Incoming C0070041

0081

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Date: 9/5/2006 5:32:29 PM
Subject: Grassy Trail Dam Seismic Update 9/1/06

Attached are the current seismic, inclinometer and piezometer reading.

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Grassy Trail Dam, Seismic Summary for September 1, 2006

For the two week period between August 19 and September 1, 2006 the number of MIS (Mining Induced Seismicity) earthquakes recorded near the site by the UUSS decreased from 62 to 23. For comparison the following table summarizes the number of earthquakes and events recorded on the dam and Hillside units during the past three weeks. It should be noted from the table that the number of earthquakes has decreased during the past two weeks and the number of events recorded on the Dam and Hillside units has fluctuated. MIS earthquakes ranged in magnitude from 1.0 to a high of 1.8. During the past two weeks only 6 of the 23 earthquakes reported were recorded on the Dam and Hillside monitoring units.

7 Days Ending	Earthquakes	Hillside	Dam
17-Aug	38	12	17
24-Aug	25	8	9
31-Aug	9	12	14

During the past two weeks the highest Peak Ground Acceleration (PGA) value recorded on the Hillside decreased from the previous high of 0.0199 to **0.0166g.** The highest PGA value on the Dam increased from 0.0182g to **0.0199g**. The largest, a 1.8 earthquake did not generate the highest PGA values. The highest PGA (0.0199g) event, which was recorded on the Dam, occurred during an event not documented by the UUSS.

Inclinometer I-3 continues to show similar movements as the last readings. Inclinometers I-2, and I-4 appear to show a decrease in movement. Inclinometer I-2 which had been showing the greatest movement during the year, showed virtually no movement along the A-axis, and slight backward movement on the B-axis.

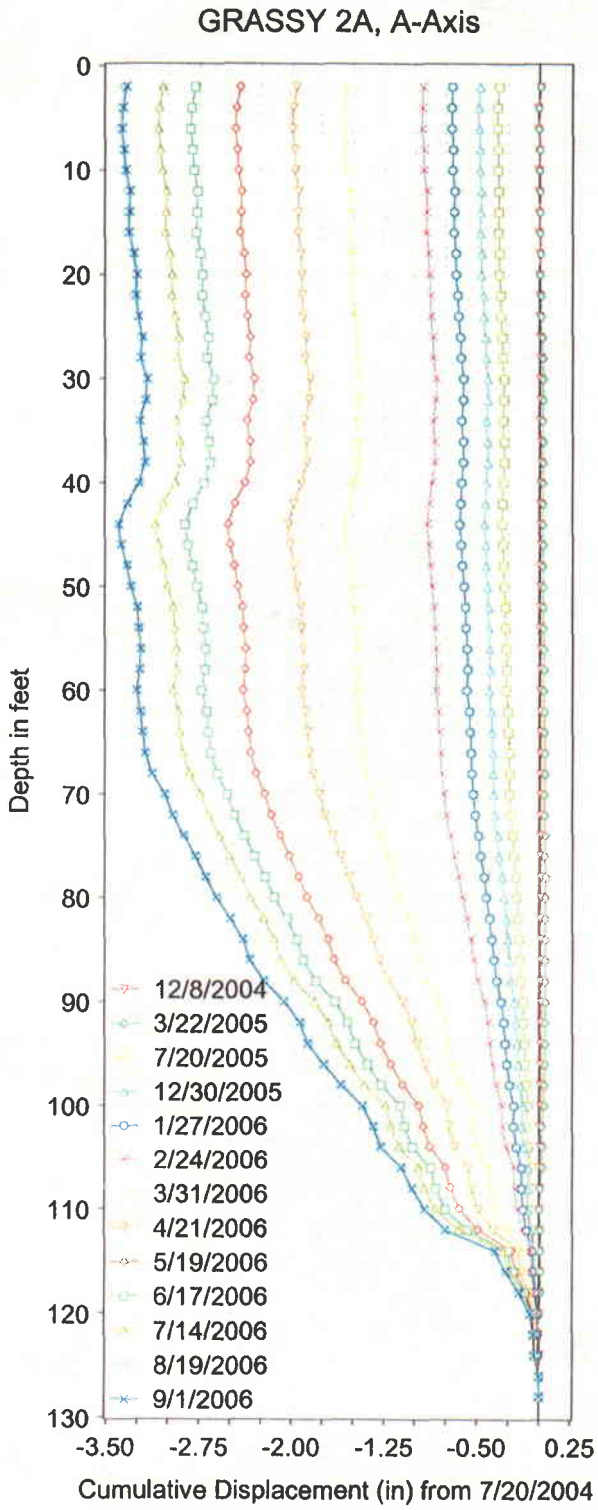
Piezometer readings are also similar to the previous reading.

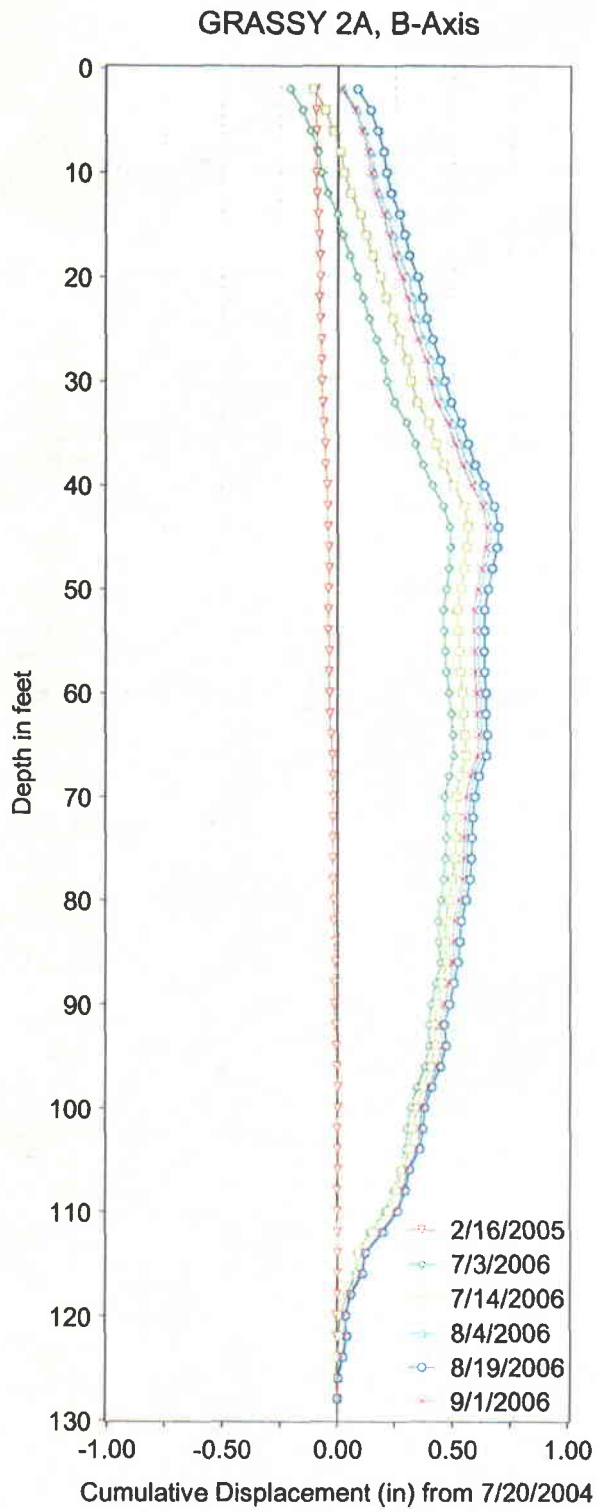
No cracks or signs of movement were noted on the dam or abutments above the dam. No significant changes in seepage readings were observed.

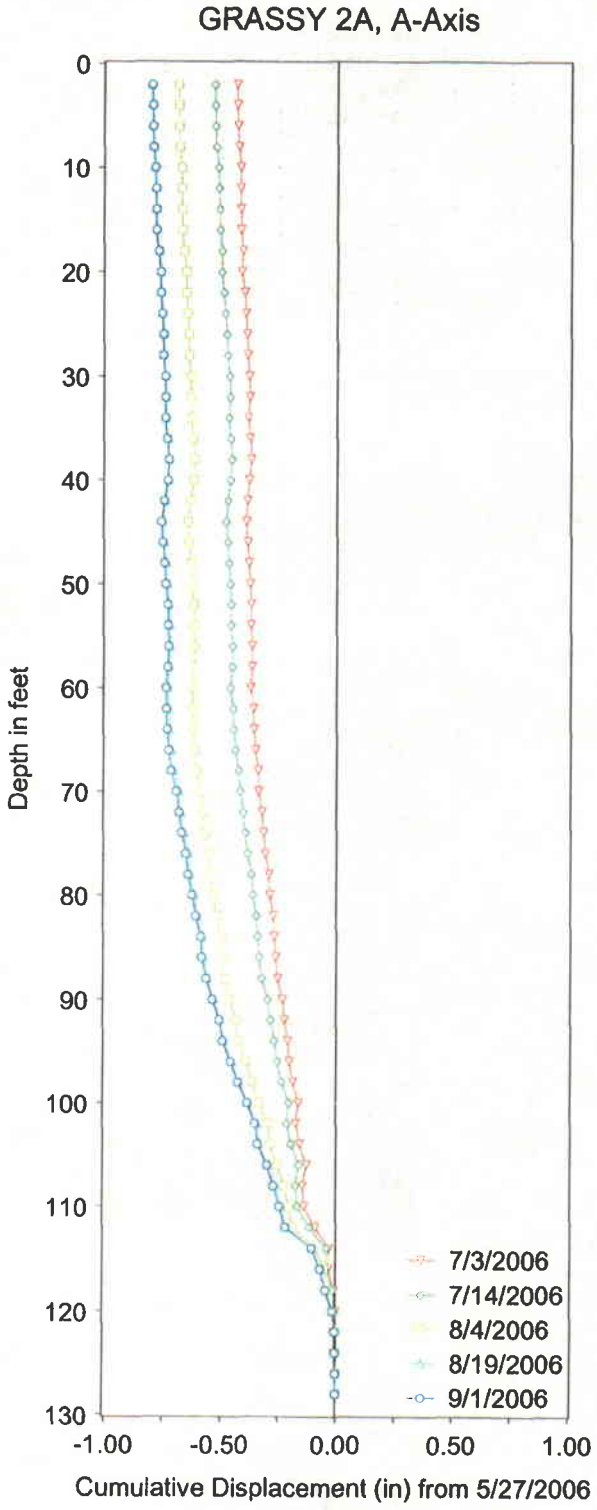
Michael Hansen
RB&G ENGINEERING

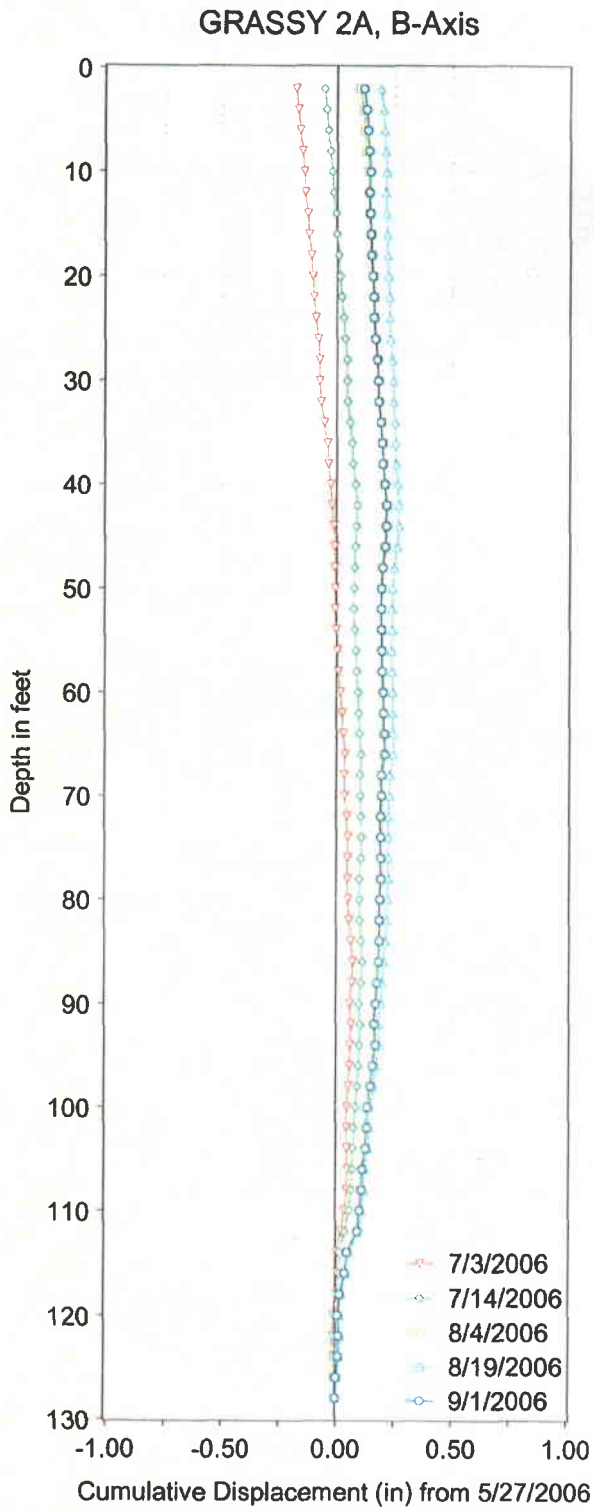
Grassy Trail Dam, Carbon County, Utah
September 1, 2006

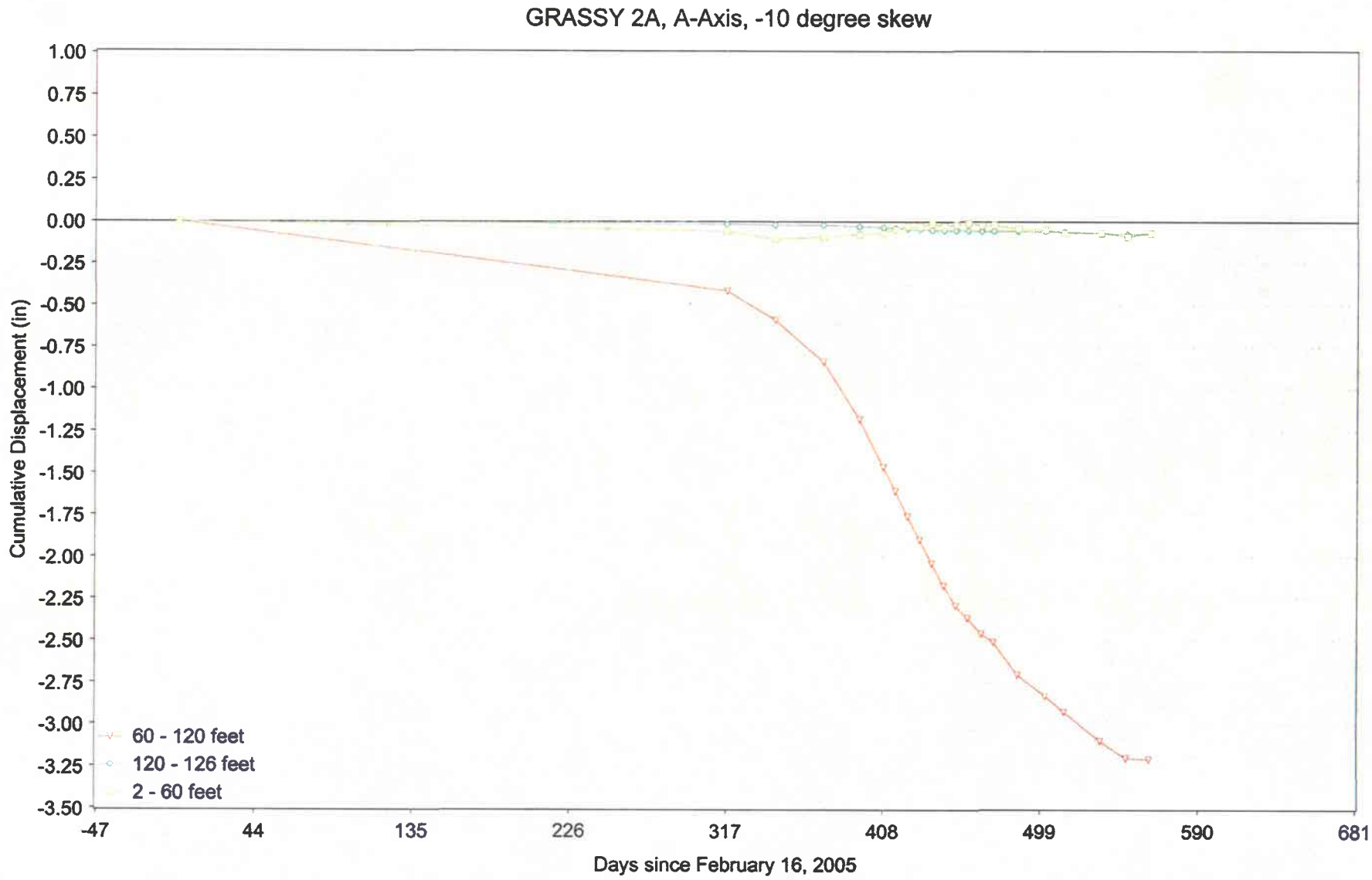
Type	Serial No.	Date	Time	Tran Peak (mm/s)	Vert Peak (mm/s)	Long Peak (mm/s)	PVS1 (mm/s)	Trigger	Tran Accel (g)	Vert Accel (g)	Long Accel (g)	Description		
LOG	BE9689	8/19/06	12:42:02	***	***	***	***	***	***	***	***		Start Monitoring	
LOG	BE9690	8/19/06	13:07:58	***	***	***	***	***	***	***	***		Start Monitoring	
W	BE9689	8/19/06	16:01:48	1.14	0.825	0.889	1.26	Tran	0.00829	0.00663	0.0166	Grassy Tr. Dam		
W	BE9690	8/19/06	16:01:48	1.32	0.603	1.49	1.84	Tran	0.0116	0.00829	0.0133	Hillside		
W	BE9689	8/19/06	16:18:10	0.508	0.905	1.13	1.37	Vert	0.0464	0.0713	0.0779	Grassy Tr. Dam	Man made	
W	BE9689	8/21/06	2:37:59	1.1	0.667	1.13	1.52	Tran	0.00994	0.00829	0.0182	Grassy Tr. Dam		EQ 1.3
W	BE9690	8/21/06	2:37:59	0.762	0.333	0.968	1.16	Tran	0.00663	0.00663	0.00829	Hillside		EQ 1.3
W	BE9690	8/21/06	8:10:53	0.381	0.349	0.937	0.956	Long	0.00829	0.00663	0.0116	Hillside		
W	BE9690	8/21/06	19:33:50	0.778	0.254	1.14	1.26	Long	0.00829	0.00497	0.0116	Hillside		EQ 1.6
W	BE9689	8/21/06	19:33:51	0.937	1	0.873	1.23	Tran	0.00994	0.00994	0.0182	Grassy Tr. Dam		EQ 1.6
W	BE9689	8/23/06	13:58:15	0.397	0.238	0.619	0.672	Long	0.00663	0.00663	0.0182	Grassy Tr. Dam		
W	BE9689	8/24/06	14:13:10	0.397	0.635	0.667	0.905	Vert	0.0315	0.0315	0.0414	Grassy Tr. Dam	Man made	
W	BE9690	8/25/06	3:02:48	0.825	0.365	1.4	1.57	Long	0.0116	0.00829	0.00994	Hillside		EQ 1.4
W	BE9689	8/25/06	3:02:50	1.21	1	1.08	1.6	Tran	0.0116	0.00994	0.0149	Grassy Tr. Dam		EQ 1.4
W	BE9689	8/25/06	3:05:29	0.571	0.603	0.524	0.7	Vert	0.00663	0.00663	0.0166	Grassy Tr. Dam		EQ 1.5
W	BE9689	8/25/06	16:26:14	0.508	0.714	0.302	0.798	Vert	0.0447	0.0563	0.0298	Grassy Tr. Dam	Man made	
W	BE9689	8/25/06	16:27:12	0.302	0.603	0.571	0.753	Vert	0.0265	0.0547	0.0464	Grassy Tr. Dam	Man Made	
LOG	BE9689	8/25/06	17:23:26	***	***	***	***	***	***	***	***		Keyboard Stop	
LOG	BE9689	8/25/06	17:24:02	***	***	***	***	***	***	***	***		Start Monitoring	
W	BE9690	8/26/06	4:22:34	1.4	0.921	2.21	2.44	Vert	0.0133	0.00994	0.0166	Hillside		EQ 1.7
W	BE9689	8/26/06	4:22:37	1.89	1.87	1.57	2.32	Long	0.0166	0.0133	0.0133	Grassy Tr. Dam		EQ 1.7
W	BE9689	8/27/06	0:17:02	0.667	0.746	0.635	0.837	Vert	0.00663	0.00829	0.0166	Grassy Tr. Dam		
W	BE9689	8/27/06	19:38:14	0.667	0.492	0.365	0.689	Tran	0.00663	0.00663	0.0182	Grassy Tr. Dam		
W	BE9690	8/27/06	19:48:51	1.38	0.794	2.21	2.32	Vert	0.0133	0.00829	0.0149	Hillside		
W	BE9689	8/27/06	19:48:55	2.16	1.29	1.79	2.51	Long	0.0166	0.0116	0.0182	Grassy Tr. Dam		
W	BE9690	8/28/06	0:18:50	0.746	0.603	1.33	1.33	Long	0.00829	0.00829	0.0133	Hillside		
W	BE9689	8/28/06	0:18:54	0.587	0.492	0.889	0.913	Long	0.00663	0.00663	0.0199	Grassy Tr. Dam		
W	BE9689	8/28/06	21:21:26	0.603	0.619	0.54	0.759	Vert	0.00663	0.00663	0.0182	Grassy Tr. Dam		
W	BE9690	8/28/06	22:44:16	1.48	0.698	2.06	2.17	Vert	0.0116	0.00829	0.0149	Hillside		
W	BE9689	8/28/06	22:44:20	2.08	1.62	1.75	2.5	Tran	0.0182	0.0116	0.0182	Grassy Tr. Dam		
W	BE9690	8/29/06	2:20:30	0.556	0.286	0.667	0.791	Long	0.00663	0.00663	0.00663	Hillside		EQ 1.8
W	BE9689	8/29/06	2:20:34	1.03	0.651	0.889	1.18	Long	0.00829	0.00663	0.0182	Grassy Tr. Dam		EQ 1.8
W	BE9690	8/30/06	0:23:10	0.587	0.302	0.873	0.969	Long	0.00663	0.00497	0.00994	Hillside		
W	BE9689	8/30/06	0:23:15	0.905	0.667	0.762	1.04	Tran	0.00994	0.00663	0.0166	Grassy Tr. Dam		
W	BE9690	8/30/06	2:14:16	0.603	0.302	0.413	0.611	Tran	0.00829	0.00663	0.00663	Hillside		
W	BE9690	8/30/06	10:42:06	0.746	0.286	0.714	0.749	Long	0.00829	0.00663	0.00663	Hillside		
W	BE9689	8/30/06	10:42:11	0.984	0.635	0.587	1.03	Tran	0.00829	0.00829	0.0182	Grassy Tr. Dam		
W	BE9690	8/31/06	3:15:15	0.492	0.381	0.714	0.749	Long	0.00663	0.00663	0.00829	Hillside		
W	BE9690	8/31/06	4:28:07	0.714	0.254	0.746	0.764	Long	0.00829	0.00663	0.00994	Hillside		
W	BE9689	8/31/06	4:28:12	0.889	0.762	0.841	1.14	Long	0.0116	0.00829	0.0182	Grassy Tr. Dam		
W	BE9690	8/31/06	18:48:52	0.778	0.302	0.635	0.824	Long	0.00663	0.00497	0.00829	Hillside		
W	BE9689	8/31/06	18:48:57	1.14	0.635	0.651	1.17	Long	0.00829	0.00663	0.0133	Grassy Tr. Dam		
LOG	BE9689	9/1/06	11:06:25	***	***	***	***	***	***	***	***		Keyboard Stop	
LOG	BE9690	9/1/06	11:54:29	***	***	***	***	***	***	***	***		Keyboard Stop	

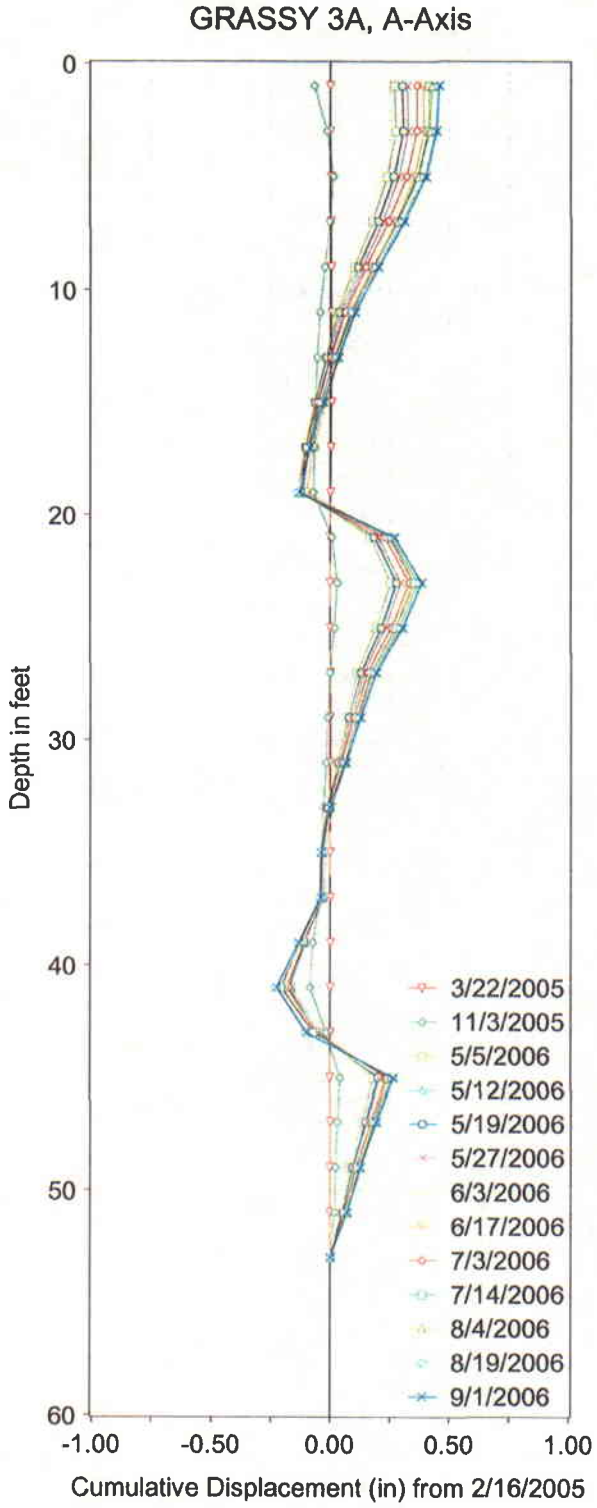

GRASSY 2A, A-Axis
Depth in feet
0
10
20
30
40
50
60
70
80
90
100
110
120
130
-3.50
-2.75
-2.00
-1.25
-0.50
0.25
Cumulative Displacement (in) from 7/20/2004
12/8/2004
3/22/2005
7/20/2005
12/30/2005
1/27/2006
2/24/2006
3/31/2006
4/21/2006
5/19/2006
6/17/2006
7/14/2006
8/19/2006
9/1/2006

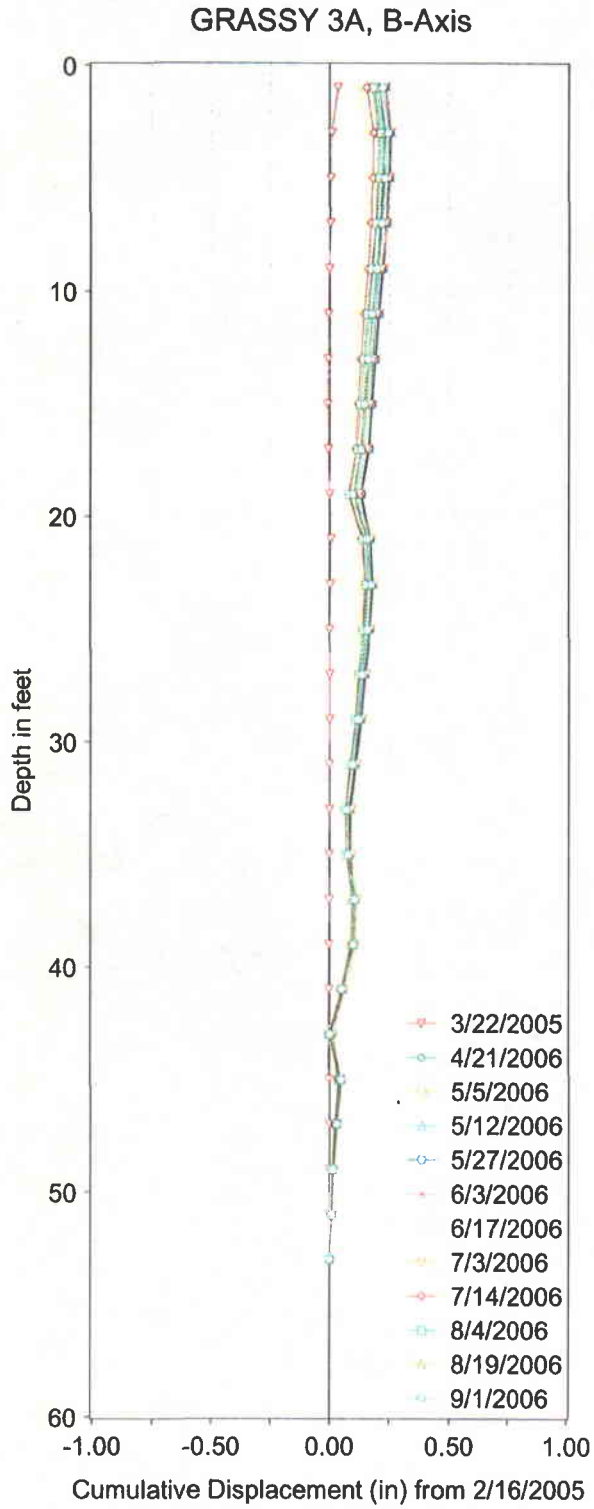

GRASSY 2A, B-Axis
Depth in feet
0
10
20
30
40
50
60
70
80
90
100
110
120
130
-1.00
-0.50
0.00
0.50
1.00
Cumulative Displacement (in) from 7/20/2004
2/16/2005
7/3/2006
7/14/2006
8/4/2006
8/19/2006
9/1/2006


GRASSY 2A, A-Axis
Depth in feet
0
10
20
30
40
50
60
70
80
90
100
110
120
130
-1.00
-0.50
0.00
0.50
1.00
Cumulative Displacement (in) from 5/27/2006
7/3/2006
7/14/2006
8/4/2006
8/19/2006
9/1/2006

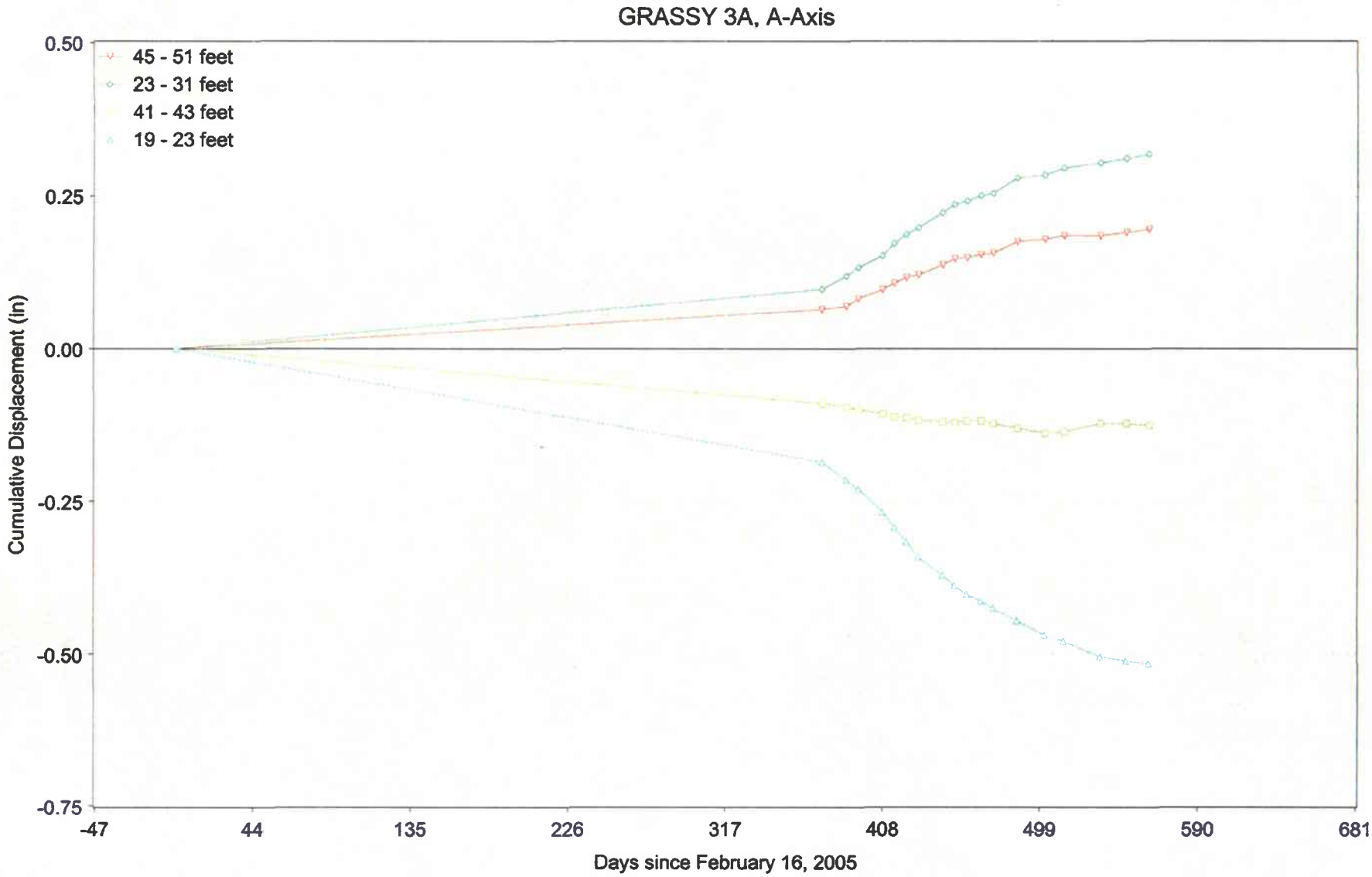

GRASSY 2A, B-Axis
Depth in feet
0
10
20
30
40
50
60
70
80
90
100
110
120
130
-1.00
-0.50
0.00
0.50
1.00
Cumulative Displacement (in) from 5/27/2006
7/3/2006
7/14/2006
8/4/2006
8/19/2006
9/1/2006

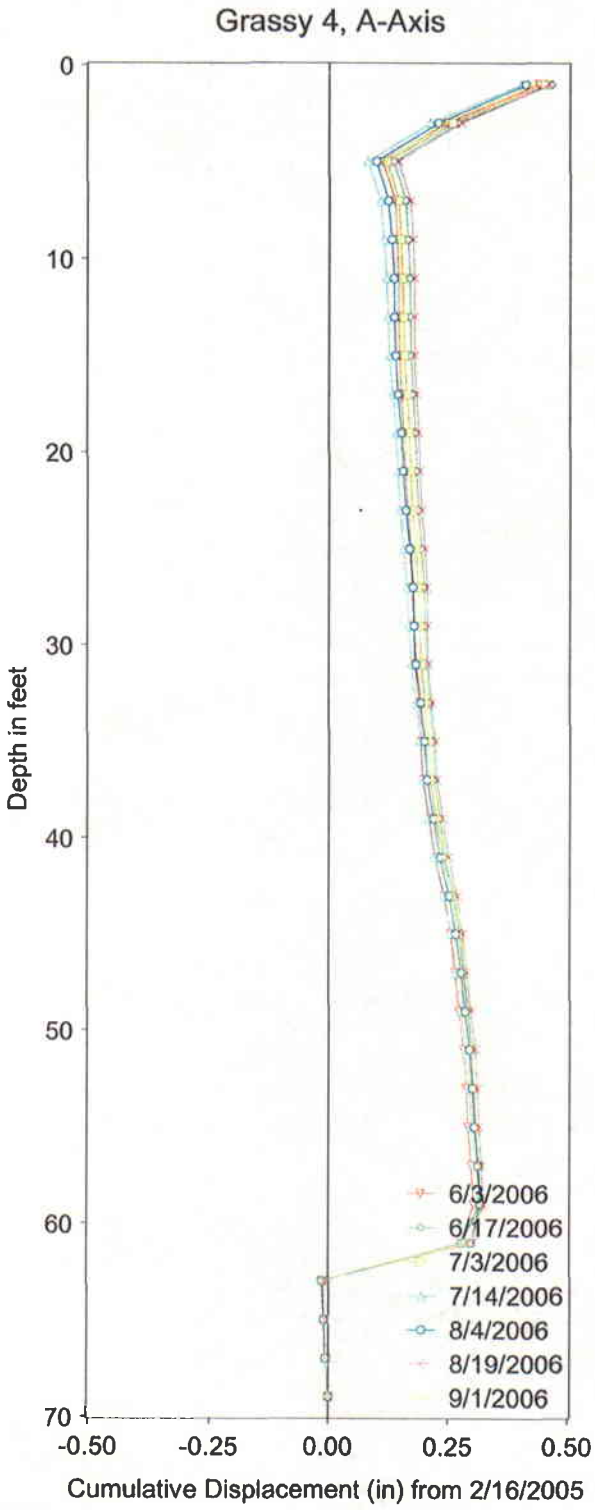

GRASSY 2A, A-Axis, -10 degree skew
Cumulative Displacement (in)
1.00
0.75
0.50
0.25
0.00
-0.25
-0.50
-0.75
-1.00
-1.25
-1.50
-1.75
-2.00
-2.25
-2.50
-2.75
-3.00
-3.25
-3.50
-47
44
135
226
317
408
499
590
681
Days since February 16, 2005
60 - 120 feet
120 - 126 feet
2 - 60 feet

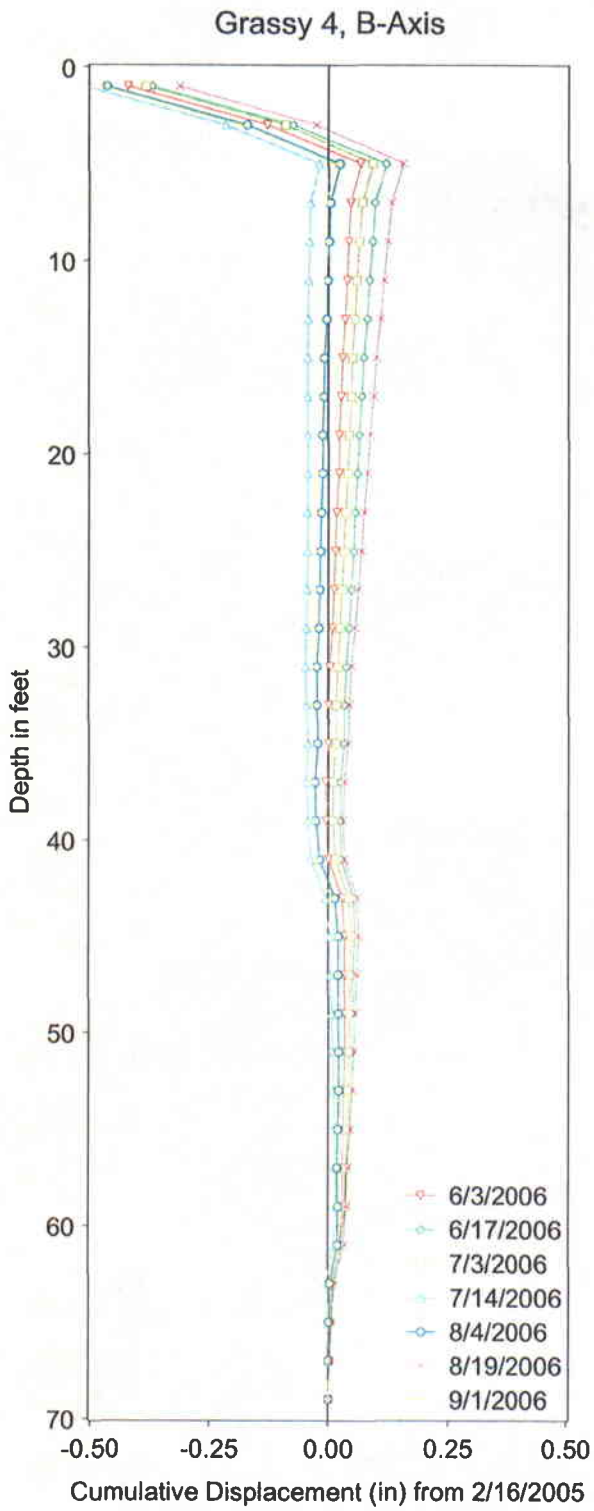


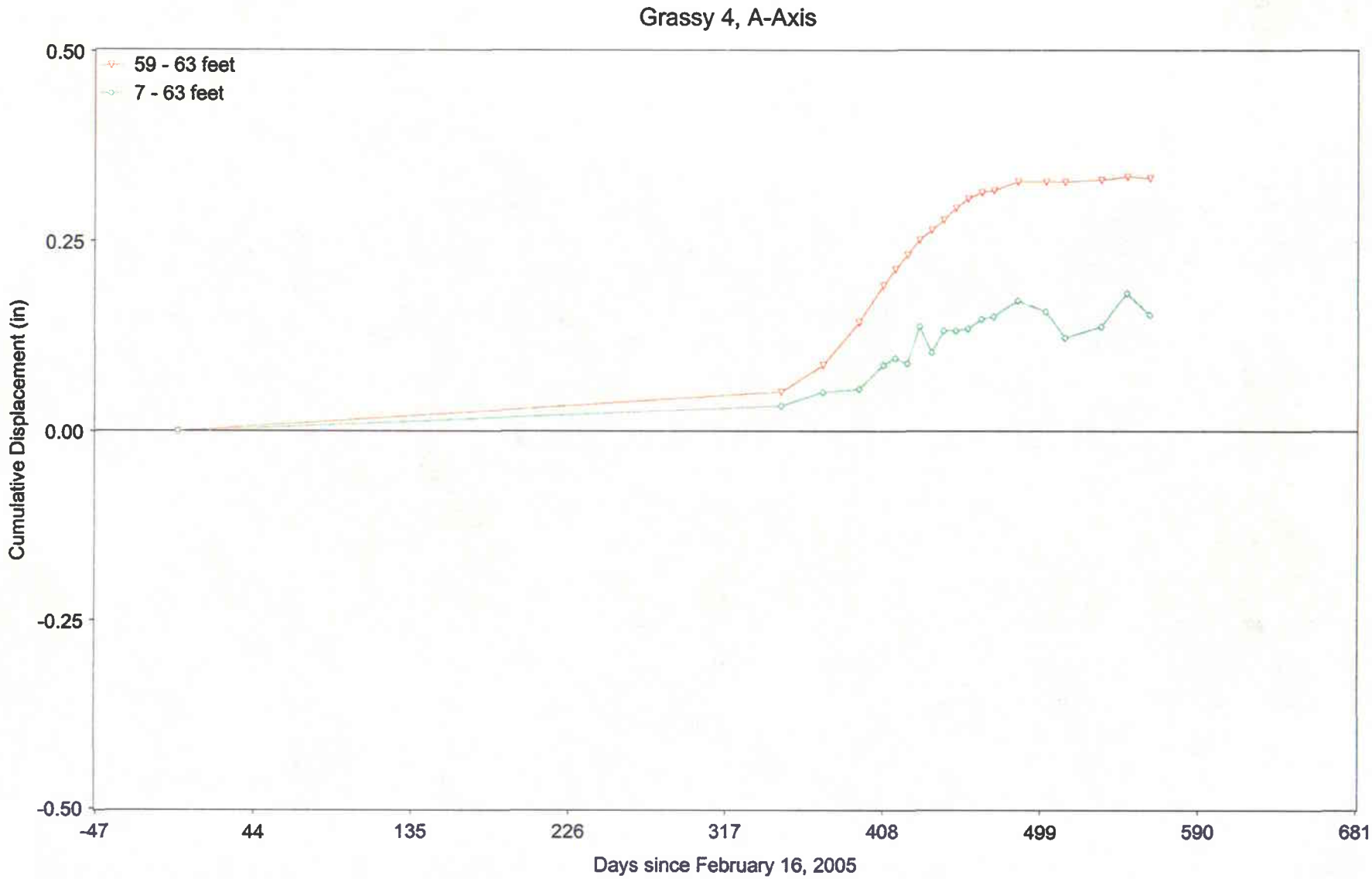


-30 degree skew


GRASSY 3A, A-Axis
45 - 51 feet
23 - 31 feet
41 - 43 feet
19 - 23 feet
0.50
0.25
0.00
-0.25
-0.50
-0.75
Cumulative Displacement (in)
-47
44
135
226
317
408
499
590
681
Days since February 16, 2005

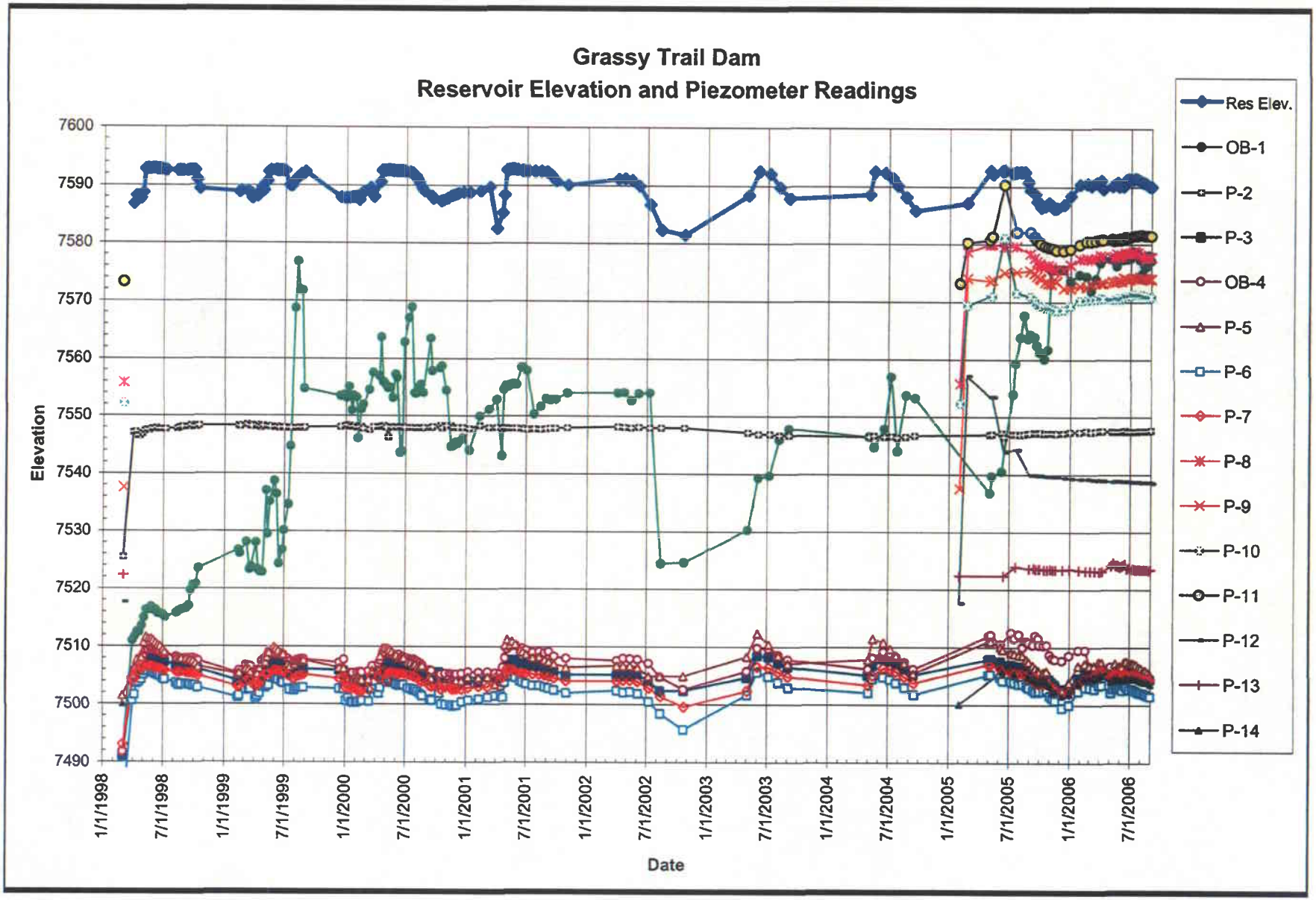

Grassy 4, A-Axis
Depth in feet
0
10
20
30
40
50
60
70
-0.50
-0.25
0.00
0.25
0.50
Cumulative Displacement (in) from 2/16/2005
6/3/2006
6/17/2006
7/3/2006
7/14/2006
8/4/2006
8/19/2006
9/1/2006


Grassy 4, B-Axis
Depth in feet
0
10
20
30
40
50
60
70
-0.50
-0.25
0.00
0.25
0.50
Cumulative Displacement (in) from 2/16/2005
6/3/2006
6/17/2006
7/3/2006
7/14/2006
8/4/2006
8/19/2006
9/1/2006


Grassy 4, A-Axis
59 - 63 feet
7 - 63 feet
0.50
0.25
0.00
-0.25
-0.50
Cumulative Displacement (in)
-47
44
135
226
317
408
499
590
681
Days since February 16, 2005

GRASSY TRAIL DAM PIEZOMETER & OBSERVATION WELL READINGS

TAKE READINGS AT RIM ELEV.			05-2		79-4	98-3		05-4		79-3	05-3A	05-3		98-2	98-4	98-6
			5+62		5+15	4+14		~4+14		3+63	2+77	2+71				
Dam Crest Elev		7600.0	PIEZ.	PIEZ.	O.W.	PIEZ.		PIEZ.		O.W.	PIEZ	PIEZ	PIEZ	PIEZ	PIEZ	PIEZ
Spillway Elev.		7592.5	8	9	1	2.0	3	13	14	4	10	11	12	5	6	7
Rim Elev. (ft)			7601.5		7601.8	7601.7		7558.9	7558.9	7601.7	7601.8	7601.7	7601.7	7528.8	7512.0	7519.5
Tip Elev. (ft		(actual)	7554.5	7535.1	7491.8	7525.4	7491.0	7521.0	7499.5	7491.7	7550.8	7572.0	7529.5	7501.5	7479.5	7493.0
Piezometer Location:			CREST EMBANK	CREST FOUND	CREST EMBANK/FOUND	CREST EMBANK.	CREST FOUND.	D.S. SLOPE EMBANK	D.S. SLOPE FOUND	CREST EMBANK/FOUND	CREST EMBANK.	CREST EMBANK.	CREST FOUND.	TOE FOUND.	TOE FOUND.	TOE FOUND.
Date	Initials	Reservoir Elevation	45.75' (47')	65' (66.4')	110'	76.2' (76.3')	110.7'	36.5' (37.9')	58.8' (59.4')	110'	49.5' (51')	28.5' (29.7')	84.0' (72.2')	27.3'	32.5'	26.5'
8/30/2005	LW	-36"	23.2	26.2	37.4	54.5	95.6	35.2	53.8	90.9	30.8	19.6	61.7	21.3	9.0	14.6
9/12/2005	LW	-44"	23.9	26.6	37.8	54.4	96.1	35.1	54.3	91.3	31.5	20.4	61.7	21.9	9.4	15.2
9/19/2005	DC	-59"	24.6	27.1	39.3	54.5	96.4	35.3	54.5	89.7	32.1	21.0	61.8	22.4	9.7	14.5
9/28/2005	LW	-65"	24.9	27.4	40.4	54.5	96.6	35.3	54.8	90.2	32.3	21.3	61.8	22.8	9.7	15.7
10/7/2005	WD	-72"	25.2	27.6	40.5	54.4	96.6	35.2	54.8	91.3	32.5	21.6	61.8	23.0	9.5	15.8
10/14/2005	LW	-69"	25.4	28.1	41.6	54.6	96.8	35.4	54.9	91.4	32.8	22.0	61.9	23.1	9.6	15.7
10/24/2005	WD	-63"	25.2	28.3	40.0	54.5	96.7	35.4	54.8	91.3	32.8	22.2	61.8	22.9	9.3	15.7
11/2/2005	WD	-68"	25.5	28.4	26.2	54.5	97.2	35.3	55.4	93.0	32.8	22.3	62.0	24.4	10.4	16.0
11/7/2005	LW	-75"	26.0	27.7	26.7	54.5	97.7	35.4	56.6	93.6	33.0	22.4	62.0	25.2	10.8	16.2
11/18/2005	WD	-73.5"	26.0	28.0	26.1	54.6	98.1	35.4	56.4	93.8	33.2	22.7	62.0	25.7	11.2	16.4
12/9/2005	MKS	-66.5" ice	25.9	29.2	26.1	54.5	98.9	35.4	57.2	94.0	33.1	22.8	62.2	26.3	12.5	17.1
12/30/2005	MKS	-48" ice	25.1	29.2	28.1	54.3	98.7	35.3	56.9	93.1	32.4	22.5	62.3	24.9	12.0	17.1
1/27/2006	MKS	-24" ice	24.1	28.8	27.0	54.3	97.0	35.5	55.0	92.2	31.5	21.7	62.4	22.0	9.6	15.7
2/17/2006	MNH	-23" ice	24.0	28.9	27.3	54.1	96.1	35.6	54.2	92.2	31.4	21.2	62.4	21.6	8.9	14.8
3/3/2006	MNH	-27" ice	24.2	28.4	29.8	54.3	96.1	35.6	54.2	95.0	31.3	21.2	62.5	22.0	9.0	14.6
3/17/2006	MNH	-22" ice	23.9	28.3	27.8	54.2	96.4	35.6	54.4	95.3	31.3	21.1	62.6	22.0	9.2	14.5
3/31/2006	MNH	-17" ice	28.3	28.3	25.0	54.2	96.0	35.8	53.9	95.4	31.1	21.0	62.7	21.3	8.6	13.5
4/7/2006	MNH	-34" ice	23.7	28.3	24.4	54.1	95.8	35.7	53.7	95.0	31.2	20.9	62.7	21.4	8.5	13.2
5/5/2006	MNH	-27"	23.9	28.0	24.4	54.2	96.7	34.7	54.7	95.0	31.3	20.8	62.8	23.2	9.8	14.3
5/11/2006	LW	-24"	23.6	28.1	24.1	54.2	96.4	34.3	54.5		31.2	21.0	62.7	23.2	9.1	14.0
5/19/2006	LW	-20.5"	23.2	28.0	25.5	54.2	96.1	34.6	54.1		31.0	20.9	62.7	21.5	8.8	13.9
5/25/2006	LW	-28"	23.5	27.8	23.7	54.2	96.1	34.7	54.2		31.1	20.7	62.7	22.2	9.2	14.0
6/1/2006	LW	-25.5"	23.5	27.9	23.8	54.2	96.3	34.9	54.3		31.2	20.9	62.8	22.0	9.1	14.1
6/8/2006	GK	-27.7"	23.7	27.4	24.4	54.1	96.4	34.7	54.4		31.0	20.7	62.8	22.1	9.4	13.3
6/15/2006	LW	-15"	23.0	27.5	24.2	54.0	96.0	34.5	54.4		30.6	20.4	62.8	21.3	8.5	14.0
6/21/2006	LW	-13"	23.1	27.7	24.3	54.2	96.0	35.2	54.0		30.7	20.5	62.8	21.2	8.9	13.9
6/29/2006	LW	-13"	23.0	27.6	24.2	54.2	96.1	35.0	54.2		30.6	20.4	62.9	21.5	9.3	14.1
7/7/2006	LW	-14"	22.8	27.4	22.9	54.2	96.0	35.3	54.1		30.4	20.2	62.9	21.5	9.2	14.0
7/13/2006	LW	-12"	22.8	27.4	23.0	54.2	96.2	35.4	54.3		30.5	20.1	62.9	21.6	9.4	14.1
7/20/2006	LW	-14"	23.0	27.4	23.3	54.2	96.2	35.5	54.3		30.5	20.1	62.9	21.8	9.6	14.2
7/27/2006	LW	-16.75"	23.4	27.2	24.4	54.1	96.5	35.4	54.5		30.5	20	63	22.2	9.8	14.4
8/3/2006	LW	-19.5"	23.8	27.3	26.9	54.1	96.7	35.5	54.7		30.5	20	63	22.4	9.9	14.5
8/11/2006	GK	-21"	23.9	27.4	27.6	54.1	96.7	35.5	54.8		30.7	20.1	63.0	22.8	10	14.6
8/17/2006	LW	-24"	23.8	27.5	25.6	54.1	96.9	35.5	54.8		30.8	20.1	63.0	22.8	10.2	14.8
8/24/2006	LW	-28"	23.7	27.6	23.6	54.1	97.0	35.5	54.8		30.8	20.1	63.0	23.1	10.4	14.9
8/31/2006	LW	-29"	23.8	27.6	24.6	54.0	97.2	35.4	55.2		30.9	20.2	63.1	23.5	10.5	14.9



RB&G ENGINEERING INC.
Provo, Utah

Figure Reservoir Elevation and Piezometer Readings
March 1998 to August 31, 2006

Grassy Trail Dam and Reservoir

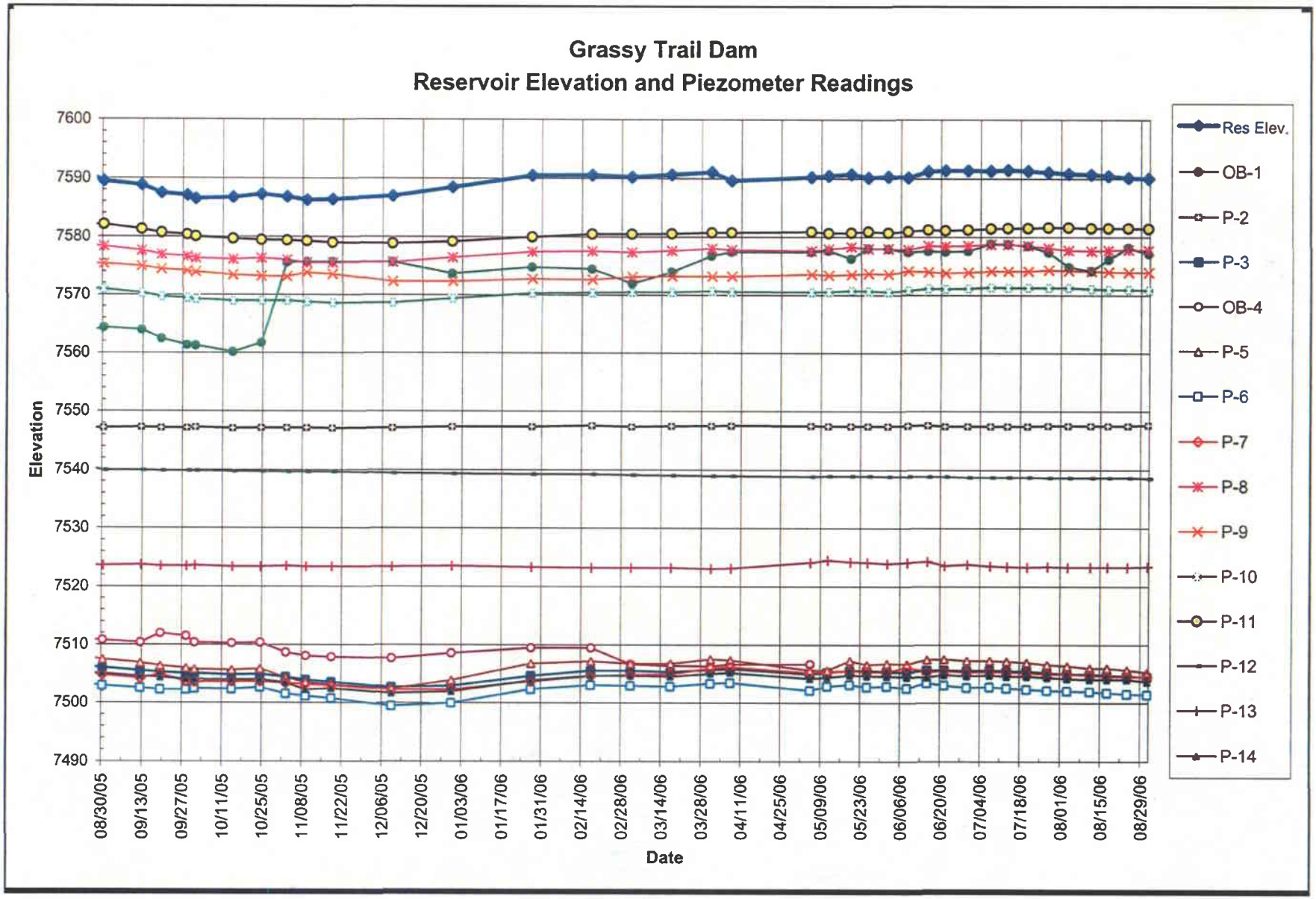


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Figure Reservoir Elevation and Piezometer Readings
August 30, 2005 to August 31, 2006

Grassy Trail Dam and Reservoir