0066

INCOMING C0070041 dlc

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Date: 7/17/2006 8:50:58 AM
Subject: Grassy Trail Dam update 7/14/06

Here is our monitoring update for 7/14/06

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RB&G ENGINEERING
Grassy Trail Dam, Seismic Summary for July 14, 2006

For the 11 day period between July 3 and July 14, 2006 the number of MIS (Mining Induced Seismicity) earthquakes recorded near the site by the UUSS increased from 17 during the previous 10 days to **32** during the past 11 days. MIS earthquakes ranged in magnitude from 1.0 to a high of 1.7. Not all of these events were recorded on the Dam and Hillside monitoring units.

With the increased number of earthquakes, the number of events recorded on the Hillside and Dam seismic units also increased. For the eleven-day period the Hillside unit increased from 23 to **32** events. MIS events on the Dam increased from 20 to **33**. There was only 1 event recorded on the dam, which was 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 eleven days the highest Peak Ground Acceleration (PGA) value recorded on the Hillside decreased from a previous high of 0.0348g to **0.0166g.** Highest PGA value on the Dam increased from 0.0481g to **0.0232g**. This highest PGA value was recorded on July 7, 2006 during a magnitude 1.7 earthquake.

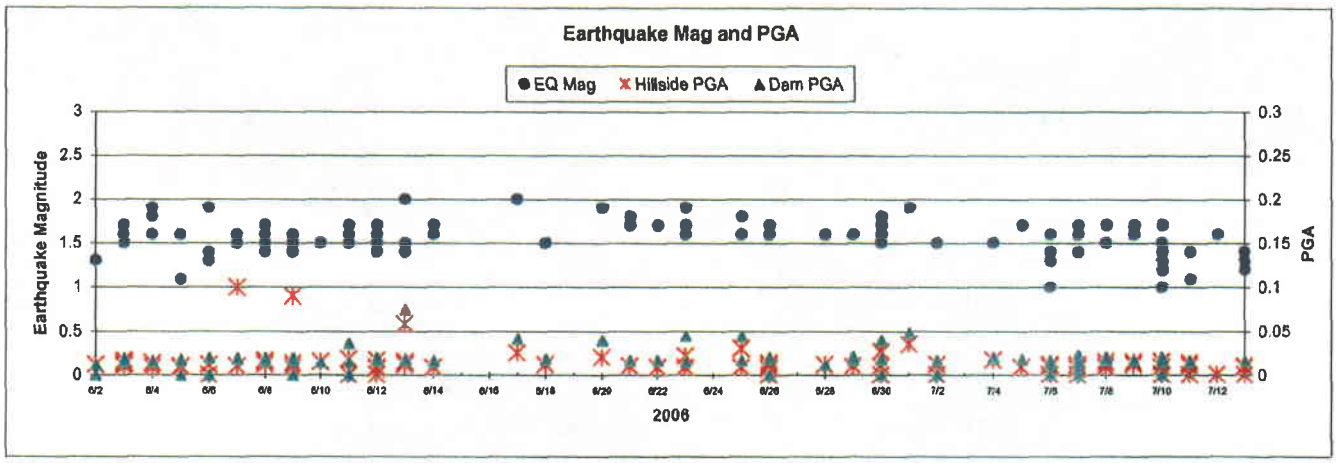
Inclinometers I-2 and I-3 showed an overall decrease in rate of movement relative to the reading on June 17. As shown on the graphs the rate of movement is still less than that recorded earlier in the year. I-1 does not show significant movement. The last two readings taken on I-4 appear to show some backward (up-slide) movement. Additional readings are needed to verify this trend.

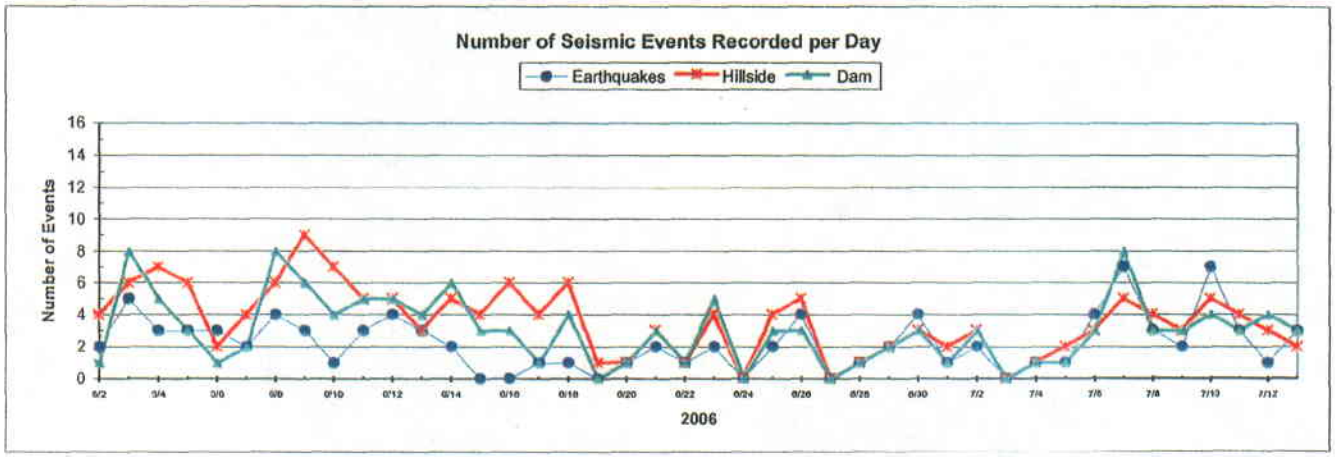
No cracks or signs of movement were noted on the dam or abutments above the dam.

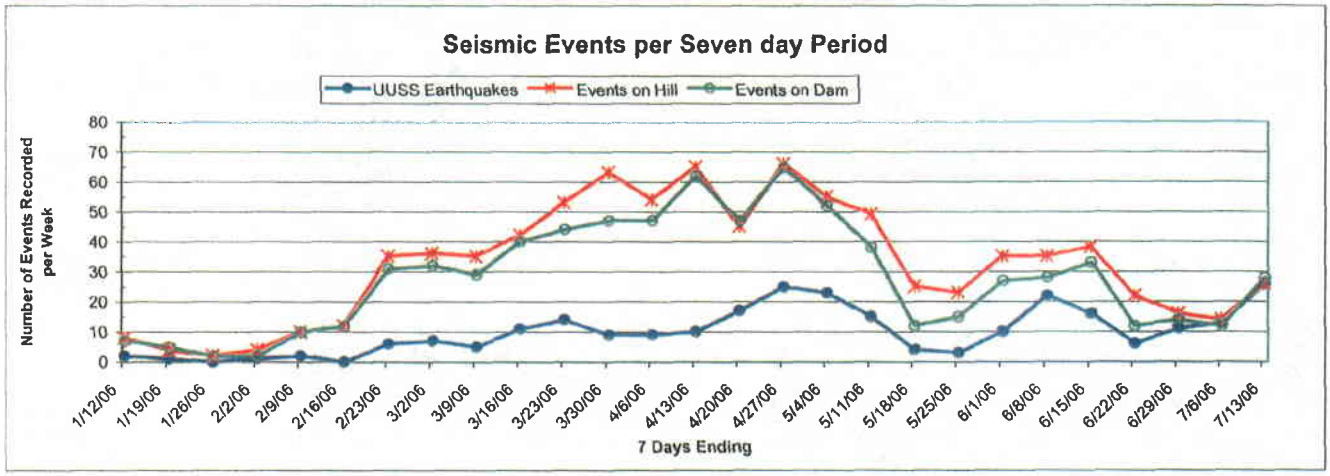
Michael Hansen
RB&G ENGINEERING

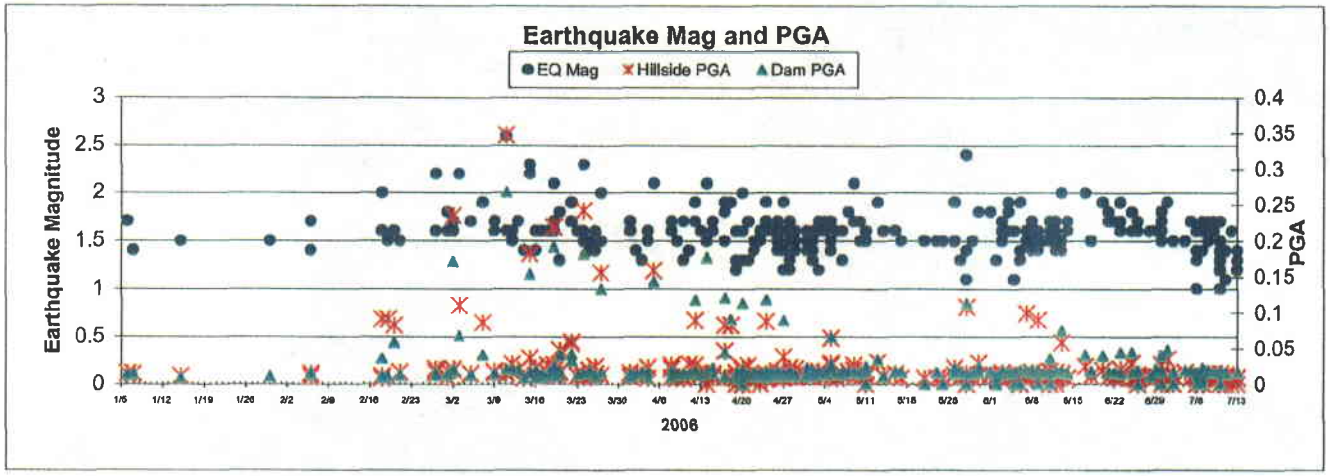
Grassy Trail Dam, Carbon County, Utah
July 14,2006

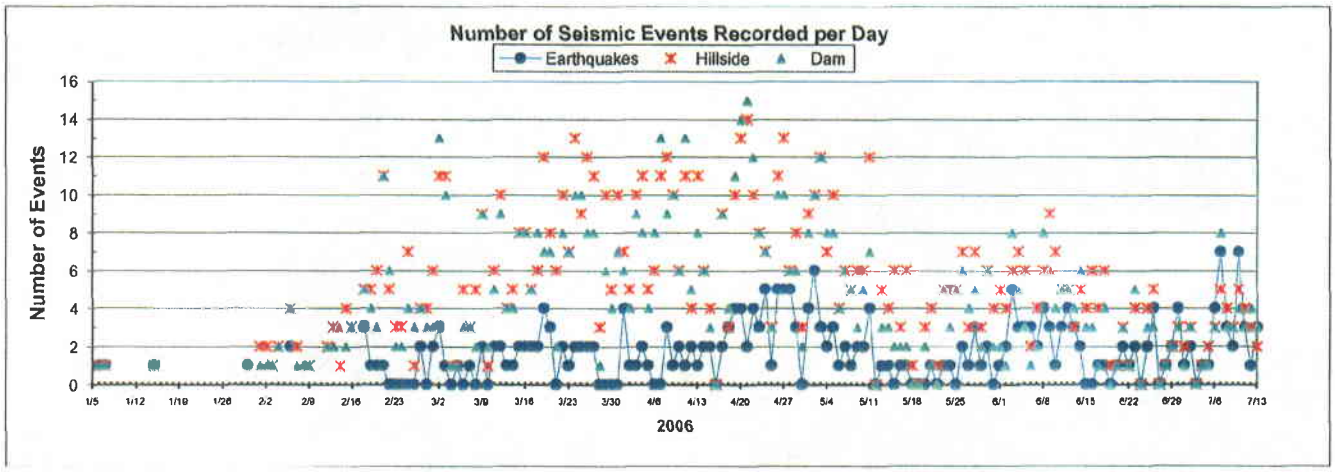
	Serial No.	Date	Time	Tran Peak (mm/s)	Vert Peak (mm/s)	Long Peak (mm/s)	PVS1 (mm/s)	Trigger	Tran Accel (g)	Vert Accel (g)	Long Accel (g)	Description	Post Event Note first line
LOG	BE9690	7/3/06	15:49:30	***	***	***	***	***	***	***	***	Start Monitoring	Start Monitoring
LOG	BE9689	7/3/06	17:13:29	***	***	***	***	***	***	***	***	Start Monitoring	Start Monitoring
W	BE9689	7/4/06	9:39:00	1.22	0.73	1.19	1.27	Long	0.00829	0.00829	0.0199	Grassy Tr. Dam	EQ Mag 1.5
W	BE9690	7/4/06	9:39:00	1.51	1.13	2.56	2.78	Vert	[illegible]	0.0116	0.0166	Hillside	[illegible]
W	BE9689	7/5/06	15:54:00	0.619	0.492	0.603	0.689	Long	0.00663	0.00663	0.0182	Grassy Tr. Dam	EQ Mag 1.7
W	BE9690	7/5/06	15:54:00	0.667	0.317	0.714	0.784	Long	0.00829	0.00663	0.00663	Hillside	EQ Mag 1.7
W	BE9690	7/5/06	21:21:42	0.683	0.381	0.476	0.705	Tran	0.00663	0.00663	0.00829	Hillside	
W	BE9690	7/6/06	6:36:38	0.571	0.27	0.635	0.696	Long	0.00829	0.00497	0.00829	Hillside	
W	BE9690	7/6/06	15:31:14	1.08	0.683	0.873	1.26	Vert	0.0116	0.00829	0.0116	Hillside	EQ Mag 1.4
W	BE9689	7/6/06	15:31:15	1.06	0.73	1.05	1.33	Tran	0.0149	0.00663	0.0166	Grassy Tr. Dam	EQ Mag 1.4
W	BE9689	7/6/06	15:52:42	0.762	0.683	0.825	0.856	Tran	0.00829	0.00663	0.0166	Grassy Tr. Dam	EQ Mag 1.6
W	BE9690	7/6/06	15:52:42	0.81	0.317	0.698	0.821	Long	0.00829	0.00663	0.00663	Hillside	EQ Mag 1.6
W	BE9689	7/6/06	15:59:31	0.651	0.46	0.556	0.7	Tran	0.00829	0.00663	0.0166	Grassy Tr. Dam	
W	BE9690	7/7/06	4:30:56	0.651	0.429	0.619	0.837	Tran	0.00663	0.00663	0.00829	Hillside	
W	BE9689	7/7/06	4:30:57	0.619	0.635	0.635	0.725	Long	0.00829	0.00663	0.0182	Grassy Tr. Dam	
W	BE9689	7/7/06	9:10:10	0.651	0.587	0.762	0.886	Long	0.00829	0.00663	0.0199	Grassy Tr. Dam	EQ Mag 1.4
W	BE9690	7/7/06	9:10:10	0.651	0.238	0.571	0.695	Tran	0.00663	0.00663	0.00829	Hillside	EQ Mag 1.4
W	BE9689	7/7/06	10:08:54	0.667	0.397	0.667	0.932	Long	0.00829	0.00663	0.0149	Grassy Tr. Dam	EQ Mag 1.6
W	BE9689	7/7/06	10:38:25	0.444	0.333	0.635	0.707	Long	0.00994	0.00663	0.0182	Grassy Tr. Dam	
W	BE9690	7/7/06	18:45:32	1.38	0.81	1.21	1.53	Vert	0.0133	0.00829	0.0116	Hillside	EQ Mag 1.7
W	BE9689	7/7/06	18:45:33	2.48	1.79	2.13	3.19	Long	0.0232	0.0116	0.0182	Grassy Tr. Dam	EQ Mag 1.7
W	BE9690	7/7/06	22:36:55	0.603	0.206	0.476	0.62	Tran	0.00663	0.00663	0.00663	Hillside	EQ Mag 1.4
W	BE9689	7/7/06	22:36:56	0.667	0.54	0.46	0.72	Tran	0.00663	0.00663	0.0166	Grassy Tr. Dam	EQ Mag 1.4
W	BE9690	7/7/06	23:21:44	1	0.635	0.921	1.04	Vert	0.00829	0.00829	0.00829	Hillside	EQ Mag 1.6
W	BE9689	7/7/06	23:21:45	1.25	1.08	1.06	1.49	Tran	0.0133	0.00829	0.0166	Grassy Tr. Dam	EQ Mag 1.6
W	BE9689	7/7/06	23:45:09	0.587	0.556	0.619	0.67	Long	0.00663	0.00663	0.0166	Grassy Tr. Dam	
W	BE9690	7/8/06	14:15:18	0.667	0.333	0.476	0.71	Tran	0.00829	0.00829	0.00663	Hillside	
W	BE9690	7/8/06	15:01:19	1.41	0.683	1.02	1.54	Vert	0.0149	0.00994	0.00829	Hillside	EQ Mag 1.5
W	BE9689	7/8/06	15:01:21	1.54	1.41	1.25	1.97	Tran	0.0116	0.0116	0.0166	Grassy Tr. Dam	EQ Mag 1.5
W	BE9690	7/8/06	17:28:28	1.14	0.714	0.905	1.36	Vert	0.00994	0.00829	0.00994	Hillside	EQ Mag 1.7
W	BE9689	7/8/06	17:28:30	1.37	1.17	1.7	1.97	Tran	0.0116	0.00829	0.0199	Grassy Tr. Dam	EQ Mag 1.7
W	BE9690	7/8/06	19:07:55	0.635	0.317	0.587	0.655	Tran	0.00829	0.00663	0.00663	Hillside	EQ Mag 1.5
W	BE9689	7/8/06	19:07:56	0.762	0.683	0.619	0.809	Long	0.00829	0.00663	0.0182	Grassy Tr. Dam	EQ Mag 1.5
W	BE9690	7/9/06	8:21:16	0.905	0.413	0.841	0.933	Long	0.0116	0.00663	0.00994	Hillside	EQ Mag 1.6
W	BE9689	7/9/06	8:21:18	1.48	1.16	0.587	1.52	Tran	0.0133	0.0116	0.0166	Grassy Tr. Dam	EQ Mag 1.6
W	BE9690	7/9/06	8:48:34	0.492	0.476	0.746	0.822	Long	0.00663	0.00663	0.00829	Hillside	
W	BE9689	7/9/06	16:43:56	0.746	0.667	0.698	0.849	Long	0.00829	0.00663	0.0133	Grassy Tr. Dam	
W	BE9690	7/9/06	20:24:07	1.35	0.698	1.02	1.53	Vert	0.0149	0.00829	0.00994	Hillside	EQ Mag 1.7
W	BE9689	7/9/06	20:24:09	1.37	1.49	1.25	1.93	Vert	0.0116	0.00994	0.0166	Grassy Tr. Dam	EQ Mag 1.7
W	BE9690	7/10/06	8:30:33	0.46	0.286	0.683	0.839	Long	0.00994	0.00663	0.00994	Hillside	
W	BE9690	7/10/06	12:54:36	0.54	0.254	0.762	0.786	Long	0.00829	0.00497	0.00829	Hillside	EQ Mag 1.5
W	BE9689	7/10/06	12:54:38	0.667	0.508	0.603	0.732	Long	0.00663	0.00663	0.0182	Grassy Tr. Dam	EQ Mag 1.5
W	BE9690	7/10/06	16:57:27	0.603	0.206	0.476	0.697	Tran	0.00663	0.00829	0.00663	Hillside	EQ Mag 1.4
W	BE9689	7/10/06	16:57:29	0.619	0.571	0.81	0.91	Long	0.00829	0.00829	0.0199	Grassy Tr. Dam	EQ Mag 1.4
W	BE9690	7/10/06	17:06:30	0.778	0.397	0.841	0.953	Long	0.00829	0.00663	0.00829	Hillside	EQ Mag 1.3
W	BE9689	7/10/06	17:06:32	0.825	0.571	0.921	0.922	Long	0.00829	0.00663	0.0149	Grassy Tr. Dam	EQ Mag 1.3
W	BE9690	7/10/06	19:08:14	1.52	0.667	1.1	1.53	Vert	0.0149	0.00829	0.00994	Hillside	EQ Mag 1.7
W	BE9689	7/10/06	19:08:16	1.4	1.57	1.67	2.03	Vert	0.0149	0.0116	0.0166	Grassy Tr. Dam	EQ Mag 1.7
W	BE9690	7/11/06	11:51:19	0.81	0.556	0.714	0.834	Tran	0.00994	0.00663	0.00829	Hillside	EQ Mag 1.1
W	BE9689	7/11/06	11:51:21	0.762	0.778	0.762	0.94	Long	0.00829	0.00829	0.0166	Grassy Tr. Dam	EQ Mag 1.1
W	BE9690	7/11/06	13:37:21	0.841	0.873	1.1	1.12	Vert	0.00994	0.00994	0.0133	Hillside	EQ Mag 1.4
W	BE9689	7/11/06	13:37:24	0.698	0.667	1	1.07	Tran	0.00829	0.00829	0.0149	Grassy Tr. Dam	EQ Mag 1.4
W	BE9689	7/11/06	13:51:09	0.175	0.825	0.413	0.855	Vert	0.00663	0.0232	0.0199	Grassy Tr. Dam	Man Made
W	BE9690	7/11/06	14:51:09	0.635	0.286	0.556	0.657	Tran	0.00663	0.00663	0.00663	Hillside	
W	BE9689	7/11/06	14:51:11	0.587	0.492	0.683	0.709	Long	0.00663	0.00663	0.0149	Grassy Tr. Dam	
W	BE9690	7/11/06	19:41:36	0.476	0.27	0.73	0.738	Long	0.00663	0.00663	0.00829	Hillside	EQ Mag 1.4??
W	BE9690	7/12/06	14:52:18	1.06	0.794	1.49	1.53	Long	0.00994	0.00829	0.0149	Hillside	
W	BE9689	7/12/06	14:52:21	0.746	0.619	0.873	1.06	Long	0.00994	0.00829	0.0182	Grassy Tr. Dam	
W	BE9690	7/12/06	18:34:27	0.698	0.54	0.556	0.714	Tran	0.00829	0.00663	0.00829	Hillside	
W	BE9689	7/12/06	18:34:30	0.651	0.444	0.556	0.753	Tran	0.00829	0.00663	0.0182	Grassy Tr. Dam	
W	BE9689	7/12/06	19:42:48	0.524	0.556	0.635	0.73	Long	0.00829	0.00663	0.0182	Grassy Tr. Dam	
W	BE9690	7/12/06	19:53:45	0.73	0.317	0.683	0.735	Long	0.00663	0.00663	0.00829	Hillside	?
W	BE9689	7/12/06	19:53:48	0.683	0.635	0.556	0.834	Tran	0.00994	0.00829	0.0166	Grassy Tr. Dam	?
W	BE9689	7/13/06	9:00:35	0.444	0.492	0.619	0.708	Long	0.00829	0.00663	0.0166	Grassy Tr. Dam	EQ Mag 1.4
W	BE9690	7/13/06	15:37:13	0.81	0.317	0.937	0.956	Long	0.00829	0.00663	0.00994	Hillside	EQ Mag 1.3
W	BE9689	7/13/06	15:37:17	0.921	0.714	1.17	1.24	Vert	0.0116	0.00829	0.0166	Grassy Tr. Dam	EQ Mag 1.3
W	BE9690	7/13/06	20:19:48	0.778	0.397	1.05	1.05	Tran	0.00663	0.00663	0.00829	Hillside	EQ Mag 1.2
W	BE9689	7/13/06	20:19:51	0.905	0.825	1.13	1.27	Tran	0.00829	0.00663	0.0166	Grassy Tr. Dam	EQ Mag 1.2
LOG	BE9689	7/14/06	12:40:52	***	***	***	***	***	***	***	***	Keyboard Stop	
LOG	BE9690	7/14/06	13:32:45	***	***	***	***	***	***	***	***	Keyboard Stop	

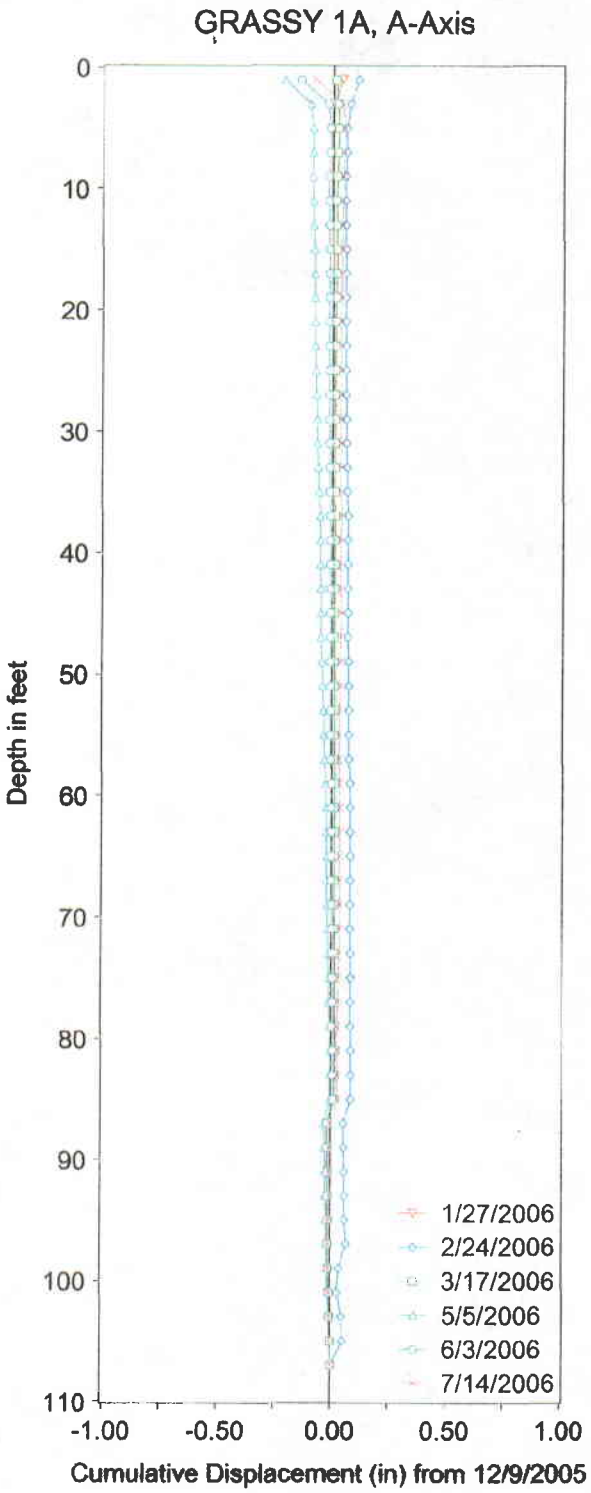

Earthquake Mag and PGA
EQ Mag
Hillside PGA
Dam PGA
Earthquake Magnitude
PGA
2006

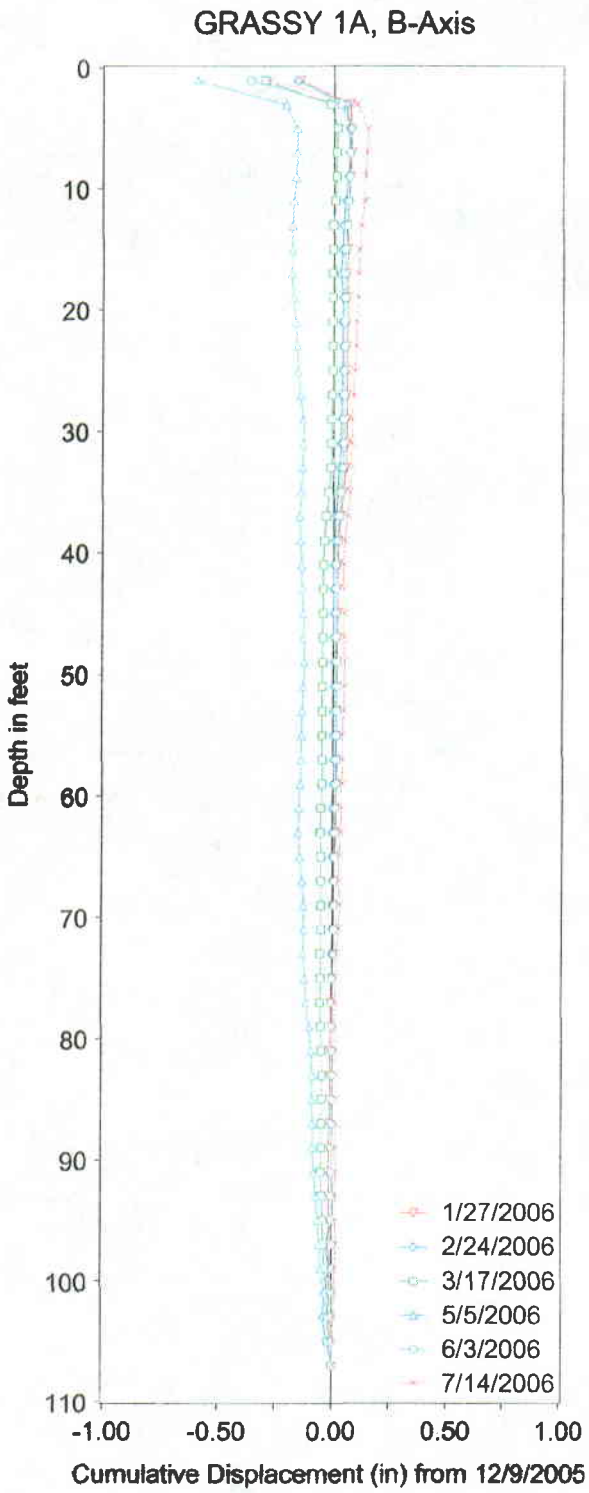

Number of Seismic Events Recorded per Day
Earthquakes
Hillside
Dam
Number of Events
2006

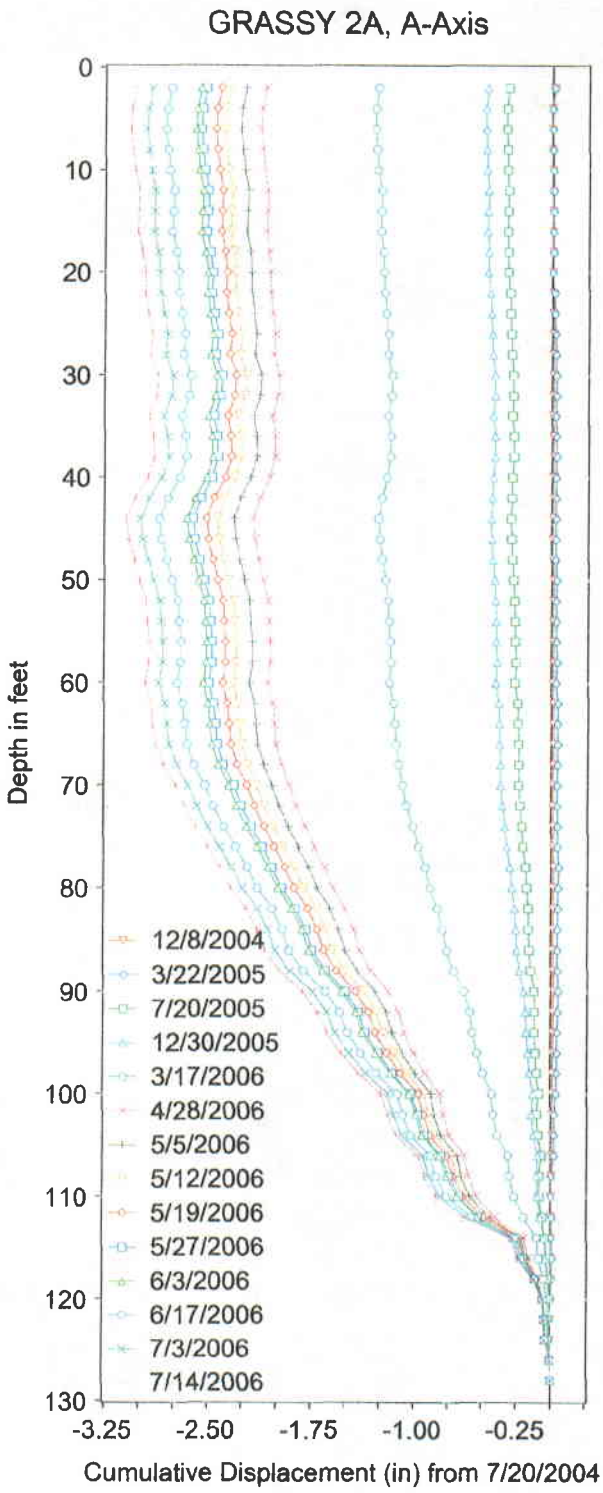

Seismic Events per Seven day Period
UUSS Earthquakes
Events on Hill
Events on Dam
Number of Events Recorded per Week
7 Days Ending

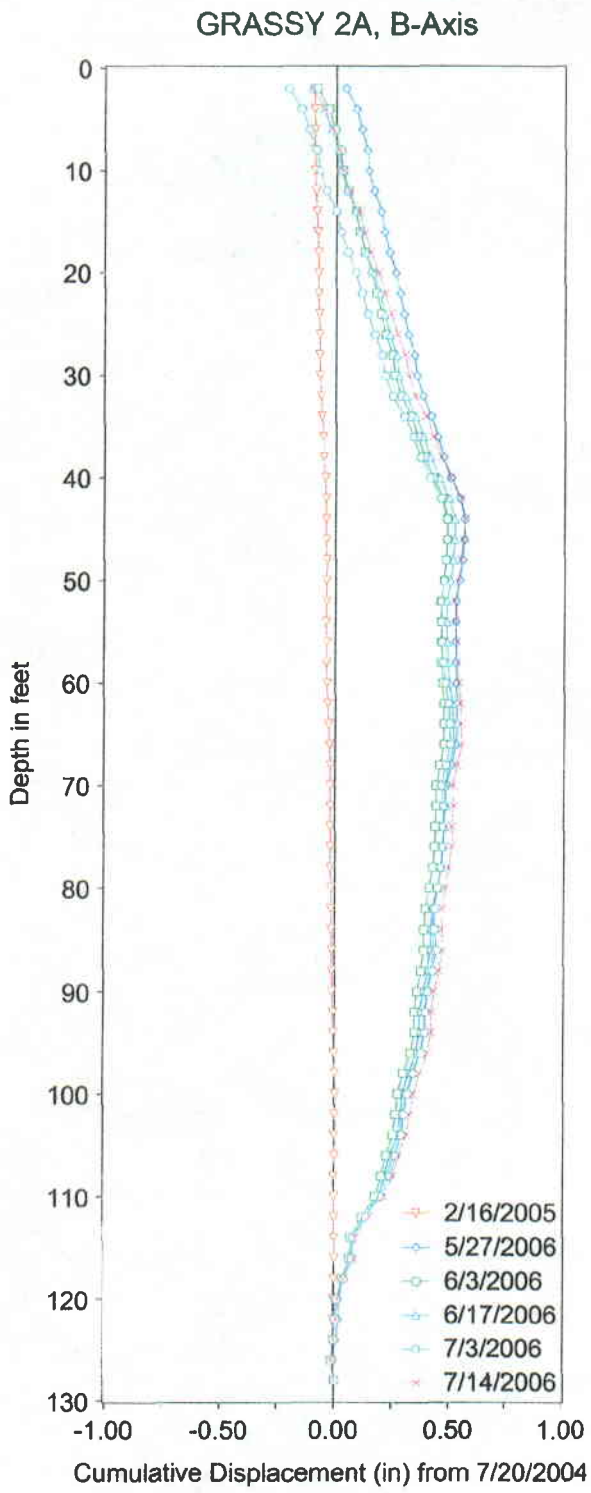

Earthquake Mag and PGA
EQ Mag
Hillside PGA
Dam PGA
Earthquake Magnitude
PGA
2006

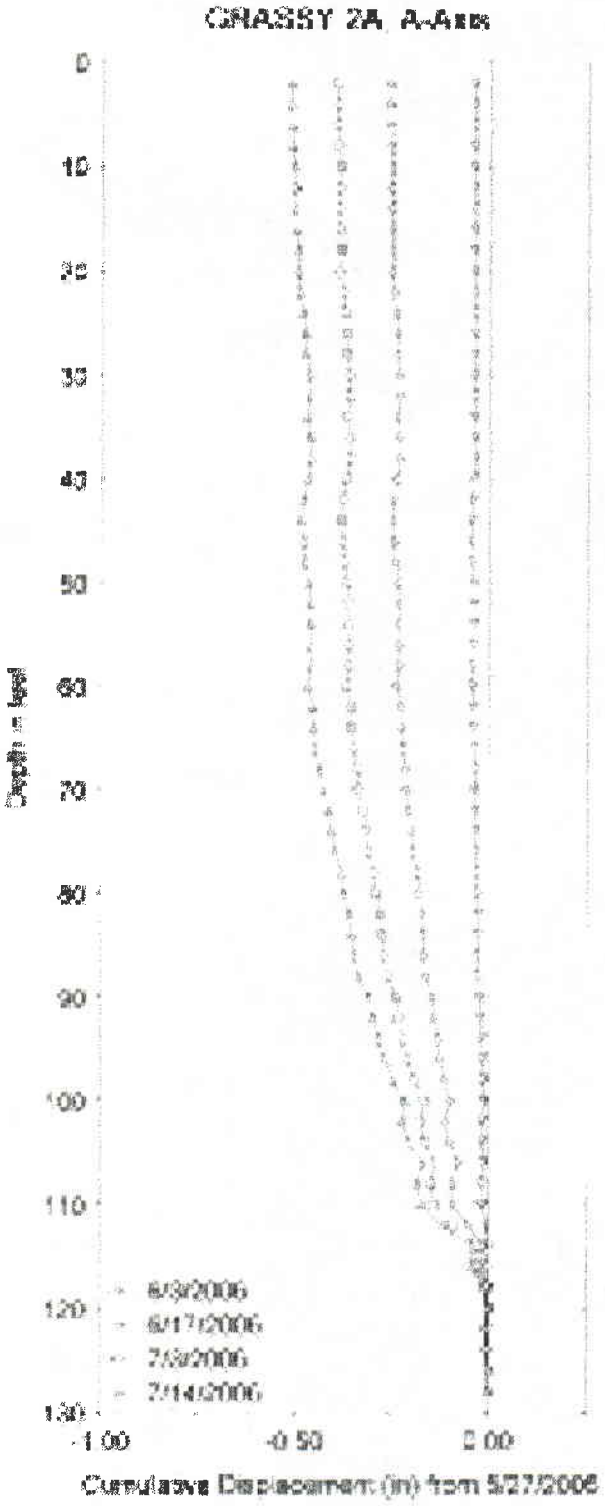

Number of Seismic Events Recorded per Day
Earthquakes
Hillside
Dam
Number of Events
2006

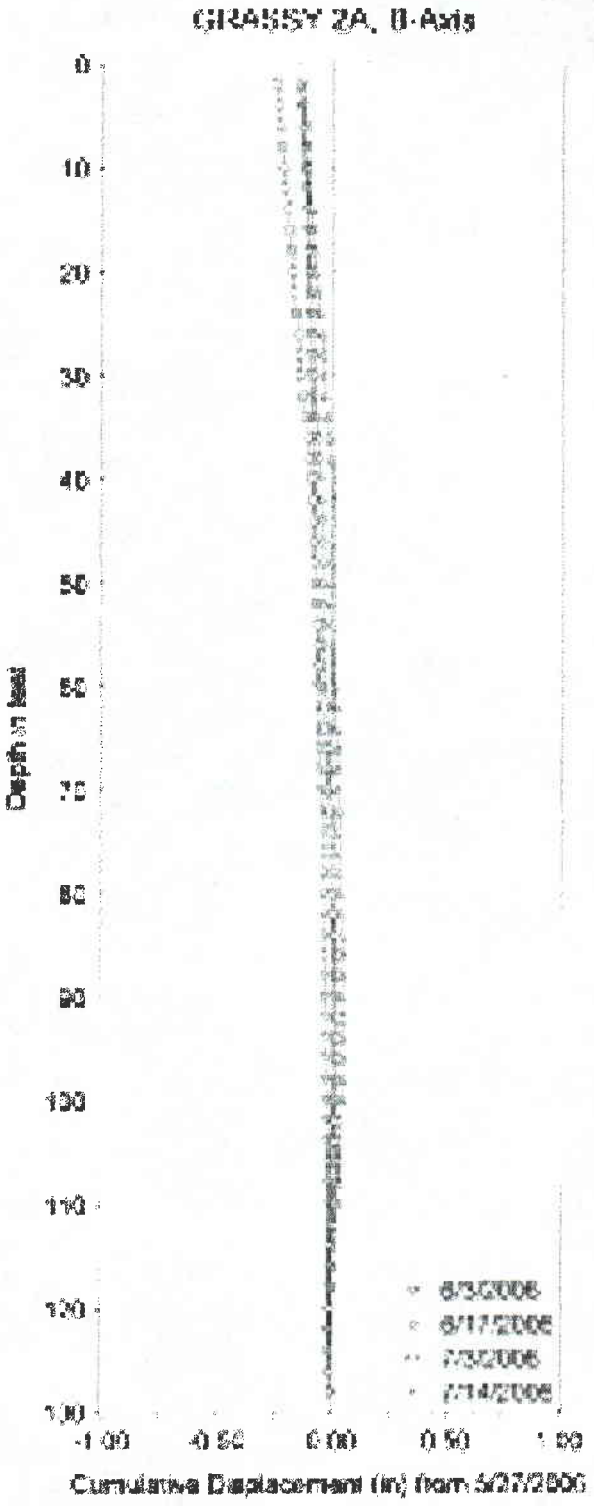

GRASSY 1A, A-Axis
Depth in feet
0
10
20
30
40
50
60
70
80
90
100
110
-1.00
-0.50
0.00
0.50
1.00
Cumulative Displacement (in) from 12/9/2005
1/27/2006
2/24/2006
3/17/2006
5/5/2006
6/3/2006
7/14/2006

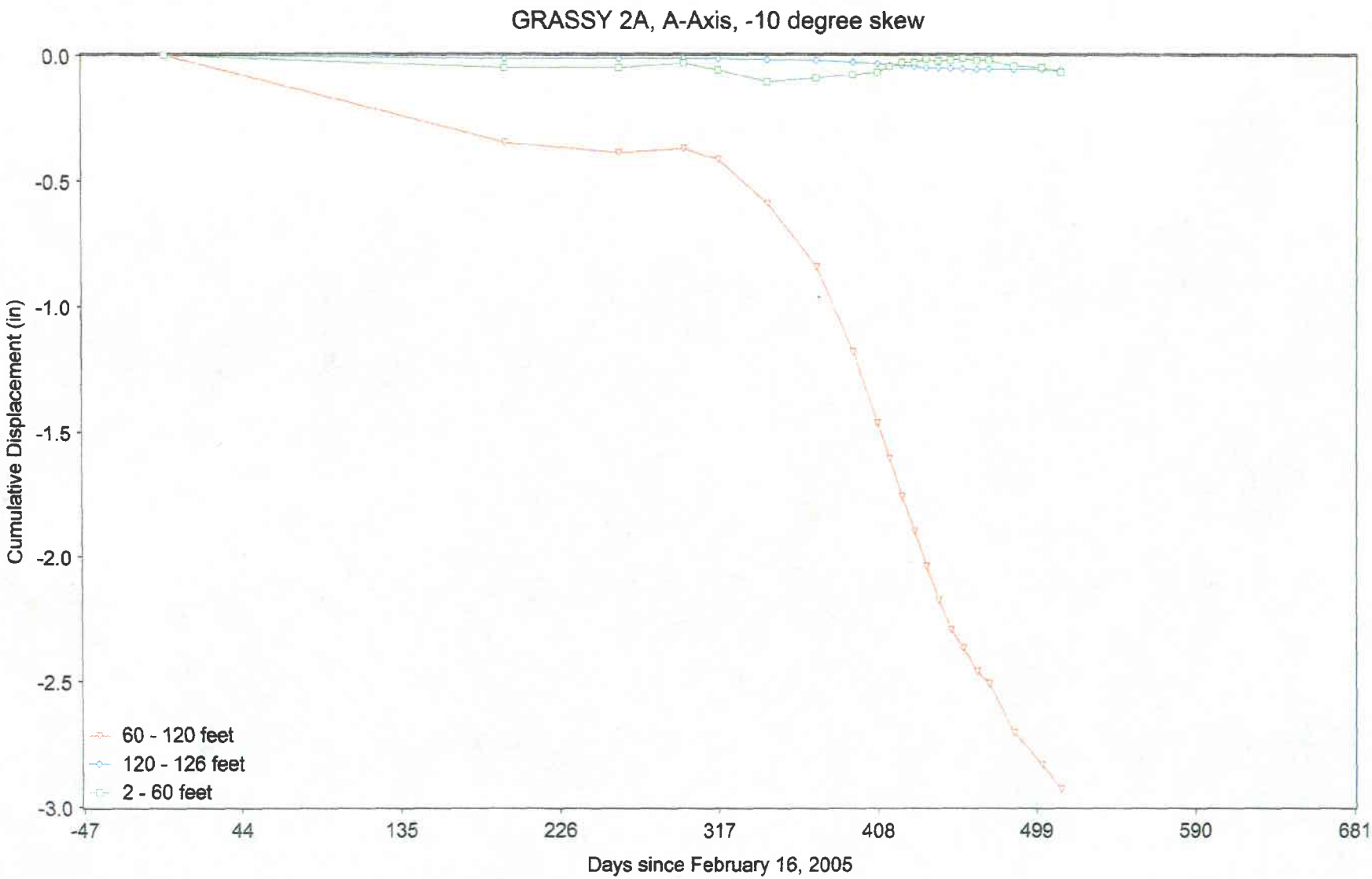

GRASSY 1A, B-Axis
Depth in feet
0
10
20
30
40
50
60
70
80
90
100
110
-1.00
-0.50
0.00
0.50
1.00
Cumulative Displacement (in) from 12/9/2005
1/27/2006
2/24/2006
3/17/2006
5/5/2006
6/3/2006
7/14/2006

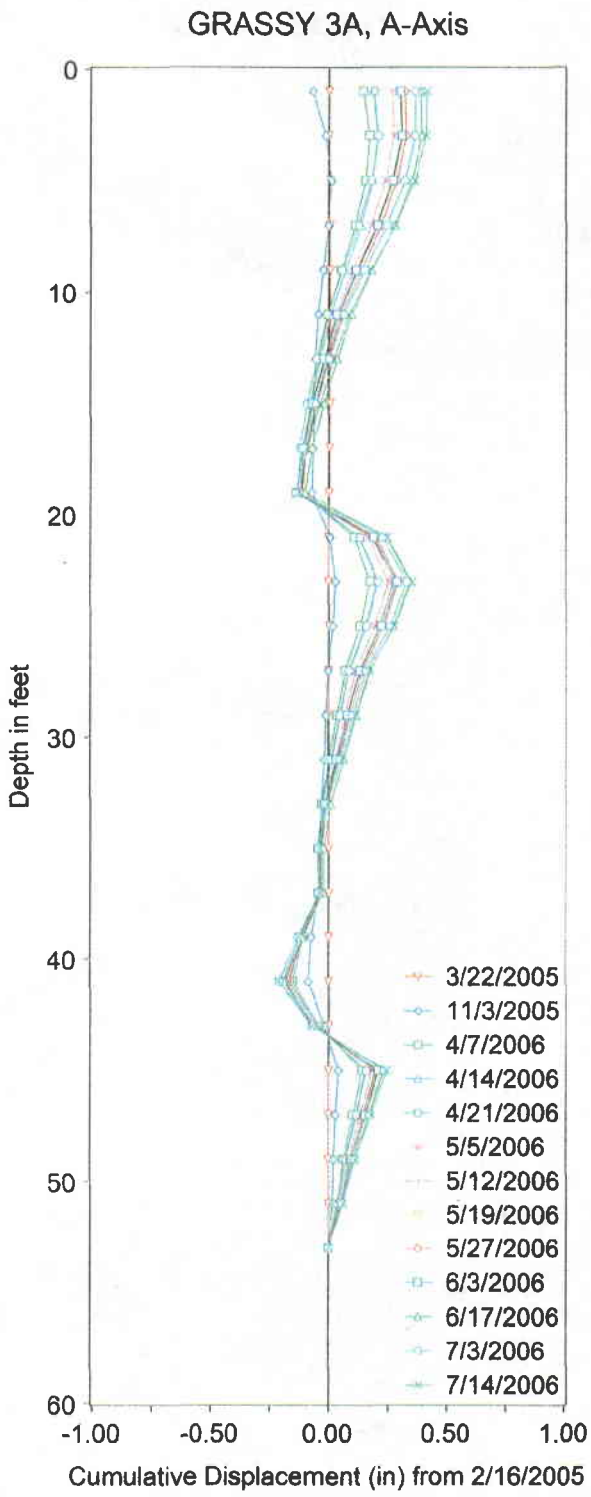

GRASSY 2A, A-Axis
Depth in feet
0
10
20
30
40
50
60
70
80
90
100
110
120
130
-3.25
-2.50
-1.75
-1.00
-0.25
Cumulative Displacement (in) from 7/20/2004
12/8/2004
3/22/2005
7/20/2005
12/30/2005
3/17/2006
4/28/2006
5/5/2006
5/12/2006
5/19/2006
5/27/2006
6/3/2006
6/17/2006
7/3/2006
7/14/2006

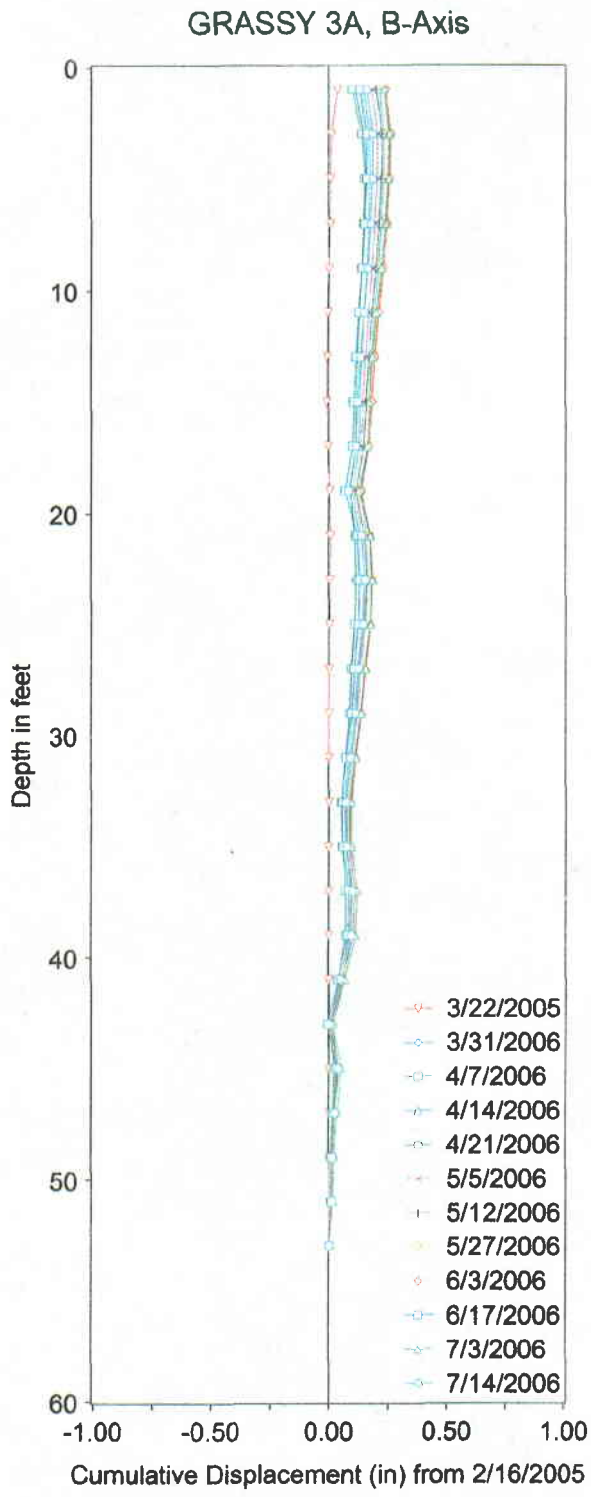

GRASSY 2A, B-Axis
Depth in feet
0
10
20
30
40
50
60
70
80
90
100
110
120
130
-1.00
-0.50
0.00
0.50
1.00
Cumulative Displacement (in) from 7/20/2004
2/16/2005
5/27/2006
6/3/2006
6/17/2006
7/3/2006
7/14/2006


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

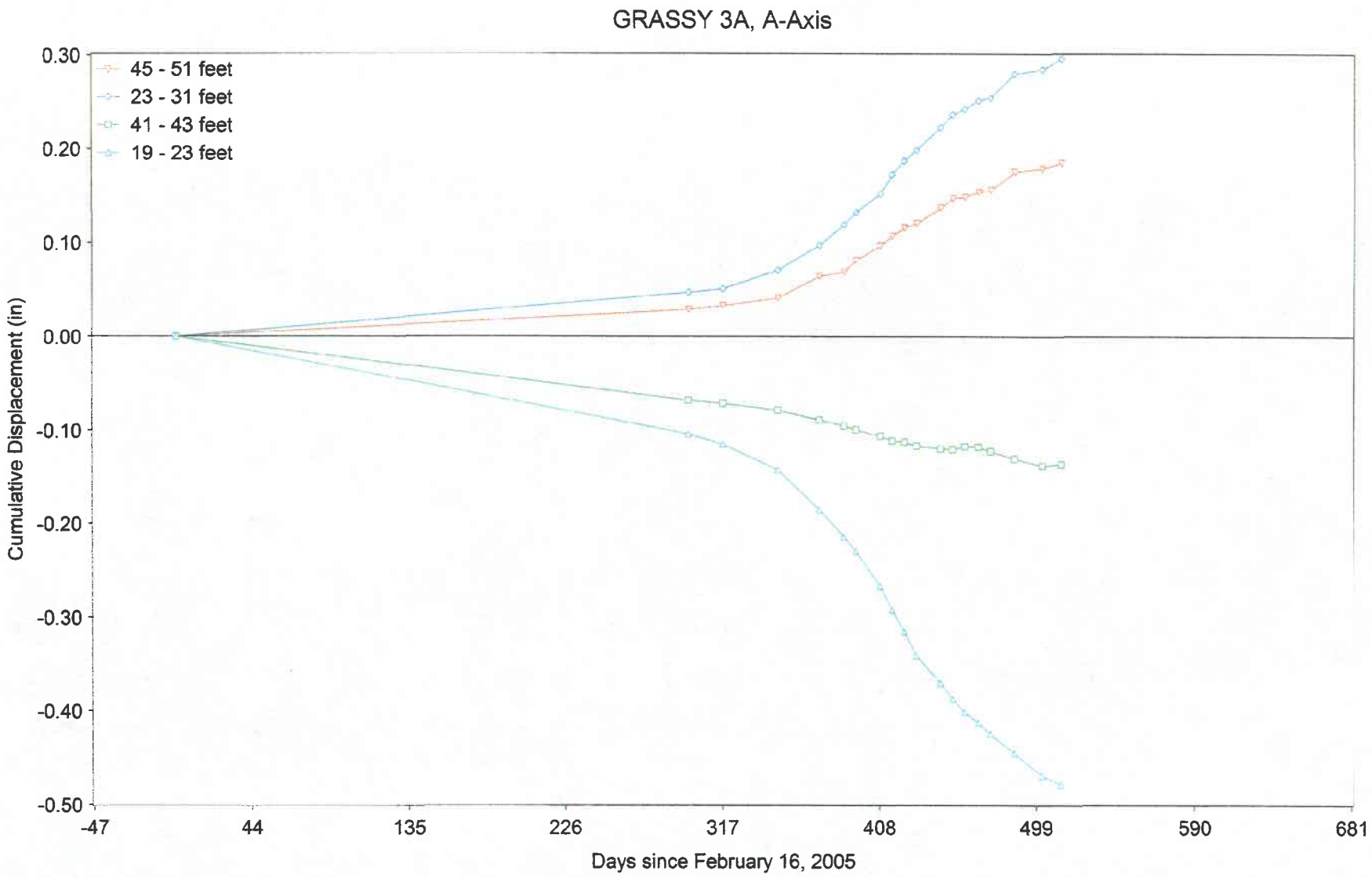

GRASSY 2A, B-Axis
Depth (in)
0
10
20
30
40
50
60
70
80
90
100
110
120
130
-1.00
-0.50
0.00
0.50
1.00
6/3/2006
6/17/2006
7/3/2006
7/14/2006
Cumulative Displacement (in) from 5/27/2006

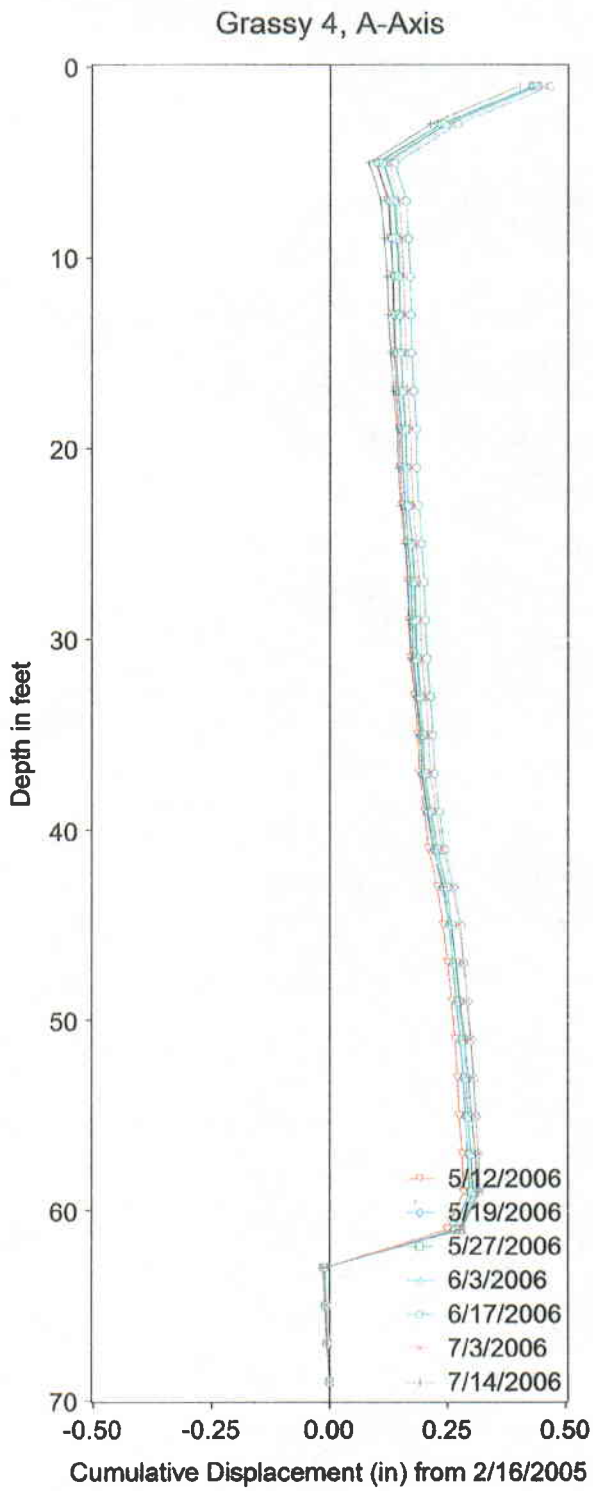

GRASSY 2A, A-Axis, -10 degree skew
Cumulative Displacement (in)
0.0
-0.5
-1.0
-1.5
-2.0
-2.5
-3.0
-47
44
135
226
317
408
499
590
681
Days since February 16, 2005
60 - 120 feet
120 - 126 feet
2 - 60 feet

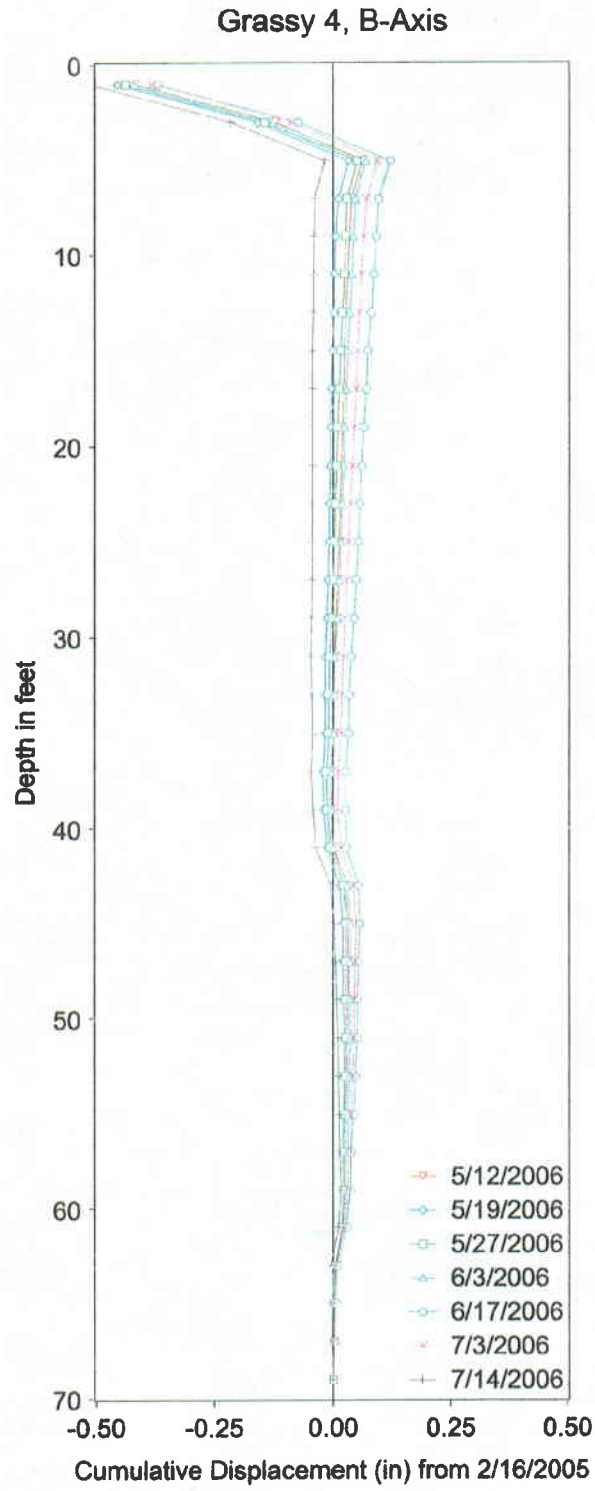


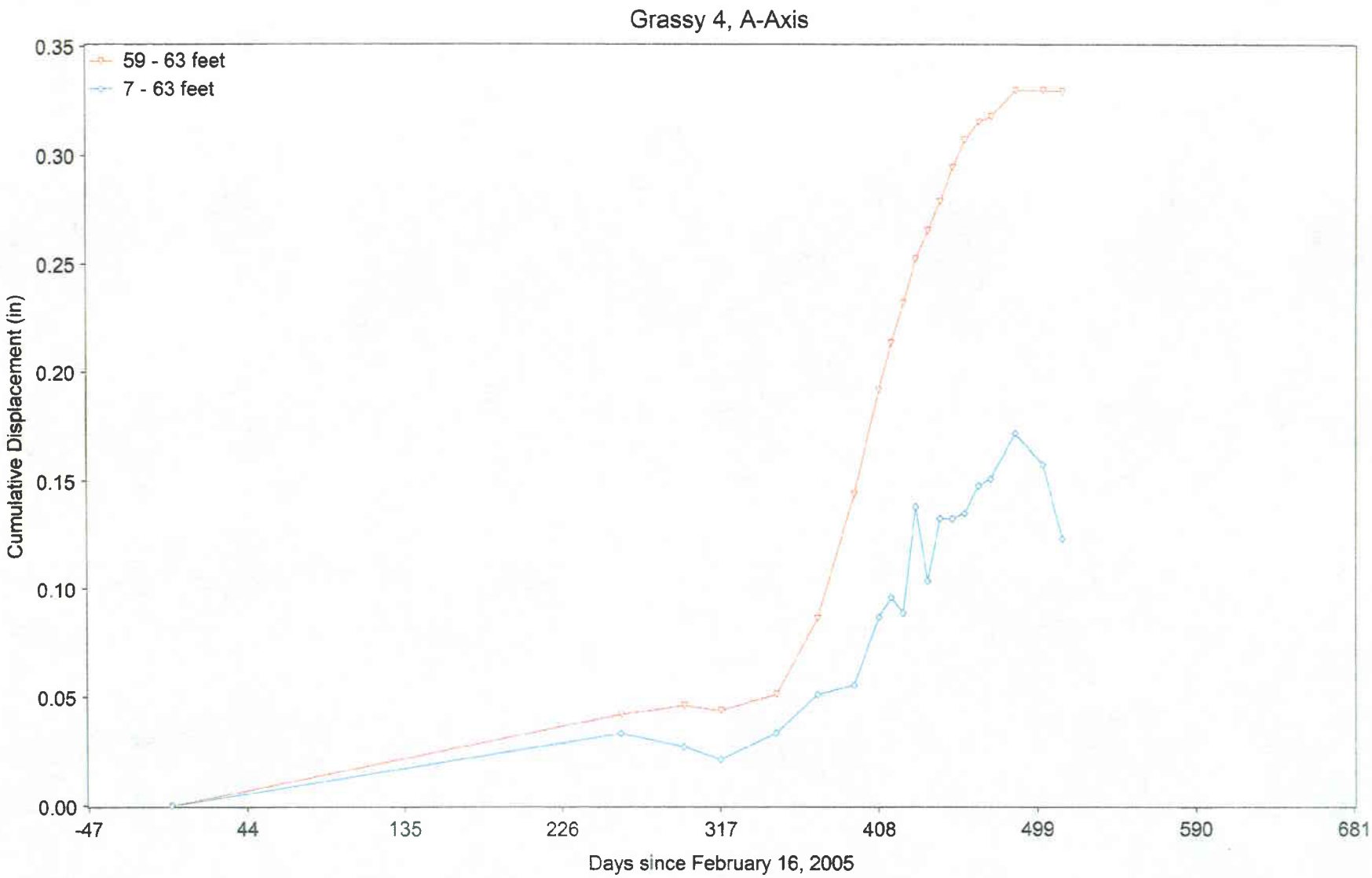


-30 degree skew


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
5/12/2006
5/19/2006
5/27/2006
6/3/2006
6/17/2006
7/3/2006
7/14/2006


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
5/12/2006
5/19/2006
5/27/2006
6/3/2006
6/17/2006
7/3/2006
7/14/2006


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