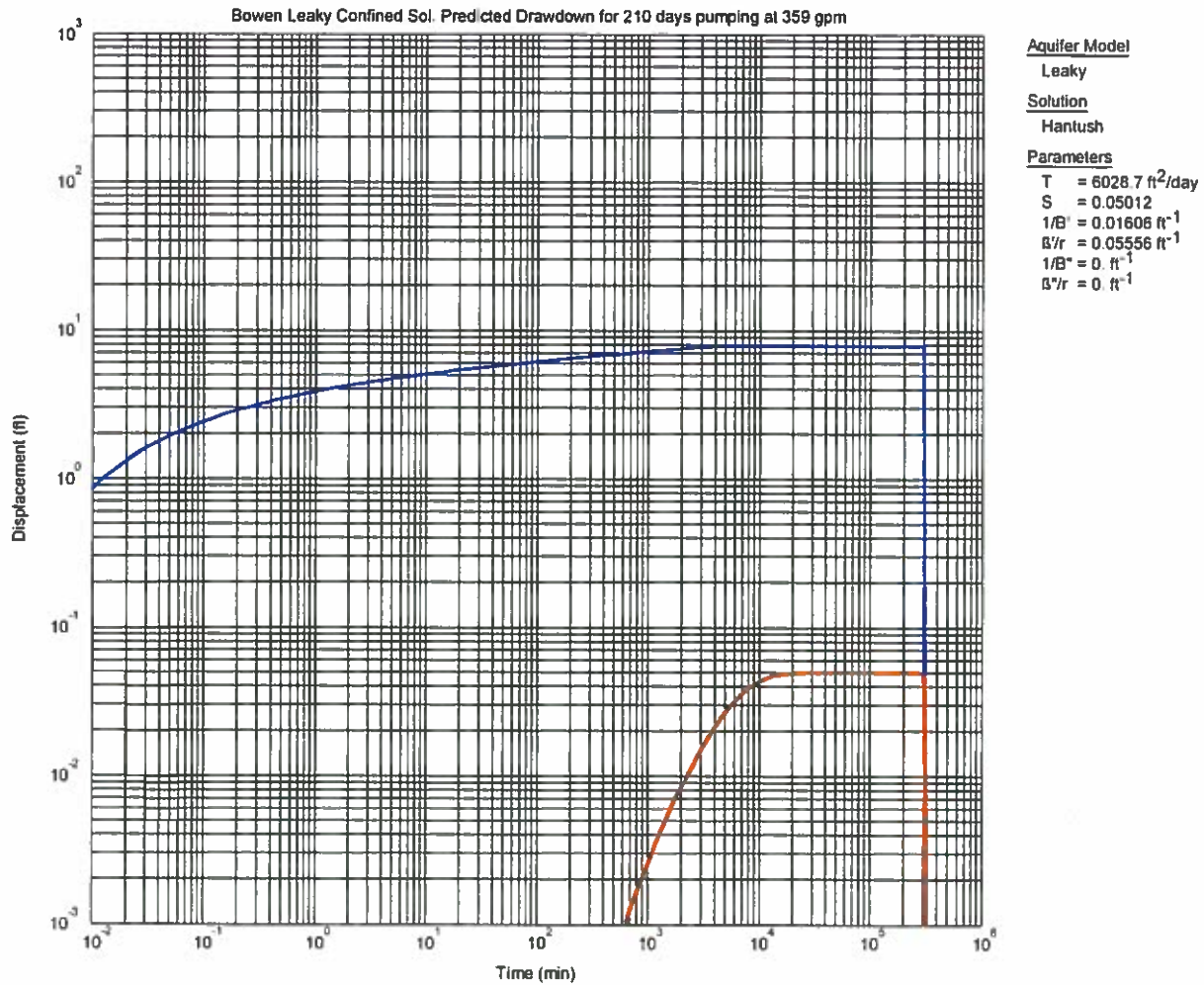


Figure 4-2 Predictive plot of drawdown at 359 gpm or 0.8 cfs for the full period of use 210 days.

Key to line colors

- Blue Proposed POD for Bowen
- Black Imaginary well ½ mile north of the proposed POD
- Green Imaginary well ½ mile west of the proposed POD
- Red Imaginary well ½ mile south of the proposed POD
- Purple Imaginary well ½ mile east of the proposed POD
- Orange Imaginary well 200 ft south of the proposed POD