Incoming C0070041

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Date: 10/6/2006 6:41:35 PM
Subject: Grassy Trail Dam Oct 2 2006 Seismic Monitoring update

Attached are the current seismic, inclinometer and piezometer readings for Oct 2,2006.

It is our understanding that West Ridge Mine completed mining in Panel #7 on September 27.

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RB&G ENGINEERING
Grassy Trail Dam, Seismic Summary for October 2, 2006

For the 16 day period between September 16 and October 2, 2006 the number of MIS (Mining Induced Seismicity) earthquakes recorded near the site by the UUSS decreased significantly from 45 to 1, with the only event occurring on September 24. For comparison the following table summarizes the number of earthquakes and events recorded on the dam and Hillside units during the past five-week period ending on Thursdays. It is our understanding that the West Ridge Mine completed mining Panel #7 on September 27, 2006 and will be moving to a new panel located further away from the dam. While the mining has stopped there may still be some rockbursts generating MIS events within the mined area. The frequency of these MIS events should continue to decrease with time.

7 Days Ending	Earthquakes	Hillside	Dam
31-Aug	9	12	14
7-Sept	34	8	9
14-Sept	9	3	3
21-Sept	0	5	3
28-Sept	1	1	1

The only MIS event recorded during the past two weeks had a magnitude of 1.6. This event on September 24 did not generate the largest PGA's. During the past two weeks the highest Peak Ground Acceleration (PGA) value recorded on the Hillside decreased slightly from the previous high of 0.0116 to **0.00829g.** The highest PGA value on the Dam decreased slightly from 0.0182 to **0.0166g.** Six events were recorded on the Hillside and 4 on the Dam.

Inclinometer I-3 continues to show similar movements as the last readings. Inclinometers I-2, and I-4 continue to show similar movements. Inclinometer I-2 showed only slight movement during the past two weeks with significant decrease during the past six weeks.

Piezometer readings are also similar to the previous reading.

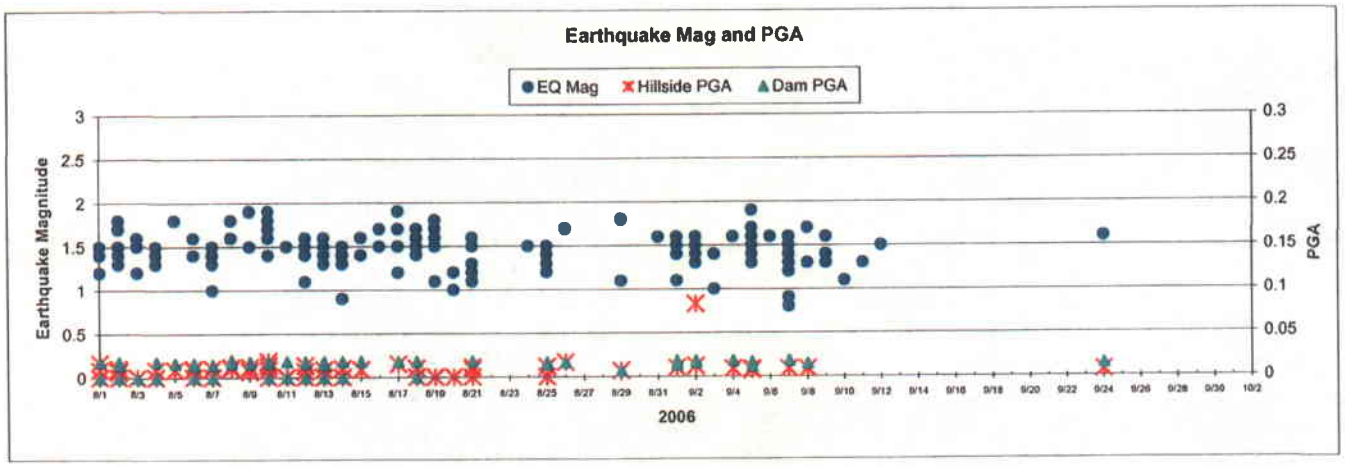
No cracks or signs of movement were noted on the dam or abutments above the dam. No significant changes in seepage readings were observed.

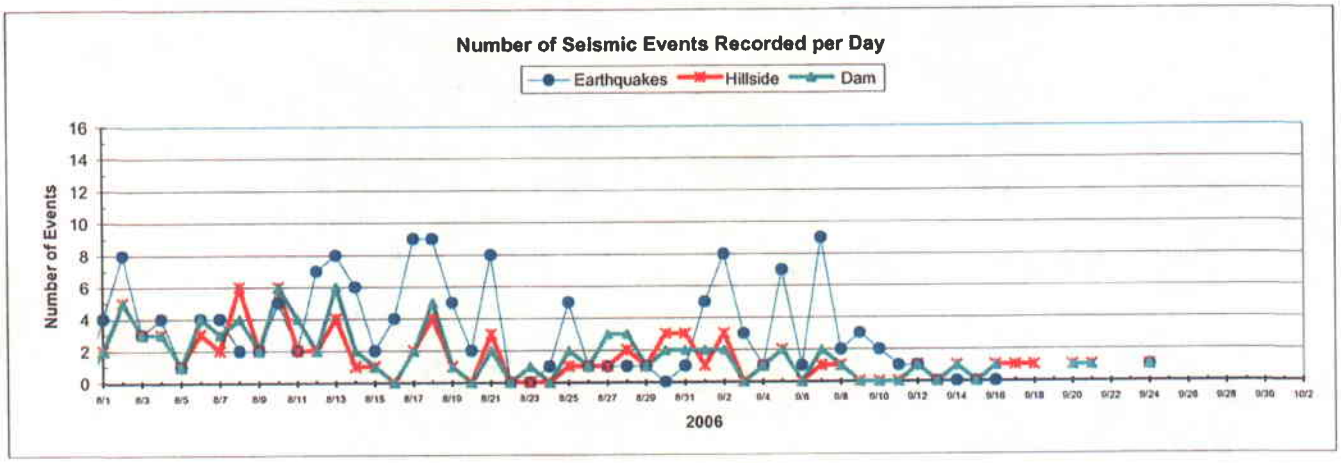
Since the mining in Panel # 7 is now completed it is our opinion that we need to evaluate and reduce the frequency of the monitoring at Grassy Trail Dam.

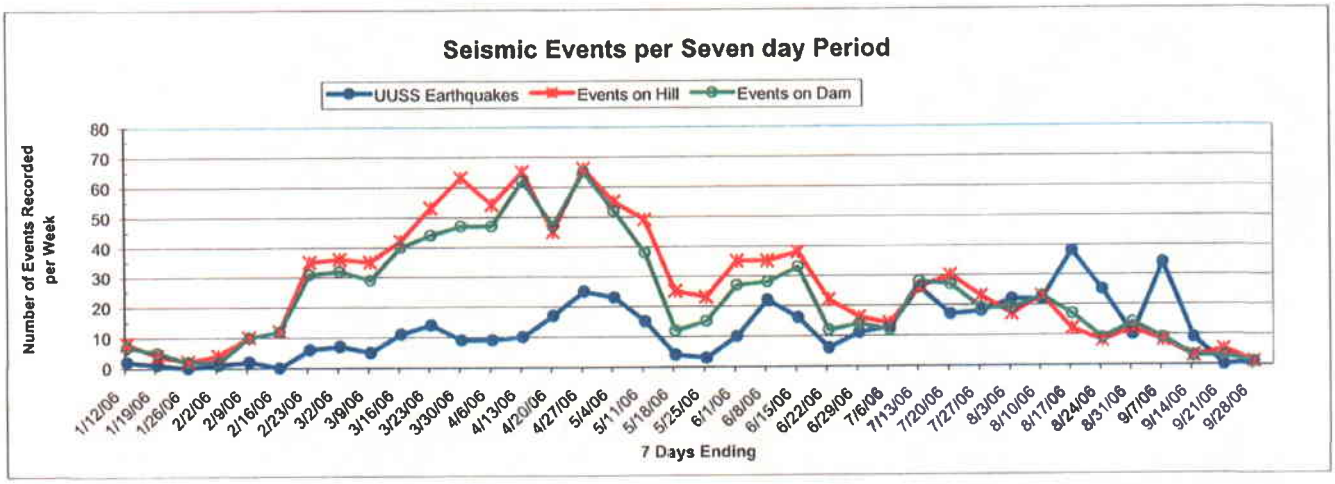
Michael Hansen
RB&G ENGINEERING

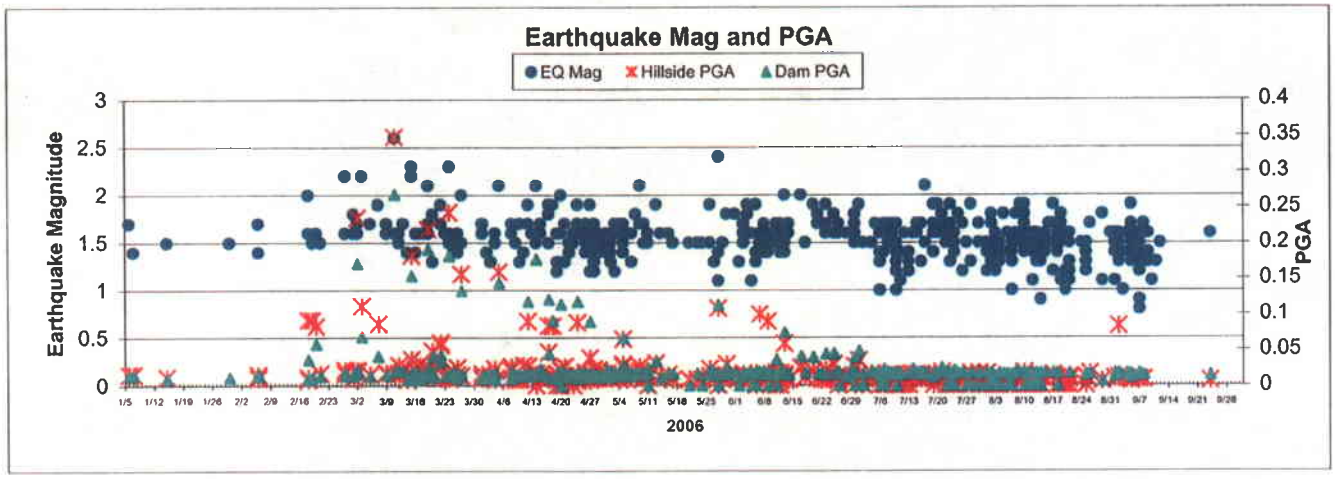
Grassy Trail Dam, Carbon County, Utah
October 2, 2006

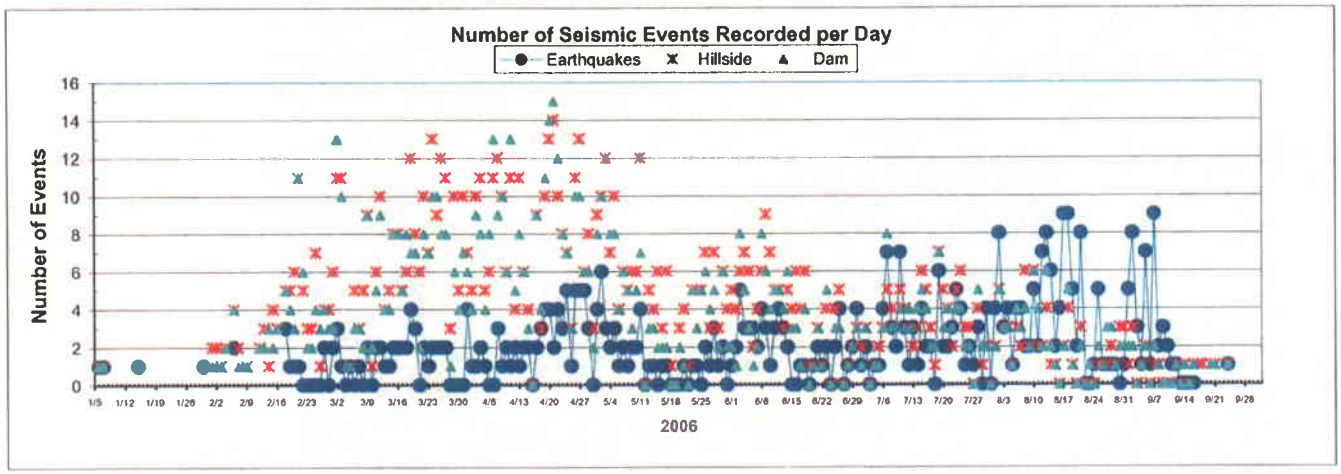
Type	Serial No.	Date	Time	Tran Peak (mm/s)	Vert Peak (mm/s)	Long Peak (mm/s)	PVS1 (mm/s)	Tran Freq. Hz.	Trigger	Tran Accel (g)	Vert Accel (g)	Long Accel (g)	Description	Post Event Note first line
LOG	BE9689	9/16/06	12:12:27	***	***	***	***	***	***	***	***	***	Start Monitoring	
LOG	BE9690	9/16/06	12:31:48	***	***	***	***	***	***	***	***	***	Start Monitoring	
W	BE9690	9/16/06	21:53:22	0.714	0.349	0.714	0.81	7.21	Tran	0.00663	0.00497	0.00829	Hillside	
W	BE9689	9/16/06	21:53:23	0.635	0.159	0.413	0.689	4.23	Tran	0.00663	0.00663	0.0166	Grassy Tr. Dam	
W	BE9690	9/17/06	12:37:59	0.365	0.27	0.73	0.731	6.17	Long	0.00663	0.00497	0.00663	Hillside	
W	BE9689	9/18/06	13:30:44	0.159	0.603	0.46	0.629	51.2	Vert	0.00663	0.0215	0.0166	Grassy Tr. Dam	Man made
W	BE9690	9/18/06	20:31:09	0.524	0.397	0.619	0.686	14.6	Long	0.00663	0.00663	0.00829	Hillside	
W	BE9690	9/20/06	14:29:56	0.714	0.365	0.698	0.785	7.11	Long	0.00663	0.00663	0.00663	Hillside	
W	BE9689	9/20/06	14:29:58	0.635	0.476	0.603	0.885	5.02	Tran	0.00663	0.00663	0.0149	Grassy Tr. Dam	
W	BE9690	9/21/06	22:27:10	0.73	0.254	0.762	0.82	6.92	Tran	0.00663	0.00497	0.00663	Hillside	
W	BE9689	9/21/06	22:27:14	0.603	0.143	0.46	0.662	4.38	Tran	0.00663	0.00663	0.0166	Grassy Tr. Dam	
LOG	BE9689	9/22/06	13:38:34	***	***	***	***	***	***	***	***	***	Keyboard Stop	
LOG	BE9689	9/22/06	13:39:02	***	***	***	***	***	***	***	***	***	Start Monitoring	
W	BE9690	9/24/06	19:05:51	0.683	0.302	0.762	0.777	6.17	Tran	0.00663	0.00663	0.00663	Hillside	Earthquake Mag 1.6
W	BE9689	9/24/06	19:05:54	0.667	0.397	0.603	0.796	4.49	Long	0.00663	0.00663	0.0149	Grassy Tr. Dam	Earthquake Mag 1.6
LOG	BE9689	10/2/06	8:51:31	***	***	***	***	***	***	***	***	***	Keyboard Stop	
LOG	BE9690	10/2/06	9:15:21	***	***	***	***	***	***	***	***	***	Keyboard Stop	

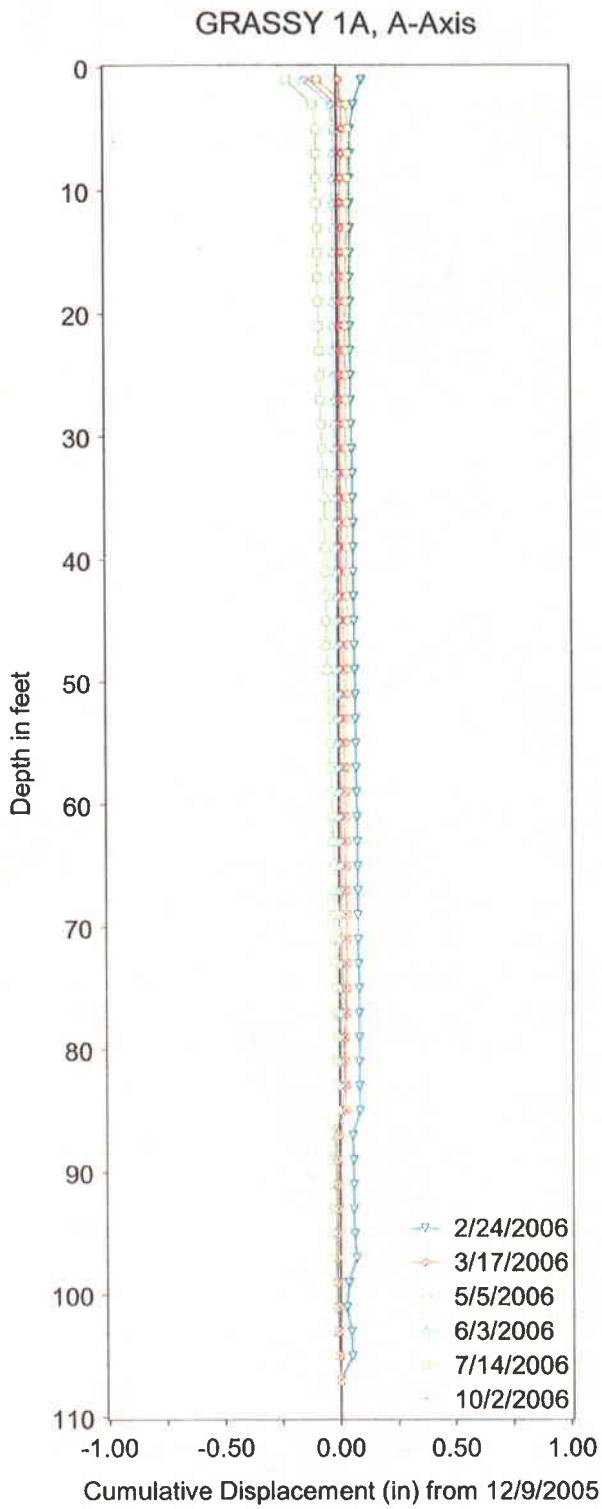

Earthquake Mag and PGA
EQ Mag
Hillside PGA
Dam PGA
Earthquake Magnitude
PGA
2006

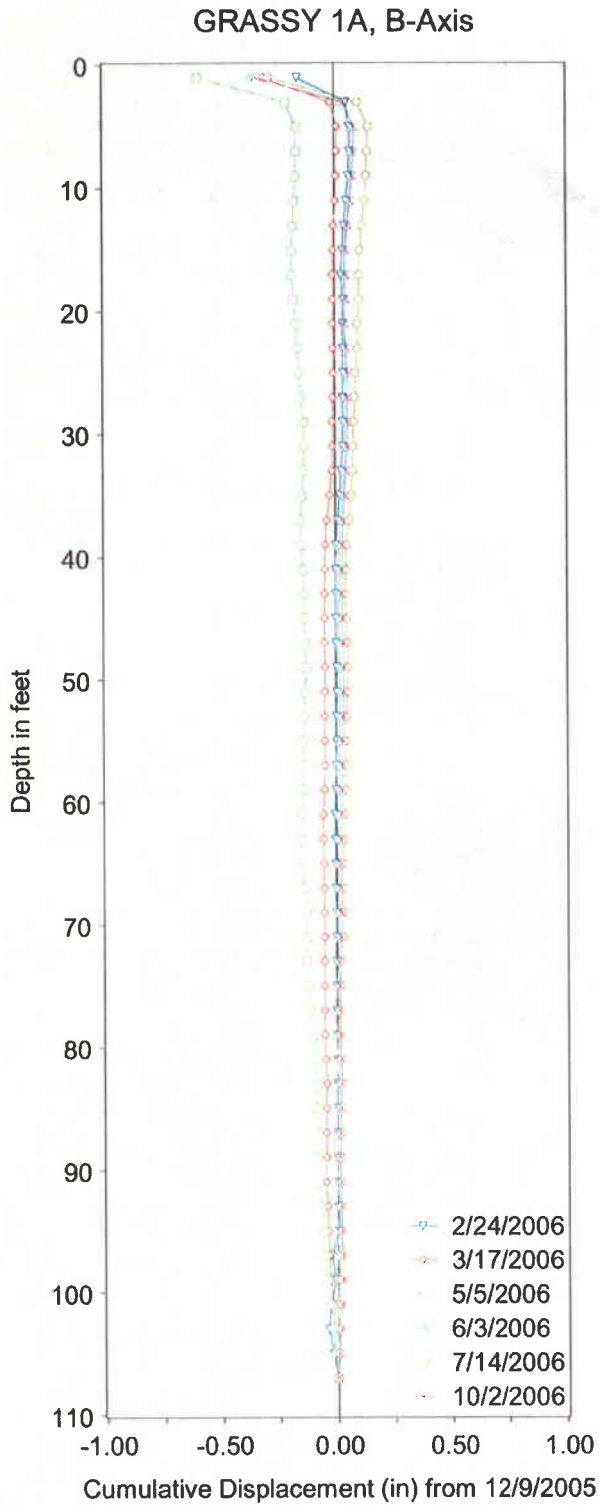

Number of Seismic Events Recorded per Day
Earthquakes
Hillside
Dam
Number of Events
2006

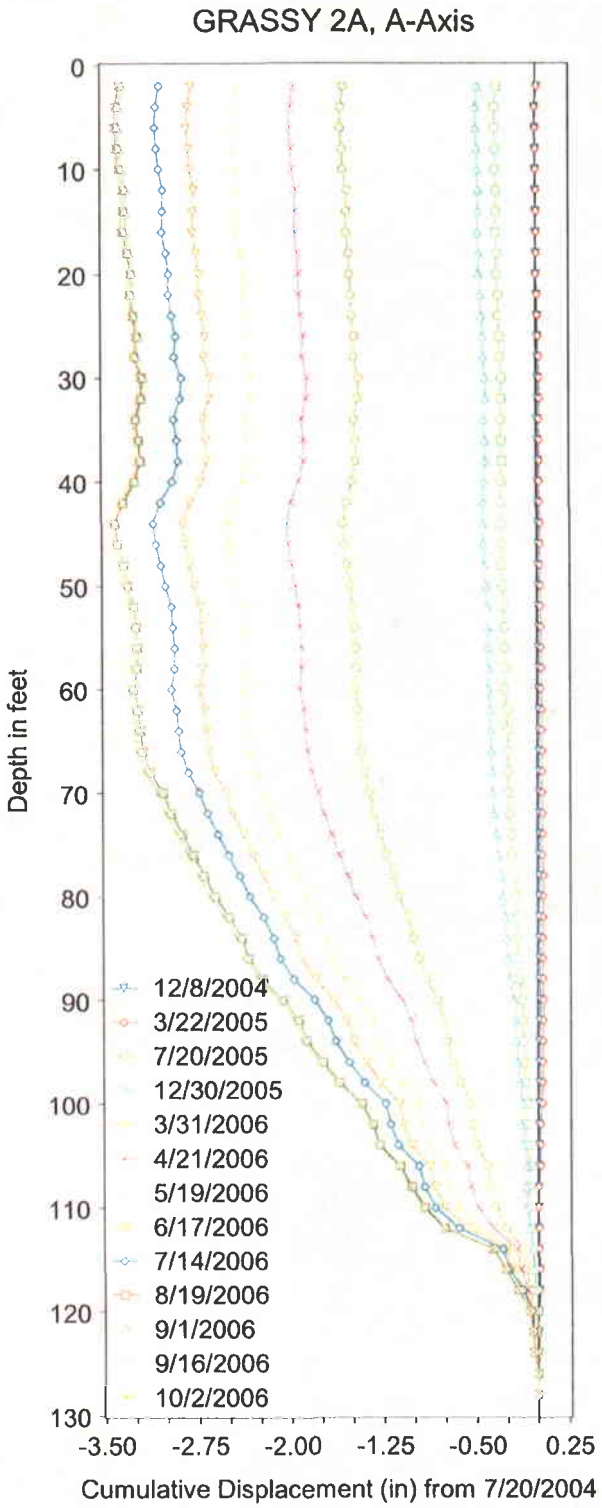

Seismic Events per Seven day Period
UUSS Earthquakes
Events on Hill
Events on Dam
Number of Events Recorded per Week
7 Days Ending

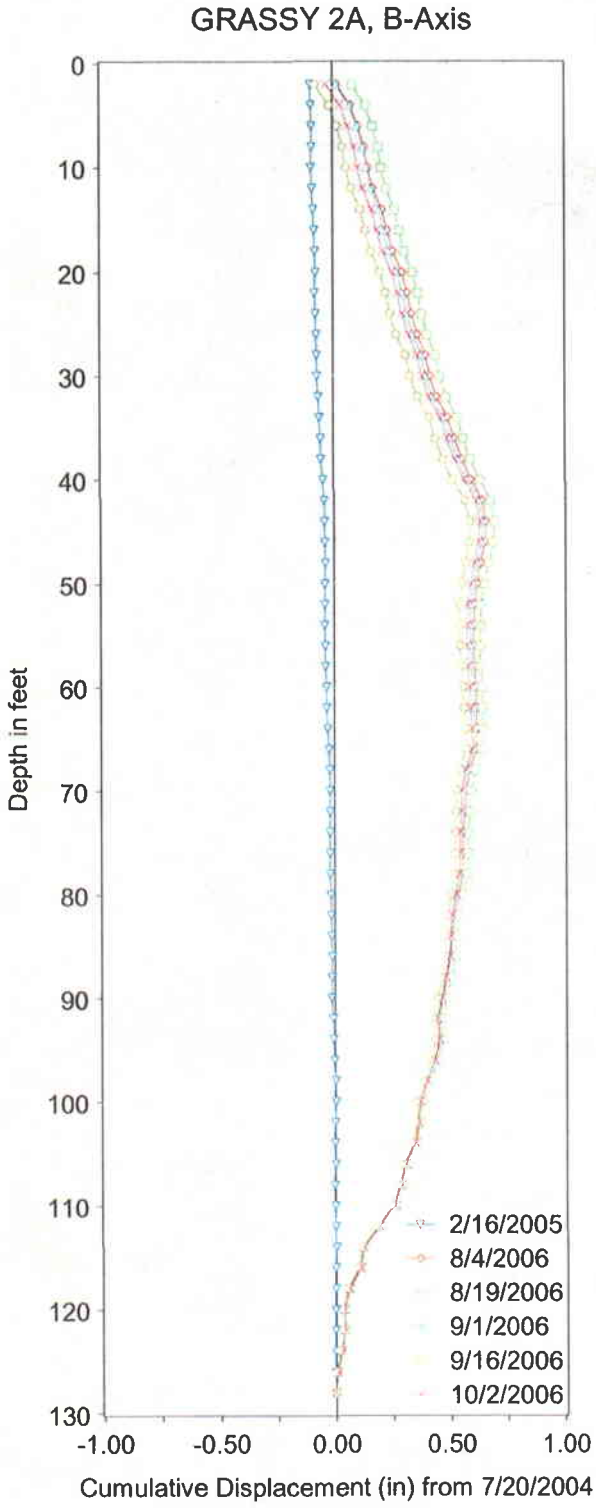

Earthquake Mag and PGA
EQ Mag
Hillside PGA
Dam PGA
Earthquake Magnitude
PGA
2006

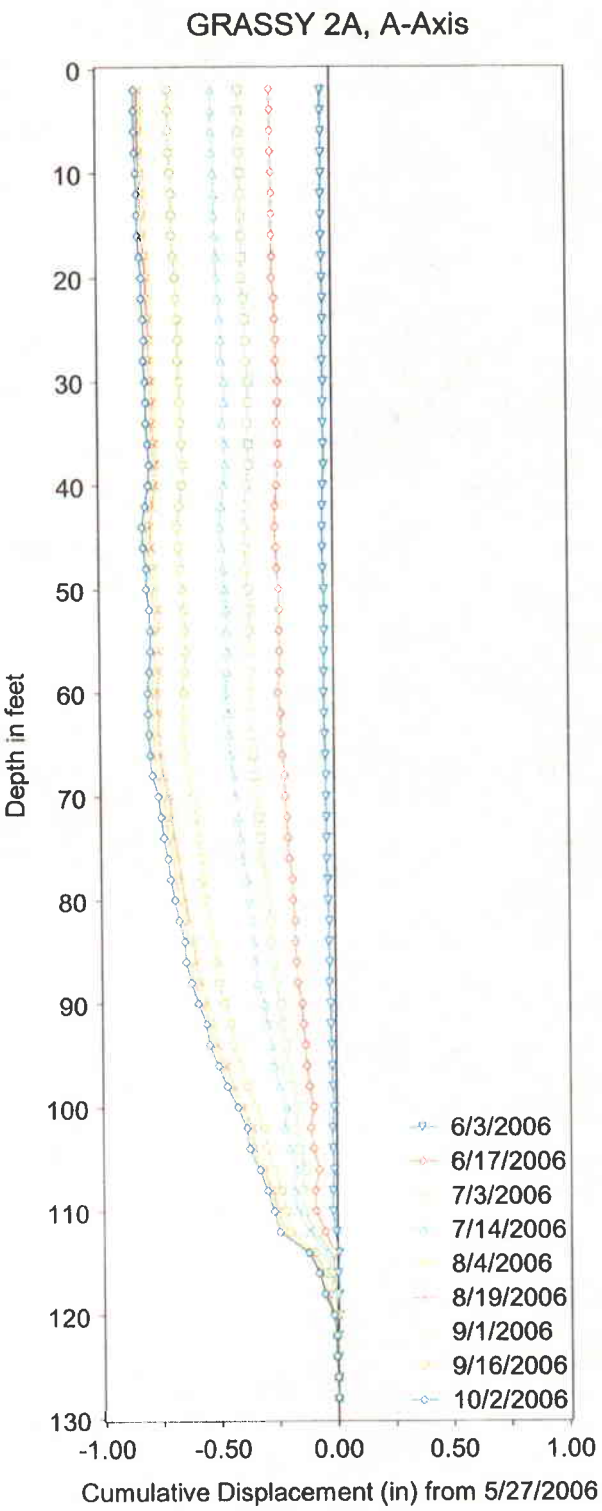

Number of Seismic Events Recorded per Day
Earthquakes
Hillside
Dam
Number of Events
2006

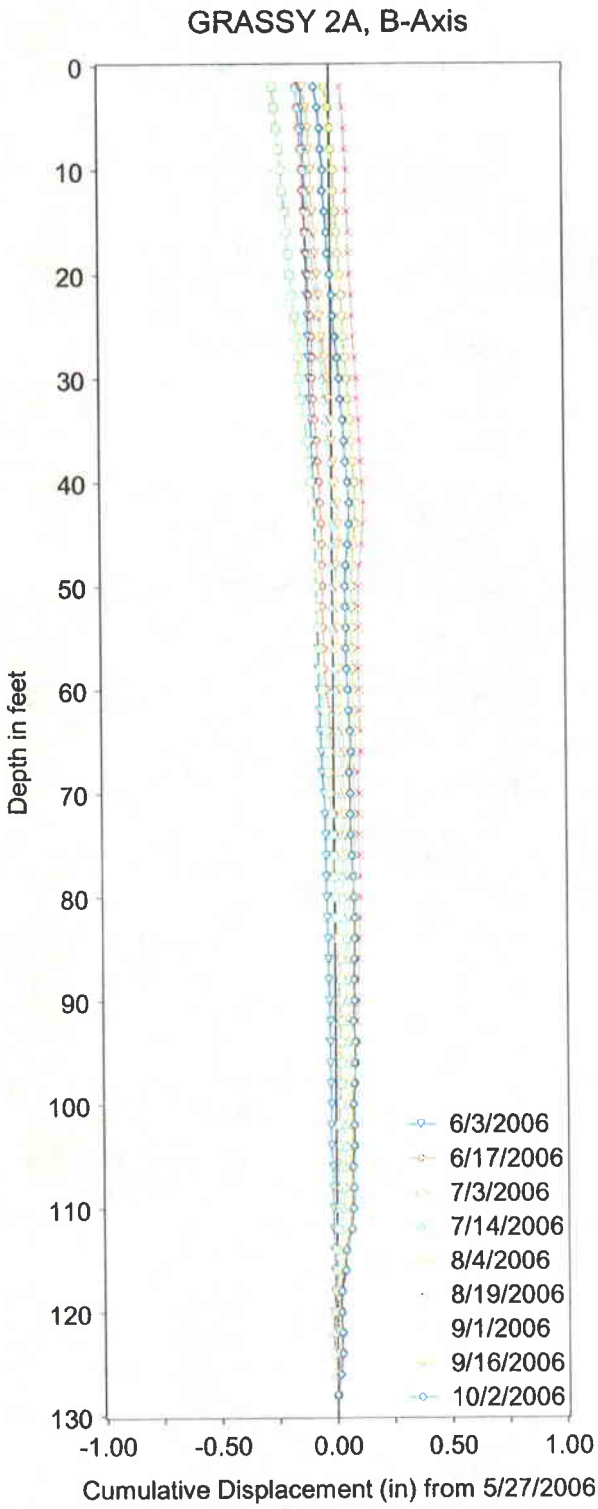

GRASSY 1A, A-Axis
Depth in feet
0
10
20
30
40
50
60
70
80
90
100
110
-1.00
-0.50
0.00
0.50
1.00
Cumulative Displacement (in) from 12/9/2005
2/24/2006
3/17/2006
5/5/2006
6/3/2006
7/14/2006
10/2/2006

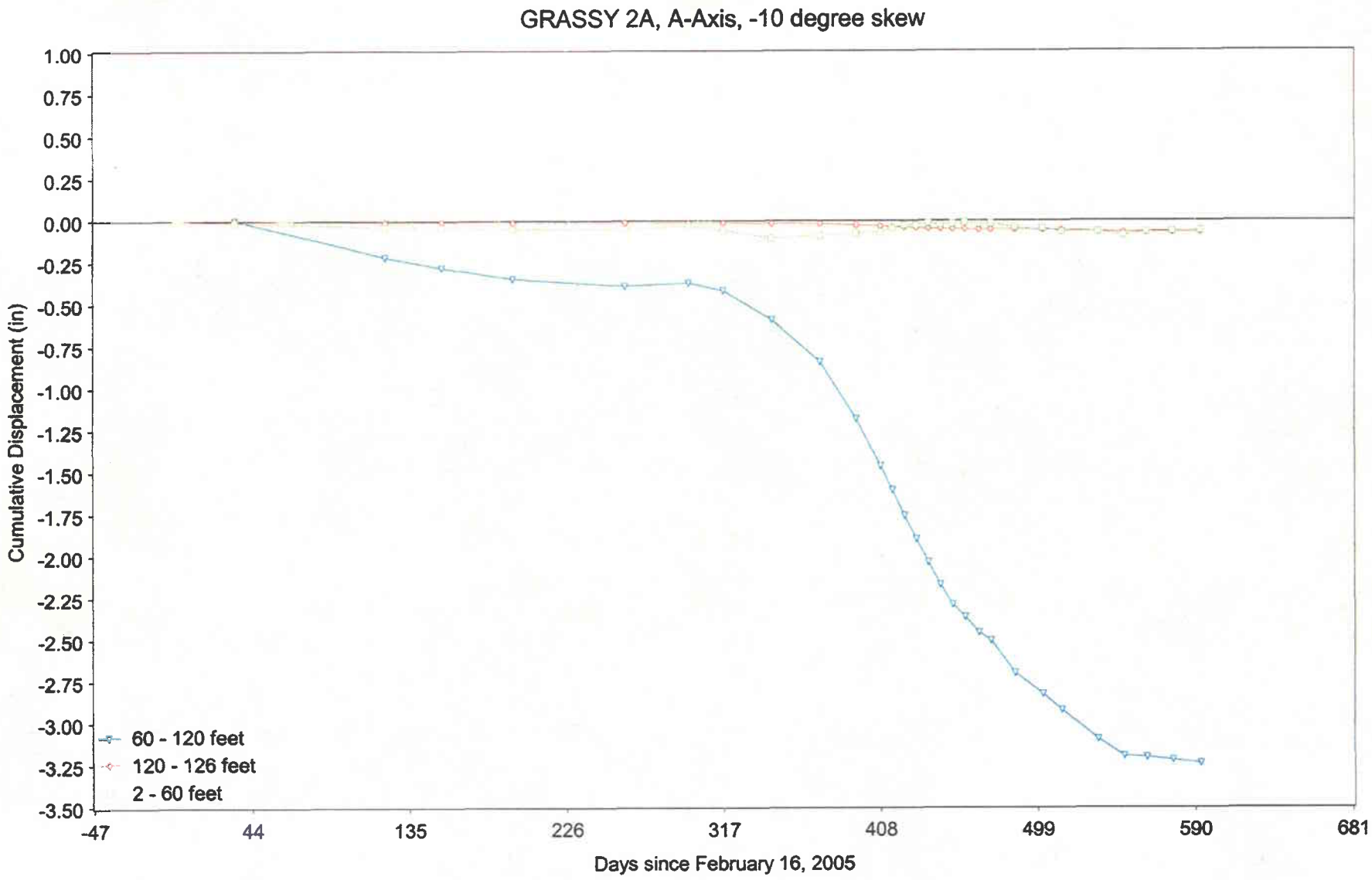

GRASSY 1A, B-Axis
Depth in feet
0
10
20
30
40
50
60
70
80
90
100
110
-1.00
-0.50
0.00
0.50
1.00
Cumulative Displacement (in) from 12/9/2005
2/24/2006
3/17/2006
5/5/2006
6/3/2006
7/14/2006
10/2/2006

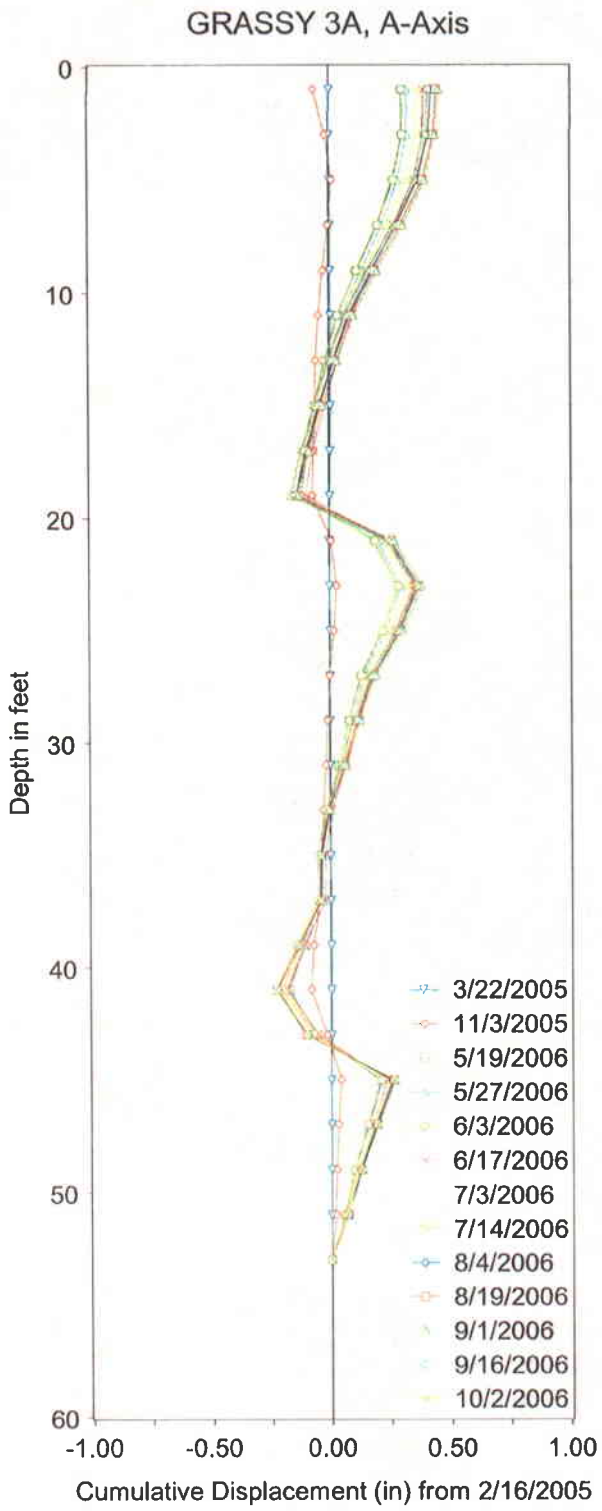

GRASSY 2A, A-Axis
Depth in feet
0
10
20
30
40
50
60
70
80
90
100
110
120
130
-3.50
-2.75
-2.00
-1.25
-0.50
0.25
Cumulative Displacement (in) from 7/20/2004
12/8/2004
3/22/2005
7/20/2005
12/30/2005
3/31/2006
4/21/2006
5/19/2006
6/17/2006
7/14/2006
8/19/2006
9/1/2006
9/16/2006
10/2/2006

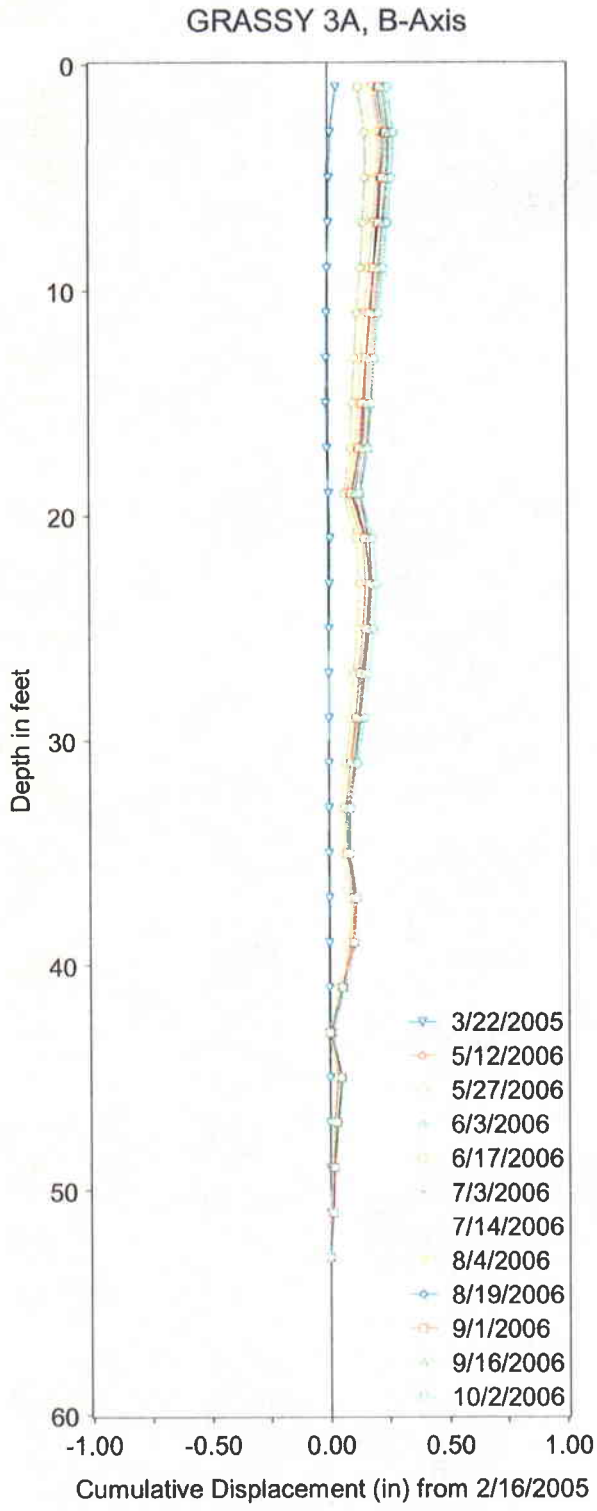

GRASSY 2A, B-Axis
Depth in feet
0
10
20
30
40
50
60
70
80
90
100
110
120
130
-1.00
-0.50
0.00
0.50
1.00
Cumulative Displacement (in) from 7/20/2004
2/16/2005
8/4/2006
8/19/2006
9/1/2006
9/16/2006
10/2/2006


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
6/3/2006
6/17/2006
7/3/2006
7/14/2006
8/4/2006
8/19/2006
9/1/2006
9/16/2006
10/2/2006

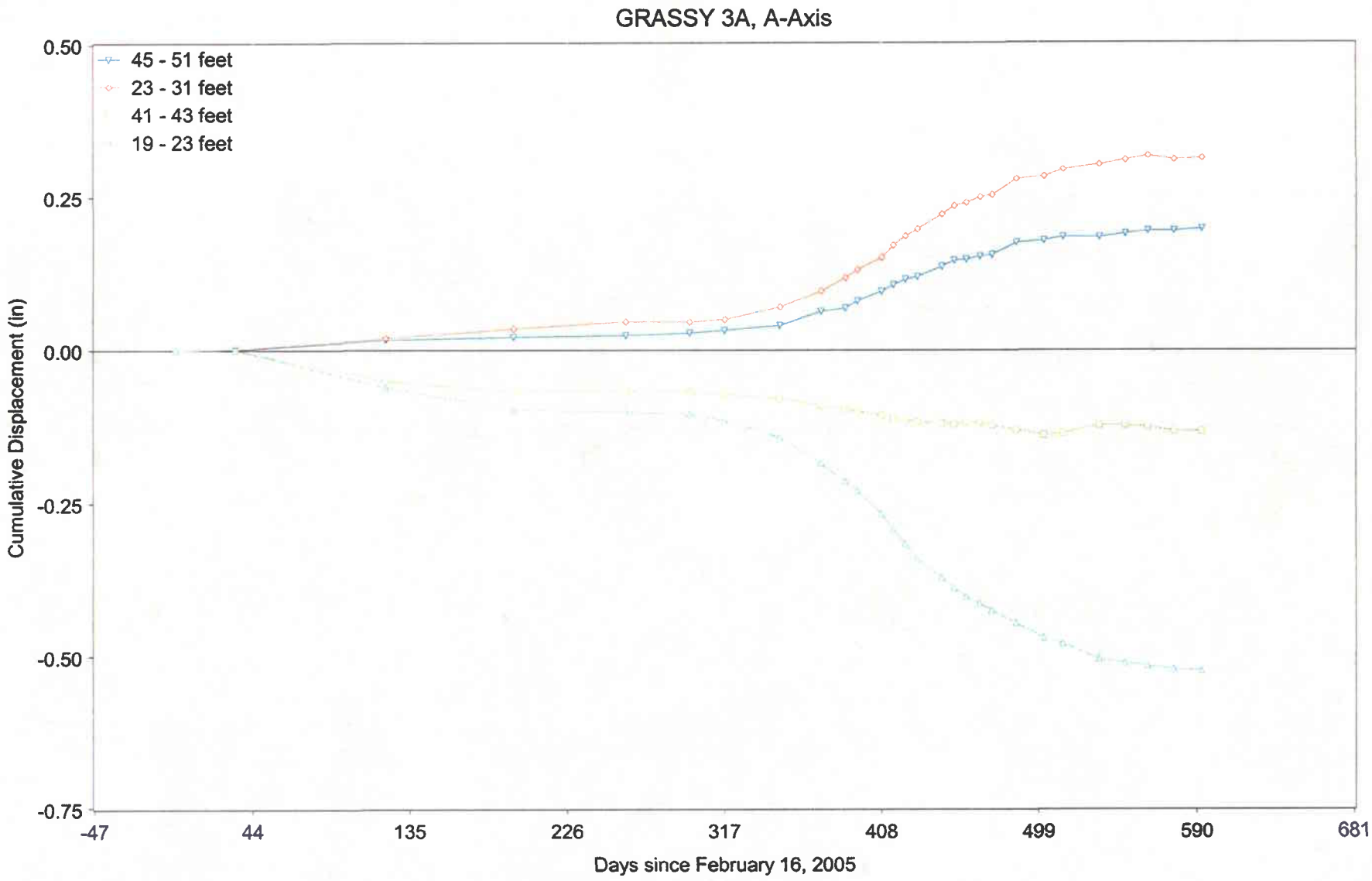

GRASSY 2A, B-Axis
Depth in feet
0
10
20
30
40
50
60
70
80
90
100
110
120
130
-1.00
-0.50
0.00
0.50
1.00
Cumulative Displacement (in) from 5/27/2006
6/3/2006
6/17/2006
7/3/2006
7/14/2006
8/4/2006
8/19/2006
9/1/2006
9/16/2006
10/2/2006

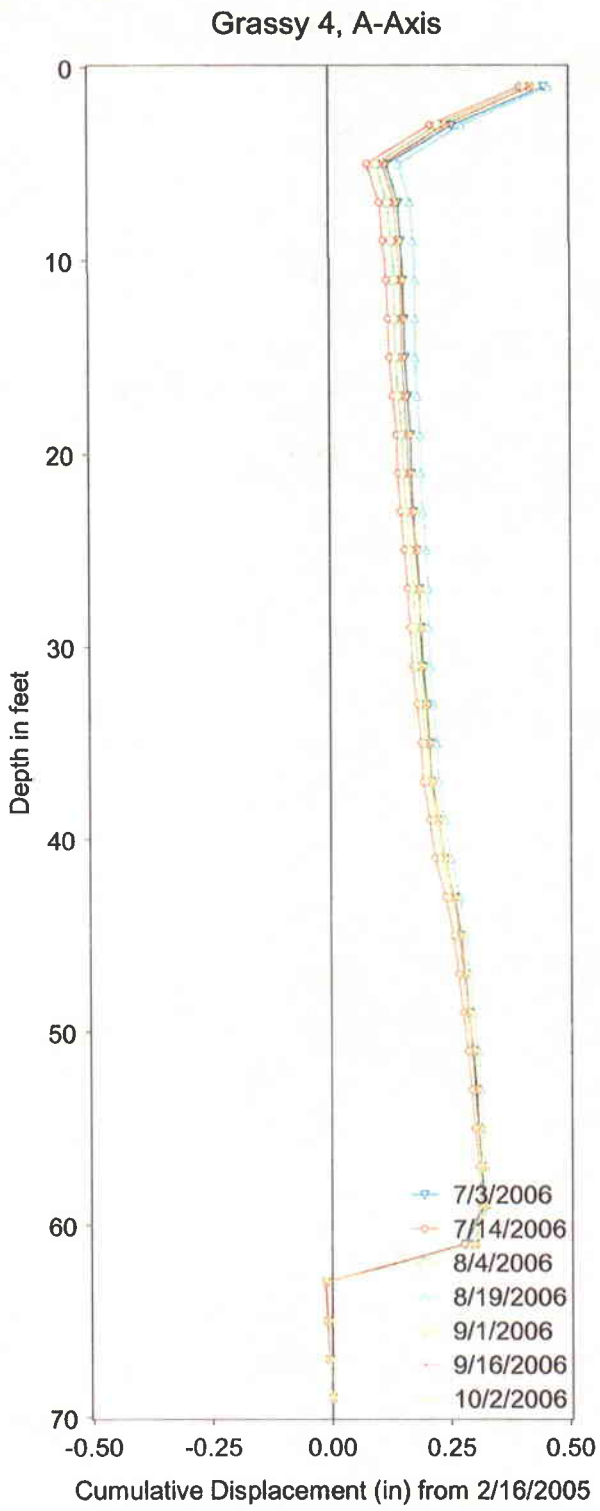

GRASSY 2A, A-Axis, -10 degree skew
Cumulative Displacement (in)
1.00
0.75
0.50
0.25
0.00
-0.25
-0.50
-0.75
-1.00
-1.25
-1.50
-1.75
-2.00
-2.25
-2.50
-2.75
-3.00
-3.25
-3.50
-47
44
135
226
317
408
499
590
681
Days since February 16, 2005
60 - 120 feet
120 - 126 feet
2 - 60 feet

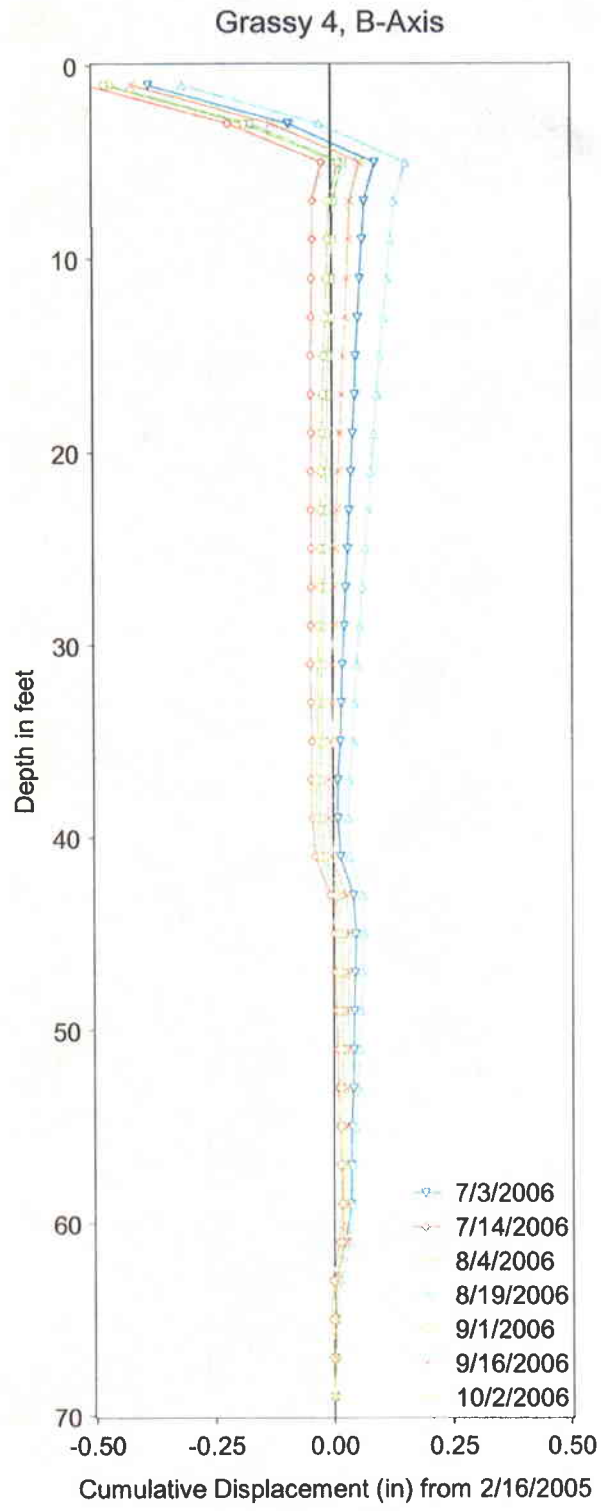


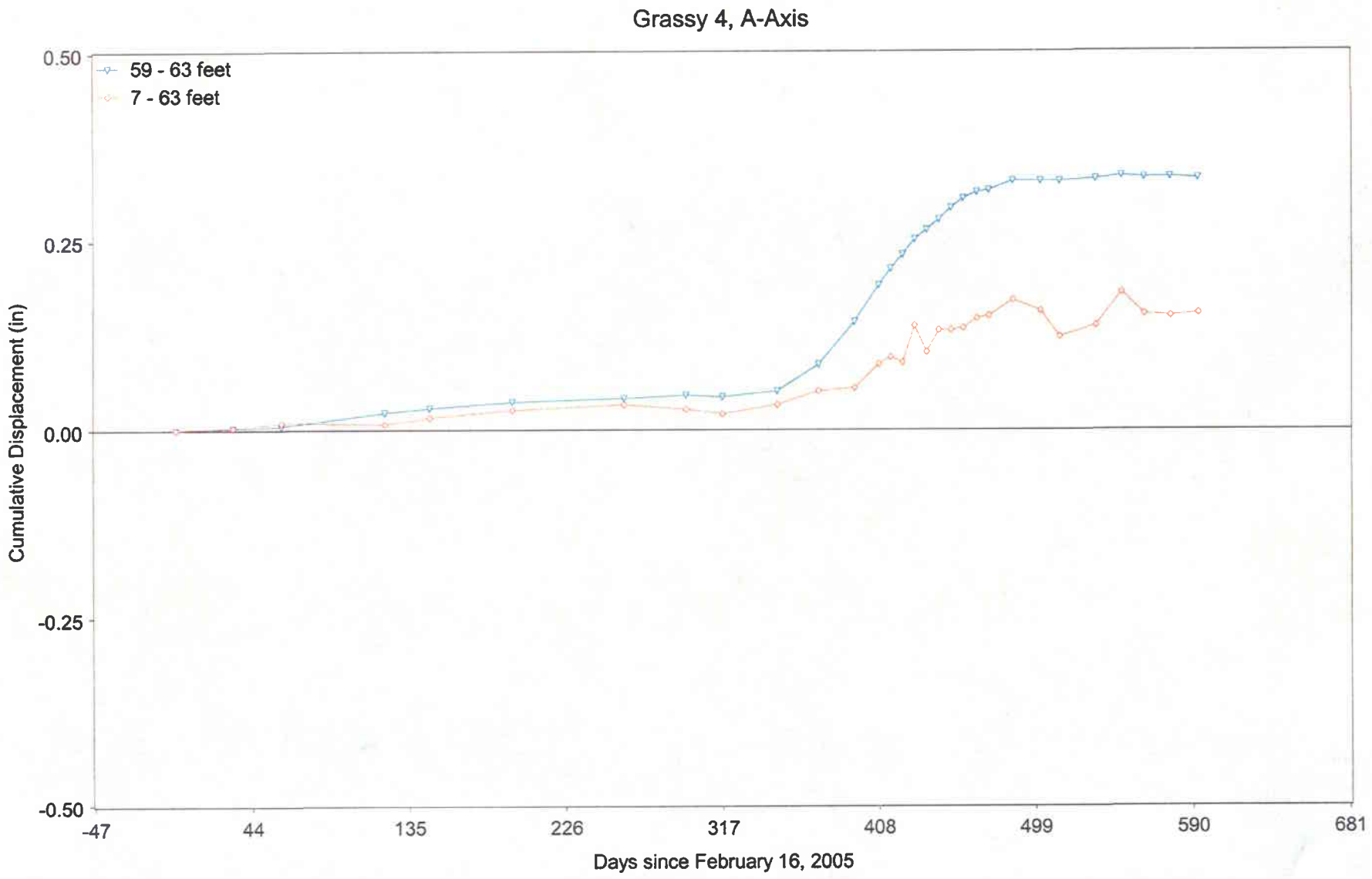


-30 degree skew


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

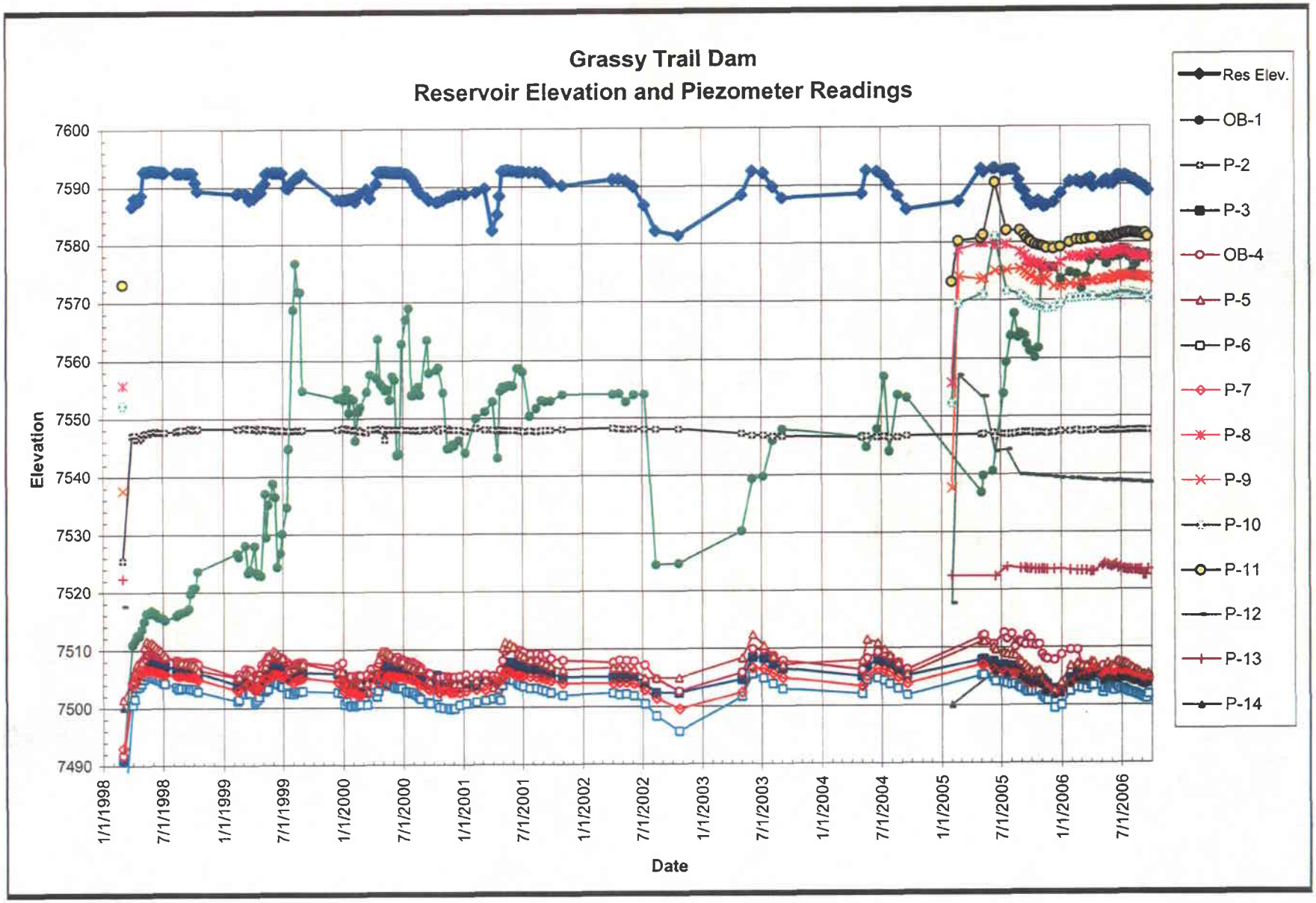

Grassy 4, A-Axis
Depth in feet
0
10
20
30
40
50
60
70
-0.50
-0.25
0.00
0.25
0.50
Cumulative Displacement (in) from 2/16/2005
7/3/2006
7/14/2006
8/4/2006
8/19/2006
9/1/2006
9/16/2006
10/2/2006


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
7/3/2006
7/14/2006
8/4/2006
8/19/2006
9/1/2006
9/16/2006
10/2/2006


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	7601.6	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	CREST	CREST	CREST	CREST	D.S. SLOPE	D.S. SLOPE	CREST	CREST	CREST	CREST	TOE	TOE	TOE
			EMBANK.	FOUND.	EMBANK/FOUND	EMBANK	FOUND	EMBANK	FOUND	EMBANK/FOUND	EMBANK.	EMBANK.	FOUND.	FOUND.	FOUND	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	54.6		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
9/7/2006	LW	-34"	23.9	27.6	24	54.1	97.3	36.4	55.4		31.0	20.3	63.1	23.5	10.7	15.1
9/14/2006	LW	-36"	23.8	27.7	23.8	54.1	97.4	36.4	55.3		30.9	20.1	63.1	23.7	10.9	15.2
9/21/2006	LW	-43"	24.4	27.9	24.3	54.1	97.1	35.4	55.1		31.6	20.7	63.1	23.4	10.1	14.9



RB&G ENGINEERING INC.
Provo, Utah

Figure Reservoir Elevation and Piezometer Readings
March 1998 to September 21, 2006

Grassy Trail Dam and Reservoir

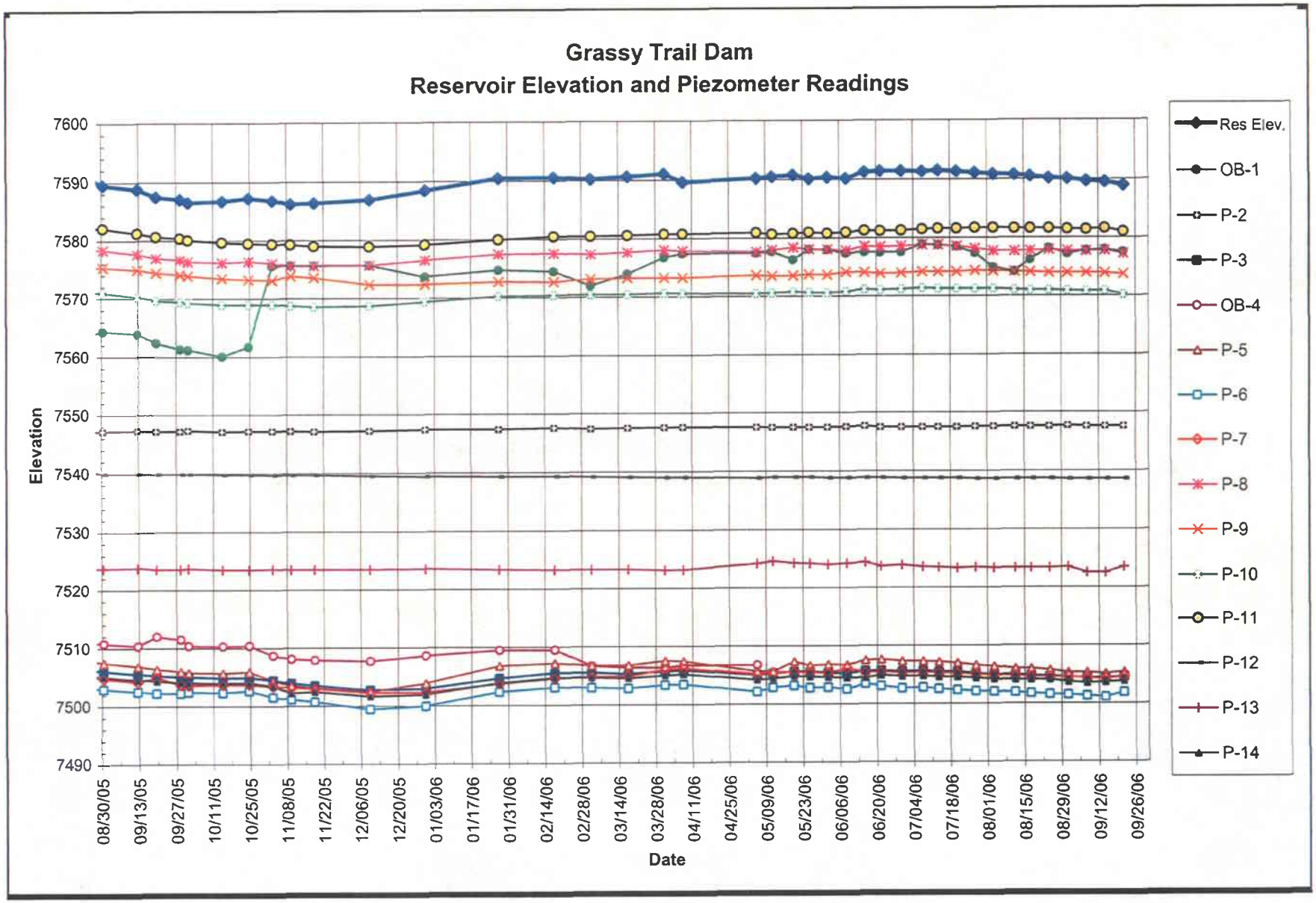


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Figure Reservoir Elevation and Piezometer Readings
August 30, 2005 to September 21, 2006

Grassy Trail Dam and Reservoir