Colorado Oil and Gas Conservation Commission

Monitor Wells Summary Report March 2012

4M Project Monitoring Program Archuleta and La Plata Counties Colorado

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1.0 INTRODUCTION

This report summarizes Colorado Oil and Gas Conservation Commission (COGCC) 4M Project monitoring well program activities and well pressure monitoring data through January 1, 2012 for Archuleta and La Plata Counties. Monitoring work was performed by COGCC staff and Norwest Corporation on behalf of the COGCC. Activities completed during this reporting period included one site specific repair event and one field inspection tour of all wells consisting of one wellhead pressure transducer and cable replacement and general maintenance of all systems at all locations. Also conducted in 2011 was automated well pressure monitoring and data transmission to In-Situ® Data Center, online data retrieval, data analysis, and summary report preparation. Well pressure measurements recorded by data loggers in each monitoring well are available to all interested parties upon request.

The COGCC 4M Project monitoring well program includes 17 wells at 11 monitoring well sites. Figure 1-1 (following page) shows the location and name of all eleven monitoring well sites and individual site monitoring well names in accordance with the following well nomenclature.

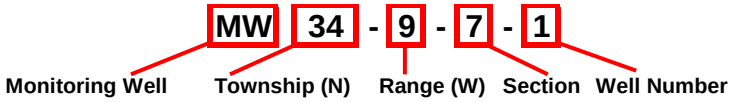


Table 1-1 lists the 4M project monitoring sites and wells by county, project phase and initiation date.

Table 1-1
4M Project Monitoring Well Program Phases

County	Site Name	Well Name	Project/Phase	Phase Initiation Date
Archuleta	Wagon Gulch	MW 34-5-4-1 MW 34-5-4-2	4M/Archuleta	October 2008
	Fosset Gulch	MW 34-5-14-1 MW 34-5-14-2		
	Highway 151	MW 34-4-30-1 MW 34-4-30-2		
	Deep Canyon	MW 34-4-32-1		June 2010
La Plata	Basin Creek	MW 34-9-7-1 MW 34-9-7-2	3M/La Plata	January 2001
	S. Fork Texas Creek	MW 35-7-8-1 MW 35-7-8-2		
	Beaver Creek Ranch	MW 35-6-17-1 MW 35-6-17-2		
	Shamrock Mines	MW 35-6-13-1		
	Palmer Ranch	MW 35-8-19-1	4M/La Plata	October 2009
	Fiddler	MW 35-8-10-1		
	BP Highlands	MW 35-7-15-1		

Table 1-2 lists monitoring well site locations and individual well completion details. Table 1-3 lists the depth and type of pressure transducers used in each monitoring well. Appendix A includes a chronology

of monitoring well installation, operation and maintenance activities for the January 2001 through December 2012 period of record.

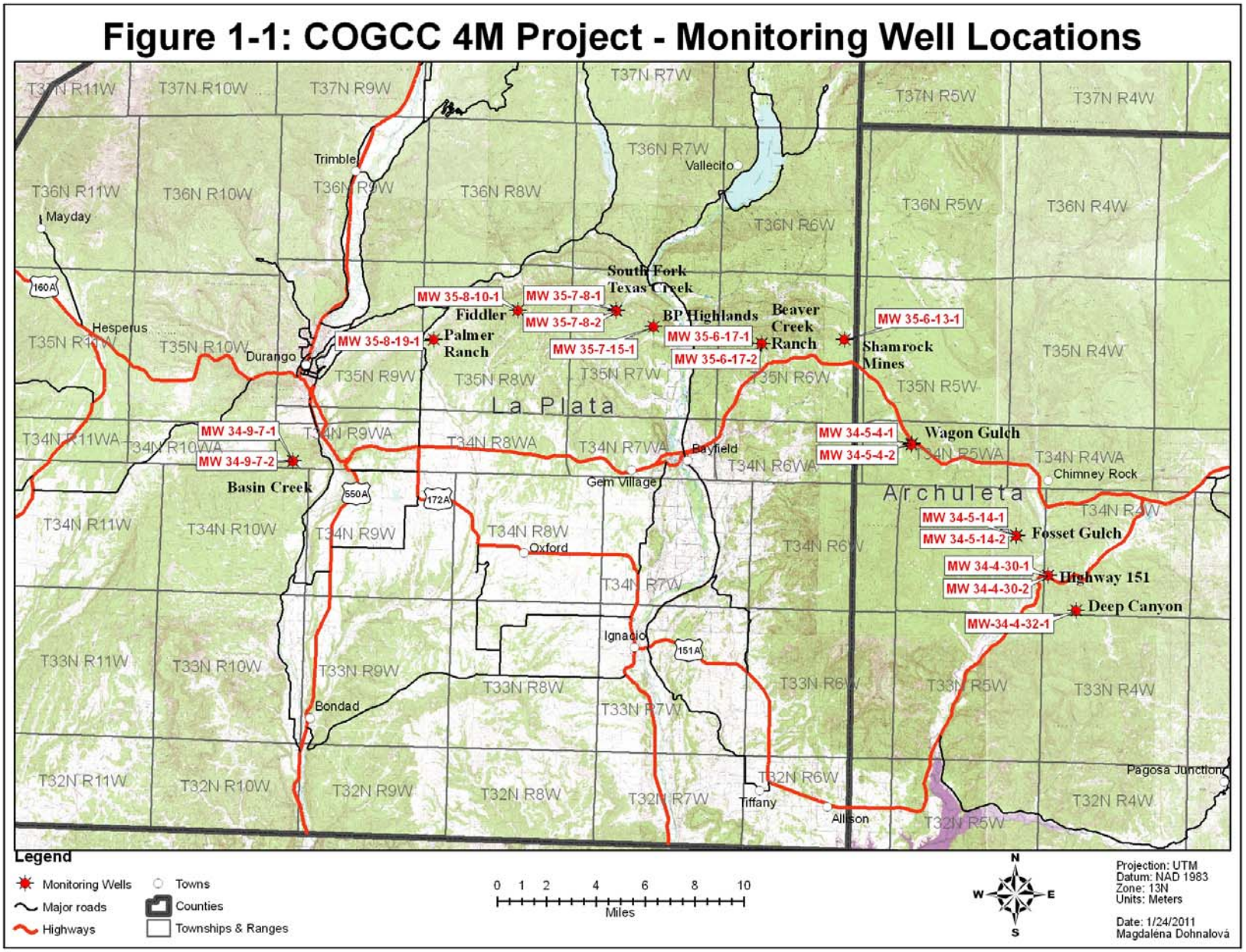


Figure 1-1: COGCC 4M Project - Monitoring Well Locations
T37N R11W
T37N R10W
T37N R9W
T37N R7W
T37N R5W
T37N R4W
T36N R11W
T36N R10W
T36N R9W
T36N R8W
T36N R7W
T36N R6W
T36N R5W
T36N R4W
Trimble
Vallecito
Mayday
160A
Hesperus
Durango
MW 35-8-10-1
MW 35-7-8-1
MW 35-7-8-2
MW 35-8-19-1
Palmer Ranch
Fiddler
South Fork Texas Creek
BP Highlands
MW 35-7-15-1
MW 35-6-17-1
MW 35-6-17-2
Beaver Creek Ranch
MW 35-6-13-1
Shamrock Mines
T35N R11W
T35N R10W
T35N R9W
T35N R8W
T35N R7W
T35N R6W
T35N R5W
T35N R4W
La Plata
MW 34-9-7-1
MW 34-9-7-2
Basin Creek
550A
172A
T34N R11WA
T34N R10WA
T34N R9WA
T34N R8WA
T34N R7WA
T34N R6WA
T34N R5WA
T34N R4WA
Bayfield
Gem Village
MW 34-5-4-1
MW 34-5-4-2
Wagon Gulch
Chimney Rock
Archuleta
T34N R11W
T34N R10W
T34N R9W
T34N R8W
T34N R7W
T34N R6W
T34N R5W
T34N R4W
Oxford
MW 34-5-14-1
MW 34-5-14-2
Fosset Gulch
MW 34-4-30-1
MW 34-4-30-2
Highway 151
Deep Canyon
MW-34-4-32-1
Ignacio
151A
T33N R11W
T33N R10W
T33N R9W
T33N R8W
T33N R7W
T33N R6W
T33N R5W
T33N R4W
Bondad
T32N R11W
T32N R10W
T32N R9W
T32N R8W
T32N R7W
T32N R6W
T32N R5W
T32N R4W
Tiffany
Allison
Pagosa Junction
Legend
Monitoring Wells
Major roads
Highways
Towns
Counties
Townships & Ranges
0 1 2 4 6 8 10
Miles
N
W
E
S
Projection: UTM
Datum: NAD 1983
Zone: 13N
Units: Meters
Date: 1/24/2011
Magdaléna Dohnalová

Table 1-2
Monitor Well Completion Summary

Site Name	Well ID	Location (NAD 83)	Construction Completion Date	Drilled Depth (fbgs)	Cored Intervals (fbgs)	Casing Depth (fbgs)	Casing Stickup (fags)	Well Casing Material	Perforated Interval in Coal seam(s) (fbgs)	Log Type	Logged Depth (fbgs)	Log Date
Basin Creek	MW 34-9-7-1	37.218482 N 107.887502 W	01/28/01	820		802	1	2 ", Schedule 40 galvanized steel pipe	578 - 609	gamma ray, bulk density, caliper, resistance	819	01/27/01
										64" normal resistivity, 16" normal resistivity, sp	822	01/27/01
										temperature, differential temperature	822	01/27/01
										gamma ray, casing collar locator	763	09/27/01
	MW 34-9-7-2	37.218542 N 107.887442 W	04/25/02	570	359 - 374 * 498 - 513 578 - 593	561	1.5	2.875" & 2.375", Oilfield steel tubing	496 - 526	gamma ray, casing collar locator	550	05/02/02
Palmer Ranch	MW-35-8-19-1	37.292284 N 107.786741 W (Estimated-survey pending)	11/10/2009	747	NA	738	2.5	4.5" 10#/foot	623-628;634-637;640-657;662-671	Open hole: gamma ray, bulk density, neutron, temperature, E-log, bore hole deviation and acoustical televiewer; Cased hole: casing collar locator and gamma ray	725	11/6/2009;11/17/09
Fiddler	MW-35-8-10-1	37.311135 N 107.725623 W (Estimated-survey pending)	11/17/2009	457	NA	457	3	4.5" 10#/foot	174-190;220-226;276-291;354-363;378-380	Open hole: gamma ray, bulk density, neutron, temperature, E-log, bore hore deviation and acoustical televiewer; Cased hole: casing collar locator and gamma ray	457	10/16/09;11/3/09
South Fork Texas Creek	MW 35-7-8-1	37.312493 N 107.653315 W	09/20/01	486		463	1.6	2 ", Schedule 40 galvanized steel pipe	403 - 416	gamma ray, bulk density, caliper, resistance	485	09/19/01
										64" normal resistivity, 16" normal resistivity, sp	485	09/19/01
										temperature, differential temperature	485	09/19/01
										gamma ray, casing collar locator	462	09/27/01
	MW 35-7-8-2	37.312443 N 107.653315 W	09/21/01	420	410 - 425	425	1.6	2", Schedule 40 galvanized steel pipe	235 - 241 254 - 258 264 - 274	gamma ray, casing collar locator	420	09/27/01
BP Highlands	MW-34-7-15-1	37.303663 N 107.625489 W (Estimated-survey pending)	10/10/2009	276	NA	241	2.5	4.5" 10#/foot	182-194	Open hole: gamma ray, bulk density, neutron, temperature, E-log, bore hole deviation and acoustical televiewer; Cased hole: casing collar locator and gamma ray	276	10/3/09; 10/9/09
Beaver Creek Ranch	MW 35-6-17-1	37.295393 N 107.546011 W	04/04/02	1,645	1,457 - 1,467 1,564 - 1,572	1,631	1.5	2.875", Oilfield steel tubing	1,572 - 1,576 1,582 - 1,584	64" normal resistivity, 16" normal resistivity, sp	1,645	04/03/02
										temperature, differential temperature	1,640	04/03/02
										gamma ray, bulk density, caliper, resistance	1,643	04/03/02
										gamma ray, casing collar locator	1,618	05/02/02
	MW 35-6-17-2	37.295503 N 107.545901 W	10/04/01	1,550		1,500	2	2", Schedule 40 galvanized steel pipe	1,437 - 1,449 1,458 - 1,472	gamma ray, neutron	1,499	10/10/01
										temperature, 4Pi density	1,493	11/14/01
										signal amplitude, travel time \ D T, VDL	1,484	11/14/01
										gamma ray, casing collar locator	1,483	11/27/01

* Cored interval from initial well drilled, plugged and abandoned in February 2001.

Table 1-2 Continued
Monitor Well Completion Summary

Site Name	Well ID	Location (NAD 83)	Construction Completion Date	Drilled Depth (fbgs)	Cored Intervals (fbgs)	Casing Depth (fbgs)	Casing Stickup (fags)	Well Casing Material	Perforated Interval in Coal seam(s) (fbgs)	Log Type	Logged Depth (fbgs)	Log Date
Shamrock Mines	MW 35-6-13-1	37.299063 N 107.484969 W	05/07/02	627		606	1.5	2.375", Oilfield steel tubing	507 - 511 517 - 533 539 - 562	gamma ray, bulk density, caliper, resistance	626	05/06/02
										64" normal resistivity, 16" normal resistivity, sp	626	05/06/02
										gamma ray, casing collar locator	626	05/10/02
Wagon Gulch	MW-34-4-30-1	37.238958 N 107.433631 W	10/2/2008	938	NA	927	2.5	4.5" 10.5#/foot	821-833	Open hole: gamma ray, bulk density, neutron, temperature, E-log, bore hole deviation and acoustical televiewer; Cased hole: casing collar locator and gamma ray	938	10/2/2008;10/16/08
	MW-34-4-30-2	37.238389 N 107.355340 W	10/13/2008	883	749-779 810-818	833	2.5	4.5" 10.5#/foot	752-767	Open Hole: gamma ray, bulk density, neutron, temperature, E-log, bore hole deviation and acoustical televiewer; Cased hole: casing collar locator and gamma ray	883	10/12/2008;10/16/08
Fosset Gulch	MW-35-5-14-1	37.186510 N 107.355270 W	10/31/2008	624	480-506 524-532	618	2.5	4.5" 10.5#/foot	482-502	Cased hole: casing collar locator and gamma ray	624	11/14/08
	MW-35-5-14-2	37.186550 N 107.355340 W	10/22/2008	660	NA	660	2.5	4.5" 10.5#/foot	525-534 548-551	Open hole: gamma ray, bulk density, neutron, temperature, E-log, bore hole deviation and acoustical televiewer; Cased hole: casing collar locator and gamma ray	648	10/22/08;11/14/2008
Highway 151	MW-34-4-30-1	37.163685 N 107.331061 W	11/11/2008	340	226-247 266-287	330	2.5	4.5" 10.5#/foot	218-22 231-241	Open hole: gamma ray, bulk density, neutron, temperature, E-log, bore hole deviation and acoustical televiewer; Cased hole: casing collar locator and gamma ray	326	11/16/09
	MW-34-4-30-2	37.163631 N 107.331008 W	11/7/2008	330	NA	330	2.5	4.5" 10.5#/foot	268-277 292-301	Open Hole: gamma ray, bulk density, neutron, temperature, E-log, bore hole deviation and acoustical televiewer; Cased hole: casing collar locator and gamma ray	326	11/6/09;11/16/09
Deep Canyon	MW 34-4-32-1	37.143311 N 107.309829 W	5/18/2010	895	NA	880	2.5	4.5" 10.5#/foot	752-761 763-765 804-813 836-838	Open Hole: gamma ray, bulk density, neutron, temperature, E-log, bore hole deviation and acoustical televiewer; Cased hole: casing collar locator and gamma ray	880	5/24/2010

Table 1-3
Monitor Well Pressure Transducers

Location	Well ID	Upper Transducer		Lower Transducer	
		Depth (fbgs)	Type and Rating	Depth (fbgs)	Type and Rating
Basin Creek	MW 34-9-7-1	5	LT 500 - 30 psia	570	LT 500 - 300 psia
	MW 34-9-7-2	5	LT 500 - 30 psia	485	LT 500 - 300 psia
Palmer Ranch	MW-35-8-19-1	3	LT 500 - 500 psia	690	LT 700 - 1000 psia
Fiddler	MW-35-8-10-1	7.5	LT 700 - 1000 psia	390	LT 700 - 1000 psia
South Fork Texas Creek	MW 35-7-8-1	5	LT 500 - 30 psia	374	LT 500 - 300 psia
	MW 35-7-8-2	5	LT 500 - 300 psia	232	LT 500 - 300 psia
BP Highlands	MW-34-7-15-1	2	LT 500 - 30 psia	204	LT 500 - 500 psia
Beaver Creek Ranch	MW 35-6-17-1	6	LT 500 - 300 psia	1,551	LT 700 - 1000 psia
	MW 35-6-17-2	5	LT 700 - 1000 psia	1,408	LT 700 - 1000 psia
Shamrock Mines	MW 35-6-13-1	0	LT 500 - 30 psia	512	LT 500 - 300 psia
Wagon Gulch	MW-34-4-30-1	2.3 (fags)	LT 700 - 1000 psia	840	LT 700 - 1000 psia
	MW-34-4-30-2	2.5	LT 700 - 1000 psia	763	LT 700 - 1000 psia
Fosset Gulch	MW-35-5-14-1	2.3 (fags)	LT 700 - 1000 psia	510	LT 700 - 1000 psia
	MW-35-5-14-2	2.3 (fags)	LT 700 - 1000 psia	560	LT 700 - 1000 psia
Highway 151	MW-34-4-30-1	2.3 (fags)	LT 700 - 1000 psia	250	LT 700 - 1000 psia
	MW-34-4-30-2	2.3 (fags)	LT 700 - 1000 psia	310	LT 700 - 1000 psia
Deep Canyon	MW-34-4-32-1	2.5	LT 700 - 1000 psia	846	LT 700 - 1000 psia

fbgs = feet below ground surface; fags = feet above ground surface; LT = Level TROLL®

2.0 LA PLATA COUNTY MONITORING WELL DATA SUMMARY

Well pressure was measured and recorded twice daily (12-hour interval) for the 7 monitoring well sites located in La Plata County, Colorado. Applicable well pressure and calculated water level data for the entire period of record for each monitoring well are plotted in annotated charts. The water level in a well is calculated using the depth of the lower transducer and the difference in pressure between upper and lower transducers. This calculation is applicable at sites where the water level in a well is above the lower pressure transducer and below the upper pressure transducer.

2.1 BASIN CREEK

Monitor well MW 34-9-7-1 has been monitored since November 29, 2001 and monitor well MW 34-9-7-2 has been monitored since May 24, 2002. Initial and ending monitoring well pressures and calculated water levels in the wells for each period of record are summarized in Table 2-1.

Table 2-1
Well Pressure Data Summary for Basin Creek Monitoring Wells

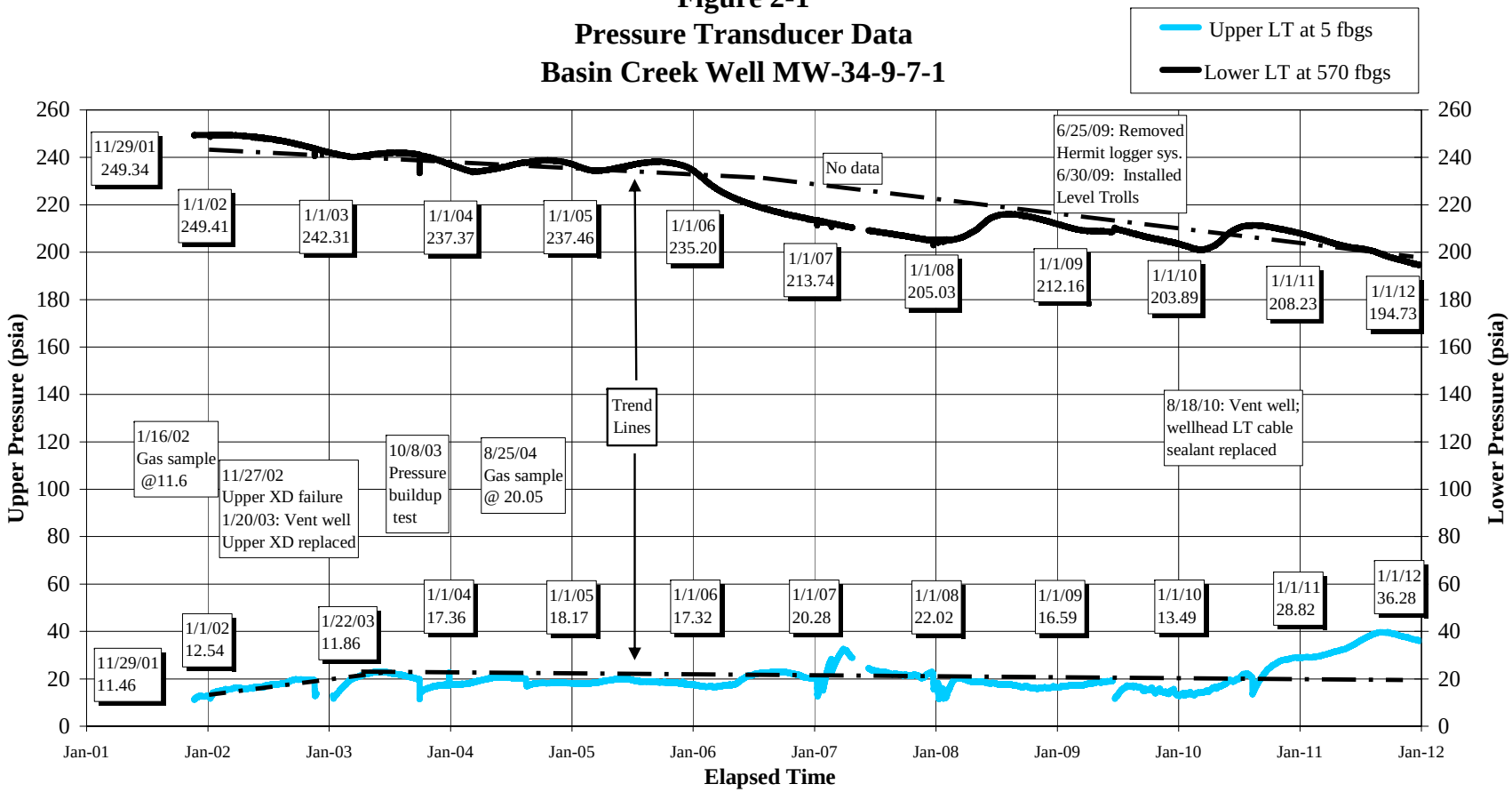
Well ID and Transducers	Period of Record	Initial Shut-In Well Pressure psia	Ending Shut-In Well Pressure psia	Net Change in Well Pressure psi	Initial Water Level in Well fbgs	Ending Water Level in Well fbgs	Net Change in Water Level ft
MW 34-9-7-1 Upper	11/29/01 to 1/1/12	11.46	36.28	24.82	20.97	204.34	-184.37
Lower		249.34	194.73	-54.61			
MW 34-9-7-2 Upper	5/24/02 to 1/1/12	33.26	13.78	-19.48	Upper transducer is under water at 5 ft below ground level		
Lower		241.42	215.35	-26.07			

2.1.1 MW 34-9-7-1

Figure 2-1 charts the upper and lower pressure transducer data and the calculated water level in the well. Table 2-1 and Figure 2-1 show a net increase of 24.82 psi in wellhead pressure for the entire 10-year period of record from November 29, 2001 (11.46 psia) to January 1, 2012 (36.28 psia). Figure 2-1 generally shows a pattern of minor seasonal fluctuations within an overall stable trend in wellhead pressure prior to wellhead cable gland seal replacement on August 18, 2010, followed by a rise in wellhead pressure to a recorded high of 39.38 psia on October 7, 2011. Continued monitoring of wellhead pressure is expected to show whether this relatively recent rise and peak is a short-term or long-term change in the pressure pattern prior to August 2010.

In contrast to the wellhead pressure patterns, Table 2-1 and Figure 2-1 show a net decline of about 184.37 feet in the calculated well water level and a corresponding net decline in down-hole pressure of about 54.61 psi for the period of record. Figure 2-1 also shows a pattern of slight seasonal fluctuations within the overall declining trend in the water level and corresponding down-hole pressure for the period of record.

Figure 2-1
Pressure Transducer Data
Basin Creek Well MW-34-9-7-1



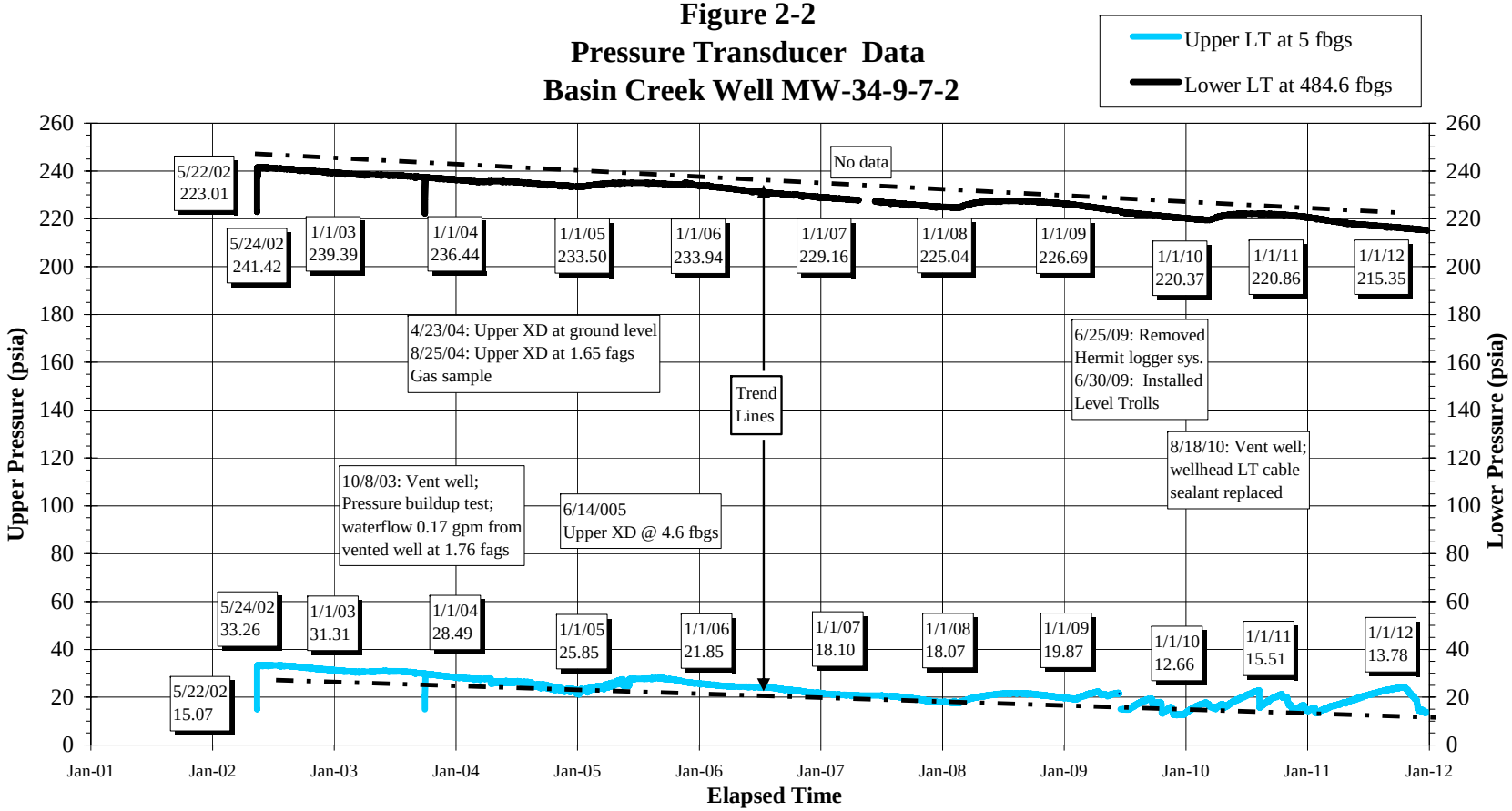
2.1.2 MW 34-9-7-2

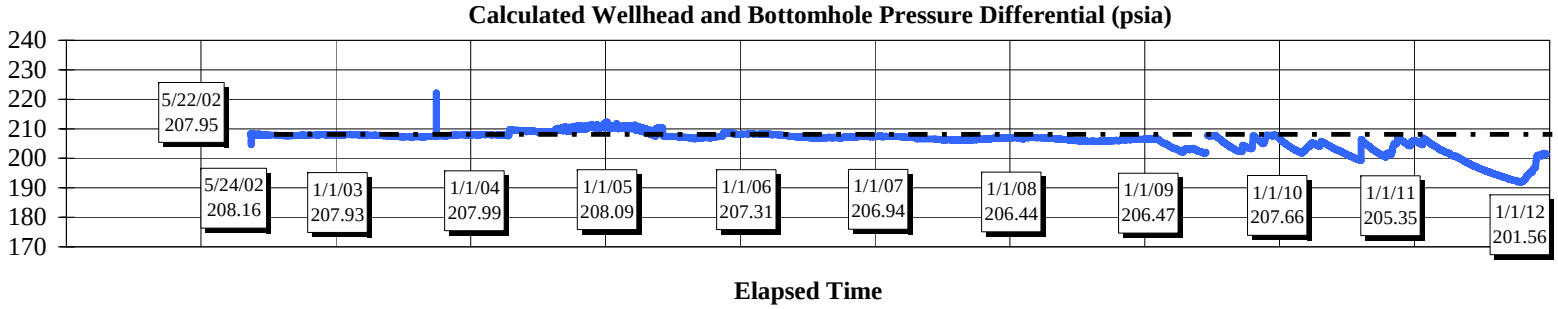
Recorded pressure data and calculated down-hole and wellhead differential pressures for well MW-34-9-7-2 are charted on Figure 2-2. Initial and ending monitoring well pressures and apparent water level in the well are summarized in Table 2-1.

Figure 2-2 continues to show a trend of gradually declining wellhead pressure and minor seasonal fluctuations in down-hole pressure within the overall declining trend for the period of record. As indicated in Table 2-1, there has been a net decline in well pressure of about 19.48 psi (wellhead) and 26.07 psi (down-hole) for the 9.5-year period of record. Between February 18, 2008 and January 1, 2012, Figure 2-2 shows an apparent seasonal fluctuation within the overall declining well pressure trend.

As described in previous COGCC Monitor Wells Summary Reports, the chart on the bottom of Figure 2-2 shows the wellhead and down-hole pressure differential instead of the calculated water level in the well because the water level in the well has been above the upper transducer for the most significant period of record. A small amount of gas was released and artesian flow (~0.2 gpm) from the well consistently occurred each time the well was vented for maintenance during the period of record between 2002 and 2010. Artesian flow from the well did not occur when the wellhead was vented on August 18, 2010 to replace the Level Troll wellhead cable Conax gland sealants. Based on the diversion of similar pressure trends recorded by the upper and lower transducers beginning in early 2009 the water level in the well is now presumed below the upper transducer. The final recorded upper transducer pressure in 2011 of 13.7 PSI is very near atmospheric pressure indicating the well is essentially in hydrostatic balance. The pressure fluctuations since early 2009 suggest that ambient surface temperatures may be affecting the gas pressure as measured by the upper transducer. A water level measurement utilizing a water level indicator tape will be conducted in 2012 when the well is safely accessible for inspection.

Figure 2-2
Pressure Transducer Data
Basin Creek Well MW-34-9-7-2





2.2 PALMER RANCH

Monitor well MW 35-8-19-1 has been monitored since November 20, 2009. Initial and ending well pressures and calculated water level in the monitor well are summarized in Table 2-2 for the indicated period of record.

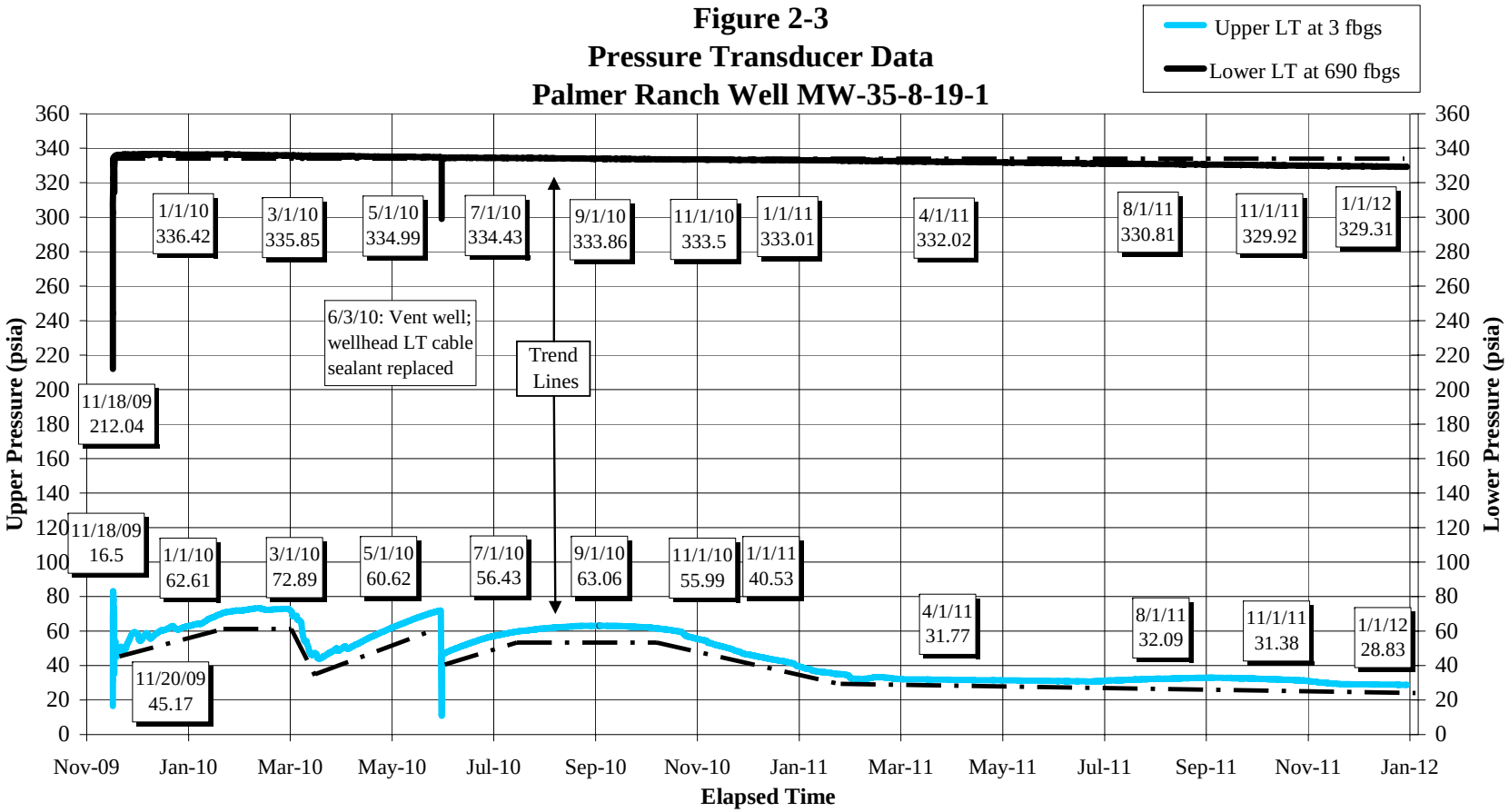
Table 2-2
Well Pressure Data Summary for Palmer Ranch Monitoring Well

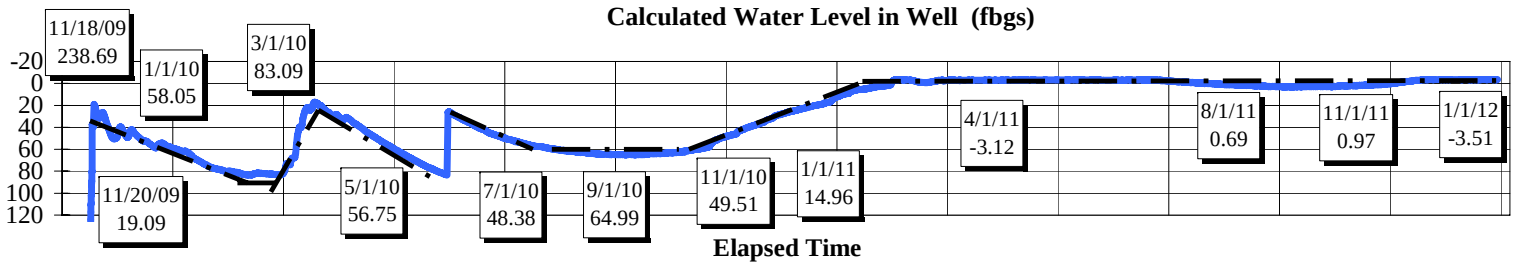
Well ID and Transducers	Period of Record	Initial Shut-In Well Pressure psia	Ending Shut-In Well Pressure psia	Net Change in Well Pressure psi	Initial Water Level in Well fbgs	Ending Water Level in Well fbgs	Net Change in Water Level ft
MW 35-8-19-1 Upper	11/20/09 to 1/1/12	45.17	28.83	-16.34	19.09	-3.51	22.6
Lower		335.86	329.31	-6.55			

Monitoring data for MW 35-8-19-1 are plotted in Figure 2-3. Since November 20, 2009, there has been seasonal fluctuation in wellhead pressure and an overall flat trend in down-hole pressure. As summarized in Table 2-2 for the 2-year period of record, the net change in wellhead and down-hole pressures are -16.34 psi and -6.55 psi respectively. The net change in the calculated water level in the well is 22.6 feet for the period of record.

Figure 2-3 shows an immediate water level rise in response to the drop in well pressure when the well was vented for maintenance on June 3, 2010, followed by a gradual, partial return of the wellhead pressure and water level to trends exhibited prior to June 3, 2010. By August 1, 2010, the wellhead pressure and water level reached about 64 percent of trends exhibited prior to June 3, 2010, then plateaued through late October, 2010. Figure 2-3 also shows a trend of water level rise in response to a steady drop in wellhead pressure between late October, 2010 and early February, 2011. The drop in wellhead pressure after October 2010 is likely due to an incomplete shut-in condition. A minor leak was detected at the wellhead during the 2011 site inspection but not corrected because tightening the leaky pipe fitting would likely have caused more damage and further compromised the seal.

Figure 2-3
Pressure Transducer Data
Palmer Ranch Well MW-35-8-19-1





2.3 FIDDLER

Monitor well MW 35-8-10-1 has been monitored since November 17, 2009. Initial and ending well pressures and calculated water level in the monitor well are summarized in Table 2-3 for the indicated period of record.

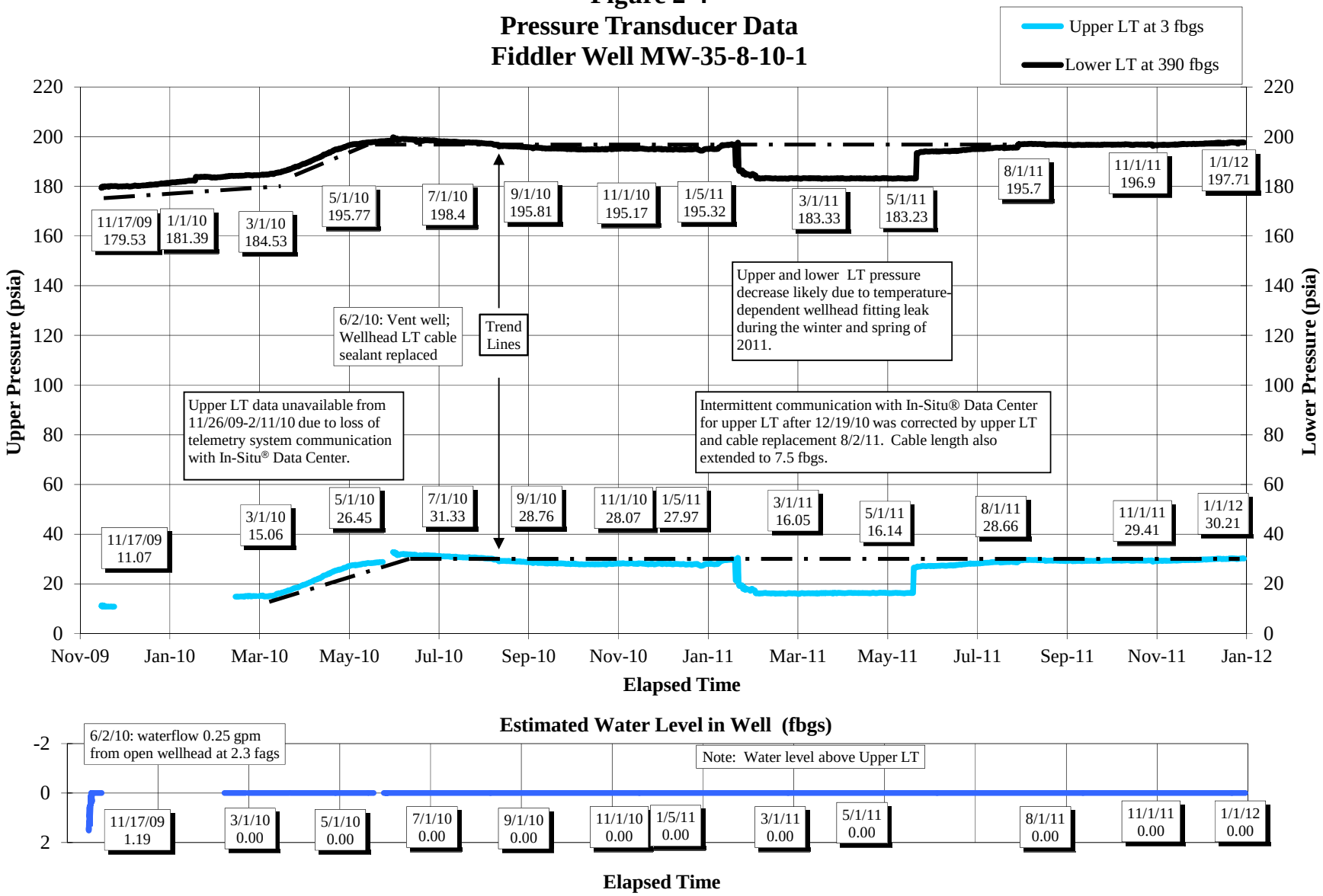
Table 2-3
Well Pressure Data Summary for Fiddler Monitoring Well

Well ID and Transducers	Period of Record	Initial Shut-In Well Pressure psia	Ending Shut-In Well Pressure psia	Net Change in Well Pressure psi	Initial Water Level in Well fbgs	Ending Water Level in Well fbgs	Net Change in Water Level ft
MW 35-8-10-1 Upper	2/18/10 to 1/1/12	14.84	30.21	15.37	Upper transducer under water at 7.5 ft below ground surface		
Lower		184.3	197.71	13.41			

Monitoring data for MW 35-8-10-1 are plotted in Figure 2-4. The net change in wellhead pressure is 15.37 psi and the net change in down-hole pressure is 13.41 psi for the 2-year period of record. As Figure 2-4 shows, both the wellhead pressure and down-hole pressure steadily increased from installation on November 17, 2009 to early June, 2010. After a minor decrease in pressure both the wellhead pressure and down-hole pressure have remained relatively stable from June, 2010 to January 1, 2012. A net water level change was not calculated because to the upper transducer is below the water level in the well. As noted on Figure 2-4, water flowed from the well at a rate of 0.25 gallons per minute (gpm) when the well was vented for maintenance on June 2, 2010. For charting purposes, the water level in the shut-in well is estimated to be at or near ground surface above the upper pressure transducer (set at 7.5 fbgs).

Also noted on Figure 2-4, telemetry system communication with the In-Situ® Data Center for the upper transducer was lost from November 26, 2009 through February 11, 2010 due to cable connection problem, and was intermittent from December 19, 2010 to January 1, 2011. The upper transducer and cable were replaced during the 2011 well inspection and the cable length was extended from 3 fbgs to 7.5 fbgs. Additionally, an apparent wellhead fitting leak during the winter and spring of 2011 caused a pressure decreased observed on both the upper and lower transducers. This was likely a temperature effect on a fitting or seal gland because when air temperatures were consistently higher beginning in late May 2011 both upper and lower transducer pressures increased to the trends previous to January 2011. The replacement of the upper transducer and cable may have resolved the issue but the wellhead fittings will be inspected in the spring of 2012 when the well is accessible.

Figure 2-4
Pressure Transducer Data
Fiddler Well MW-35-8-10-1



2.4 SOUTH FORK TEXAS CREEK

Monitor wells MW 35-7-8-1 and MW 35-7-8-2 have been monitored since November 29, 2001. Initial and ending well pressures and calculated water levels in the monitor wells are summarized in Table 2-4 for the indicated period of record.

Table 2-4
Well Pressure Data Summary for South Fork Texas Creek Monitoring Wells

Well ID and Transducers	Period of Record	Initial Shut-In Well Pressure psia	Ending Shut-In Well Pressure psia	Net Change in Well Pressure psi	Initial Water Level in Well fbgs	Ending Water Level in Well fbgs	Net Change in Water Level ft
MW 35-7-8-1 Upper	12/01/01 to 1/1/12	13.79	49.26	35.47	88.39	151.72	-63.33
Lower		144.47	145.61	1.14			
MW 35-7-8-2 Upper	1/15/02 to 1/1/12	91.32[1]	79.99	-11.33	Water level in well is >225 fbgs with complete shut in		
Lower		91.91[1]	80.32	-10.99			

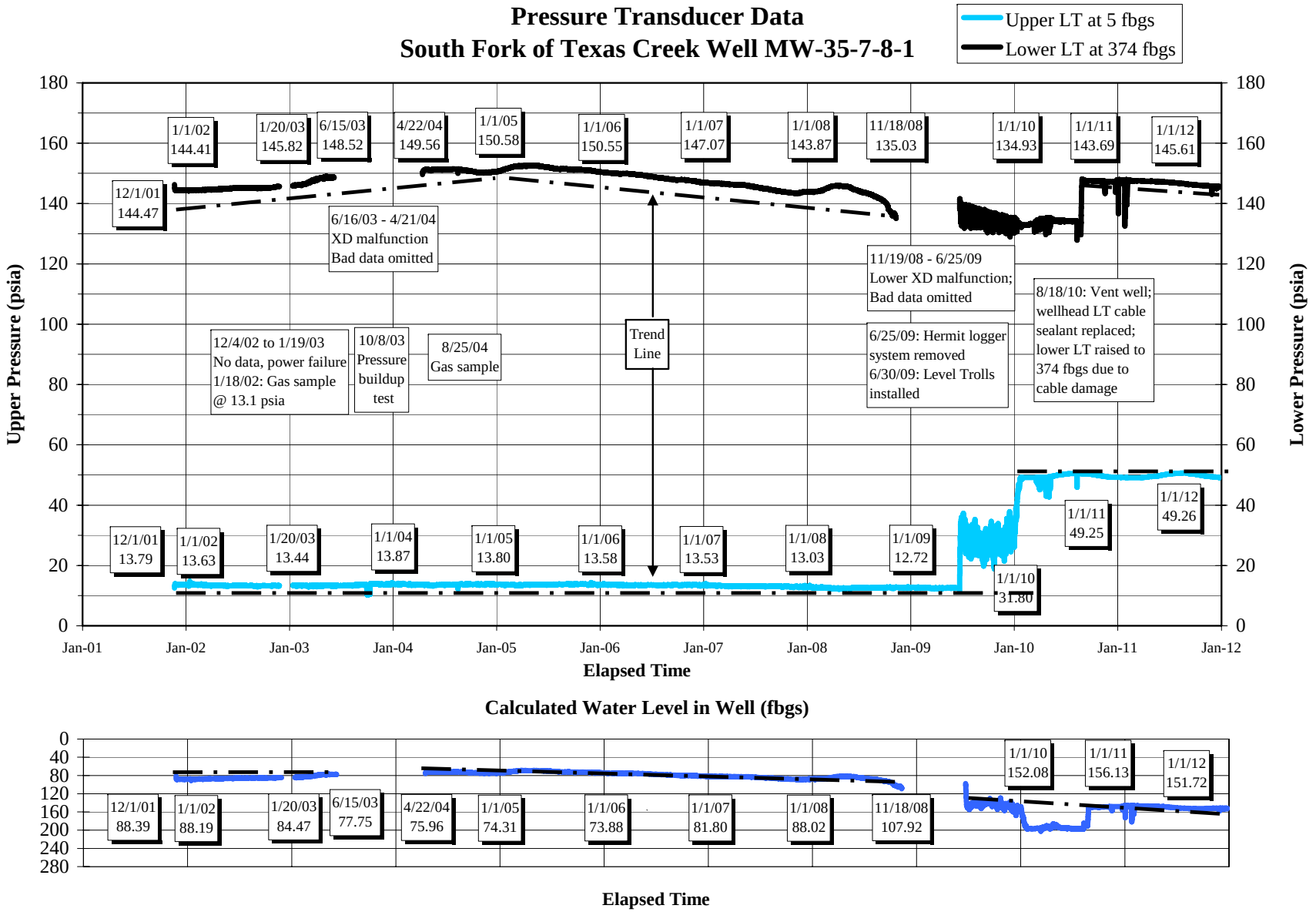
1 Both down-hole and wellhead pressure are typically the same in MW 35-7-8-2 with complete shut in.

2.4.1 MW 35-7-8-1

Monitoring data for MW 35-7-8-1 are plotted in Figure 2-5. As summarized in Table 2-4, the net change in wellhead and down-hole pressures is 35.47 psi and 1.14 psi respectively for the 10-year period of record. The net change in the calculated water level in the well is -63.33 feet.

Figure 2-5 shows a relatively stable wellhead pressure (12 to 13.5 psia) prior to installation of the Level Troll instrument on June 30, 2009. After the transducer change-out, there was a build-up in wellhead pressure from 11.52 psia on June 30, 2009 to 33.76 psia on July 3, 2009 followed by frequent fluctuations in wellhead pressure ranging between 19 psia and 38 psia through January 18, 2010. Between January 19, 2010 and January 30, 2010, the wellhead pressure rose from 38 psia to 49 psia and then remained fairly stable through January 1, 2011. The relatively stable wellhead pressure curve prior to June 30, 2009 is inconsistent with the fluctuating and notably higher pressure measurements recorded after June 30, 2009. Likewise, the lower Level Troll has recorded frequent down-hole pressure fluctuations (between 129 and 142 psia) not previously observed in well pressure data prior to June 30, 2009. The higher well pressure regime since August 2010 may indicate complete well shut-in was not achieved until after the Level Troll cable wellhead seals were replaced on August 18, 2010.

Figure 2-5
Pressure Transducer Data
South Fork of Texas Creek Well MW-35-7-8-1



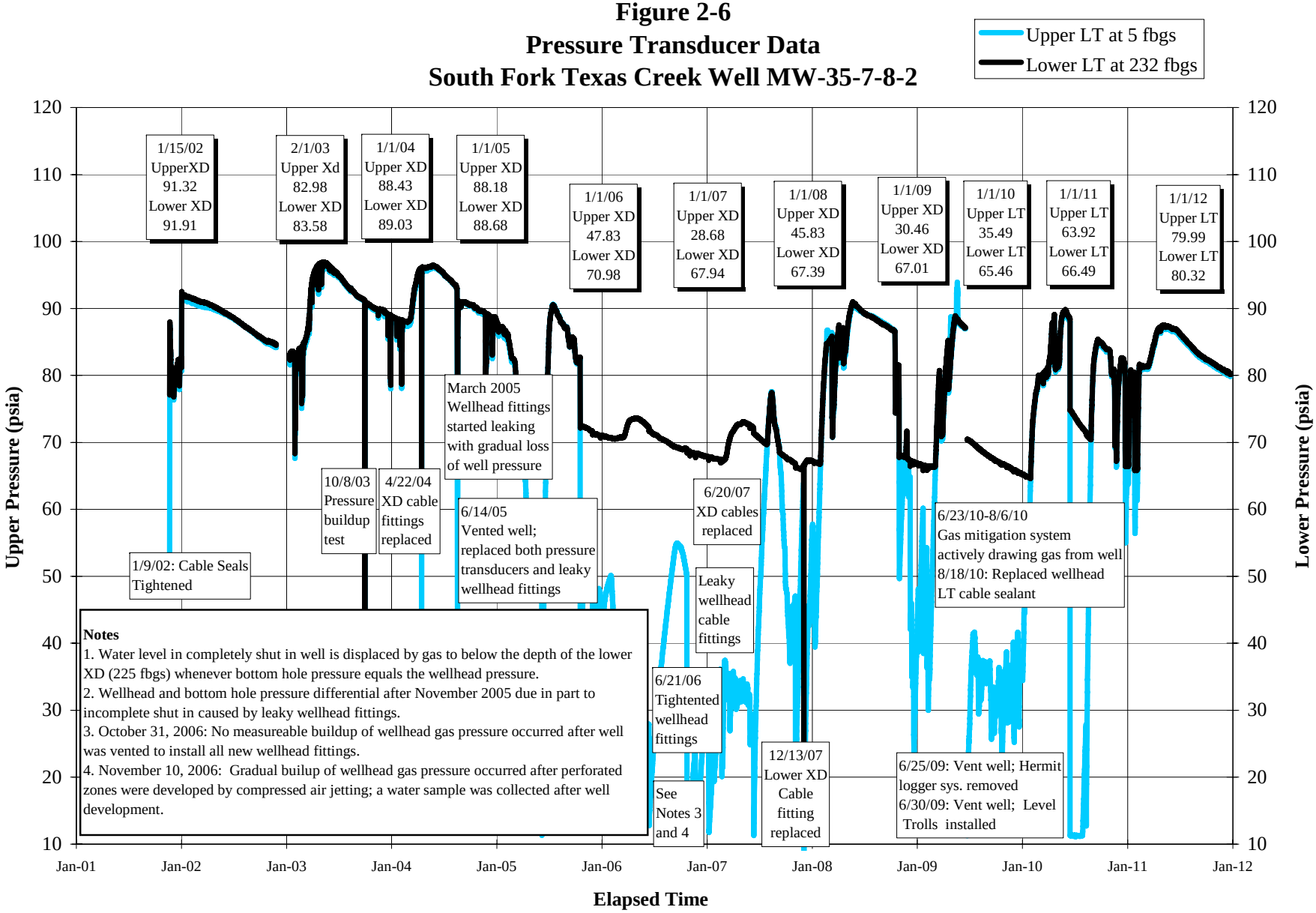
2.4.2 MW 35-7-8-2

Figure 2-6 charts the pressure data for well MW 35-7-8-2, which exhibits an entirely different pressure regime than the deeper monitoring well MW 35-7-8-1. Figure 2-6 shows nearly equal wellhead and down-hole pressures for the period of record when the well is completely shut in. For example, wellhead and down-hole pressures recorded on December 31, 2010 were 80.3 psia and 80.62 psia respectively under shut-in conditions. Based on the period of record to date, incomplete well shut-in is indicated whenever the well pressure drops below about 70 psia.

The production casing at well MW 35-7-8-2 was connected, via transition to PVC pipeline, into the South Fork gas mitigation system in June 2010 to test if there was enough gas in the well to supplement the larger-scale gas recovery and electrical generation system located along South Fork Texas Creek. The well was opened to the mitigation system on June 23, 2010. At 06:00 hours, the recorded wellhead and down-hole pressures were about 88 psia. At 18:00 hours on June 23, 2010, the recorded wellhead pressure had dropped to 11.31psia (atmospheric pressure) and the down-hole pressure had dropped to about 74.8 psia. The well was removed from the gas mitigation system on August 6, 2010 due to lack of demonstrated performance. At that time, the recorded wellhead pressure was still about 11.3 psia and the down-hole pressure was about 71 psia. The initial well pressure, 88 psia, was not sustained during system operation and there was no decrease in gas recovery system performance when the well was shut in on August 6, 2010. The well did not contribute enough gas to improve the gas recovery system operation.

Figure 2-6 shows a fairly rapid increase in well pressure after the well was shut in on August 18, 2010. The peak build-up pressure of about 85 psia on September 28, 2010 was followed by an erratic decline in well pressure. On January 1, 2012, the wellhead pressure was 79.99 psia and the down-hole pressure was 80.32 psia, which may suggest an incomplete well shut-in condition. The inspection of the well in 2011 revealed no fittings leaks at that time, however it is possible that leakage only occurs due to materials contraction during low surface temperatures in the winter months. Otherwise upper and lower transducer pressure trends tracked very closely during 2011 demonstrating a good well shut-in condition.

Figure 2-6
Pressure Transducer Data
South Fork Texas Creek Well MW-35-7-8-2



2.5 BP HIGHLANDS

Monitor well MW 34-7-15-1 has been monitored since November 19, 2009. Initial and ending well pressures and calculated water levels in the monitor well are summarized in Table 2-5 for the indicated period of record.

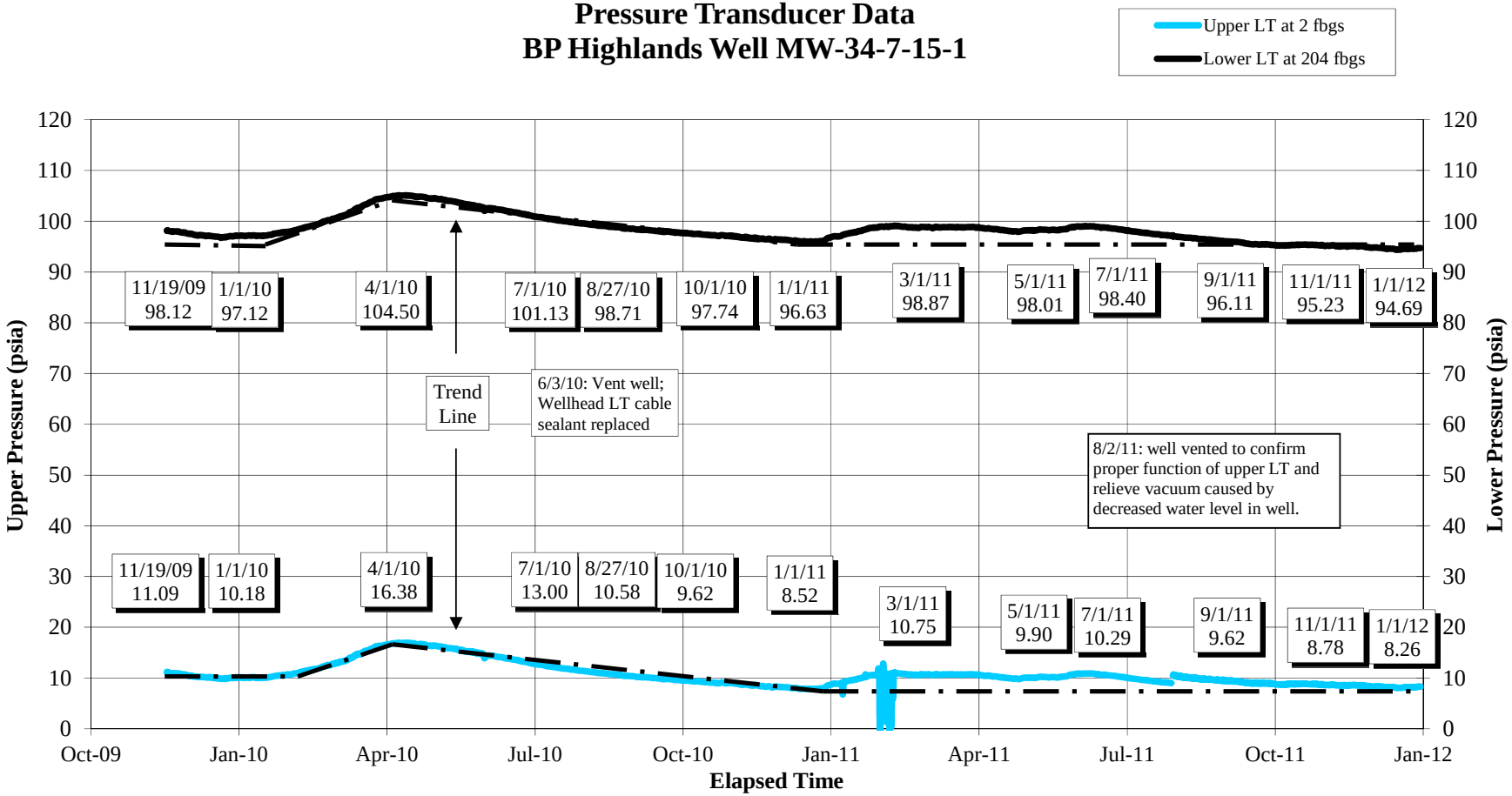
Table 2-5
Well Pressure Data Summary for BP Highlands Monitoring Well

Well ID and Transducers	Period of Record	Initial Shut-In Well Pressure psia	Ending Shut-In Well Pressure psia	Net Change in Well Pressure psi	Initial Water Level in Well fbgs	Ending Water Level in Well fbgs	Net Change in Water Level ft
MW 34-7-15-1 Upper	11/19/09 to 1/1/12	11.09	8.26	-2.83	3.13	4.52	-1.39
Lower		98.12	94.69	-3.43			

Monitoring data for MW 34-7-15-1 are plotted in Figure 2-7. As summarized in Table 2-5 for the 2-year period of record, the net change in down-hole pressures is a decrease of 3.43 psi. The wellhead pressure curve and the down-hole pressure curve follow the same trend with an initial rise in pressure through April 1, 2010 then a steady decline through late December 2010. The net change in the calculated water level in the well is a decrease of 1.39 feet. As noted on Figure 2-7, water flowed from the well at a rate of 0.25 gallons per minute (gpm) when the well was vented for maintenance on June 3, 2010. For charting purposes, the water level in the shut-in well is estimated to be slightly above ground surface with the upper transducer under water at 2 fbgs.

The wellhead pressure started dropping below atmospheric pressure around August 12, 2010. This condition suggested either a potential problem with the upper transducer or a well pressure vacuum effect created in a completely shut-in well under declining water level conditions. A well instrumentation inspection and barometric pressure check conducted in 2011 confirmed the proper function of the upper transducer and venting the well allowed for physical confirmation that the well was under vacuum pressure conditions.

Figure 2-7
Pressure Transducer Data
BP Highlands Well MW-34-7-15-1



2.6 BEAVER CREEK RANCH

Well MW 35-6-17-1 has been monitored since May 21, 2002 and well MW 35-6-17-2 has been monitored since November 30, 2001. Initial and ending well pressures and calculated water levels in the monitor wells are summarized in Table 2-6 for the indicated period of record. The access agreement to the Beaver Creek Ranch location expired following the August 2011 site inspection. COGCC staff is attempting to negotiate a new access agreement to continue full use including access for maintenance.

Table 2-6
Well Pressure Data Summary for Beaver Creek Ranch Monitoring Wells

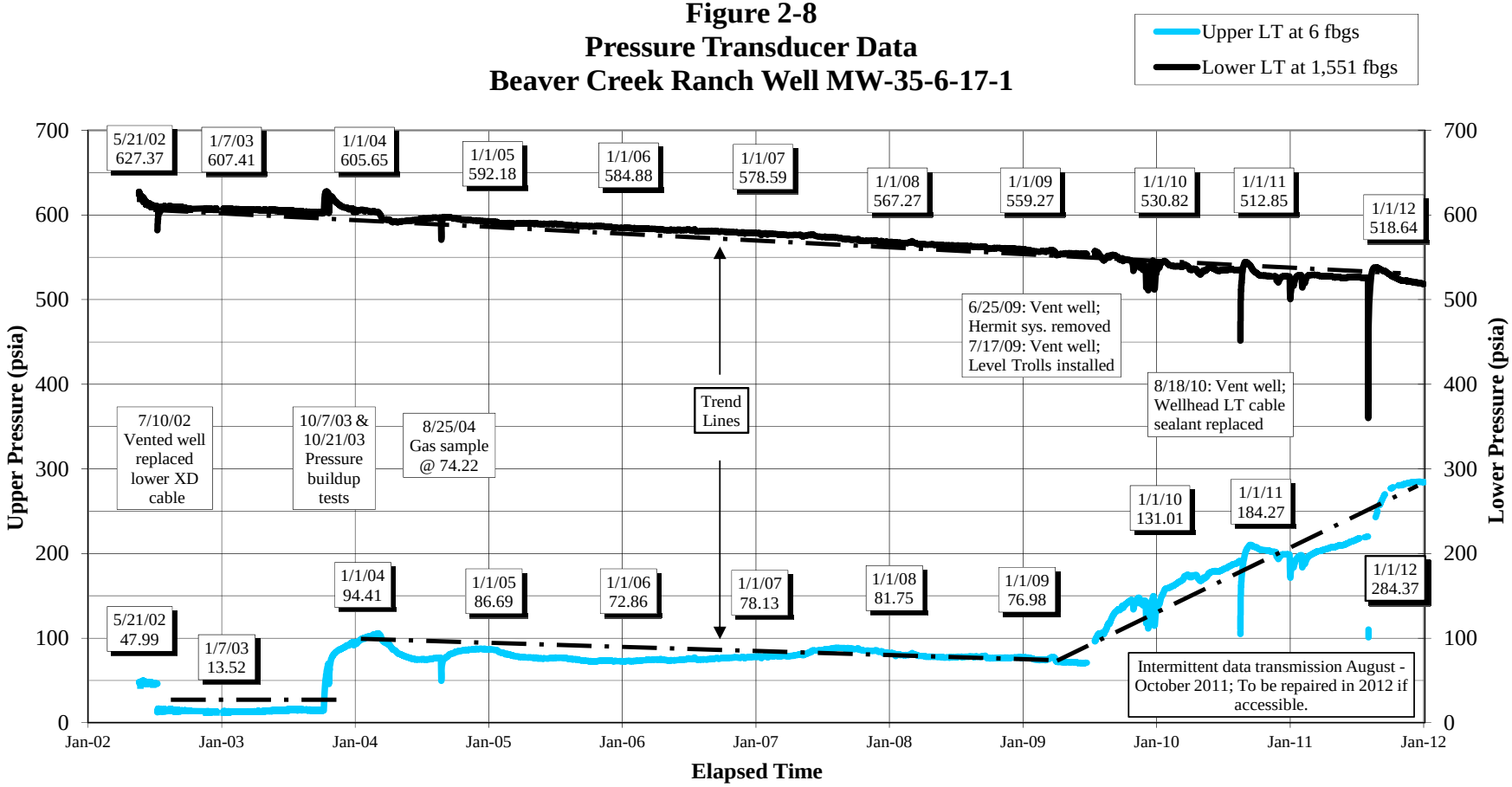
Well ID and Transducers	Period of Record	Initial Shut-In Well Pressure psia	Ending Shut-In Well Pressure psia	Net Change in Well Pressure psi	Initial Water Level in Well fbgs	Ending Water Level in Well fbgs	Net Change in Water Level ft
MW 35-6-17-1 Upper	08/01/02 to 1/1/12	15.44	284.37	268.93	194.37	1010.59	-816.22
Lower		609.55	518.64	-90.91			
MW 35-6-17-2 Upper	06/15/02 to 1/1/12	614.27	474.92	-139.35	1,377.64	1,375.46	2.18
Lower		632.63	460.90	-171.73			

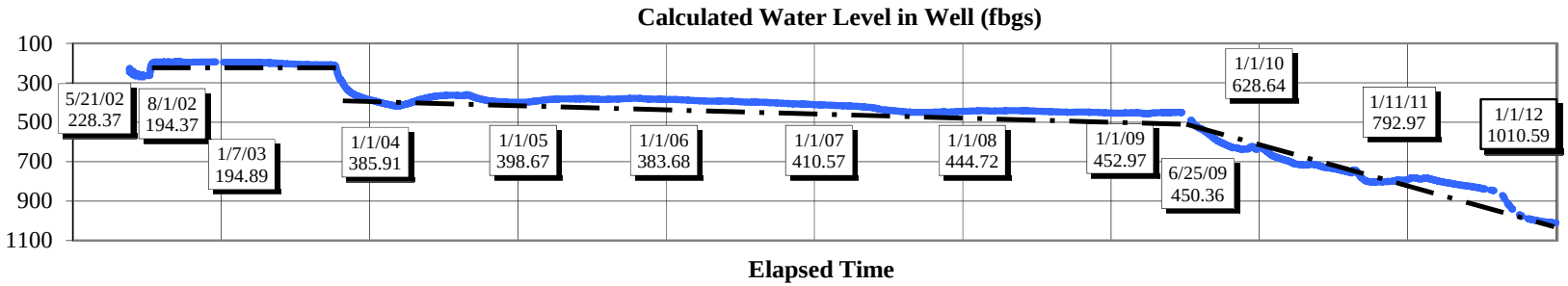
2.6.1 MW 35-6-17-1

Monitoring data for well MW 35-6-27-1 are charted on Figure 2-8. As shown in Table 2-6, the pressure regime for this well is different than the regime exhibited by well MW 35-6-17-2.

Table 2-6 and Figure 2-8 show a net increase of 268.93 psi in wellhead pressure, a net decline of 90.91 psi in down-hole pressure and a corresponding net decline of 816.22 feet in the water level in the well for the entire 9-year period of record. Figure 2-8 also shows a steady decline in bottom-hole pressure curve for the period of record, while the wellhead pressure curve shows two notable increases in the well pressure regime. Both increases in wellhead pressure suggest stimulation of gas flow into the well with corresponding declines in the water level occurred in response to venting the well in July 2003, June and July 2009 and August 2011. However, the most substantial cause for gas pressure increase during the period of record was the replacement of monitoring equipment and minimization of fittings leakage in July 2009. A significant leak was again repaired during the 2011 well inspection. These fittings and also an upper transducer communication problem causing intermittent data collection in the second half of 2011 will be investigated and repaired as necessary if this site is accessible in 2012.

Figure 2-8
Pressure Transducer Data
Beaver Creek Ranch Well MW-35-6-17-1





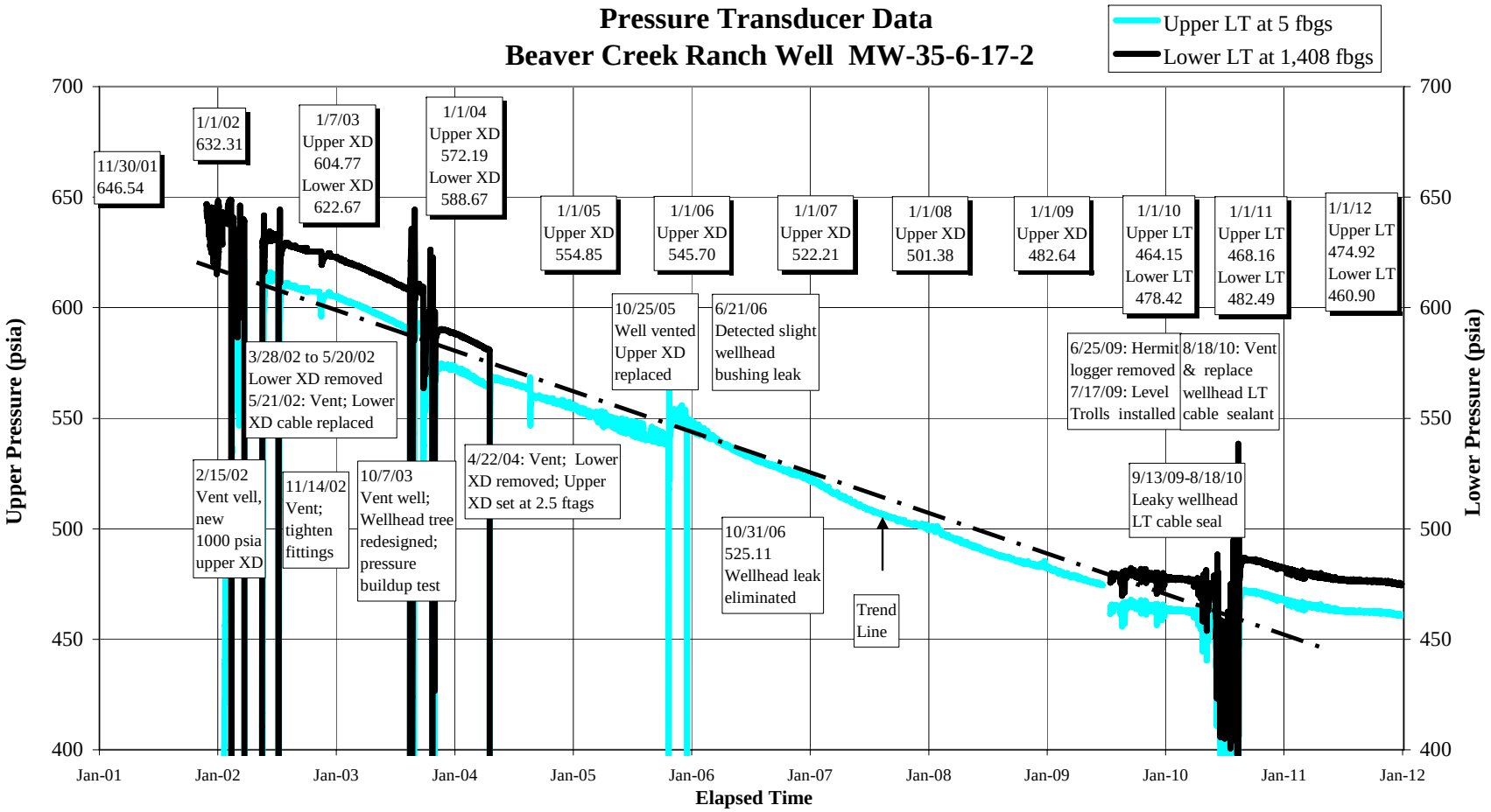
2.6.2 MW 35-6-17-2

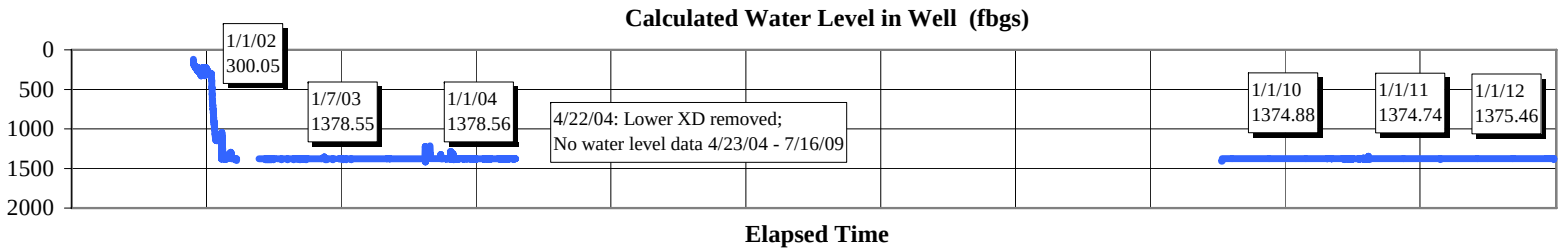
Wellhead pressure, down-hole pressure, and calculated well water level data for well MW 35-6-17-2 are charted in Figure 2-9 and summarized in Table 2-6 for the period of record. Monitoring of down-hole pressure was terminated after the lower transducer was removed from the well for the period of record between April 22, 2004 and June 25, 2009. The Hermit data logger and wellhead PXD pressure transducer were removed on June 25, 2009. New wellhead and down-hole Level Trolls were installed in well MW 35-6-17-2 on July 17, 2009 to re-enable monitoring of both wellhead and down-hole pressure regimes and the water level in the well.

Figure 2-9 shows the well pressure in a declining trend for the entire period record. There is a notable shift in the well pressure curve following the installation of Level Troll instruments on July 17, 2009, followed by erratic well pressure spikes associated with incomplete shut-in through August 17, 2010. After the well was vented August 18, 2010 to replace the Level Troll cable fitting sealants, there was a steady build-up of well pressure through early September 2010 followed by a return to a declining trend through December 2011. This may be a result of an incomplete shut-in condition as a small leak was found at a two pipe fittings on the wellhead during the 2011 inspection. The fittings were not tightened at that time due to concern of further damage to the fittings causing an increase in leak-off.

As shown on Figure 2-9, no water level data is available for the 6-year period of record when there was only one well pressure transducer. Well pressure data available after installation of wellhead and down-hole Level Trolls on July 19, 2009 shows essentially no net change in the water level. The calculated water level was 1,375.9 fbgs on April 22, 2004 as compared with 1,375.46 fbgs on January 1, 2012.

Figure 2-9
Pressure Transducer Data
Beaver Creek Ranch Well MW-35-6-17-2





2.7 SHAMROCK MINES

Well MW 35-6-13-1 monitoring data are charted in Figures 2-10 and summarized in Table 2-7 for the entire 9.5-year period of record. Since there are no producing wells in close proximity to this area, this well is used to collect background data and has been monitored continuously since May 22, 2002.

Table 2-7
Well Pressure Data Summary for Shamrock Mines Monitoring Well

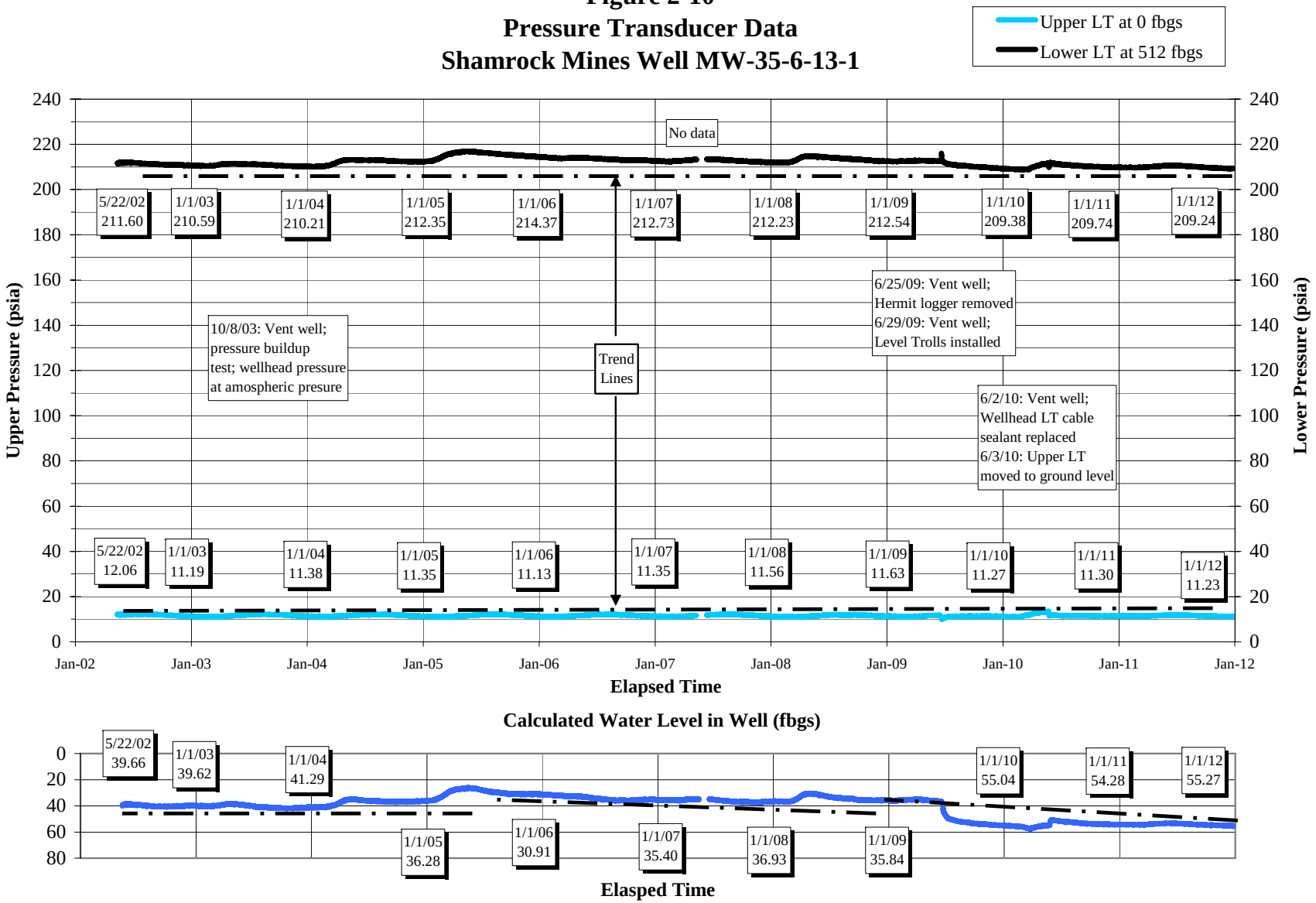
Well ID and Transducers	Period of Record	Initial Shut-In Well Pressure psia	Ending Shut-In Well Pressure psia	Net Change in Well Pressure psi	Initial Water Level in Well fbgs	Ending Water Level in Well fbgs	Net Change in Water Level ft
MW 35-6-13-1 Upper	5/22/02 to 1/1/12	12.06	11.23	Atmospheric Pressure	39.66	55.27	-15.61
Lower		211.60	209.24	-2.36			

1 On May 26, 2005, the measured down-hole pressure (216.89 psia) and calculated depth to water (26.53 ft) in well MW 35-6-13-1 were at their highest levels for the period of record.

Figures 2-10 shows the wellhead pressure regime continues to be at atmospheric pressure and fluctuates within a range of 2 psi (between 10 psia and 12 psia). During the months of April and May 2010, the wellhead pressure steadily increased to around 13.4 psia. Wellhead pressure returned to the historic atmospheric pressure trend after the Level Troll wellhead cable sealants were replaced on June 2, 2010.

Figure 2-10 also shows the down-hole pressure and calculated water level in the well continued to exhibit a similar pattern of seasonal fluctuation within the overall declining well pressure trend for the period of record since April 2005. With wellhead pressure equal to atmospheric pressure, fluctuation of down-hole pressure is attributable to the fluctuation of the water level in the well.

Figure 2-10
Pressure Transducer Data
Shamrock Mines Well MW-35-6-13-1



3.0 ARCHULETA COUNTY MONITORING WELL DATA SUMMARY

Monitoring well pressure was measured and recorded twice daily (12-hour interval) at the 4 monitoring well sites located in Archuleta County, Colorado. Applicable well pressure and calculated water level data for the entire period of record for each monitoring well are plotted in annotated charts.

3.1 WAGON GULCH

Monitor wells MW 34-5-4-1 and MW 34-5-4-2 have been monitored since December 2, 2008. Initial and ending monitoring well pressures and calculated water levels in the wells for the period of record are summarized in Table 3-1.

Table 3-1
Well Pressure Data Summary for Wagon Gulch Monitoring Wells

Well ID and Transducers	Period of Record	Initial Shut-In Well Pressure psia	Ending Shut-In Well Pressure psia	Net Change in Well Pressure psi	Initial Water Level in Well fbgs	Ending Water Level in Well fbgs	Net Change in Water Level ft
MW 34-5-4-1 Upper	12/26/08 to 1/1/12	50.14	20.14	-30.0	650.74	290.63	360.11
Lower		131.88	261.68	129.8			
MW 34-5-4-2 Upper	5/1/09 to 1/1/12	48.5	50.89	2.39	Upper transducer is under water at 2.5 ft below ground level		
Lower		391.07	380.02	-11.05			

3.1.1 MW 34-5-4-1

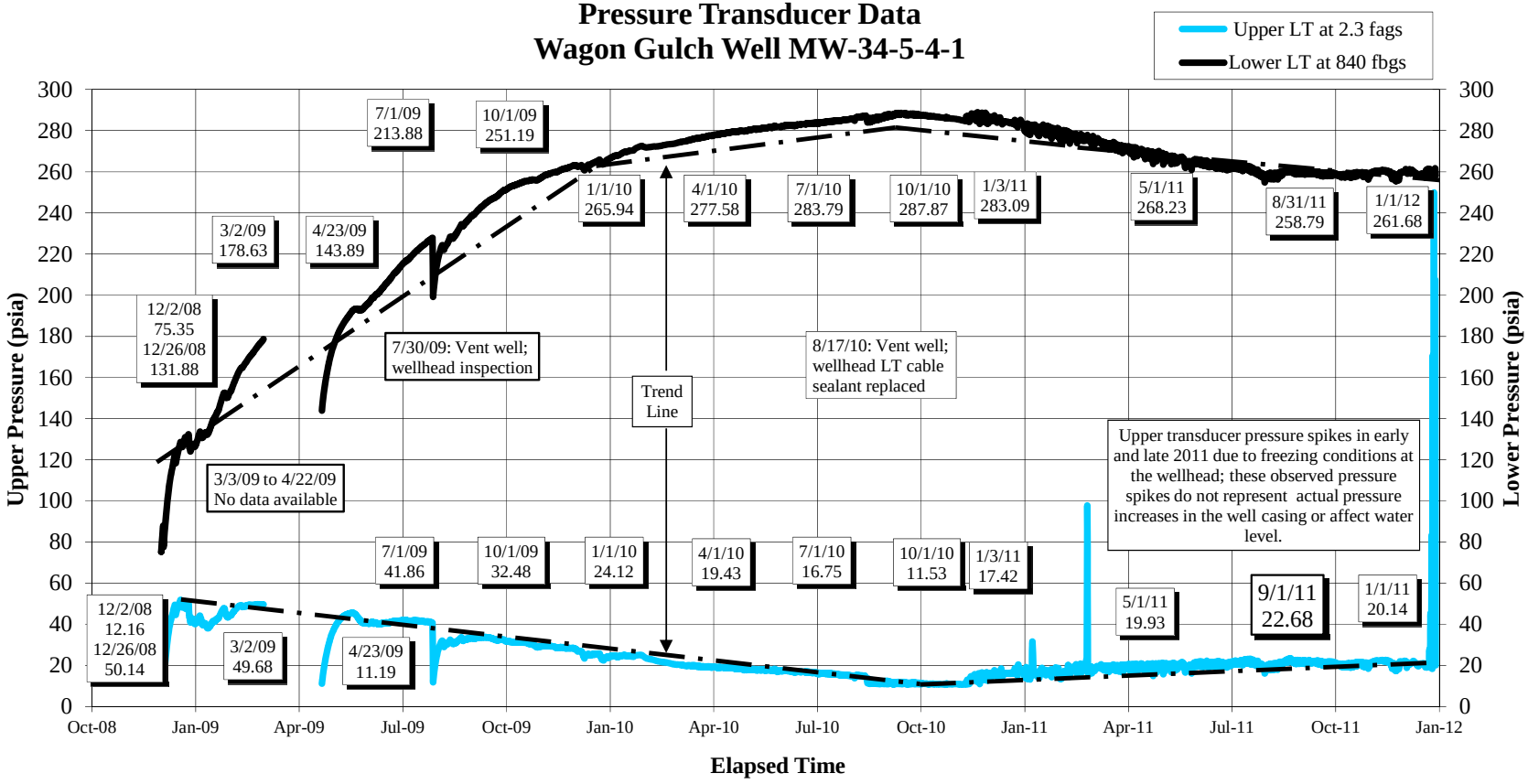
Figure 3-1 charts the upper and lower pressure transducer data and the calculated water level in the well. Although the well was shut in for monitoring on December 2, 2008, the wellhead pressure did not reach an initial stable pressure of about 50.1 psia until December 26, 2008, 24 days after shut-in. Table 3-1 and Figure 3-1 show a 30 psi net decline in wellhead pressure for the entire 3-year period of record from December 26, 2008 (50.14 psia) to January 1, 2012 (20.14 psia). Figure 3-1 shows the trend of decreasing wellhead pressure continued in 2010 until the trend reversed in mid-November 2010. Between November 14, 2010 and December 31, 2010, the wellhead pressure curve on Figure 3-1 shows a steady increase in pressure from about 11 psia to 20.14 psia.

Table 3-1 and Figure 3-1 show a net increase in down-hole pressure of 129.8 psi for the entire 3-year period of record from December 26, 2008 (131.88 psia) to January 1, 2012 (261.68 psia). The well pressure increase is primarily due to the 360 feet of net water level rise in the well since December 26,

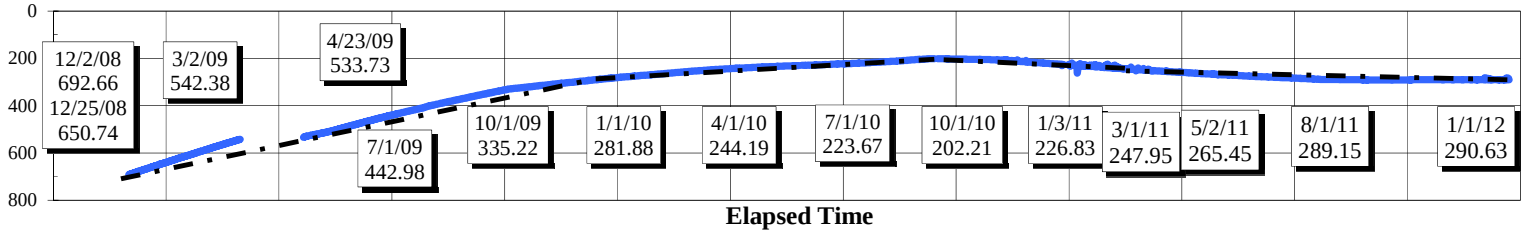
2008. Figure 3-1 shows the trend of rising water level with corresponding increasing down-hole pressure continued in 2010 until the trend reversed in mid-September 2010. This may be related to the transducer cable sealant being changed on August 17, 2010 and possibly eliminating a partial shut-in condition. Between October 1, 2010 and December 31, 2010, Figure 3-1 shows the water level decreased about 21.2 feet while the down-hole pressure decreased about 2.7 psia.

During early 2011 two upper transducer pressure spikes occurred due to the pressure transducer freezing within its deployment location in the wellhead 2.3 feet above ground surface. These are not actual increases in gas pressure within the well casing, but rather caused when the air volume next to the transducer inlet is trapped and then compressed by expanding ice. When the 2011 well inspection was conducted at MW 34-5-4-1 the well was vented to ensure that the transducer would return to atmospheric pressure; this test successfully showed that the transducer continued to function properly and was not damaged. Equipment was not available at that time to lower the transducer to prevent it from freezing again. In late December 2011 another freeze-related pressure spike occurred causing on artificial pressure increase of approximately 230 PSI. The transducer appears to have recovered after surface temperatures warmed but the transducer will be inspected for damage and lowered into the well similar to most other upper transducer installations in 2012 when safe access is possible.

Figure 3-1
Pressure Transducer Data
Wagon Gulch Well MW-34-5-4-1



Calculated Water Level in Well (fbgs)



3.1.2 MW 34-5-4-2

Figure 3-2 charts the upper and lower pressure transducer data and the estimated water level in the well. Although the well was shut in for monitoring on December 4, 2008, a well pressure build-up to a stable down-hole pressure of about 391 psi and wellhead pressure of about 47-48 psia were not confirmed until May 2009. No data are available from February 15, 2009 to April 23, 2009 due to pressure transducer malfunction.

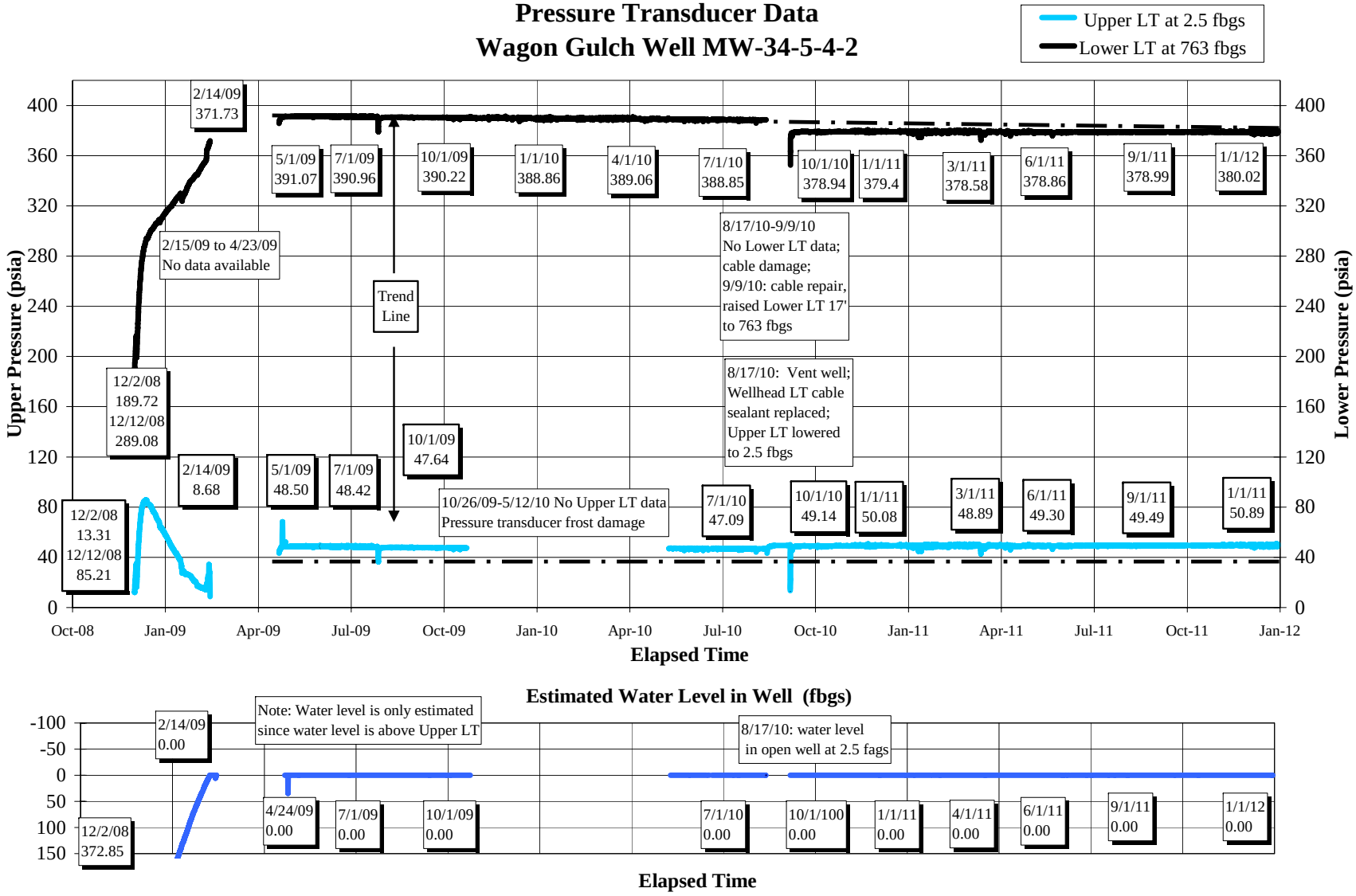
Figure 3-2 shows a relatively constant wellhead pressure of about 47 - 48 psia between April 24, 2009 and October 25, 2009. An erratic pressure spiking pattern between October 26, 2009 and May 12, 2010 suggested wellhead Level Troll pressure sensor freeze damage, so the data were omitted from Figure 3-2. Between May 13, 2010 and August 16, 2010 the wellhead pressure remained fairly constant at around 47 psia

Freeze damage to the upper Level Troll pressure transducer sensor was confirmed after the well was vented on August 17, 2010. As noted on Figure 3-2, the water level inside the open wellhead was at a height of about 2.5 feet above ground level. The new upper Level Troll was changed from an external mount to an internal depth setting of 2.5 fbgs on August 17, 2010 to protect the transducer sensor from freezing conditions. After well shut-in on August 17, 2010, Figure 3-2 shows a relatively rapid return of wellhead pressure to an average constant pressure of about 50 psia.

The lower Level Troll cable was damaged during replacement of Level Troll wellhead cable sealants on August 17, 2010. Cable repair performed on September 9, 2010 included raising the Level Troll 17 feet from 780 fbgs to 763 fbgs. As a result of this change, Figure 3-2 shows a shift in the down-hole pressure curve to a corrected constant down-hole pressure regime of 378-379 psia.

As noted above, the water level was inside the open wellhead at a height of about 2.5 feet above ground level on August 17, 2010. The wellhead pressure build-up after shut-in may reflect water and/or gas pressure build-up. For charting purposes, the water level in the shut-in well is estimated to be at or near ground surface above the upper Level Troll (set at 2.5 fbgs). However, there is a possibility that the observed build-up in wellhead pressure is from gas pressure, which could result in a downward displacement of the water in the well to some level below the upper Level Troll. The current monitoring scheme for observing shut-in well pressure does not include the capability of determining the source(s) of wellhead pressure build-up in response to complete well shut-in. As an alternative, the well will be vented in 2012 when the site is safely accessible to check for artesian water flow from the well and/or venting of gas under atmospheric pressure conditions.

Figure 3-2
Pressure Transducer Data
Wagon Gulch Well MW-34-5-4-2



3.2 FOSSET GULCH

Monitor wells MW 34-5-14-1 and MW 34-5-14-2 have been monitored since December 4, 2008. Initial and ending monitoring well pressures and calculated water levels in the wells for the period of record are summarized in Table 3-2. Data loss occurred from 4/11/11 to 4/27/11 following damage caused during earlier pipeline construction adjacent to both monitoring wells damaged buried transducer cables linking the wells to the telemetry station. The cables were replaced on 4/27/12 and normal data collection and transmission resumed.

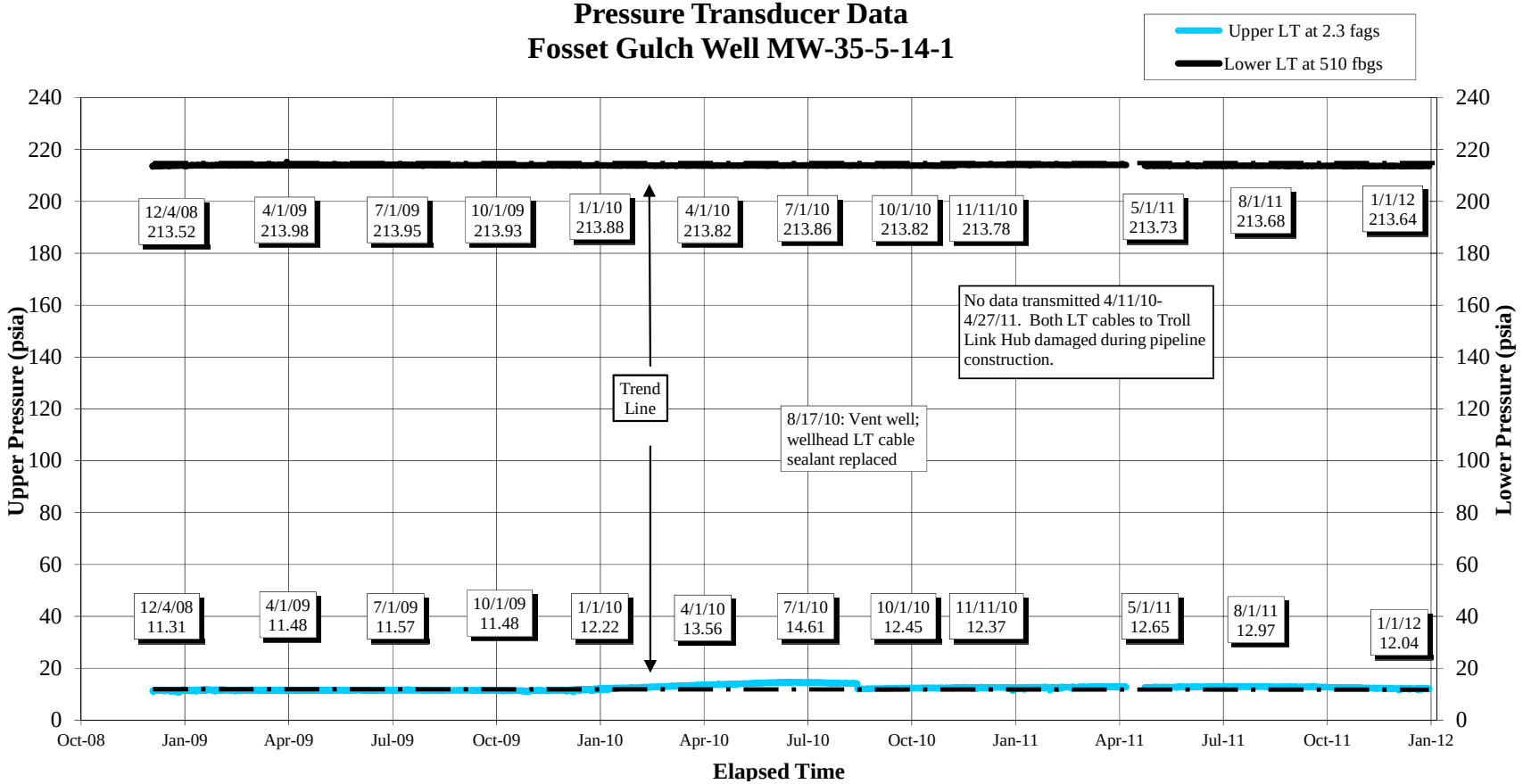
Table 3-2
Well Pressure Data Summary for Fosset Gulch Monitoring Wells

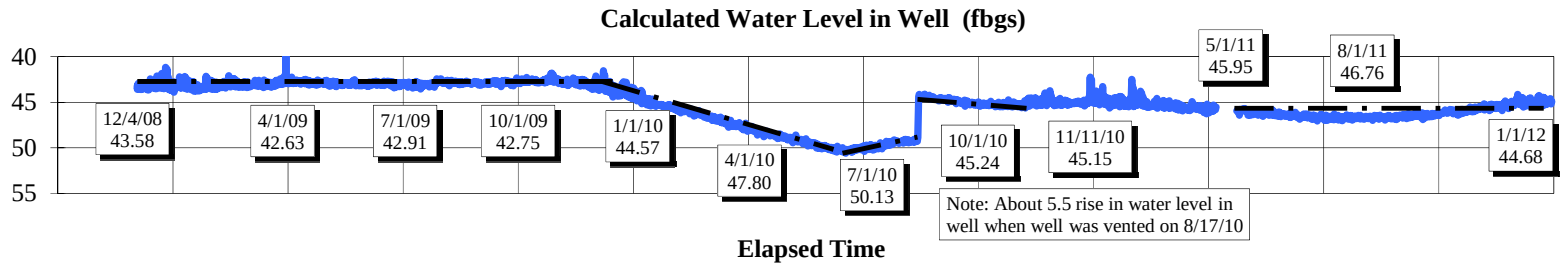
Well ID and Transducers	Period of Record	Initial Shut-In Well Pressure psia	Ending Shut-In Well Pressure psia	Net Change in Well Pressure psi	Initial Water Level in Well fbgs	Ending Water Level in Well fbgs	Net Change in Water Level ft
MW 34-5-14-1 Upper	12/4/08 to 1/1/12	11.31	12.04	0.73	43.58	44.68	-1.1
Lower		213.52	213.64	0.12			
MW 34-5-14-2 Upper	12/4/08 to 1/1/12	11.35	16.60	5.25	39.29	38.69	0.6
Lower		242.65	242.25	-0.4			

3.2.1 MW 34-5-14-1

Figure 3-3 charts the upper and lower pressure transducer data and the calculated water level in the well. Table 3-2 and Figure 3-3 show the wellhead pressure at atmospheric pressure prior to 2010 followed by a gradual increase in pressure through August 16, 2010 to 14.19 psia. Following the August 17, 2010 well maintenance event including venting, the wellhead pressure has remained relatively constant within a normal atmospheric pressure range of 11.5 psia through 13 psia through January 1, 2012. Figure 3-3 shows a stable down-hole pressure trend (213.5-213.9 psia) for the entire period of record. Figure 3-3 also shows a stable water level (42 fbgs and 43.5 fbgs) until November 2009, followed by a gradually declining water level trend through July 1, 2010 (50.13 fbgs). The water level increased to 49.28 fbgs until the well was vented on August 17, 2010. The water level immediately rose to 44.36 fbgs when the well was vented on August 17, 2010, but has since followed apparent gentle seasonal fluctuation through January 1, 2012. Altogether, the upper and lower transducer pressures and thus the calculated water level have remained relatively constant since the venting event in August 2010.

Figure 3-3
Pressure Transducer Data
Fosset Gulch Well MW-35-5-14-1



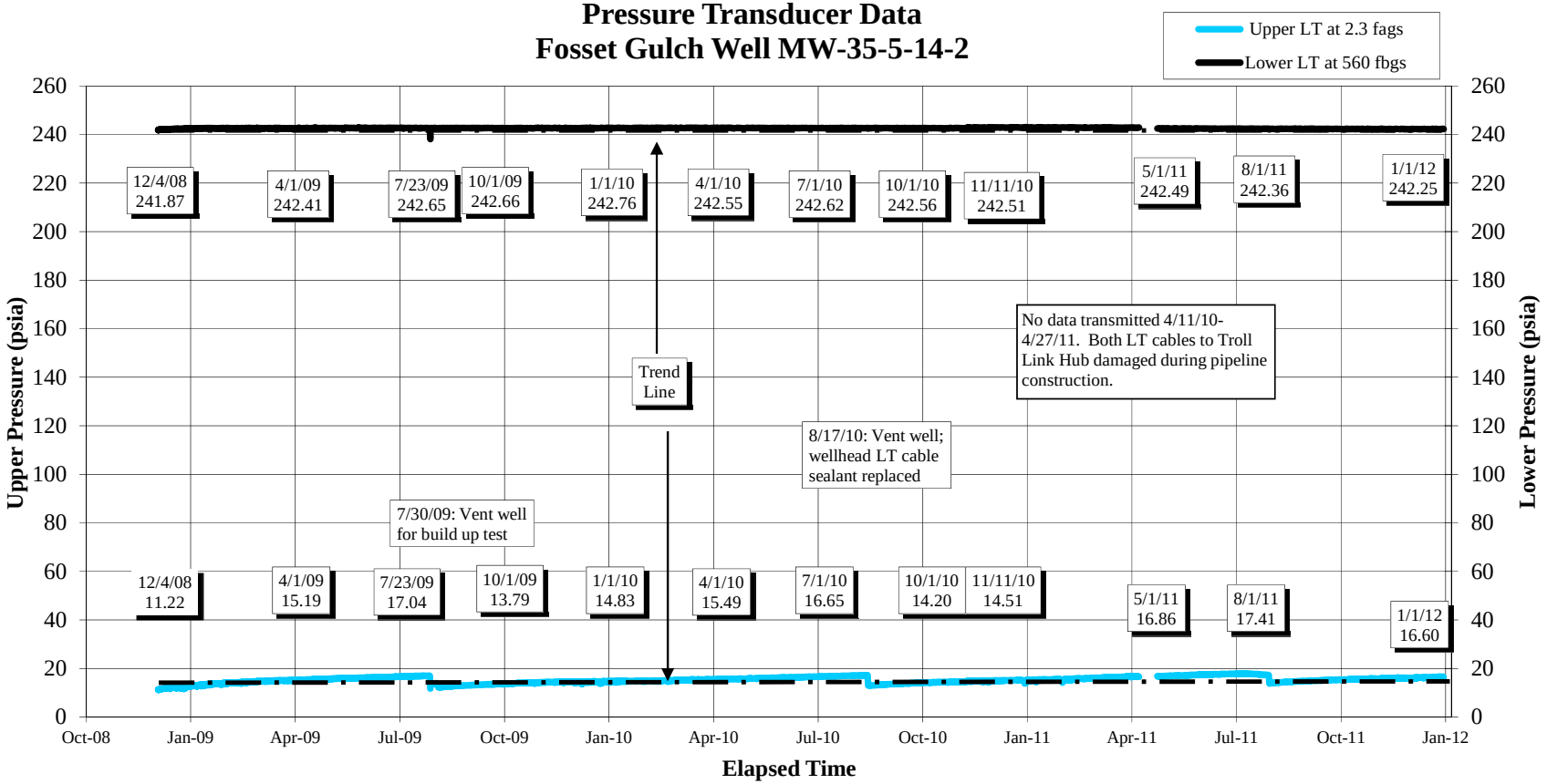


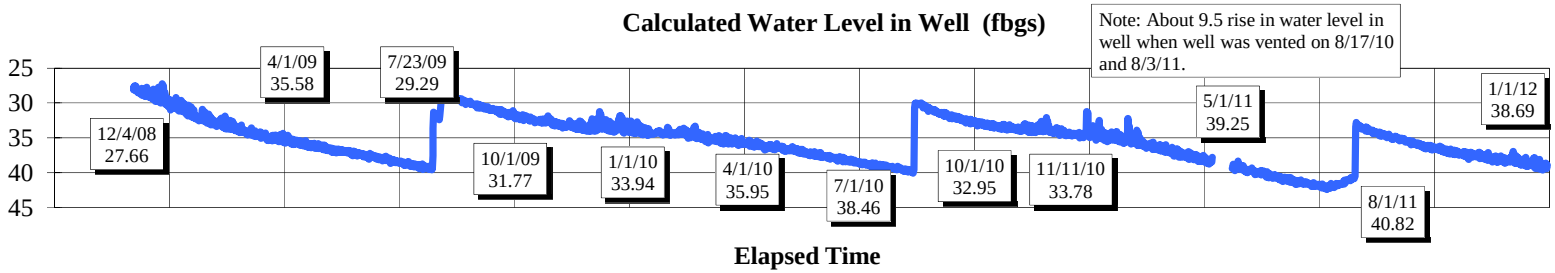
3.2.2 MW 34-5-14-2

Figure 3-4 plots the upper and lower pressure transducer data and the calculated water level in the well. Although the well was shut in for monitoring on December 4, 2008, wellhead pressure did not stabilize at about 17 psia until July 2009. Table 3-2 and Figure 3-4 show a net increase of about 5.25 psi in wellhead pressure for the period of record between December 4, 2008 (11.35 psia) and January 1, 2012 (16.60 psia). Figure 3-4 shows a stable down-hole well pressure trend for the entire period of record, with fluctuations ranging between a minimum pressure of 241 psia to a maximum pressure of 242.8 psia. The down-hole pressure was 242.22 psia on January 1, 2012.

Table 3-2 indicates a net water level rise of about 0.6 feet in the well as of January 1, 2012. However, Figure 3-4 shows that the wellhead pressure and water level on January 1, 2012 is approaching the same pressure regime exhibited prior to venting the well on July 23, 2009 and August 17, 2010. Although there is an immediate drop in wellhead pressure and corresponding rise in the water level each time the well is vented to the atmosphere, Figure 3-4 also shows the build-up in wellhead pressure takes two to four months to return to the pressure regime exhibited prior to each well venting event. Continued monitoring without venting the well for at least six months is expected to be required to confirm undisturbed well pressure conditions.

Figure 3-4
Pressure Transducer Data
Fosset Gulch Well MW-35-5-14-2





3.3 HIGHWAY 151

Monitor wells MW 34-4-30-1 and MW 34-4-30-2 have been monitored since December 3, 2008. Initial and ending monitoring well pressures and calculated water levels in the wells for the period of record are summarized in Table 3-3.

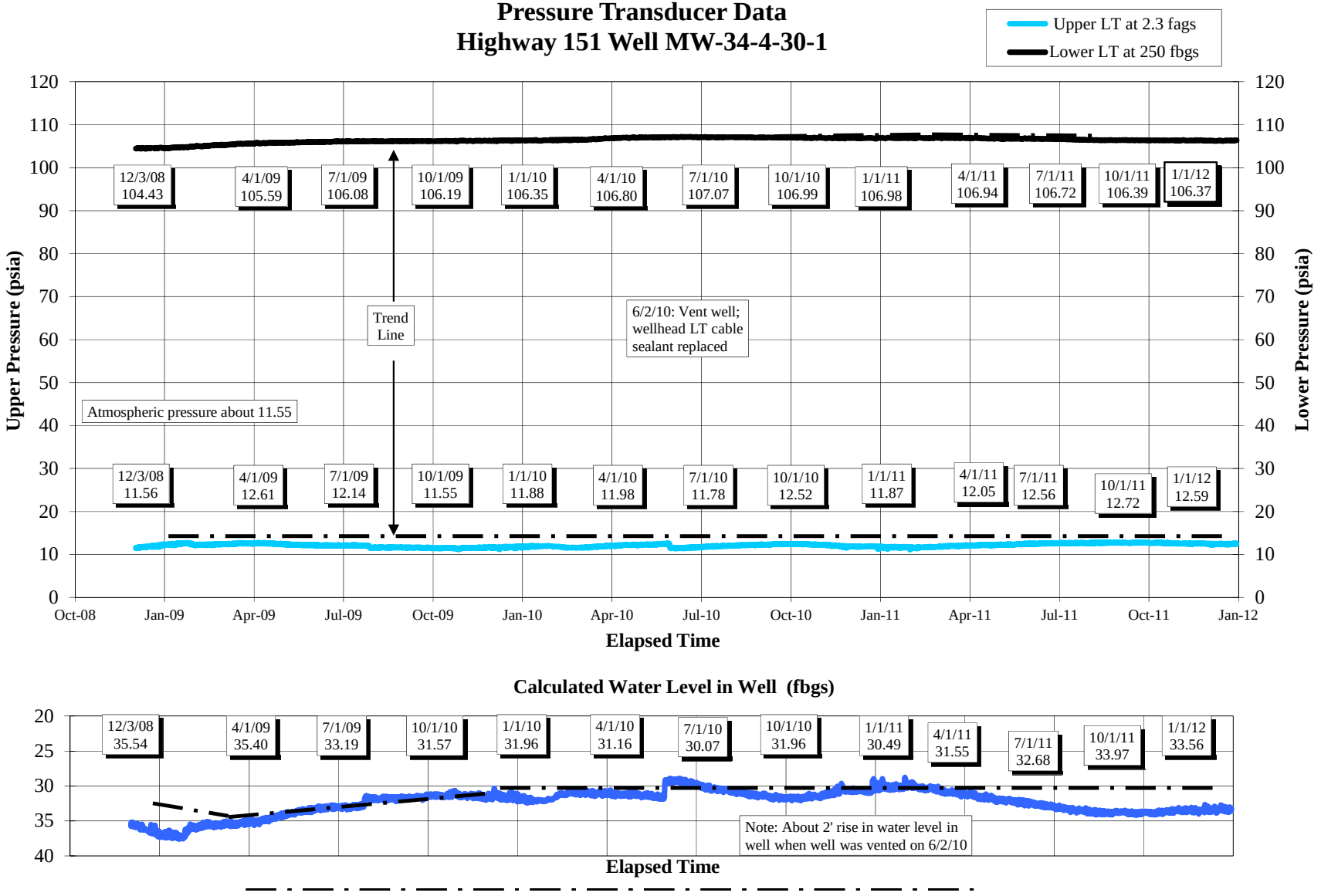
Table 3-3
Well Pressure Data Summary for Highway 151 Monitoring Wells

Well ID and Transducers	Period of Record	Initial Shut-In Well Pressure psia	Ending Shut-In Well Pressure psia	Net Change in Well Pressure psi	Initial Water Level in Well fbgs	Ending Water Level in Well fbgs	Net Change in Water Level ft
MW 34-4-30-1 Upper	12/3/08 to 1/1/12	11.56	12.59	Atmospheric Pressure	35.54	33.56	1.98
Lower		104.43	106.37	1.94			
MW 34-4-30-2 Upper	12/3/08 to 1/1/12	13.18	14.70	1.52	41.65	45.41	-3.76
Lower		129.59	129.36	-0.23			

3.3.1 MW 34-4-30-1

Figure 3-5 charts the upper and lower pressure transducer data and the calculated water level in the well. Table 3-3 and Figure 3-5 show a relatively stable well pressure regime with a stable wellhead pressure trend at atmospheric pressure, a stable down-hole pressure trend of about 106-107 psia, and a stable water level trend of 30- 33 fbgs since August 2009. Spike fluctuations in both wellhead pressure and the calculated water level shown on Figure 3-3 correspond to the immediate loss of pressure when the well is vented (e.g., June 2, 2010), followed by a gradual return to the well pressure regime exhibited prior to venting the well.

Figure 3-5
Pressure Transducer Data
Highway 151 Well MW-34-4-30-1

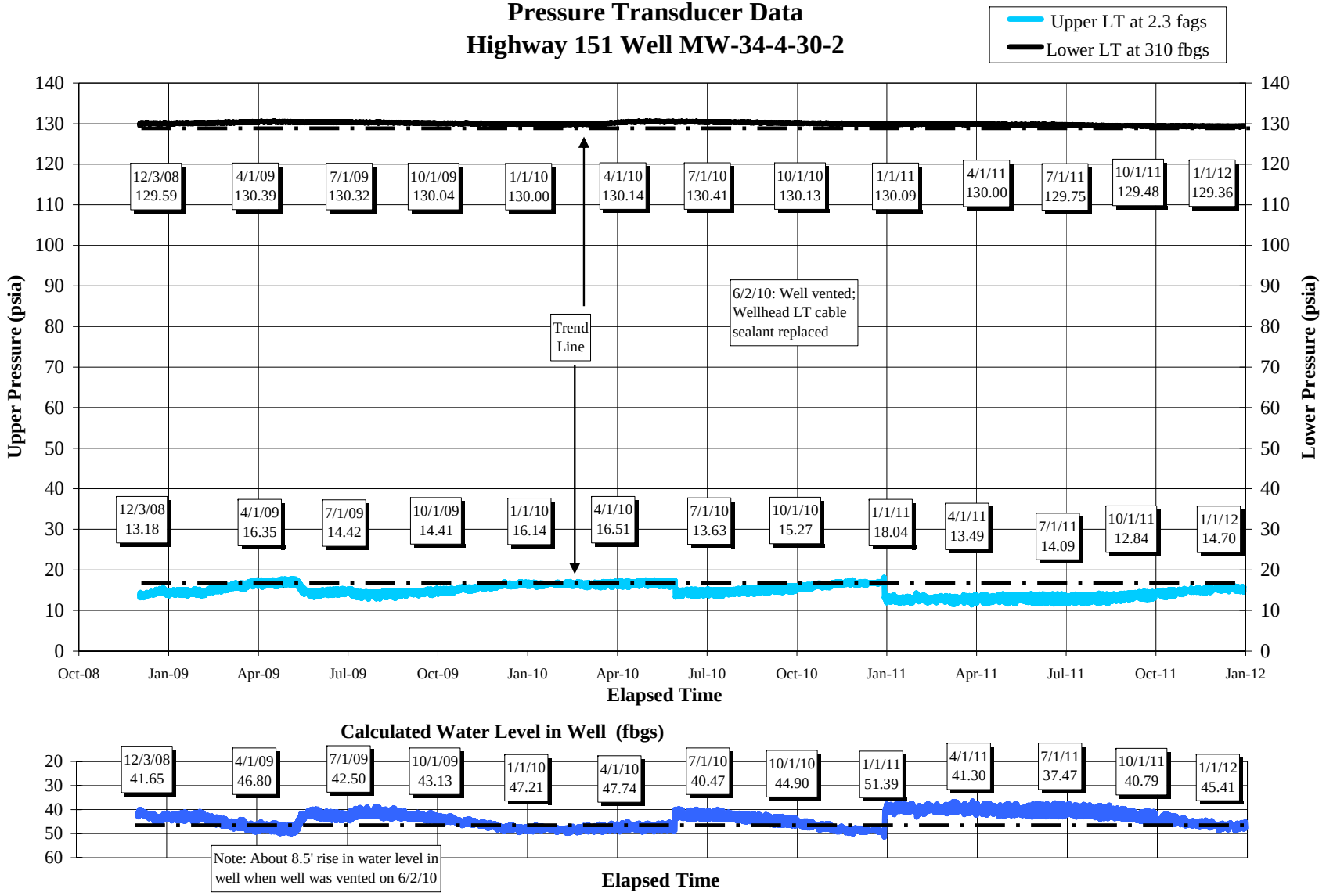


3.3.2 MW 34-4-30-2

Figure 3-6 charts the upper and lower pressure transducer data and the calculated water level in the well. Table 3-3 and Figure 3-6 shows a stable down-hole pressure trend with 0.5 psi change from 129.59 psia on December 3, 2008 to 129.36 psia on January 1, 2012. In addition, there was a net wellhead pressure increase of about 4.9 psi with a corresponding net decline of nearly 10 ft in the water level for the entire period of record from December 3, 2008 (13.18 psia) to January 1, 2012 (14.70 psia).

Similar to the Well 34-4-30-1 pressure regime for the period record, spike fluctuations in both wellhead pressure and the calculated water level correspond to the immediate loss of pressure when the well is vented (e.g., June 2, 2010), followed by a gradual return to the well pressure regime exhibited prior to venting the well. This includes an event on 1/1/11 in which there was a sudden loss of wellhead pressure to approximately atmospheric pressure. No COGCC field activities occurred on this date, but the pressure response is similar to the venting that was intentionally conducted on June 2, 2010.

Figure 3-6
Pressure Transducer Data
Highway 151 Well MW-34-4-30-2



3.4 DEEP CANYON

Monitor well MW 34-4-32-1 has been monitored since June 2, 2010. Initial and ending well pressures and calculated water levels in the monitor well are summarized in Table 3-4 for the indicated period of record.

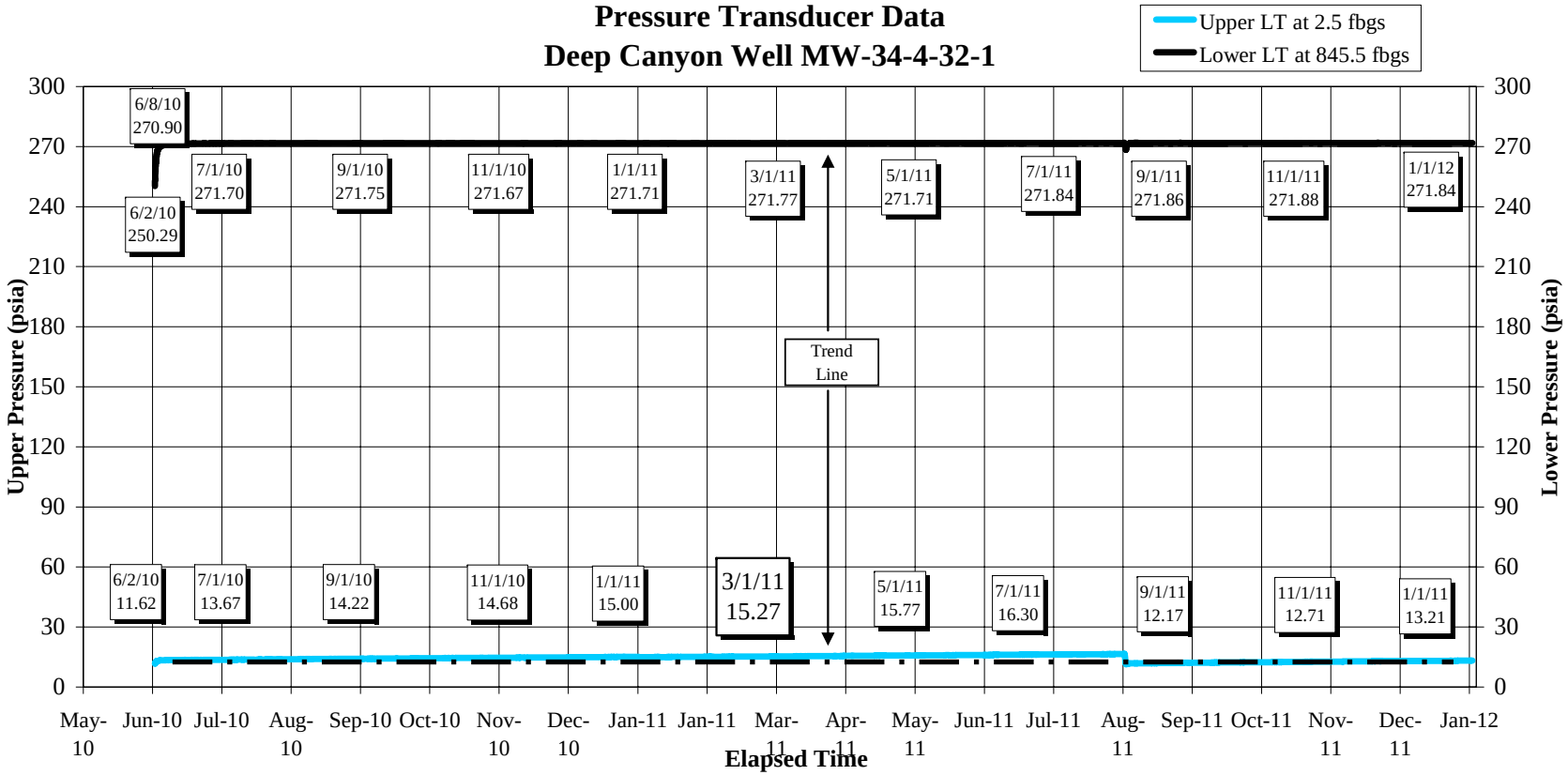
Table 3-4
Well Pressure Data Summary for Deep Canyon Monitoring Well

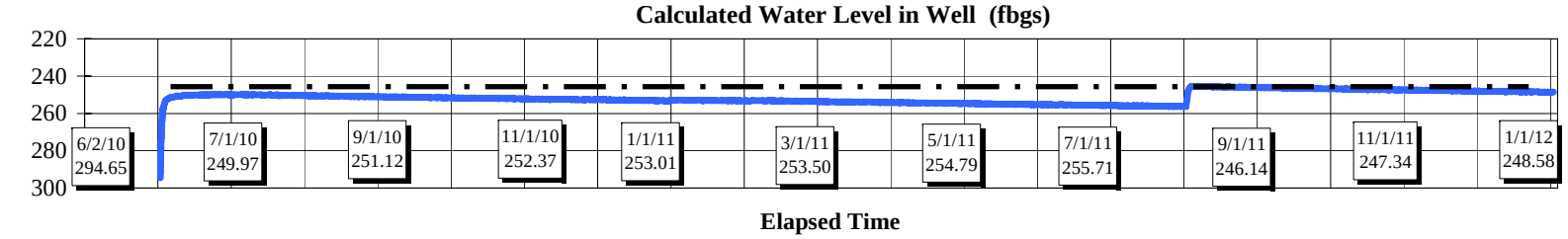
Well ID and Transducers	Period of Record	Initial Shut-In Well Pressure psia	Ending Shut-In Well Pressure psia	Net Change in Well Pressure psi	Initial Water Level in Well fbgs	Ending Water Level in Well fbgs	Net Change in Water Level ft
MW 34-4-32-1 Upper	6/8/10 to 1/1/12	13.41	13.21	-1.2	251.21	248.58	2.63
Lower		270.9	271.84	0.94			

3.4.1 MW 34-4-32-1

Figure 3-7 charts the upper and lower pressure transducer data and the calculated water level in the well. Table 3-4 and Figure 3-7 show the well pressure initially stabilized on June 8, 2010, six days after the well was shut in for monitoring on June 2, 2010. Prior to shut-in on June 2, 2010, Figure 3-7 shows the wellhead pressure at 11.62 psia (atmospheric pressure), down-hole pressure at 250.29 psia, and water level in the well at about 294 fbgs. By June 8, 2010, wellhead pressure had increased 1.8 psi to 13.41 psia, bottom-hole pressure had increased 20.4 psi to 270.7 psia, and the water level in the well had risen about 43 ft to 252.21 fbgs. Table 3-4 and Figure 3-7 also show a relatively stable well pressure regime for the 1.5 year period of record through January 1, 2012 with only a slight increase in well pressure and a corresponding water level decline of 1.8 feet in the well.

Figure 3-7
Pressure Transducer Data
Deep Canyon Well MW-34-4-32-1





4.0 FUTURE WORK

Future routine work will consist of periodic field checks of each monitoring system and remote retrieval of recorded pressure measurement data using the In-Situ Inc. TROLL® Link telemetry system and ISI Data Center. COGCC staff will schedule an inspection and testing of all wellhead components and instruments after the 2012 spring snowmelt period when all monitoring well sites are safely accessible.

APPENDIX A
4M PROJECT MONITOR WELL CHRONOLOGY

4M Project Monitor Well Chronology

Location	Well	2001				2002								
		Jan	Sep	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Oct - Nov	Dec
Basin Creek	MW 34-9-7-1	Jan. 24-28: Drill & install well	Sept. 27: Perforate well	Nov. 28: Set up telemetry unit; replace bad xds cables	Survey	Jan. 18:Tighten wellhead fittings; rewire telemetry sys	Replace telemetry 12v battery sys, In-Situ assist							Lost telemetry communitcation with data logger
	MW 34-9-7-2								April 24-25: Drill & install well	May 5: Perforate well May 9: Fish out cable May 22: Install xds	Survey			
Palmer Ranch	MW-35-8-19-1													
Fiddler	MW-35-8-10-1													
South Fork Texas Creek	MW 35-7-8-1		Sept. 17-20: Drill/install well; Sept. 27: Perforate well	Nov. 29: Set up telemetry unit; replace bad xd cables	Survey	Jan. 18: Tighten wellhead fittings; rewire telemetry sys	Replace telemetry 12v battery sys, In-Situ assist			May 21: Ck for leaks				Dec. 4: Data lost through end of year due to Hermit internal battery failure; lost telemetry communitcation with data logger Dec 7: Tightened wellhead fittings
	MW 35-7-8-2		Sept. 20-21: Drill/install well Sept. 27: Perforate well	Nov. 29: Set up telemetry unit; replace bad xd cables	Survey	Jan. 18: Tighten wellhead fittings				May 21: Ck for leaks			Oct 25: Vent well; replaced strain relief fittings; shut in well	
BP Highlands	MW-34-7-15-1													
Beaver Creek Ranch	MW 35-6-17-1						Replace telemetry 12v battery sys, In-Situ assist	Mar. 5-Apr 4: Drill & install well		May 2: Perforate well; May 20-21: Install xds	Survey	July 10: Replace lower xd cable with unvented cable		Dec 13: Insp by Raymond Const.- no wellhead gas leak; logger batt @ 0% capacity; modem problem Dec. 19: Data lost through end of year due to bad data logger bkup battery
	MW 35-6-17-2		Sept. 22-Oct. 4: Drill/install well	Nov. 26: Perforate well Nov. 27: Set up telemetry unit	Survey	Jan. 17 - Install new xd cables with SwageLok fittings; rewire telemetry unit			Apr 8: Pull lower xd cable; no data Apr 8 to May 20	May 21: Install unvented, heavy duty xd cable; shut in well		Gas leak @ top bushing; July 10: Vent well & ck bushing seals; July 11: shut in well	Nov. 14: Vent well; replaced valve and reseal all connections	
Shamrock Mines	MW 35-6-13-1									May 3-7: Drill/install well May 10: Perforate well May 20, 21: Install pad, telemetry & data logger systems, & xds	Survey			Lost telmetry communitcation with data logger
Wagon Gulch	MW-34-4-30-1													
	MW-34-4-30-2													
Fosset Gulch	MW-35-5-14-1													
	MW-35-5-14-2													
Highway 151	MW-34-4-30-1													
	MW-34-4-30-2													
Deep Canyon	MW-34-4-32-1													

4M Project Monitor Well Chronology

Location	Well	2003					2004		
		Jan	Feb - Apr	May - Jun	Aug	Oct - Dec	Jan - Mar	Apr	Aug
Basin Creek	MW 34-9-7-1	Jan 20: New well 34-9-7-1 upper xd (30 psig, sn 7201); rewire pwr regultr; replace logger bkup lith. batt; re-flash modem memory; enable modem auto pwr-up	Telemetry system malfunction	May 20: Replace modem and cell phone	Aug 21: Vent both wells and tighten wellhead xd cable strain relief fittings	Oct 8: Conduct rapid blowdown & shutin test			Aug 25: New data logger battery pack; vent well; gas sample
	MW 34-9-7-2				Aug 21: Vent both wells and tighten wellhead xd cable strain relief fittings	Oct 8: Conduct rapid blowdown & shut-in test		Apr 23: vent well & raise upper xd from 5 fbgs to ground surface	Aug 25: vent well; raise upper xd to 1.65 ft above ground; gas sample
Palmer Ranch	MW-35-8-19-1								
Fiddler	MW-35-8-10-1								
South Fork Texas Creek	MW 35-7-8-1	Jan 20: rewire pwr regultr; replace logger bkup lith. batt; re-flash modem memory; enable modem auto pwr-up	Telemetry system malfunction;	June 16: lower xd failed		Oct 8: Well pressure buildup test	No data reported for 6/16/03 to 4/22/04 - lower xd failed	Apr 22: vent well; temperarily replaced lower xd with 1000 psia xd	Aug 25: New data logger battery pack; vent well; tighten xd fittings; gas sample
	MW 35-7-8-2			May 20: Replace modem and cell phone		Oct 8: Well pressure buildup test	Well pressure data suggest that wellhead xd cable strain relief fittings leak intermittently in winter	Apr 22: vent well; replaced strain relief fittings	Aug 25: vent well; tighten xd fittings replace lwr 1000 psia xd with new 500 psia xd; gas sample
BP Highlands	MW-34-7-15-1								
Beaver Creek Ranch	MW 35-6-17-1	Jan 7 & Jan 21: No wellhead gas leak @ MW35-6-17-2 Jan 21: rewire pwr regultr; replace logger bkup lith. batt; re-flash modem memory; enable modem auto pwr-up	Telemetry system malfunction	May 20: Replace modem and cell phone;		Oct 7 & 21: Well pressure buildup test			Aug 24: New data logger battery pack; vent well; Aug 25: gas sample
	MW 35-6-17-2		Wellhead bushing leak	May 20: Wellhead bushing leak; wellhead assembly to be redesigned	Aug 20: New flanged wellhead assembly; xd cable leak at swagelok fitting	Oct 8 & 21: Well pressure buildup test; wellhead leaks @ pressure >570 psia;	Wellhead leaks @ pressure >570 psia	Apr 22: vent well/removed lower xd; attached upper xd externally to wellhead; no leaks	Aug 24: vent well; Aug 25: gas sample
Shamrock Mines	MW 35-6-13-1	Jan 21: rewire pwr regultr; replace logger bkup lith. batt; re-flash modem memory; enable modem auto pwr-up	Telemetry system malfunction	May 20: Replace modem and cell phone;	Aug 20: Modem pwr down; replaced 12v battery	Oct 7: Replaced 12v battery pack Oct 8: well pressure buildup tests Oct 21: Replaced solar panel			Aug 24: New data logger battery pack; vent well, no gas to sample
Wagon Gulch	MW-34-4-30-1								
	MW-34-4-30-2								
Fosset Gulch	MW-35-5-14-1								
	MW-35-5-14-2								
Highway 151	MW-34-4-30-1								
	MW-34-4-30-2								
Deep Canyon	MW-34-4-32-1								

4M Project Monitor Well Chronology

Location	Well	2005			2006			2007		
		Mar	Jun	Oct - Dec	Jan	Jun -Nov	Dec	Jun	Aug	Nov - Dec
Basin Creek	MW 34-9-7-1		June 14: Inspection			June 21: Inspection		June 20: Inspection; replace logger battery; start new test	Analog modem telemtry sys. off line; local telecom. service changed to digital by provider; Hermit logger data must be extracted to a PC on site.	Nov 12 & Dec 12: Inspection and Hermit logger data extraction
	MW 34-9-7-2		June 14: Inspection; pressure gauge leaking; vented well (artesian flow < 0.5 gpm); lowered upper xd to 4.6 fbgs (under water); replaced gauge with plug			June 21: Inspection				
Palmer Ranch	MW-35-8-19-1									
Fiddler	MW-35-8-10-1									
South Fork Texas Creek	MW 35-7-8-1		June 13: Inspection; new data logger test started			June 21: Inspection		June 20: Inspection; replace logger battery; start new test	See above	Nov 12 & Dec 12: Inspection and Hermit logger data extraction
	MW 35-7-8-2	Mar: Well pressure deviation from previous norm; possible wellhead leak or xd failure or decline in well gas pressure	June 13: Wellhead fitting leaks detected June 14: Vented well and replaced both 500 psia xds; new data logger test started	Oct 25: Vent well; replaced strain relief fittings Dec 7: Tightened wellhead fittings	Jan 3: Tightened wellhead fittings	June 21: Tightened wellhead fittings October 31: Replaced all well head fittings November 10: Developed well and water sample collected	Dec 11 &13: Tightened wellhead strain relief fittings	June 20: Wellhead fittings leak; vent well; replaced xd cables with rugged polyethylene cables		Dec 12: Wellhead strain relief cable fitting leak; vent well; installed Swaglok tube fitting on upper xd cable at wellhead
BP Highlands	MW-34-7-15-1									
Beaver Creek Ranch	MW 35-6-17-1		June 13: Inspection			June 21: Inspection		June 20: Inspection; replace logger battery; start new test	See above	Nov 12 & Dec 12: Inspection and Hermit logger data extraction
	MW 35-6-17-2		June 13: Inspection; slight leak detected from wellhead xd bushing			June 21: Inspection; slight leak detected from wellhead xd bushing October 31: Leaky wellhead xd bushing sealed				
Shamrock Mines	MW 35-6-13-1		June 13: Inspection			June 21: Inspection		June 20: Inspection; replace logger battery; start new test	See above	Nov 12 & Dec 12: Inspection and Hermit logger data extraction
Wagon Gulch	MW-34-4-30-1									
	MW-34-4-30-2									
Fosset Gulch	MW-35-5-14-1									
	MW-35-5-14-2									
Highway 151	MW-34-4-30-1									
	MW-34-4-30-2									
Deep Canyon	MW-34-4-32-1									

4M Project Monitor Well Chronology

Location	Well	2008					2009		
		May	Sep	Oct	Nov	Dec	Jun-Jul	Oct	Nov
Basin Creek	MW 34-9-7-1	May 6: Inspection and Hermit logger data extraction	Sept 3: Inspection and Hermit logger data extraction			Dec 10: Inspection and Hermit logger data extraction	June 25: Inspection and Hermit logger data extraction, removal of data logger equipment from well June 30: Installation of Level Troll data logger equipment		
	MW 34-9-7-2								
Palmer Ranch	MW-35-8-19-1							Installed Well	Nov 18: Installed Level Troll data logger & telemetry system
Fiddler	MW-35-8-10-1							Installed Well	Nov 17: Installed Level Troll data logger & telemetry system
South Fork Texas Creek	MW 35-7-8-1	May 6: Inspection and Hermit logger data extraction	Sept 3: Inspection and Hermit logger data extraction			Dec 10: Inspection and Hermit logger data extraction	June 25: Inspection and Hermit logger data extraction, removal of data logger equipment from well June 30: Installation of Level Troll data logger equipment		
	MW 35-7-8-2	May 6: Inspection and Hermit logger data extraction; Slight leak at lower xd cable wellhead strain relief fitting	Sept 3: Inspection and Hermit logger data extraction; Very slight leak at lower xd cable wellhead strain relief fitting			Dec 10: Inspection and Hermit logger data extraction; Slight leak at lower xd cable wellhead strain relief fitting			
BP Highlands	MW-34-7-15-1							Installed Well	Nov 19: Installed Level Troll data logger & telemetry system
Beaver Creek Ranch	MW 35-6-17-1	May 6: Inspection and Hermit logger data extraction	Sept 3: Inspection and Hermit logger data extraction			Dec 10: Inspection and Hermit logger data extraction	June 25: Inspection and Hermit logger data extraction, removal of data logger equipment from well June 30: Installation of Level Troll data logger equipment		
	MW 35-6-17-2								
Shamrock Mines	MW 35-6-13-1	May 6: Inspection and Hermit logger data extraction	Sept 3: Inspection and Hermit logger data extraction			Dec 10: Inspection and Hermit logger data extraction	June 25: Inspection and Hermit logger data extraction, removal of data logger equipment from well June 30: Installation of Level Troll data logger equipment		
Wagon Gulch	MW-34-4-30-1			Oct 2: Installed Well		Dec 2: Installed Level Troll data logger equipment & telemetry system			
	MW-34-4-30-2			Oct 13: Installed Well					
Fosset Gulch	MW-35-5-14-1			Oct 31: Installed Well		Dec 4 :I Installed Level Troll data logger equipment & telemetry system			
	MW-35-5-14-2			Oct 22: Installed Well					
Highway 151	MW-34-4-30-1				Nov 11: Installed Well	Dec 3: Installed Level Troll data logger equipment & telemetry system			
	MW-34-4-30-2				Nov 7: Installed Well				
Deep Canyon	MW-34-4-32-1								

4M Project Monitor Well Chronology

Location	Well	2010					2011	
		May	Jun	Aug	Sept	Nov	Apr	Aug
Basin Creek	MW 34-9-7-1	May 18: Well Inspection		Aug 18: Vented well; Replaced all wellhead LT cable Conax Teflon gland seals with Neoprene seals				Aug 2: Well inspection
	MW 34-9-7-2							
Palmer Ranch	MW-35-8-19-1	May 18: Not able to inspect well due to reclamation	Jun 3: Vented well; Replaced both wellhead LT cable Conax Teflon gland seals with Neoprene seals					Aug 2: Well inspection, minor leak at busing below Conax fitting
Fiddler	MW-35-8-10-1	May 18: Well Inspection	Jun 3: Vented well; Replaced both wellhead LT cable Conax Teflon gland seals with Neoprene seals; TROLL® Link cables checked/connections cleaned					Aug 2: Change out upper LT; Replaced upper LT cable
South Fork Texas Creek	MW 35-7-8-1	May 18: Well Inspection; Tightened small leak on upper LT Conax fitting		Aug 18: Vented well; Replaced both wellhead LT cable Conax Teflon gland seals with Neoprene seals; Lower LT raised from 390 fbgs to 374 fbgs due to cable damage				Aug 2: Well inspection
	MW 35-7-8-2	May 18: Well Inspection; Tightened small leak on upper LT Conax fitting and ball plug; Ball plug fitting leak on lower LT	Jun 14-24: Well spliced into gas mitigation system Jun 25: Gas mitigation system actively drawing gas from well	Aug 6: Well shut in from gas mitigation system Aug 18: Vented well; Replaced both wellhead LT cable Conax Teflon gland seals with Neoprene seals				Aug 2: Well inspection
BP Highlands	MW-34-7-15-1	May 18: Not able to inspect well due to reclamation	Jun 3: Vented well; Replaced both wellhead LT cable Conax Teflon gland seals with Neoprene seals					Aug 2: Attempted toreplace upper LT but fittings too tight; blowdown test showed LT OK
Beaver Creek Ranch	MW 35-6-17-1	May 18: Well Inspection; Tightened small leak on upper and lower LT cable Conax fitting		Aug 18: Vented well; Replaced all wellhead LT cable Conax Teflon gland seals with Neoprene seals				Aug 3: Slight leak in lower LT well head Conax 3/4" bushing and well head pressure gauge fitting
	MW 35-6-17-2	May 18: Well Inspection; Tightened hissing leak on upper LT cable Conax fitting; Small leak at fitting into flange						Aug 3: Leak in with both Conax fitting 3/4" bushings
Shamrock Mines	MW 35-6-13-1	May 18: Well Inspection; No leaks; Tightened upper and lower LT cable Conax fitting	Jun 2: Vented well; Replaced both wellhead LT cable Conax Teflon gland seals with Neoprene seals Jun 3: Upper LT raised to ground level after removal of 4 ft of damaged cable					Aug 3: Well Inspection
Wagon Gulch	MW-34-4-30-1	May 18: Well Inspection; No leaks; Solar power instrument pool-cable conduit sealed		Aug 17: Vented well; Replaced lower LT wellhead cable Conax Teflon gland seal with Neoprene seal				Aug 3: blowdown; cleaned bushing
	MW-34-4-30-2			Aug 17: Vented well; Replaced lower LT wellhead cable Conax Teflon gland seal with Neoprene seal; Upper LT external mount changed to down-hole mount 2.5 fbgs	Sept 9: Vented well; raised lower LT from 780 fbgs to 763 fbgs due to cable damage			Aug 3: Well Inspection
Fosset Gulch	MW-35-5-14-1	May 18: Well Inspection; No leaks		Aug 17: Vented well; Replaced both lower LT wellhead cable Conax Teflon gland seals with Neoprene seals		Nov 11: Telemetry sys off-line; cable damage during pipeline construction	Apr 27: Surface transducer cables replaced; Telemetry system back online	Aug 3: Well Inspection; Tightened cable fitting
	MW-35-5-14-2							Aug 3: Tightened leaky bull plug
Highway 151	MW-34-4-30-1	May 18: Well Inspection; No leaks	Jun 2: Vented well; Replaced both lower LT wellhead cable Conax Teflon gland seals with Neoprene seals					Aug 3: Well head inspection
	MW-34-4-30-2							
Deep Canyon	MW-34-4-32-1	May 18: Well installed	Jun 2: Installed Level Troll data logger equipment & telemetry system					Aug 3: Well inspection; blowdown test