0063

Incoming
C0070041 OK

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Date: 7/5/2006 11:48:58 AM
Subject: Grassy Trail Dam Seismic Update July 3, 2006

See attachment.

RB&G ENGINEERING
Grassy Trail Dam, Seismic Summary for July 3, 2006

For the 10 day period between June 23 and July 3, 2006 the number of MIS (Mining Induced Seismicity) earthquakes recorded near the site by the UUSS increased from 6 during the previous 6 days to 17 during the past 10 days. MIS earthquakes ranged in magnitude from 1.5 to a high of 1.9. Not all of these events were recorded on the Dam and Hillside monitoring units. A 1.7 and two 1.5 magnitude events were not recorded on either instrument.

With the increased number of earthquakes, the number of events recorded on the Hillside and Dam seismic units also increased. For the ten-day period the Hillside unit recorded a total of 23 events. MIS events on the Dam totaled 20. There were also 3 additional events recorded on the dam which were generated by people or other movement directly on the dam, which were not mining related. No events with a PGA value greater than 0.1g were recorded at the site.

During the past ten days the highest Peak Ground Acceleration (PGA) value recorded on the Hillside increased from a previous high of 0.0232g to **0.0348g.** Highest PGA value on the Dam increased from 0.0398g to **0.0481g**. These highest PGA values were on July 1, 2006 during a 1.9 magnitude earthquake.

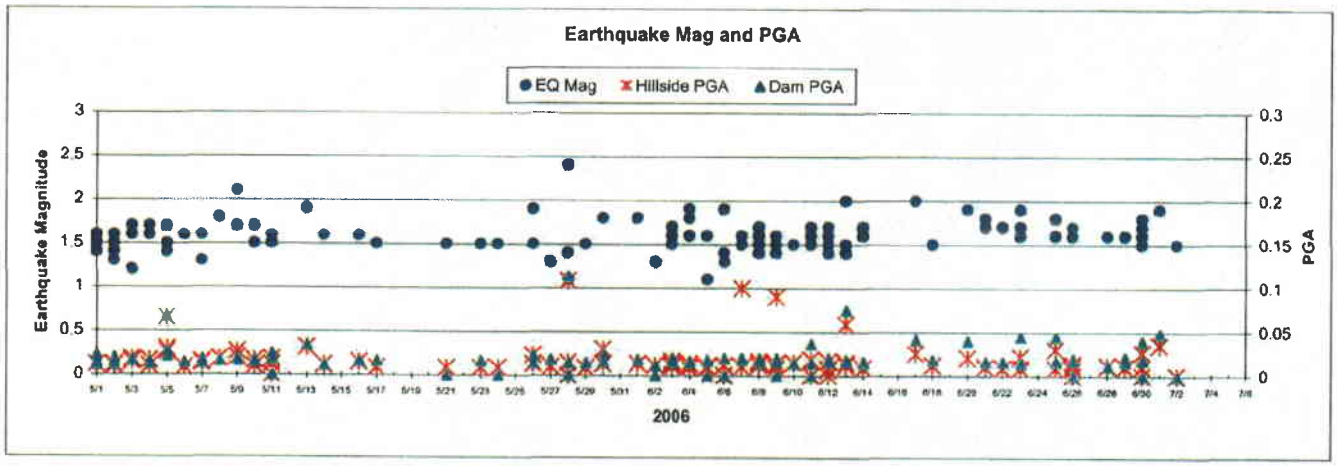
Inclinometers I-2, I-3 and I-4 showed an overall decrease in rate of movement relative to the previous reading on June 17. As shown on the graphs the rate of movement is still less than that recorded earlier in the year.

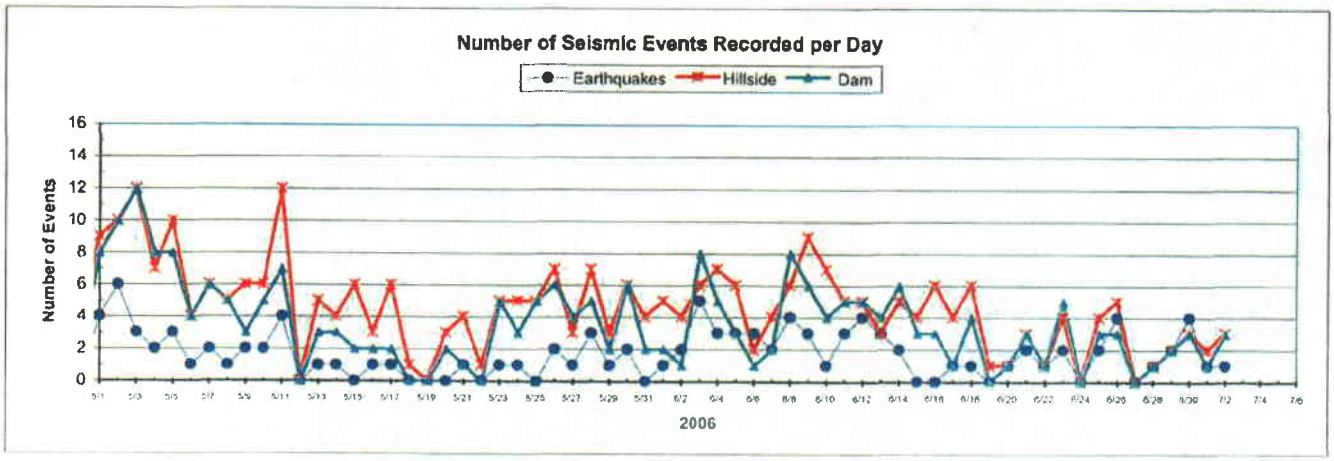
No cracks or signs of movement were noted on the dam or abutments above the dam.

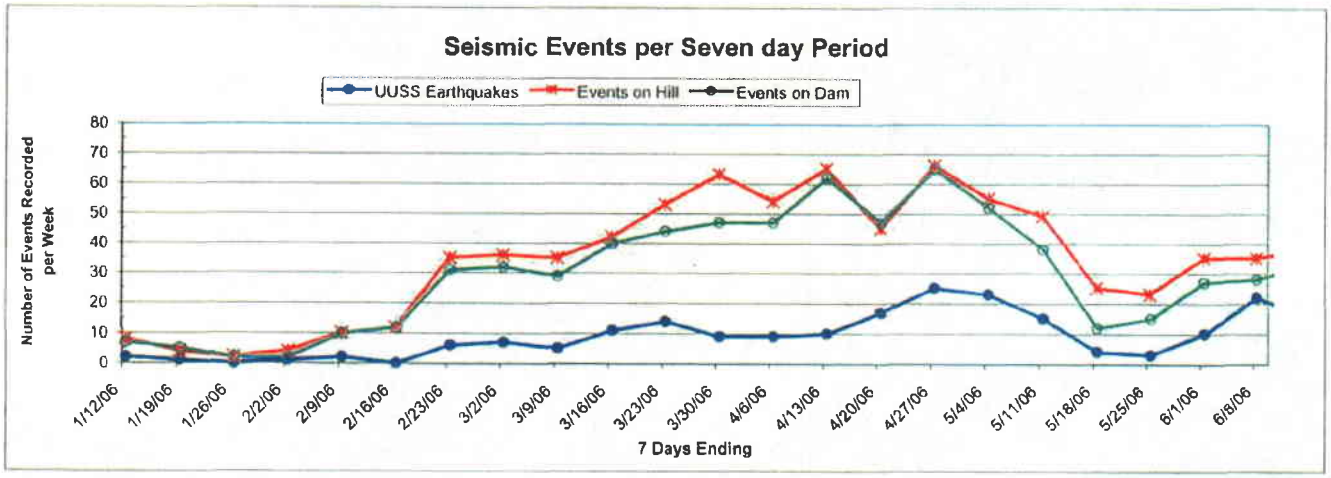
Michael Hansen
RB&G ENGINEERING

Grassy Trail Dam, Carbon County, Utah
July 3,2006

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	Post Event Note first line
LOG	BE9690	6/23/06	12:44:21	***	***	***	***	***	***	***	***	Start Monitoring	Start Monitoring
LOG	BE9689	6/23/06	12:58:49	***	***	***	***	***	***	***	***	Start Monitoring	Start Monitoring
W	BE9689	6/23/06	14:41:20	0.127	0.667	0.254	0.667	Vert	0.00663	0.0215	0.0149	Grassy Tr. Dam	**Man Made**
W	BE9690	6/23/06	15:20:29	0.524	0.317	0.698	0.811	Long	0.00663	0.00663	0.00829	Hillside	Earthquake Mag 1.6
W	BE9689	6/23/06	20:24:00	3.78	3.25	4	5.22	Vert	0.0417	0.0182	0.0298	Grassy Tr. Dam	**Eq mag 1.9**
W	BE9690	6/23/06	20:24:00	2.64	1.35	1.98	3.03	Vert	0.0215	0.0116	0.0182	Hillside	**Eq mag 1.9**
W	BE9689	6/23/06	21:59:18	0.413	0.317	0.651	0.699	Long	0.00663	0.00663	0.0166	Grassy Tr. Dam	
W	BE9689	6/23/06	22:48:55	0.476	0.302	0.635	0.66	Long	0.00663	0.00663	0.0166	Grassy Tr. Dam	
W	BE9689	6/23/06	23:36:25	0.683	0.683	0.698	0.846	Long	0.00663	0.00663	0.0166	Grassy Tr. Dam	
W	BE9690	6/23/06	23:36:25	0.762	0.349	0.54	0.859	Tran	0.00994	0.00663	0.00663	Hillside	
W	BE9690	6/25/06	14:05:13	0.746	0.397	0.651	0.811	Tran	0.00829	0.00663	0.00829	Hillside	Eq mag 1.6
W	BE9689	6/25/06	14:05:14	0.683	0.46	0.587	0.87	Tran	0.00663	0.00663	0.0166	Grassy Tr. Dam	Eq mag 1.6
W	BE9690	6/25/06	21:46:49	0.492	0.397	0.683	0.695	Long	0.00829	0.00663	0.00829	Hillside	
W	BE9690	6/25/06	21:48:22	0.444	0.508	0.698	0.716	Long	0.00663	0.00663	0.00829	Hillside	
W	BE9690	6/25/06	22:12:20	2.83	1.3	3.32	3.52	Vert	0.0232	0.0149	0.0298	Hillside	Eq mag 1.8
W	BE9689	6/25/06	22:12:21	4.29	3.06	3.67	4.79	Vert	0.0447	0.0182	0.0331	Grassy Tr. Dam	Eq mag 1.8
W	BE9689	6/25/06	22:22:11	0.476	0.444	0.619	0.762	Long	0.00663	0.00663	0.0166	Grassy Tr. Dam	
W	BE9690	6/26/06	0:52:58	0.635	0.254	0.524	0.735	Tran	0.00663	0.00663	0.00663	Hillside	Eq mag 1.6
W	BE9690	6/26/06	8:04:35	1.24	0.667	1.11	1.26	Long	0.0133	0.00829	0.0133	Hillside	Eq mag 1.7
W	BE9689	6/26/06	8:04:36	1.3	1.03	1.57	1.88	Tran	0.0166	0.00829	0.0199	Grassy Tr. Dam	Eq mag 1.7
W	BE9690	6/26/06	8:27:39	0.714	0.19	0.444	0.735	Tran	0.00829	0.00663	0.00663	Hillside	
W	BE9689	6/26/06	8:27:41	0.651	0.492	0.492	0.685	Tran	0.00829	0.00829	0.0182	Grassy Tr. Dam	
W	BE9690	6/26/06	10:45:35	0.429	0.476	0.619	0.623	Long	0.00829	0.00663	0.00829	Hillside	
W	BE9689	6/26/06	13:49:39	0.143	0.873	0.286	0.887	Vert	0.00663	0.0249	0.0166	Grassy Tr. Dam	**Man Made**
W	BE9690	6/26/06	19:01:11	1.19	0.571	1.06	1.33	Tran	0.00994	0.00829	0.00994	Hillside	Eq mag 1.7
W	BE9689	6/26/06	19:01:12	1.56	1.06	1.44	1.89	Tran	0.0182	0.00829	0.0182	Grassy Tr. Dam	Eq mag 1.7
W	BE9690	6/28/06	10:05:55	1.05	0.683	1.03	1.26	Vert	0.0116	0.00829	0.00829	Hillside	Eq mag 1.6
W	BE9689	6/28/06	10:05:58	0.619	0.397	0.54	0.747	Tran	0.00829	0.00663	0.0166	Grassy Tr. Dam	Eq mag 1.6
W	BE9690	6/29/06	8:18:18	1.19	0.508	0.873	1.2	Long	0.00994	0.00829	0.00829	Hillside	Eq mag 1.6
W	BE9689	6/29/06	8:18:21	1.33	0.873	1.08	1.7	Tran	0.0149	0.00829	0.0166	Grassy Tr. Dam	Eq mag 1.6
W	BE9690	6/29/06	16:26:38	0.778	0.333	0.54	0.81	Tran	0.00994	0.00663	0.00829	Hillside	Eq mag 1.6
W	BE9689	6/29/06	16:26:41	0.952	0.619	0.841	1.22	Tran	0.0116	0.00994	0.0215	Grassy Tr. Dam	Eq mag 1.6
W	BE9690	6/30/06	3:56:44	0.349	0.365	0.921	0.96	Long	0.00663	0.00829	0.0116	Hillside	
W	BE9690	6/30/06	7:24:04	0.937	0.651	0.73	0.992	Vert	0.00994	0.00663	0.00829	Hillside	Eq mag 1.6
W	BE9689	6/30/06	7:24:07	1.25	0.762	0.889	1.29	Long	0.0116	0.00829	0.0182	Grassy Tr. Dam	Eq mag 1.6
W	BE9689	6/30/06	10:57:55	0.27	0.651	0.413	0.736	Vert	0.0249	0.0381	0.0265	Grassy Tr. Dam	**Man Made**
W	BE9690	6/30/06	14:47:41	2.02	1.05	2.37	2.79	Vert	0.0133	0.0116	0.0265	Hillside	Eq mag 1.8
W	BE9689	6/30/06	14:47:44	3.95	2.62	2.89	4.06	Vert	0.0398	0.0149	0.0232	Grassy Tr. Dam	Eq mag 1.8
W	BE9689	6/30/06	23:49:38	0.524	0.397	0.651	0.729	Long	0.00829	0.00663	0.0166	Grassy Tr. Dam	
W	BE9690	7/1/06	10:42:57	0.492	0.444	0.698	0.723	Long	0.00829	0.00829	0.00829	Hillside	
W	BE9690	**7/1/06**	**10:50:32**	2.59	1.38	3.29	3.76	Vert	0.0232	0.0166	**0.0348**	Hillside	**Eq mag 1.9**
W	BE9689	**7/1/06**	**10:50:36**	5.29	3.46	4.14	5.59	Vert	**0.0481**	0.0215	0.0315	Grassy Tr. Dam	**Eq mag 1.9**
W	BE9690	7/2/06	1:41:42	0.667	0.238	0.873	0.997	Long	0.00829	0.00663	0.00829	Hillside	
W	BE9689	7/2/06	1:41:46	0.476	0.413	0.651	0.755	Long	0.00829	0.00663	0.0166	Grassy Tr. Dam	
W	BE9690	7/2/06	9:01:23	0.825	0.825	2.05	2.07	Vert	0.0133	0.00994	0.0166	Hillside	
W	BE9689	7/2/06	9:01:27	0.556	0.46	0.905	0.957	Long	0.00663	0.00829	0.0215	Grassy Tr. Dam	
W	BE9690	7/2/06	12:25:02	1.06	0.698	0.984	1.39	Vert	0.0116	0.00994	0.0116	Hillside	
W	BE9689	7/2/06	12:25:06	1.64	1.16	2.24	2.77	Long	0.0133	0.00994	0.0166	Grassy Tr. Dam	
LOG	BE9690	7/3/06	15:40:17	***	***	***	***	***	***	***	***	Keyboard Stop	No
LOG	BE9689	7/3/06	17:07:10	***	***	***	***	***	***	***	***	Keyboard Stop	No


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
1/12/06
1/19/06
1/26/06
2/2/06
2/9/06
2/16/06
2/23/06
3/2/06
3/9/06
3/16/06
3/23/06
3/30/06
4/6/06
4/13/06
4/20/06
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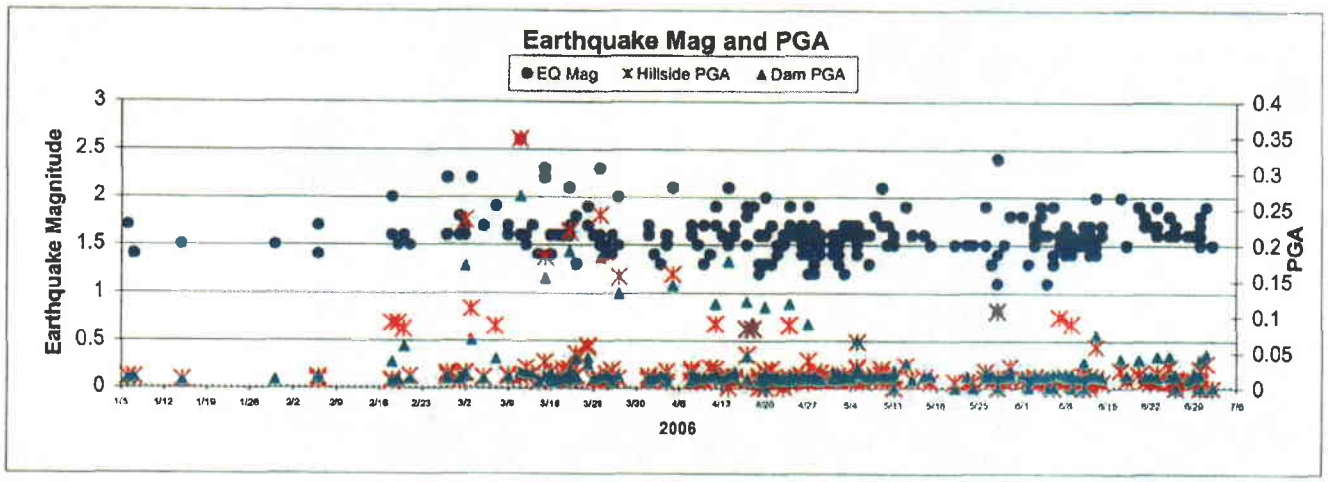
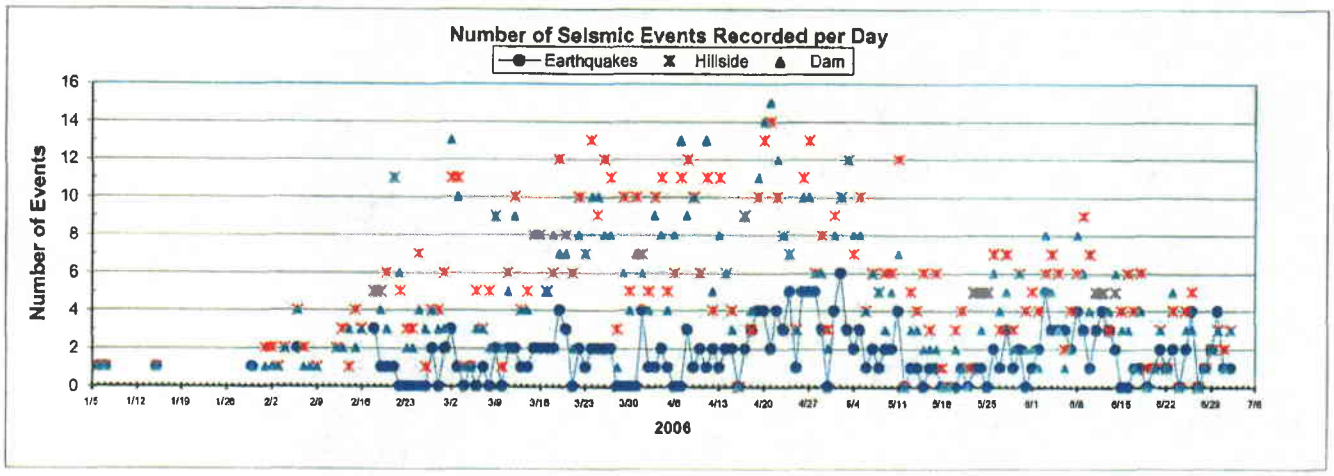
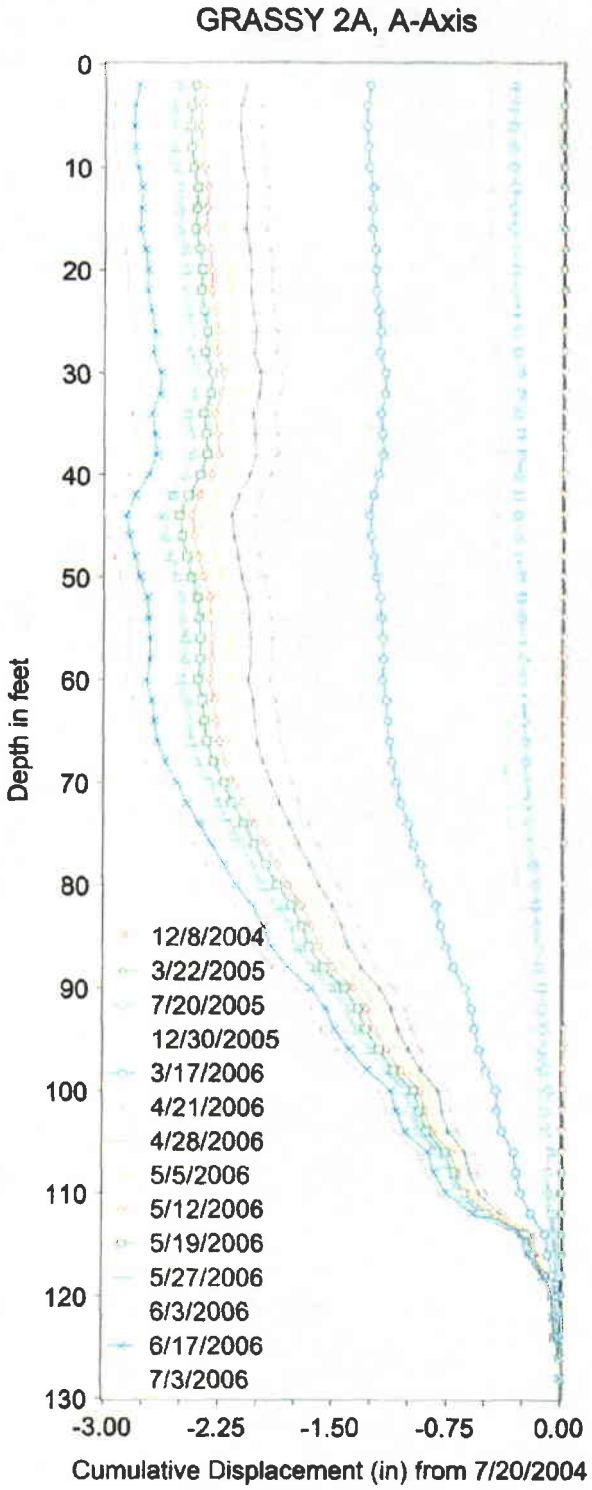
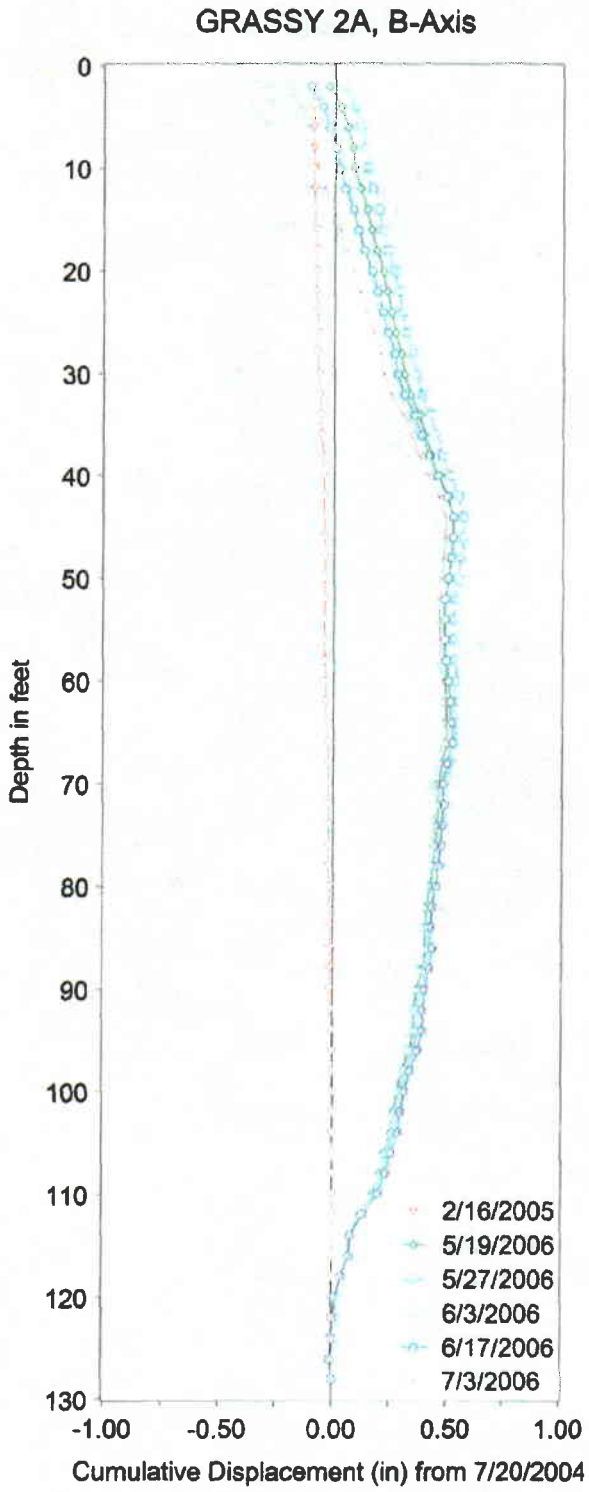
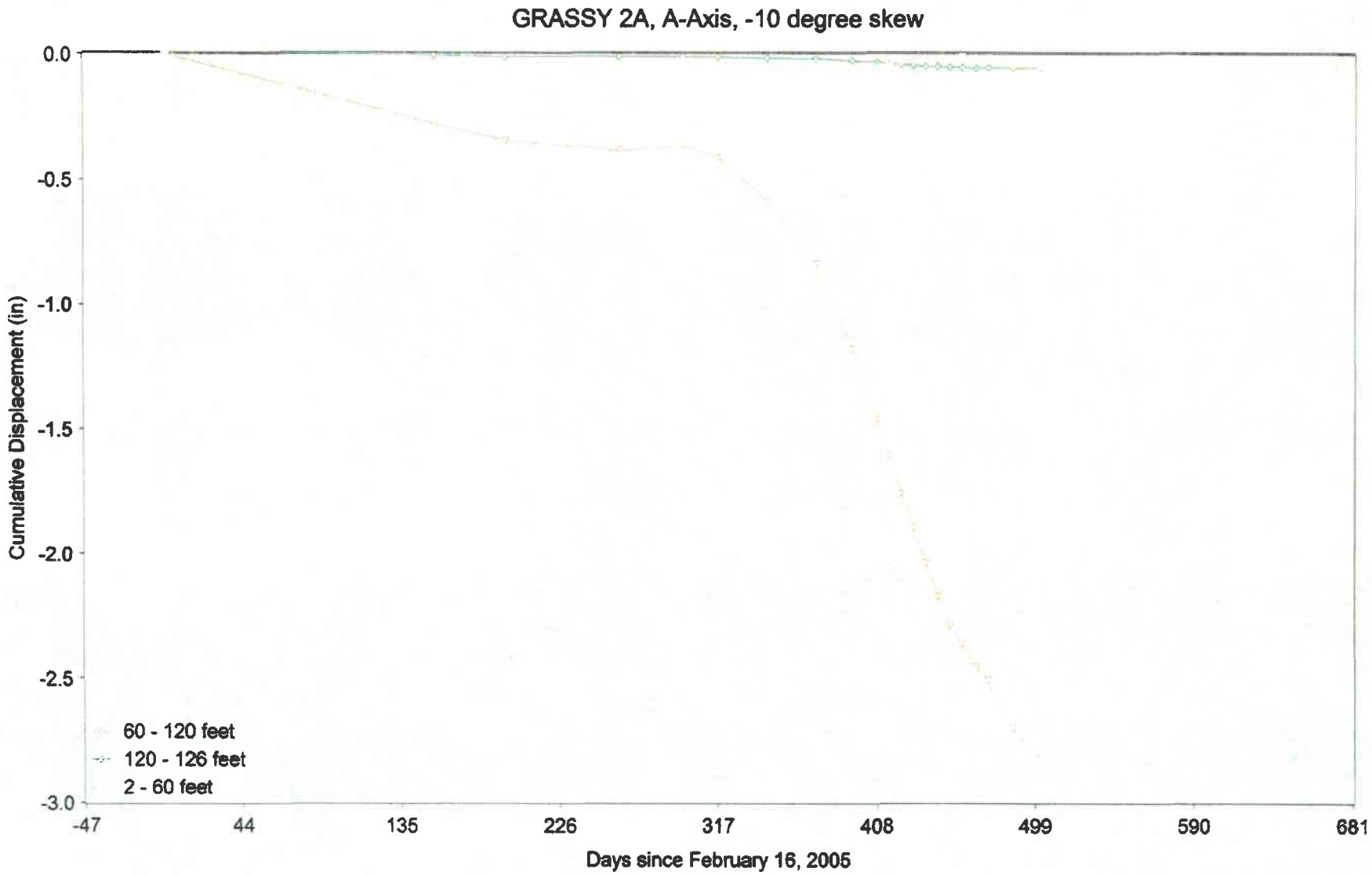
5/25/06
6/1/06
6/8/06
7 Days Ending

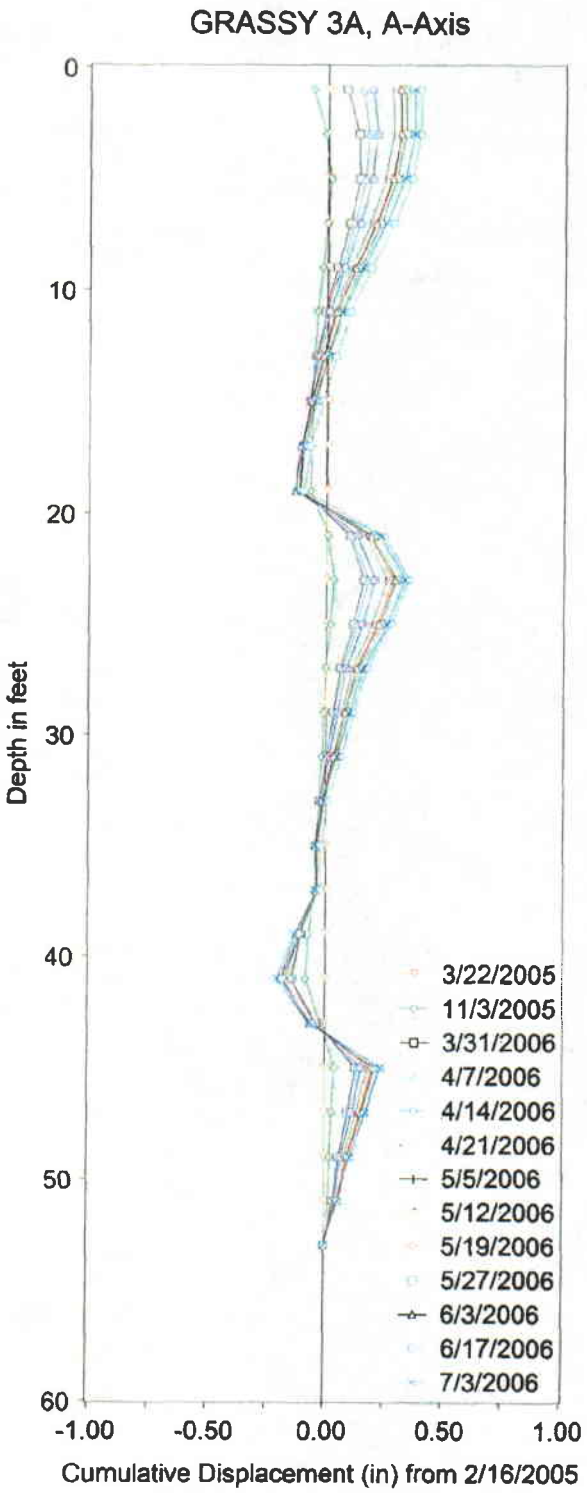

Earthquake Mag and PGA
EQ Mag
Hillside PGA
Dam PGA
Earthquake Magnitude
PGA
2006

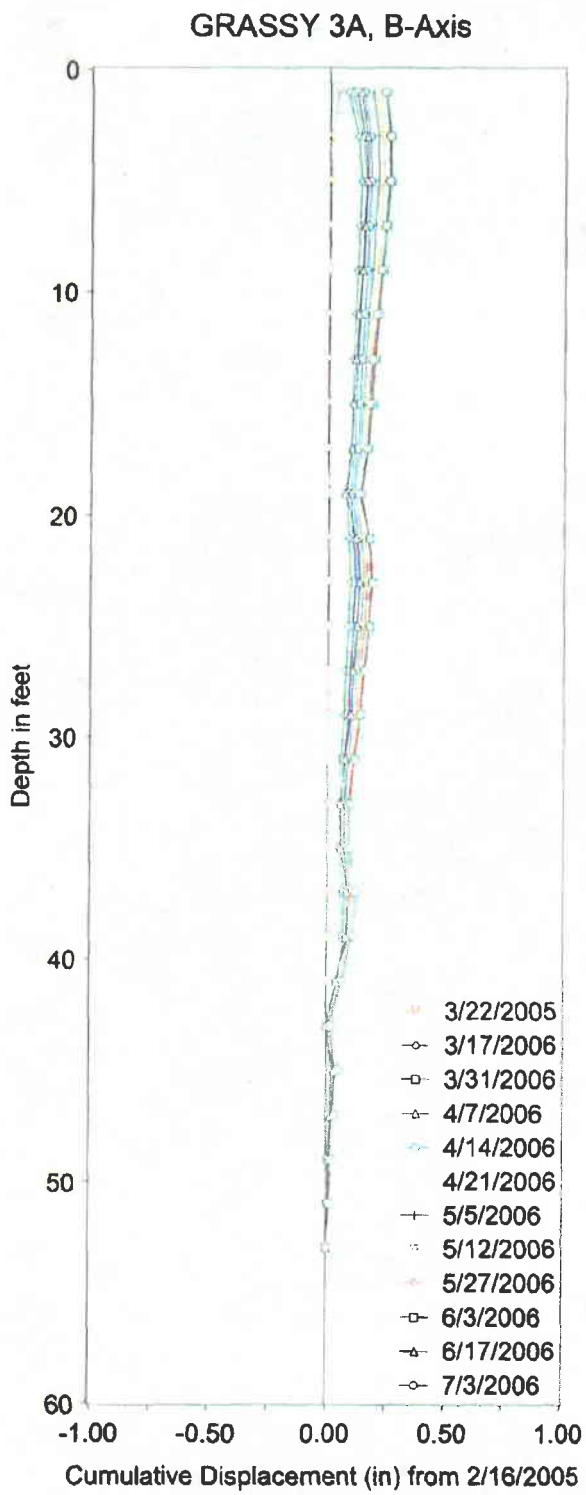

Number of Seismic Events Recorded per Day
Earthquakes
Hillside
Dam
Number of Events
2006


GRASSY 2A, A-Axis
Depth in feet
0
10
20
30
40
50
60
70
80
90
100
110
120
130
-3.00
-2.25
-1.50
-0.75
0.00
Cumulative Displacement (in) from 7/20/2004
12/8/2004
3/22/2005
7/20/2005
12/30/2005
3/17/2006
4/21/2006
4/28/2006
5/5/2006
5/12/2006
5/19/2006
5/27/2006
6/3/2006
6/17/2006
7/3/2006

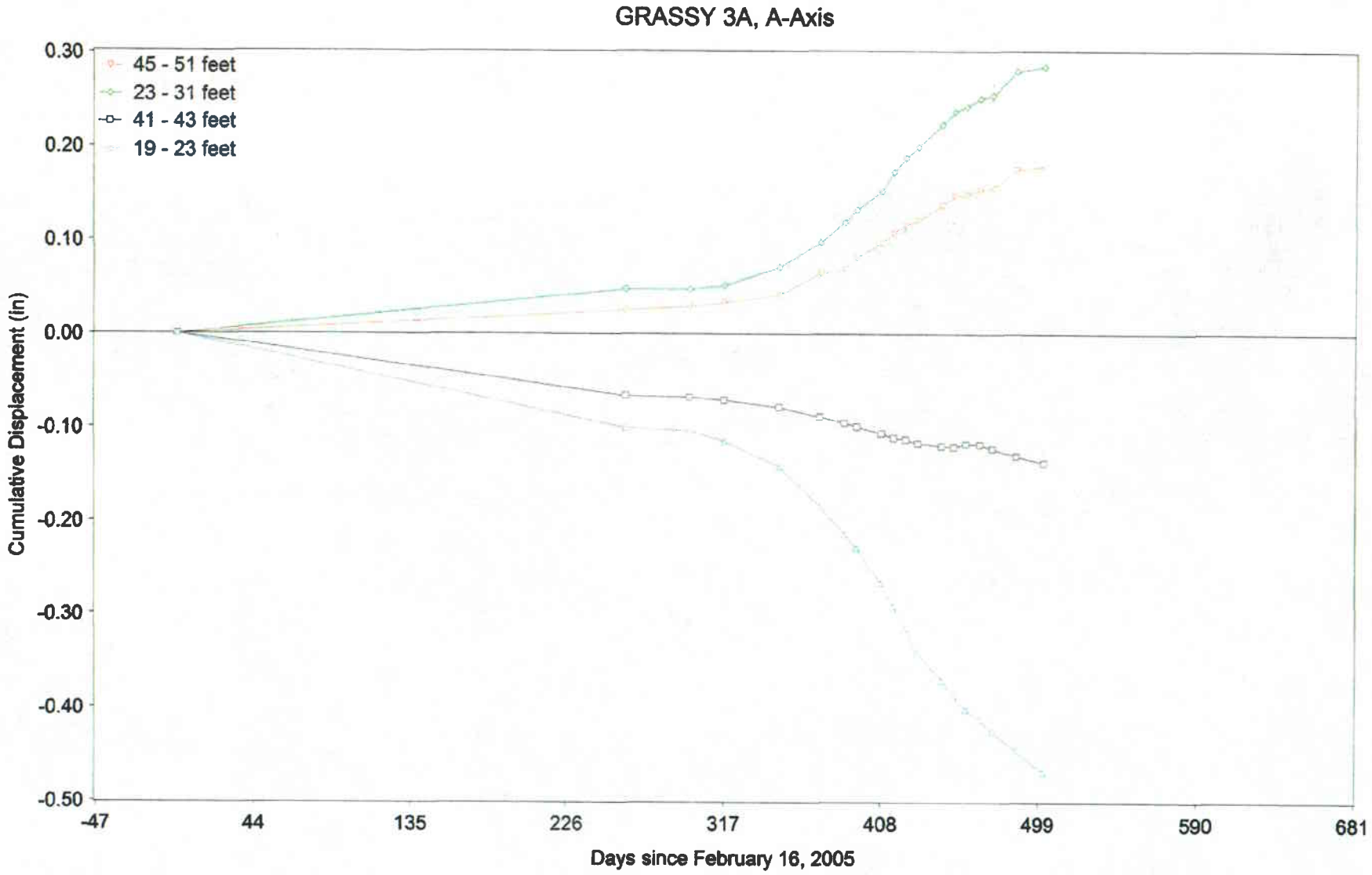

GRASSY 2A, B-Axis
Depth in feet
0
10
20
30
40
50
60
70
80
90
100
110
120
130
-1.00
-0.50
0.00
0.50
1.00
Cumulative Displacement (in) from 7/20/2004
2/16/2005
5/19/2006
5/27/2006
6/3/2006
6/17/2006
7/3/2006

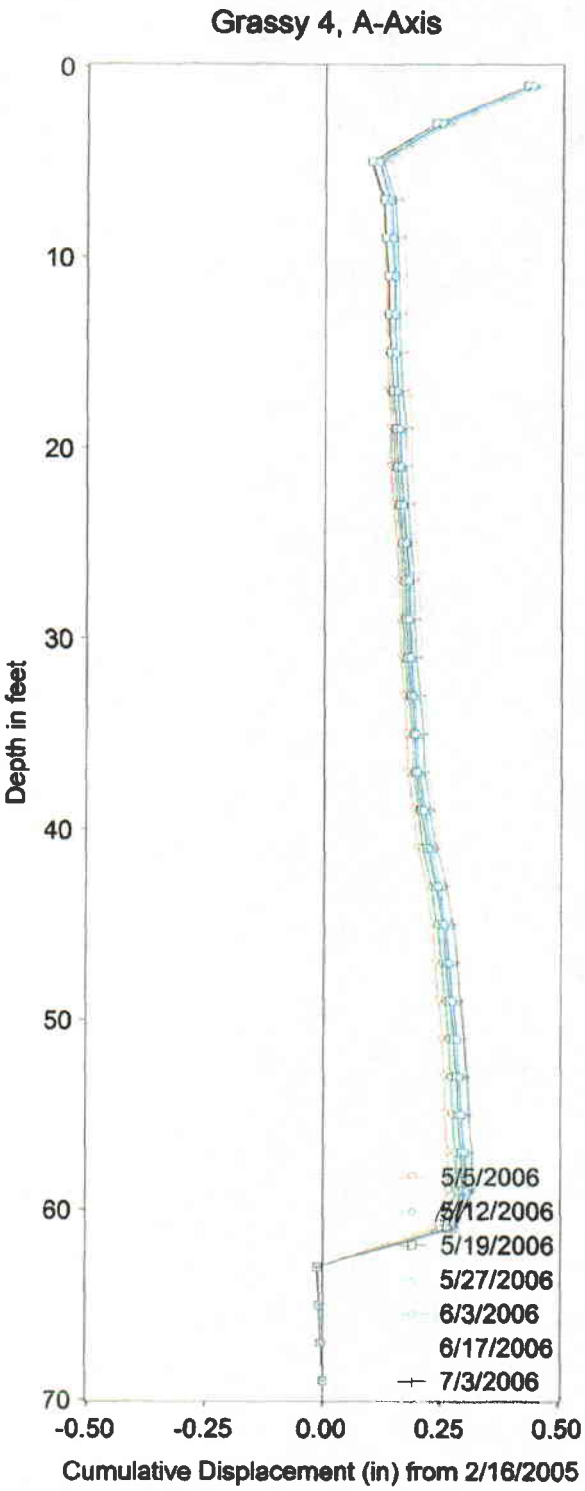

GRASSY 2A, A-Axis, -10 degree skew
Cumulative Displacement (in)
0.0
-0.5
-1.0
-1.5
-2.0
-2.5
-3.0
-47
44
135
226
317
408
499
590
681
Days since February 16, 2005
60 - 120 feet
120 - 126 feet
2 - 60 feet

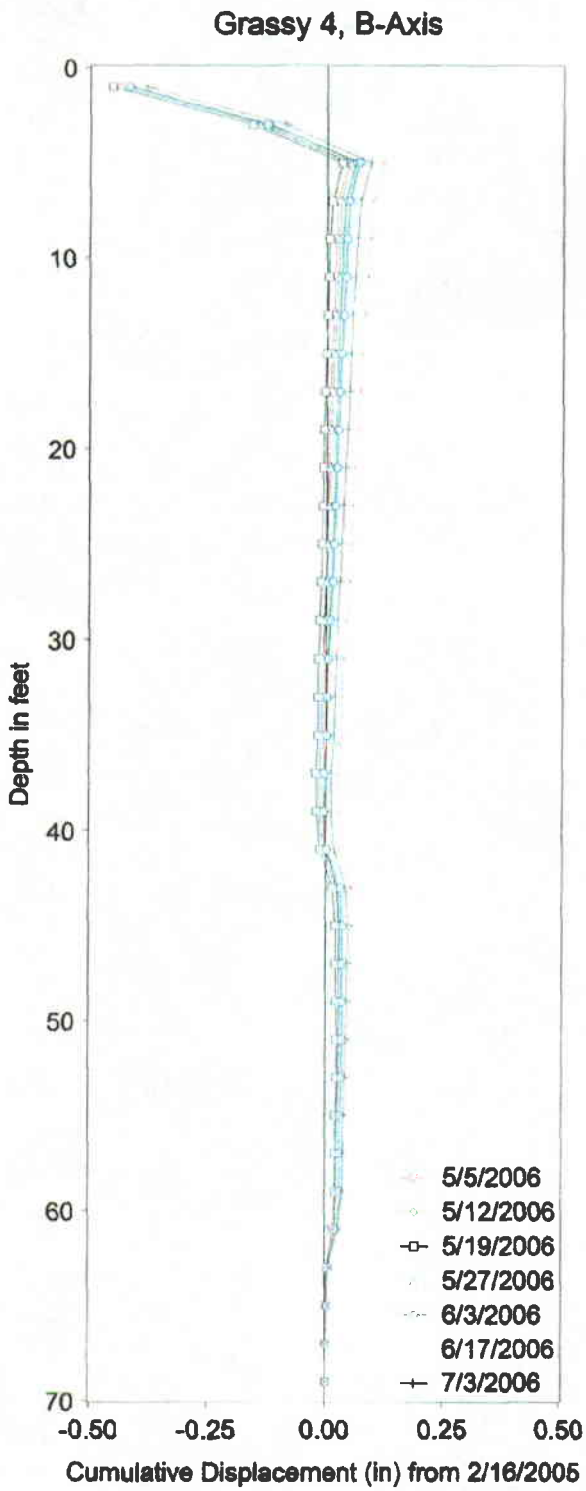


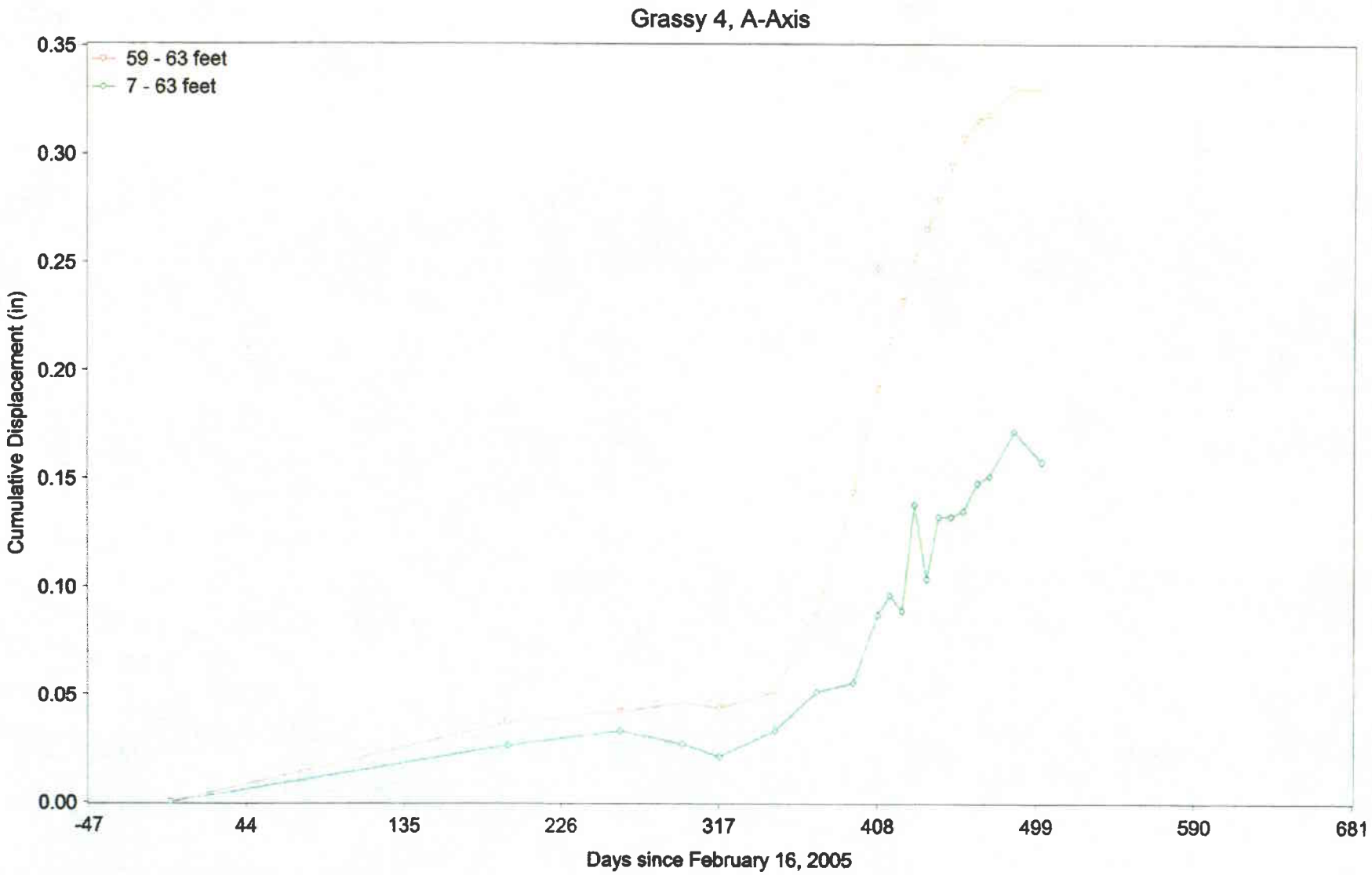


-30 degree skew


GRASSY 3A, A-Axis
45 - 51 feet
23 - 31 feet
41 - 43 feet
19 - 23 feet
Cumulative Displacement (in)
0.30
0.20
0.10
0.00
-0.10
-0.20
-0.30
-0.40
-0.50
-47
44
135
226
317
408
499
590
681
Days since February 16, 2005

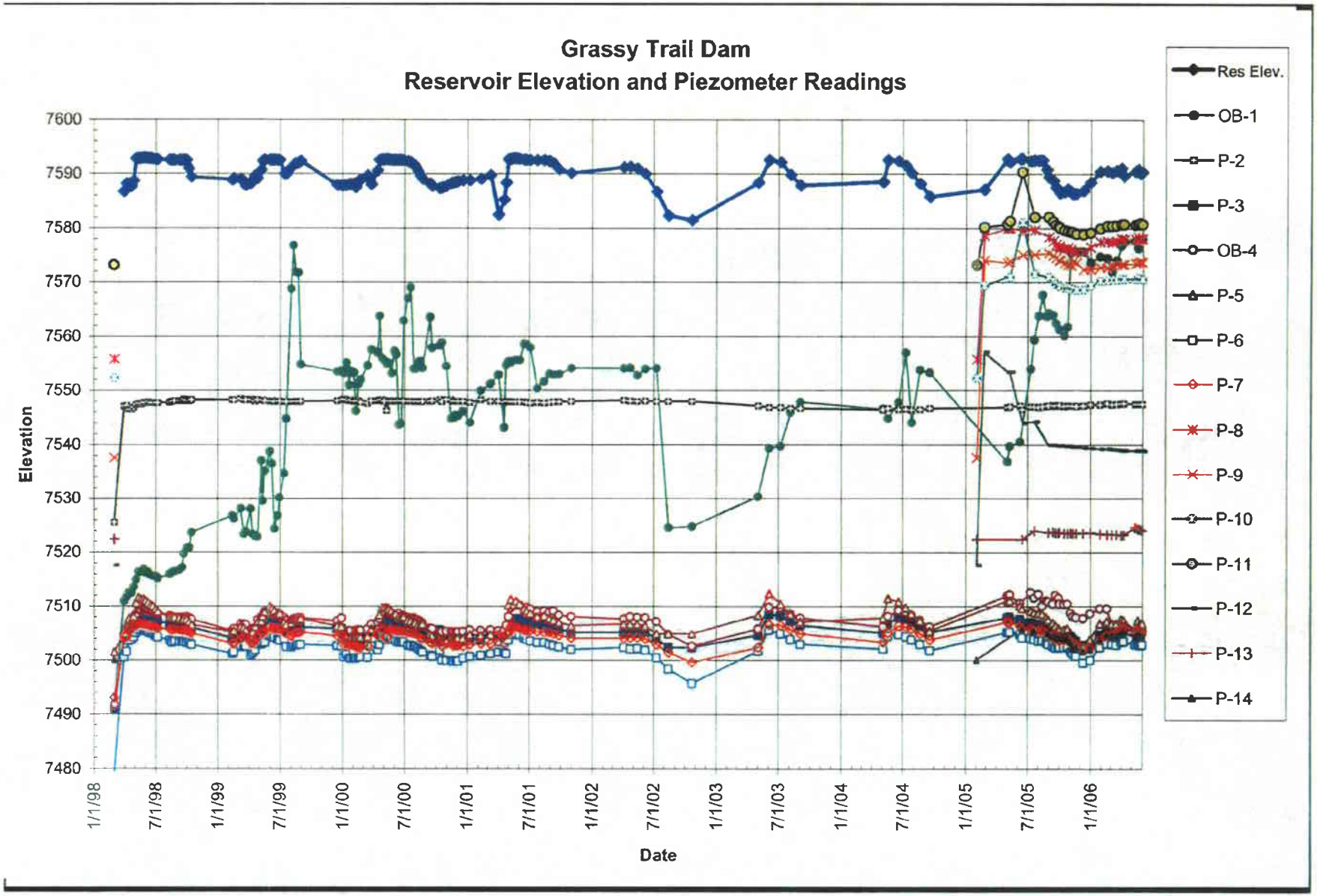

Grassy 4, A-Axis
Depth in feet
0
10
20
30
40
50
60
70
-0.50
-0.25
0.00
0.25
0.50
Cumulative Displacement (in) from 2/16/2005
5/5/2006
5/12/2006
5/19/2006
5/27/2006
6/3/2006
6/17/2006
7/3/2006


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
5/5/2006
5/12/2006
5/19/2006
5/27/2006
6/3/2006
6/17/2006
7/3/2006


Grassy 4, A-Axis
59 - 63 feet
7 - 63 feet
Cumulative Displacement (in)
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
-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	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'
8/30/05	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
9/12/05	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
9/19/05	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
9/28/05	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
10/7/05	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
10/14/05	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
10/24/05	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
11/2/05	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
11/7/05	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
11/18/05	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
12/9/05	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
12/30/05	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
1/27/06	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
2/17/06	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
3/3/06	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
3/17/06	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
3/31/06	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
4/7/06	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
5/5/06	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
5/11/06	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
5/19/06	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
5/25/06	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
6/1/06	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
6/8/06	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
6/15/06	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
6/21/06	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
6/29/06	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



RB&G ENGINEERING INC.
Provo, Utah

Figure Reservoir Elevation and Piezometer Readings
March 1998 to June 29, 2006

Grassy Trail Dam and Reservoir

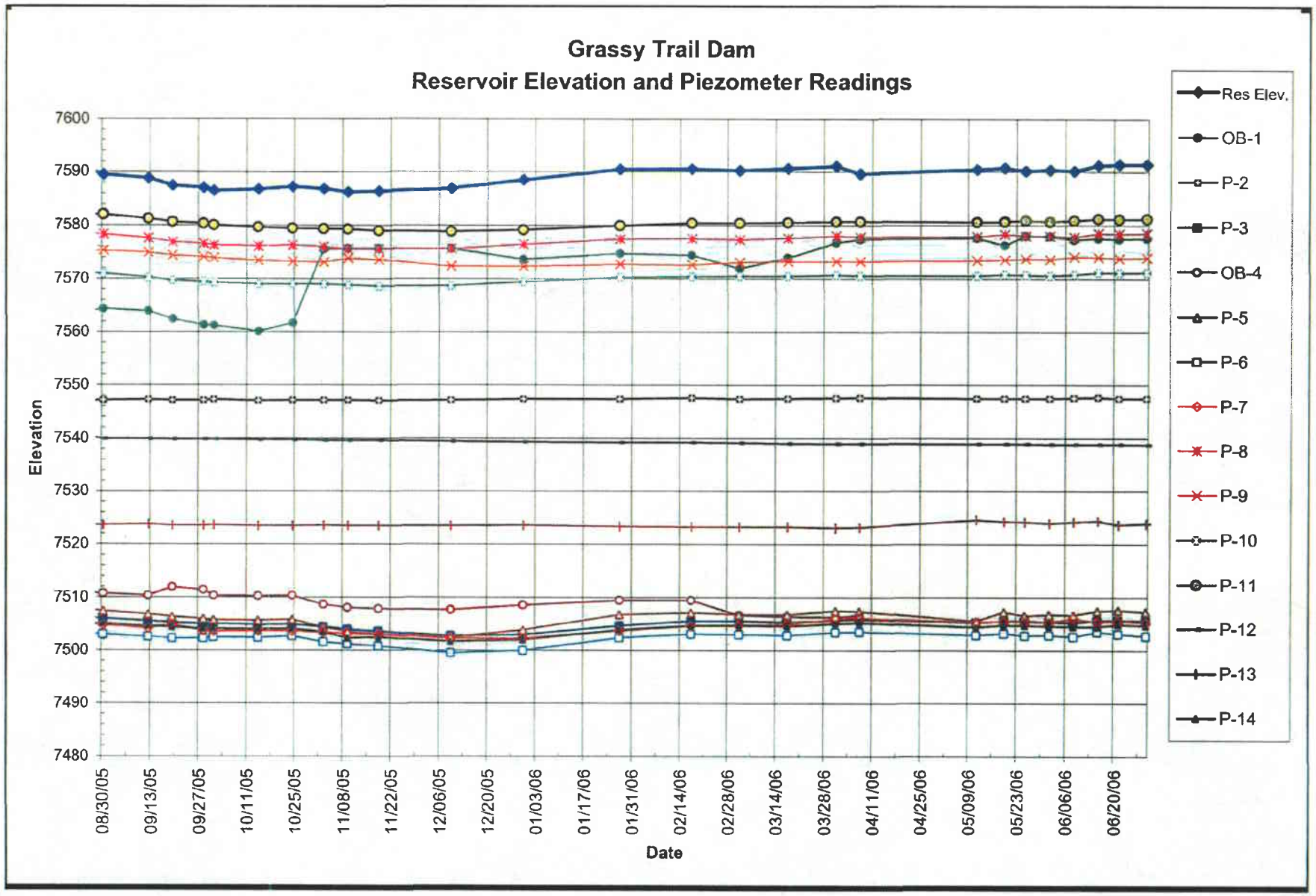


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Figure Reservoir Elevation and Piezometer Readings
August 30, 2005 to June 29, 2006

Grassy Trail Dam and Reservoir