0070

Incoming C0070041

ok

From: "Michael Hansen" <Mhansen@rbgengineering.com>
To: <dshaver@andalex.com>, <jsorensen@andalex.com>, <thurst@andalex.com>, <James_Kohler@blm.gov>, <Jeff_McKenzie@blm.gov>, <Stan_Perkes@blm.gov>, <Steve_Falk@blm.gov>, <steve_rigby@blm.gov>, <jllewelyn@co.carbon.ut.us>, <ecc@emerytelcom.net>, <sunny1@emerytelcom.net>, "Brad Price" <bprice@rbgengineering.com>, "Rob johnson" <robj@rbgengineering.com>, <bretdixon@utah.gov>, <davemarble@utah.gov>, <karlhouskeeper@utah.gov>, <marcstilson@utah.gov>, <pamgrubaughlittig@utah.gov>, <petehess@utah.gov>, <waynehedberg@utah.gov>
Date: 8/7/2006 9:28:22 AM
Subject: Grassy Trail Dam Seismic Monitoring 8/3/06

We were unable to complete the update last week, so it has been three weeks since the last update.

Michael Hansen
Engineering Geologist

RB&G ENGINEERING Inc.
1435 West 820 North
Provo Ut. 84601

Ph 801-374-5771
SLC 801-521-5771
Fax 801-374-5773

email mhansen@rbgengineering.com

RB&G ENGINEERING
Grassy Trail Dam, Seismic Summary for August 4, 2006

For the three week period between July 14 and August 4, 2006 the number of MIS (Mining Induced Seismicity) earthquakes recorded near the site by the UUSS decreased from the 26 events recorded during the previous week. 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 while the number of earthquakes has been increasing over the past three weeks the number of events recorded on the Dam and Hillside units has been decreasing. MIS earthquakes ranged in magnitude from 1.2 to a high of 2.1. Fifteen earthquakes were not recorded on the Dam and Hillside monitoring units. These events ranged in magnitude from 1.2 to 1.9.

7 Days Ending	Earthquakes	Hillside	Dam
20-Jul	17	30	27
27-Jul	18	23	19
3-Aug	22	17	19
Total	*57*	*70*	*65*

During the past 21 days the highest Peak Ground Acceleration (PGA) value recorded on the Hillside increased from a previous high of 0.0166g to **0.0298g.** Highest PGA value on the Dam increased from 0.0232g to **0.0249g**. The largest 2.1 earthquake did not generate the highest PGA values. The 0.0249g event on the Dam occurred during a 1.8 magnitude event while the 0.0298g event on the Hillside was not reported as an earthquake.

Inclinometers I-2, and I-3 continue to show similar movements as the last readings. As shown on the graphs the rate of movement is still less than that recorded earlier in the year. The previous few readings on I-4 appeared to show some backward (up-slide) movement. The current reading however shows down-slope movement placing the inclinometer close to where it was in early June.

Piezometer readings are similar to the previous reading. OW-1 shows a drop of about 4 feet in the past 3 week, but this well tends to fluctuate. As seen on the attached table and graphs many of the other piezometers are showing a gradual drop with time. Due to problems in OW-4 it is not being read.

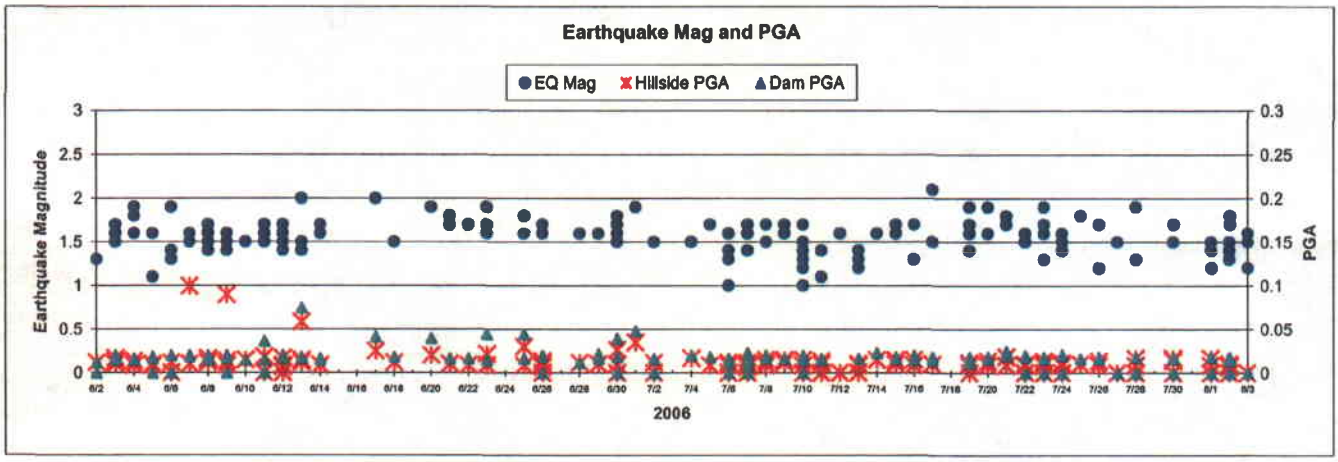
No cracks or signs of movement were noted on the dam or abutments above the dam.

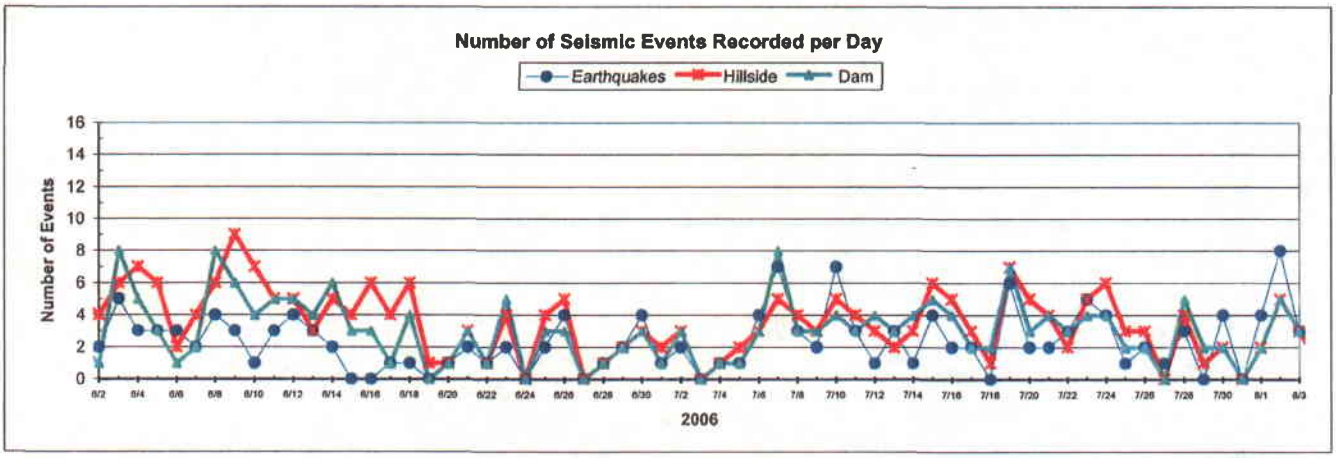
Michael Hansen
RB&G ENGINEERING

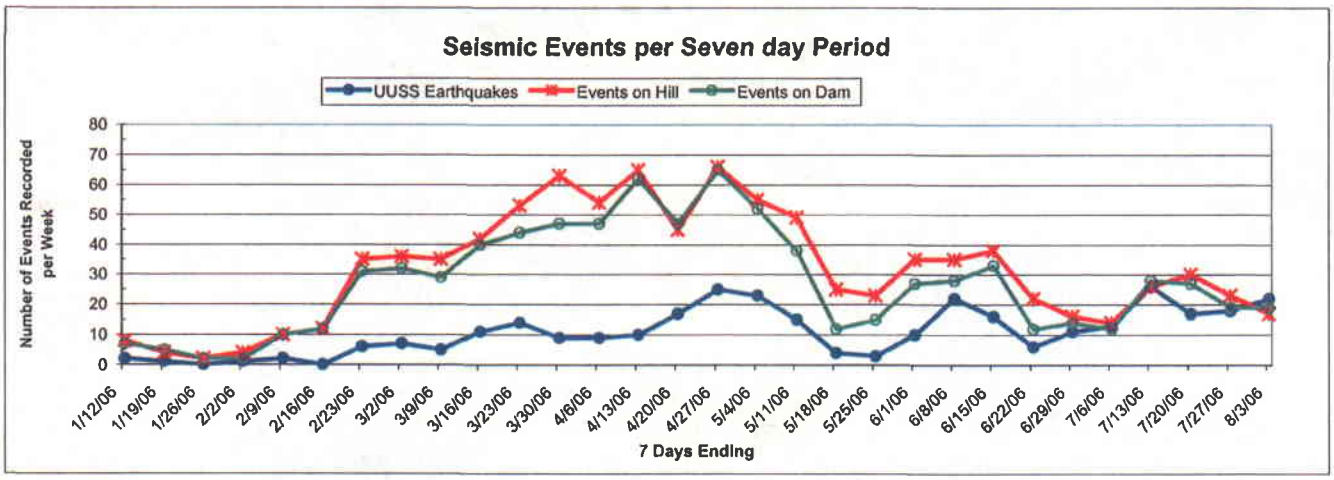
Grassy Trail Dam, Carbon County, Utah
August 4, 2006

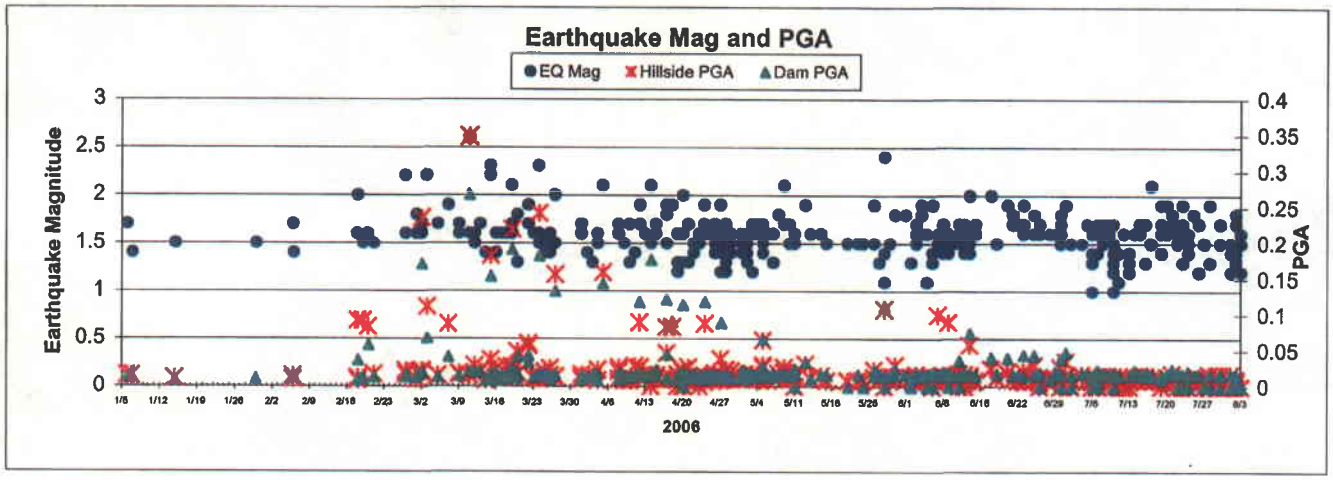
Type	Serial No.	Date	Time	Tran Peak (mm/s)	Vert Peak (mm/s)	Long Peak (mm/s)	PVS1 (mm/s)	Trigger	Tran Accel (g)	Vert Accel (g)	Long Accel (g)	Description	Post Event Note first line
LOG	BE9689	7/14/06	13:17:12	***	***	***	***	***	***	***	***	Start Monitoring	
LOG	BE9690	7/14/06	13:40:42	***	***	***	***	***	***	***	***	Start Monitoring	
W	BE9689	7/14/06	14:05:08	0.762	0.587	0.746	0.98	Tran	0.00994	0.00663	0.0182	Grassy Tr. Dam	
W	BE9689	7/14/06	14:37:27	0.825	0.81	0.857	1.01	Long	0.00663	0.00663	0.0182	Grassy Tr. Dam	
W	BE9690	7/14/06	14:37:28	0.857	0.413	0.651	0.899	Long	0.00829	0.00663	0.00829	Hillside	
W	BE9689	7/14/06	14:45:34	2.89	1.86	2.4	3.7	Vert	0.0232	0.0133	0.0182	Grassy Tr. Dam	Eq Mag 1.6
W	BE9690	7/14/06	14:45:35	1.78	1.19	1.21	1.83	Vert	0.0149	0.00994	0.0133	Hillside	felt, Eq Mag 1.6
W	BE9689	7/14/06	22:32:53	0.444	0.317	0.714	0.76	Long	0.00663	0.00663	0.0182	Grassy Tr. Dam	
W	BE9690	7/14/06	22:32:54	0.492	0.254	0.714	0.73	Long	0.00663	0.00663	0.00829	Hillside	
W	BE9689	7/15/06	2:41:12	0.778	0.81	1.57	1.67	Vert	0.00994	0.0116	0.0199	Grassy Tr. Dam	
W	BE9690	7/15/06	2:41:12	1.35	1.62	4.22	4.4	Vert	0.0182	0.0182	[redacted]	**Hillside**	
W	BE9690	7/15/06	8:36:21	0.317	0.254	0.635	0.674	Long	0.00663	0.00497	0.00994	Hillside	
W	BE9689	7/15/06	8:51:00	1.41	1	1.75	2.05	Long	0.0149	0.00994	0.0182	Grassy Tr. Dam	Eq Mag 1.7
W	BE9690	7/15/06	8:51:01	1.11	0.619	1.41	1.81	Tran	0.00994	0.00829	0.0133	Hillside	Eq Mag 1.7
W	BE9689	7/15/06	13:07:09	1.32	0.841	1.44	1.58	Long	0.00994	0.00829	0.0215	Grassy Tr. Dam	Eq Mag 1.6
W	BE9690	7/15/06	13:07:10	0.889	0.524	1.11	1.23	Tran	0.00829	0.00663	0.00994	Hillside	Eq Mag 1.6
W	BE9690	7/15/06	14:47:21	0.508	0.397	0.651	0.706	Long	0.00663	0.00497	0.00663	Hillside	
W	BE9689	7/15/06	19:30:12	0.587	0.476	0.746	0.87	Long	0.00994	0.00829	0.0182	Grassy Tr. Dam	Eq Mag 1.7
W	BE9690	7/15/06	19:30:13	0.714	0.762	0.952	0.97	Vert	0.00829	0.00829	0.00994	Hillside	Eq Mag 1.7
W	BE9689	7/15/06	23:59:01	0.444	0.365	0.635	0.714	Long	0.00829	0.00663	0.0182	Grassy Tr. Dam	
W	BE9689	7/16/06	5:06:25	1.43	1.21	1.65	1.95	Vert	0.0116	0.00829	0.0166	Grassy Tr. Dam	Eq Mag 1.6
W	BE9690	7/16/06	5:06:26	0.825	0.603	1.56	1.61	Vert	0.00829	0.00829	0.0149	Hillside	Eq Mag 1.6
W	BE9689	7/16/06	11:22:24	1.41	1.22	1.95	2.23	Long	0.0116	0.00994	0.0199	Grassy Tr. Dam	Eq Mag 1.7
W	BE9690	7/16/06	11:22:25	1.17	1.24	1.75	1.79	Vert	0.00994	0.0116	0.0149	Hillside	Eq Mag 1.7
W	BE9690	7/16/06	17:25:09	0.492	0.571	0.873	0.988	Long	0.00829	0.00829	0.0116	Hillside	
W	BE9689	7/16/06	18:05:47	0.73	0.54	0.651	0.888	Long	0.00829	0.00663	0.0149	Grassy Tr. Dam	Eq Mag 1.3
W	BE9690	7/16/06	18:05:47	0.714	0.619	0.571	0.721	Vert	0.00829	0.00829	0.00663	Hillside	Eq Mag 1.3
W	BE9689	7/16/06	18:06:45	0.635	0.444	0.556	0.762	Tran	0.00829	0.00829	0.0166	Grassy Tr. Dam	
W	BE9690	7/16/06	20:51:48	0.476	0.206	0.667	0.685	Long	0.00663	0.00663	0.00829	Hillside	
W	BE9690	7/17/06	10:31:02	0.683	0.317	0.714	0.9	Tran	0.00829	0.00663	0.00994	Hillside	
W	BE9689	7/17/06	11:36:11	1.14	0.73	1.3	1.41	Long	0.00994	0.00829	0.0149	Grassy Tr. Dam	Eq Mag 2.1
W	BE9690	7/17/06	11:36:11	1.08	0.444	1	1.32	Long	0.00994	0.00663	0.00994	Hillside	Eq Mag 2.1
W	BE9689	7/17/06	19:35:12	0.984	1	1.37	1.69	Tran	0.00994	0.00829	0.0182	Grassy Tr. Dam	Eq Mag 1.5
W	BE9690	7/17/06	19:35:12	0.873	0.778	1.17	1.18	Vert	0.00829	0.00829	0.00994	Hillside	Eq Mag 1.5
W	BE9689	7/18/06	0:57:21	0.603	0.413	0.524	0.682	Tran	0.00663	0.00663	0.0182	Grassy Tr. Dam	
W	BE9690	7/18/06	1:37:40	0.476	0.302	0.794	0.805	Long	0.00663	0.00497	0.00829	Hillside	
W	BE9689	7/18/06	1:37:41	0.54	0.556	0.635	0.712	Long	0.00663	0.00663	0.0166	Grassy Tr. Dam	
W	BE9690	7/19/06	0:42:06	0.857	0.333	0.873	0.987	Long	0.00663	0.00663	0.00994	Hillside	Eq Mag 1.6
W	BE9689	7/19/06	0:42:07	0.825	0.667	0.81	1.15	Tran	0.0116	0.00663	0.0182	Grassy Tr. Dam	Eq Mag 1.6
W	BE9689	7/19/06	9:16:33	0.556	0.508	0.714	0.866	Long	0.00829	0.00829	0.0182	Grassy Tr. Dam	Eq Mag 1.4
W	BE9690	7/19/06	9:28:38	0.952	0.317	0.667	1	Tran	0.00829	0.00663	0.00829	Hillside	
W	BE9689	7/19/06	9:28:39	0.889	0.889	0.778	1.01	Long	0.00829	0.00829	0.0182	Grassy Tr. Dam	
W	BE9690	7/19/06	10:16:09	0.429	0.238	0.683	0.686	Long	0.00663	0.00497	0.00829	Hillside	Eq Mag 1.4
W	BE9689	7/19/06	10:16:10	0.524	0.444	0.762	0.773	Long	0.00663	0.00663	0.0166	Grassy Tr. Dam	Eq Mag 1.4
W	BE9690	7/19/06	12:16:43	0.46	0.524	0.746	0.796	Long	0.00663	0.00994	0.00829	Hillside	
W	BE9690	7/19/06	15:39:49	1.49	0.984	1.21	1.55	Vert	0.0116	0.00994	0.00994	Hillside	Eq Mag 1.7
W	BE9689	7/19/06	15:39:50	1.67	1.52	2	2.4	Tran	0.0149	0.0116	0.0182	Grassy Tr. Dam	Eq Mag 1.7
W	BE9690	7/19/06	17:01:30	1.1	0.762	1.17	1.42	Vert	0.0116	0.00994	0.00994	Hillside	Eq Mag 1.6
W	BE9689	7/19/06	17:01:32	1.33	1.49	0.857	1.61	Tran	0.00994	0.00994	0.0149	Grassy Tr. Dam	Eq Mag 1.6
W	BE9690	7/19/06	19:19:10	0.349	0.317	0.73	0.774	Long	0.00663	0.00663	0.00829	Hillside	
W	BE9689	7/19/06	23:11:01	0.508	0.556	0.714	0.783	Long	0.00829	0.00663	0.0182	Grassy Tr. Dam	Eq Mag 1.9
W	BE9690	7/20/06	8:24:58	0.794	0.222	0.492	0.826	Tran	0.00829	0.00663	0.00663	Hillside	
W	BE9690	7/20/06	12:37:29	0.524	0.238	0.603	0.624	Long	0.00663	0.00663	0.00663	Hillside	
W	BE9689	7/20/06	12:37:30	0.524	0.619	0.667	0.837	Long	0.00994	0.00663	0.0182	Grassy Tr. Dam	
W	BE9690	7/20/06	14:33:38	1.1	0.524	1.24	1.31	Tran	0.0116	0.00829	0.0133	Hillside	Eq Mag 1.6
W	BE9689	7/20/06	14:33:40	1.54	1.06	1.67	1.95	Tran	0.0149	0.00994	0.0166	Grassy Tr. Dam	Eq Mag 1.6
W	BE9690	7/20/06	17:32:09	0.381	0.302	0.667	0.694	Long	0.00829	0.00829	0.00829	Hillside	
W	BE9689	7/20/06	17:56:22	0.159	1.05	0.333	1.05	Vert	0.00994	0.0365	0.0149	Grassy Tr. Dam	Man Made
W	BE9690	7/20/06	19:38:59	0.619	0.27	0.825	0.866	Long	0.00829	0.00663	0.00829	Hillside	Eq Mag 1.9
W	BE9689	7/20/06	19:39:01	0.635	0.635	0.698	0.932	Long	0.00829	0.00829	0.0182	Grassy Tr. Dam	Eq Mag 1.9
W	BE9690	7/21/06	9:15:22	0.857	0.333	0.603	0.904	Tran	0.00994	0.00663	0.00663	Hillside	
W	BE9690	7/21/06	10:18:02	2.64	1.68	1.94	2.84	Vert	0.0182	0.0166	0.0133	Hillside	Eq Mag 1.8
W	BE9689	7/21/06	10:18:04	2.79	2.17	2.91	3.87	Vert	[redacted]	0.0149	0.0166	**Grassy Tr. Dam**	Eq Mag 1.8
W	BE9690	7/21/06	17:58:54	0.397	0.19	0.635	0.655	Long	0.00663	0.00663	0.00829	Hillside	
W	BE9689	7/21/06	17:58:56	0.571	0.444	0.619	0.654	Long	0.00829	0.00663	0.0182	Grassy Tr. Dam	
W	BE9690	7/21/06	19:00:17	0.587	0.254	0.794	0.805	Long	0.00829	0.00497	0.00829	Hillside	Eq Mag 1.7
W	BE9689	7/21/06	19:00:20	0.683	0.524	0.81	1.01	Long	0.00829	0.00663	0.0199	Grassy Tr. Dam	Eq Mag 1.7
W	BE9689	7/21/06	23:30:39	0.619	0.556	0.397	0.697	Tran	0.00829	0.00663	0.0215	Grassy Tr. Dam	
W	BE9690	7/22/06	10:17:00	0.857	0.397	1.27	1.29	Tran	0.00994	0.00663	0.00994	Hillside	Eq Mag 1.6
W	BE9689	7/22/06	10:17:02	1.3	0.921	1.21	1.66	Tran	0.0116	0.00829	0.0199	Grassy Tr. Dam	Eq Mag 1.6
W	BE9690	7/22/06	11:48:24	0.46	0.19	0.667	0.694	Long	0.00663	0.00829	0.00829	Hillside	?
W	BE9689	7/22/06	11:48:26	0.603	0.429	0.667	0.704	Long	0.00663	0.00663	0.0182	Grassy Tr. Dam	?
W	BE9690	7/22/06	22:06:31	0.413	0.222	0.619	0.645	Long	0.00663	0.00663	0.00829	Hillside	Eq Mag 1.6
W	BE9689	7/22/06	22:06:34	0.556	0.444	0.683	0.824	Long	0.00829	0.00663	0.0182	Grassy Tr. Dam	Eq Mag 1.6
W	BE9690	7/23/06	4:46:09	0.587	0.746	1.71	1.83	Long	0.00663	0.00994	0.0149	Hillside	
W	BE9689	7/23/06	4:46:12	0.556	0.397	0.683	0.803	Long	0.00829	0.00663	0.0182	Grassy Tr. Dam	
W	BE9690	7/23/06	13:23:24	0.841	0.444	1.43	1.47	Tran	0.00994	0.00994	0.0116	Hillside	Eq Mag 1.6
W	BE9689	7/23/06	13:23:27	1.27	0.841	1.21	1.48	Tran	0.0116	0.00829	0.0182	Grassy Tr. Dam	Eq Mag 1.6

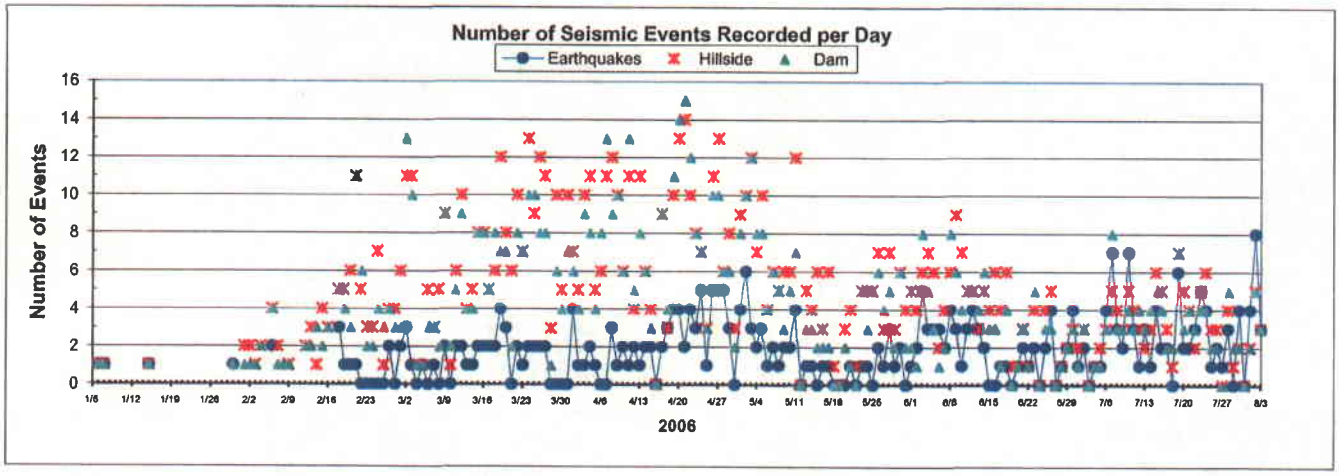
W	BE9690	7/23/06	14:22:18	0.683	0.857	1.27	1.29	Vert	0.00829	0.00829	0.0133	Hillside	Eq Mag	1.7
W	BE9689	7/23/06	14:22:21	0.698	0.524	0.905	1.02	Tran	0.00829	0.00663	0.0182	Grassy Tr. Dam	Eq Mag	1.7
W	BE9690	7/23/06	19:05:42	0.889	0.524	1.38	1.4	Long	0.00994	0.00829	0.0116	Hillside	Eq Mag	1.6
W	BE9689	7/23/06	19:05:46	1.49	1.17	1.25	1.58	Long	0.0116	0.00994	0.0166	Grassy Tr. Dam	Eq Mag	1.6
W	BE9690	7/23/06	22:46:50	0.603	0.27	0.714	0.741	Tran	0.00663	0.00663	0.00829	Hillside	Eq Mag	1.9
W	BE9689	7/23/06	22:46:54	0.667	0.571	0.635	0.887	Tran	0.00829	0.00663	0.0182	Grassy Tr. Dam	Eq Mag	1.9
W	BE9690	7/24/06	0:41:22	0.571	0.238	0.905	0.927	Long	0.00663	0.00663	0.0116	Hillside		
W	BE9689	7/24/06	0:41:25	0.762	0.603	0.81	0.882	Vert	0.00663	0.00829	0.0166	Grassy Tr. Dam		
W	BE9690	7/24/06	1:04:56	0.381	0.254	0.635	0.642	Long	0.00829	0.00663	0.00663	Hillside	Eq Mag	1.4
W	BE9689	7/24/06	1:04:59	0.413	0.365	0.603	0.666	Long	0.00663	0.00663	0.0215	Grassy Tr. Dam	Eq Mag	1.4
W	BE9690	7/24/06	9:37:17	0.619	0.619	0.984	1.06	Vert	0.00994	0.00829	0.0116	Hillside		
W	BE9689	7/24/06	9:37:21	0.508	0.333	0.651	0.652	Long	0.00663	0.00663	0.0182	Grassy Tr. Dam		
W	BE9690	7/24/06	15:58:43	0.603	0.635	1.14	1.19	Vert	0.00829	0.00994	0.0116	Hillside		
W	BE9690	7/24/06	18:13:56	0.524	0.27	0.73	0.837	Long	0.00663	0.00663	0.00829	Hillside		
W	BE9690	7/24/06	21:41:14	0.857	0.444	1.21	1.24	Tran	0.00994	0.00663	0.0116	Hillside	Eq Mag	1.6
W	BE9689	7/24/06	21:41:18	1.02	0.683	0.952	1.19	Tran	0.00829	0.00829	0.0199	Grassy Tr. Dam	Eq Mag	1.6
W	BE9690	7/25/06	9:22:59	1.02	0.444	1.43	1.46	Tran	0.00994	0.00829	0.00994	Hillside	Eq Mag	1.8
W	BE9689	7/25/06	9:23:03	1.49	1.11	1.59	1.9	Vert	0.0116	0.00994	0.0166	Grassy Tr. Dam	Eq Mag	1.8
W	BE9690	7/25/06	11:36:42	0.381	0.19	0.619	0.63	Long	0.00663	0.00663	0.00829	Hillside		
W	BE9690	7/25/06	13:48:39	0.651	0.254	0.889	0.915	Long	0.00663	0.00663	0.00994	Hillside		
W	BE9689	7/25/06	13:48:43	0.762	0.571	0.762	0.879	Long	0.00829	0.00663	0.0199	Grassy Tr. Dam		
W	BE9690	7/26/06	11:26:19	1.1	0.841	1.49	1.51	Vert	0.0133	0.00994	0.0116	Hillside	Eq Mag	1.7
W	BE9689	7/26/06	11:26:24	1.48	1.37	1.32	1.76	Tran	0.0166	0.00994	0.0166	Grassy Tr. Dam	Eq Mag	1.7
W	BE9689	7/26/06	14:30:33	0.111	0.778	0.46	0.781	Vert	0.00829	0.0265	0.0166	Grassy Tr. Dam	**Man Made**	
W	BE9690	7/26/06	21:43:34	0.683	0.413	0.825	0.864	Tran	0.00829	0.00663	0.00829	Hillside	Eq Mag	1.2
W	BE9689	7/26/06	21:43:39	1	0.952	0.825	1.11	Tran	0.00994	0.00829	0.0182	Grassy Tr. Dam	Eq Mag	1.2
W	BE9690	7/26/06	22:56:00	0.444	0.238	0.714	0.72	Long	0.00663	0.00663	0.00829	Hillside		
W	BE9690	7/28/06	2:14:21	0.714	0.46	0.873	1.11	Tran	0.00829	0.00663	0.00829	Hillside	Eq Mag	1.3
W	BE9689	7/28/06	2:14:26	1.1	0.905	0.952	1.39	Tran	0.00994	0.00829	0.0182	Grassy Tr. Dam	Eq Mag	1.3
W	BE9690	7/28/06	17:14:48	0.476	0.27	0.683	0.698	Long	0.00663	0.00663	0.00829	Hillside		
W	BE9689	7/28/06	17:14:54	0.524	0.349	0.794	0.853	Long	0.00663	0.00663	0.0182	Grassy Tr. Dam		
W	BE9689	7/28/06	17:41:39	0.603	0.556	0.397	0.693	Tran	0.00663	0.00663	0.0166	Grassy Tr. Dam		
W	BE9689	7/28/06	19:06:16	0.667	0.651	0.508	0.724	Tran	0.00663	0.00663	0.0166	Grassy Tr. Dam		
W	BE9690	7/28/06	22:38:25	1.73	0.81	2.14	2.15	Vert	0.0166	0.00994	0.0166	Hillside	Eq Mag	1.9
W	BE9689	7/28/06	22:38:31	2.29	0.921	1.67	2.37	Long	0.0133	0.00994	0.0182	Grassy Tr. Dam	Eq Mag	1.9
W	BE9690	7/28/06	23:47:31	0.746	0.524	1.52	1.53	Long	0.00829	0.00829	0.0133	Hillside		
W	BE9690	7/29/06	3:46:31	0.429	0.286	0.603	0.715	Long	0.00663	0.00663	0.00663	Hillside		
W	BE9689	7/29/06	3:46:37	0.698	0.603	0.651	0.928	Tran	0.00829	0.00663	0.0182	Grassy Tr. Dam		
W	BE9689	7/29/06	14:41:48	0.683	0.619	0.587	0.775	Tran	0.00829	0.00663	0.0166	Grassy Tr. Dam		
W	BE9690	7/30/06	9:34:18	1.14	0.571	0.937	1.15	Tran	0.0116	0.00994	0.00994	Hillside	Eq Mag	1.7
W	BE9689	7/30/06	9:34:24	1.49	1	1	1.51	Tran	0.0116	0.00829	0.0199	Grassy Tr. Dam	Eq Mag	1.7
W	BE9690	7/30/06	14:10:38	1.22	0.698	1.1	1.53	Vert	0.0133	0.00994	0.0133	Hillside	Eq Mag	1.7
W	BE9689	7/30/06	14:10:45	1.46	1.37	1.08	1.62	Tran	0.00994	0.00994	0.0166	Grassy Tr. Dam	Eq Mag	1.7
W	BE9690	8/1/06	1:23:14	0.952	0.667	1.32	1.66	Vert	0.00994	0.00829	0.0116	Hillside	Eq Mag	1.4
W	BE9689	8/1/06	1:23:22	1.3	1.13	1.19	1.77	Vert	0.0116	0.0116	0.0182	Grassy Tr. Dam	Eq Mag	1.4
W	BE9690	8/1/06	7:48:11	0.667	0.317	0.984	1.02	Long	0.00829	0.00497	0.00829	Hillside	Eq Mag	1.5
W	BE9689	8/1/06	7:48:19	0.73	0.651	0.794	1.04	Long	0.00663	0.00829	0.0182	Grassy Tr. Dam	Eq Mag	1.5
W	BE9690	8/2/06	4:30:06	0.587	0.302	0.698	0.881	Long	0.00994	0.00663	0.00829	Hillside	Eq Mag	1.5
W	BE9689	8/2/06	4:30:14	0.841	0.794	0.778	0.978	Tran	0.00994	0.00663	0.0166	Grassy Tr. Dam	Eq Mag	1.5
W	BE9690	8/2/06	6:24:44	0.603	0.19	0.619	0.687	Tran	0.00663	0.00663	0.00663	Hillside	Eq Mag	1.5
W	BE9690	8/2/06	12:09:21	0.778	0.365	0.778	0.933	Long	0.00994	0.00663	0.00829	Hillside	Eq Mag	1.3
W	BE9689	8/2/06	12:09:29	0.873	0.841	0.81	1.08	Tran	0.00994	0.00663	0.0182	Grassy Tr. Dam	Eq Mag	1.3
W	BE9690	8/2/06	13:36:29	0.603	0.27	0.587	0.709	Tran	0.00663	0.00497	0.00829	Hillside	Eq Mag	1.4
W	BE9689	8/2/06	13:36:36	0.635	0.619	0.603	0.901	Vert	0.00663	0.00663	0.0149	Grassy Tr. Dam	Eq Mag	1.4
W	BE9690	8/2/06	16:29:16	0.714	0.317	0.571	0.784	Tran	0.00994	0.00663	0.00663	Hillside		
W	BE9689	8/2/06	16:29:24	0.794	0.667	0.698	0.924	Tran	0.00829	0.00663	0.0182	Grassy Tr. Dam		
W	BE9689	8/2/06	20:34:04	0.603	0.635	0.603	0.746	Tran	0.00829	0.00663	0.0182	Grassy Tr. Dam		
W	BE9690	8/3/06	4:19:46	1.02	0.968	2.46	2.51	Vert	0.00994	0.0133	0.0199	Hillside		
W	BE9689	8/3/06	4:19:54	0.556	0.46	0.952	1.03	Long	0.00663	0.00994	0.0182	Grassy Tr. Dam		
W	BE9690	8/3/06	12:51:31	0.762	0.429	0.81	0.846	Tran	0.00994	0.00663	0.00829	Hillside		
W	BE9689	8/3/06	12:51:40	0.794	0.73	0.762	0.995	Long	0.00994	0.00994	0.0166	Grassy Tr. Dam		
W	BE9690	8/3/06	22:00:38	0.683	0.302	0.714	0.948	Long	0.00829	0.00663	0.00994	Hillside		
W	BE9689	8/3/06	22:00:47	0.762	0.73	0.698	1.01	Tran	0.00994	0.00829	0.0149	Grassy Tr. Dam		
LOG	BE9689	8/4/06	10:56:10	***	***	***	***	***	***	***	***	Keyboard Stop		
W	BE9690	8/4/06	11:36:40	0.937	0.349	0.778	1.1	Long	0.00994	0.00663	0.00994	Hillside		
LOG	BE9690	8/4/06	11:48:12	***	***	***	***	***	***	***	***	Keyboard Stop		

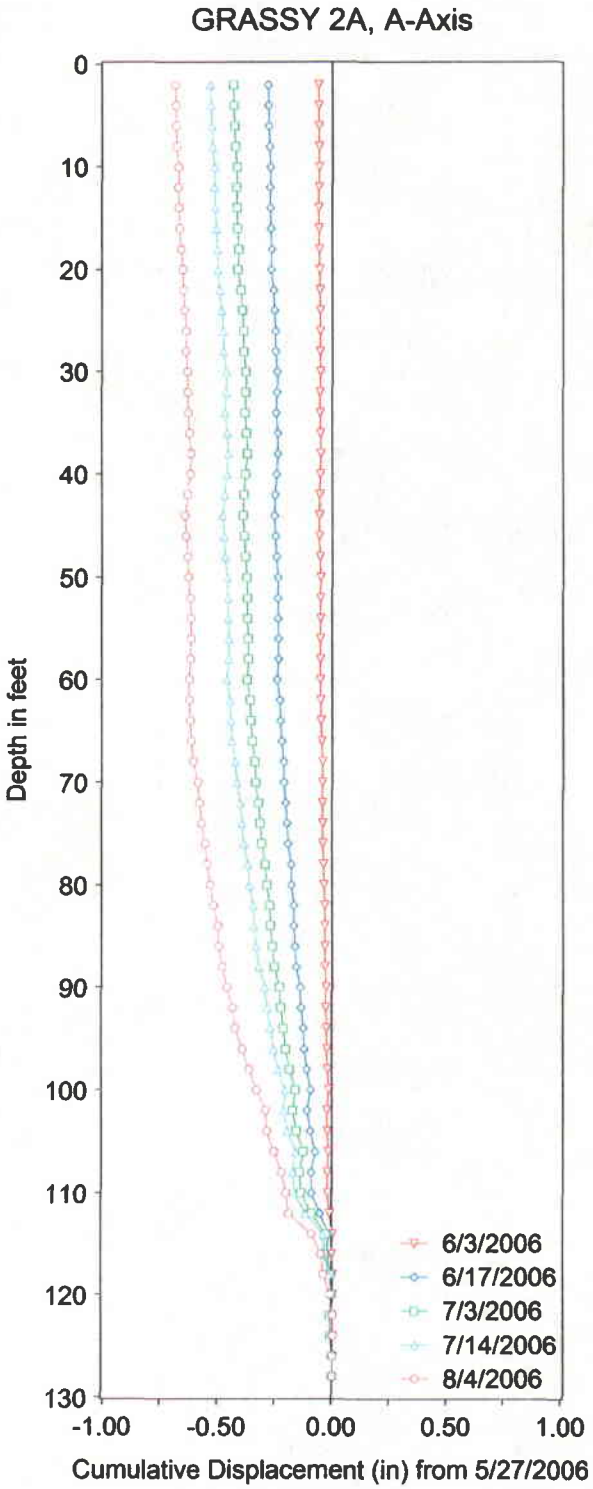

Earthquake Mag and PGA
EQ Mag
Hillside PGA
Dam PGA
Earthquake Magnitude
PGA
2006

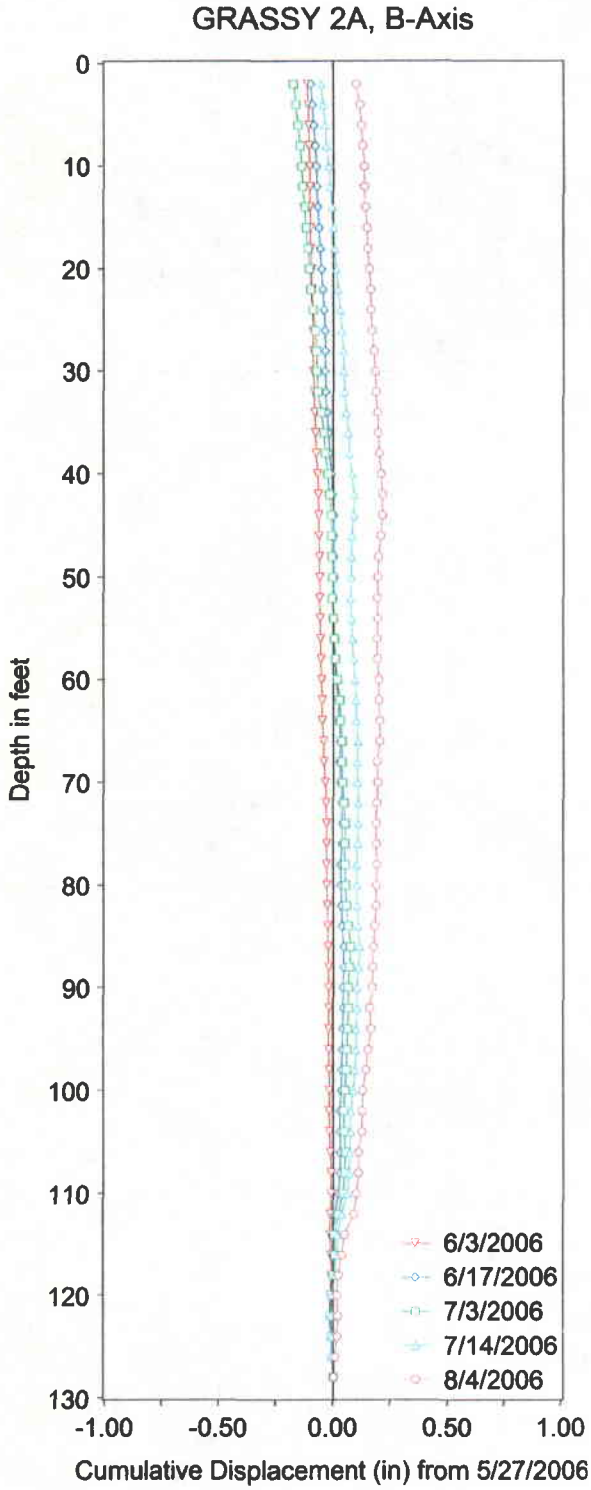

Number of Seismic Events Recorded per Day
Earthquakes
Hillside
Dam
Number of Events
2006

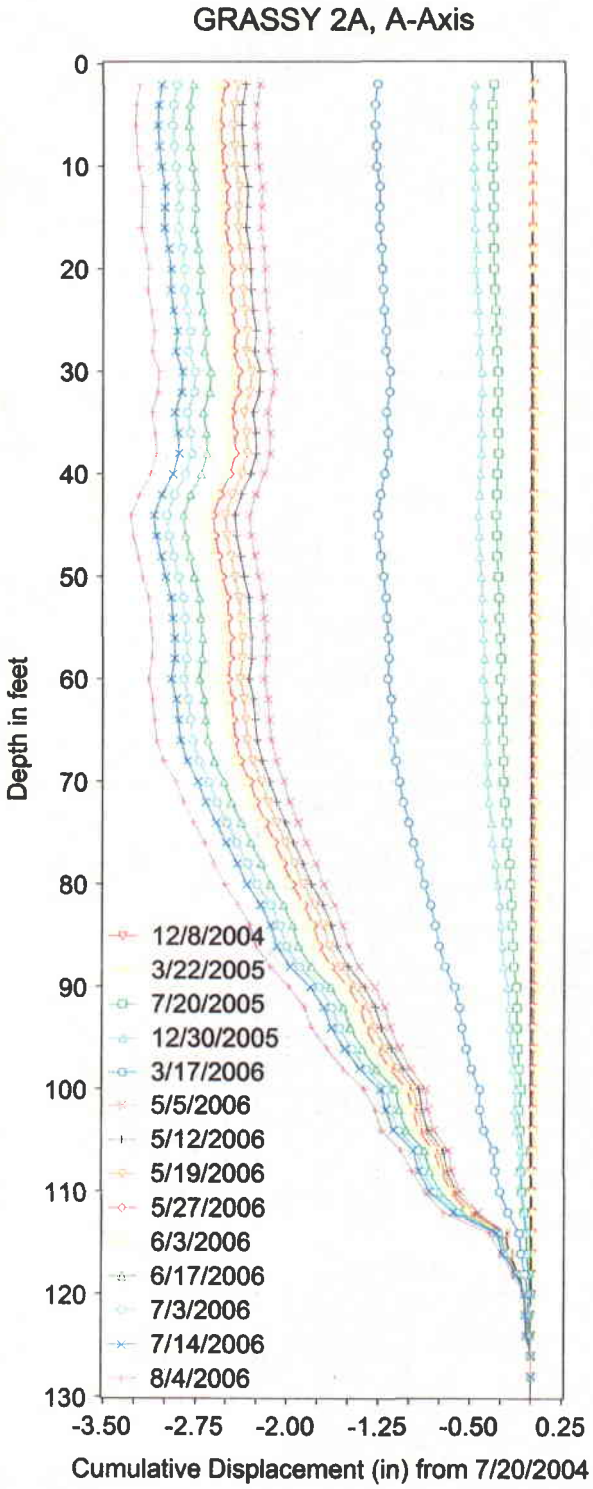

Seismic Events per Seven day Period
UUSS Earthquakes
Events on Hill
Events on Dam
Number of Events Recorded per Week
7 Days Ending

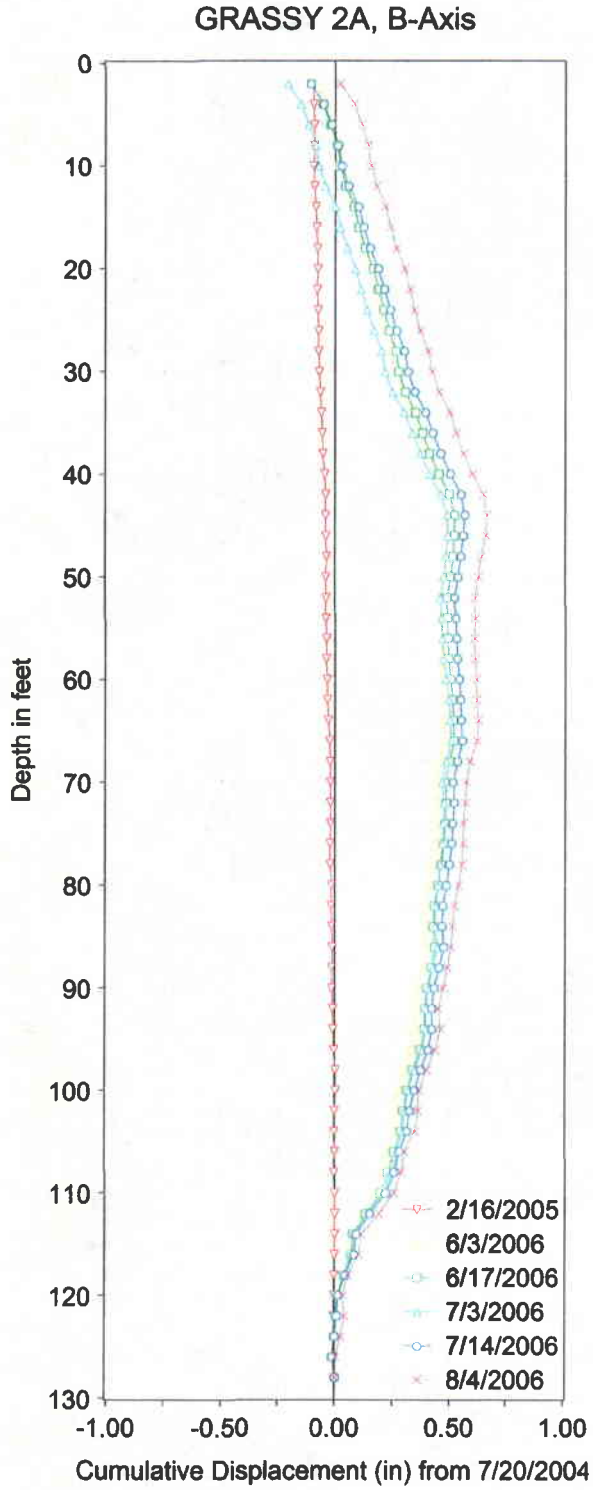

Earthquake Mag and PGA
EQ Mag
Hillside PGA
Dam PGA
Earthquake Magnitude
PGA
2006

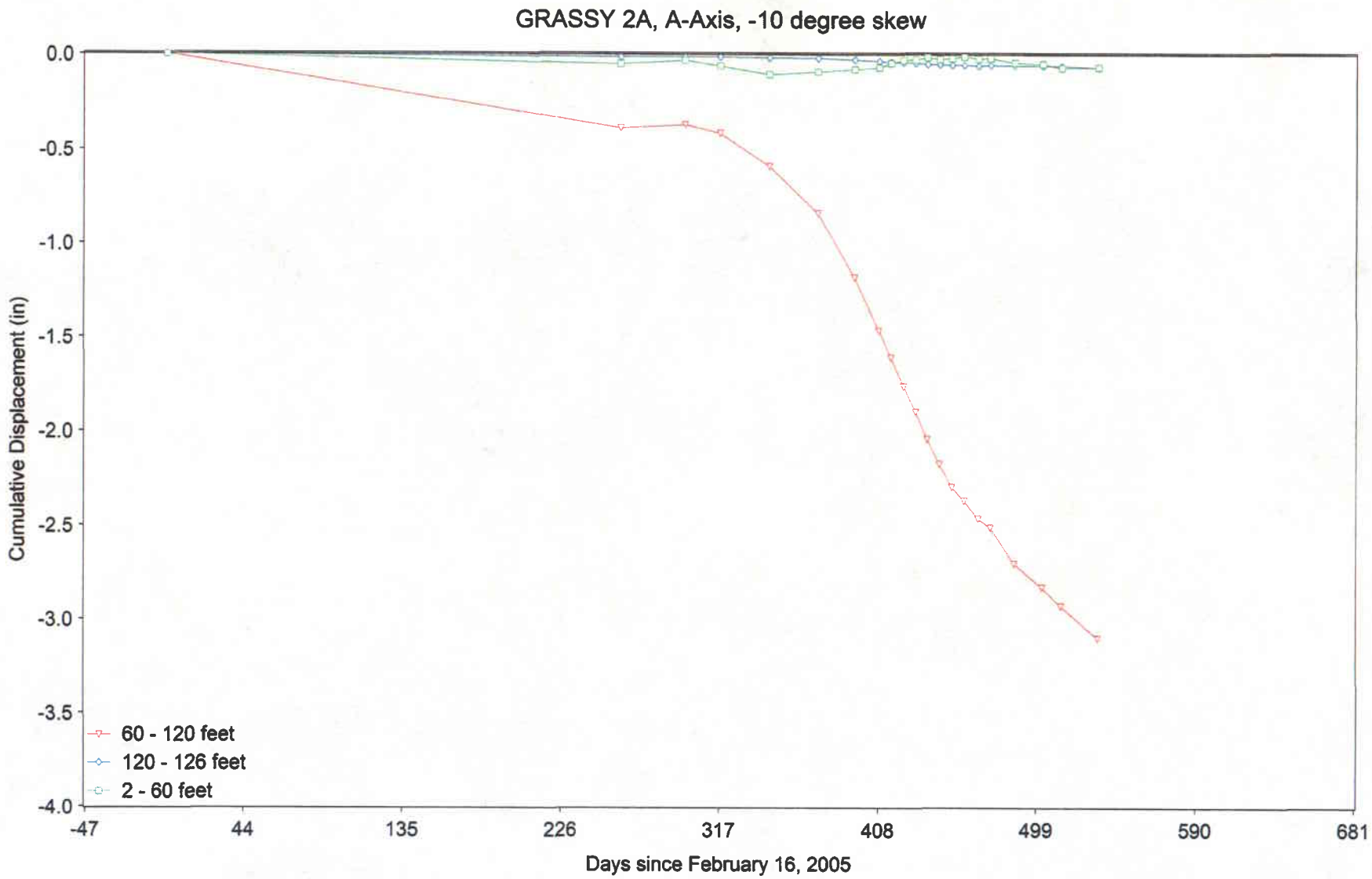

Number of Seismic Events Recorded per Day
Earthquakes
Hillside
Dam
Number of Events
2006

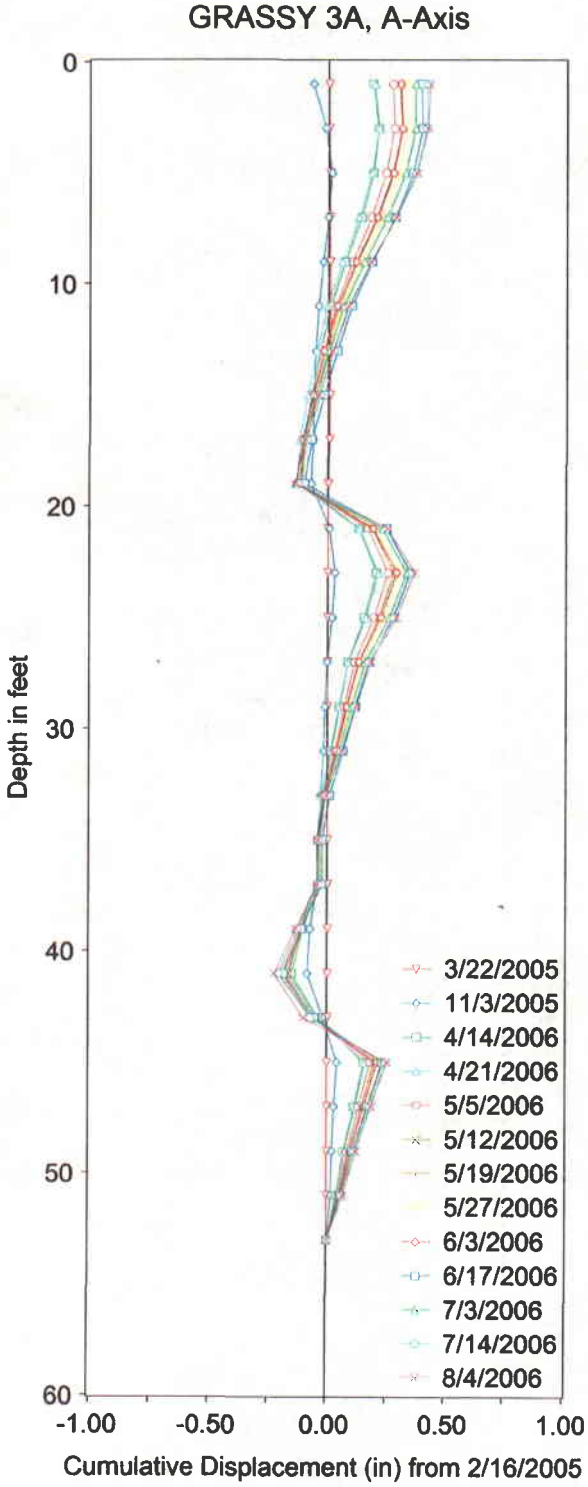

GRASSY 2A, A-Axis
Depth in feet
0
10
20
30
40
50
60
70
80
90
100
110
120
130
-1.00
-0.50
0.00
0.50
1.00
Cumulative Displacement (in) from 5/27/2006
6/3/2006
6/17/2006
7/3/2006
7/14/2006
8/4/2006

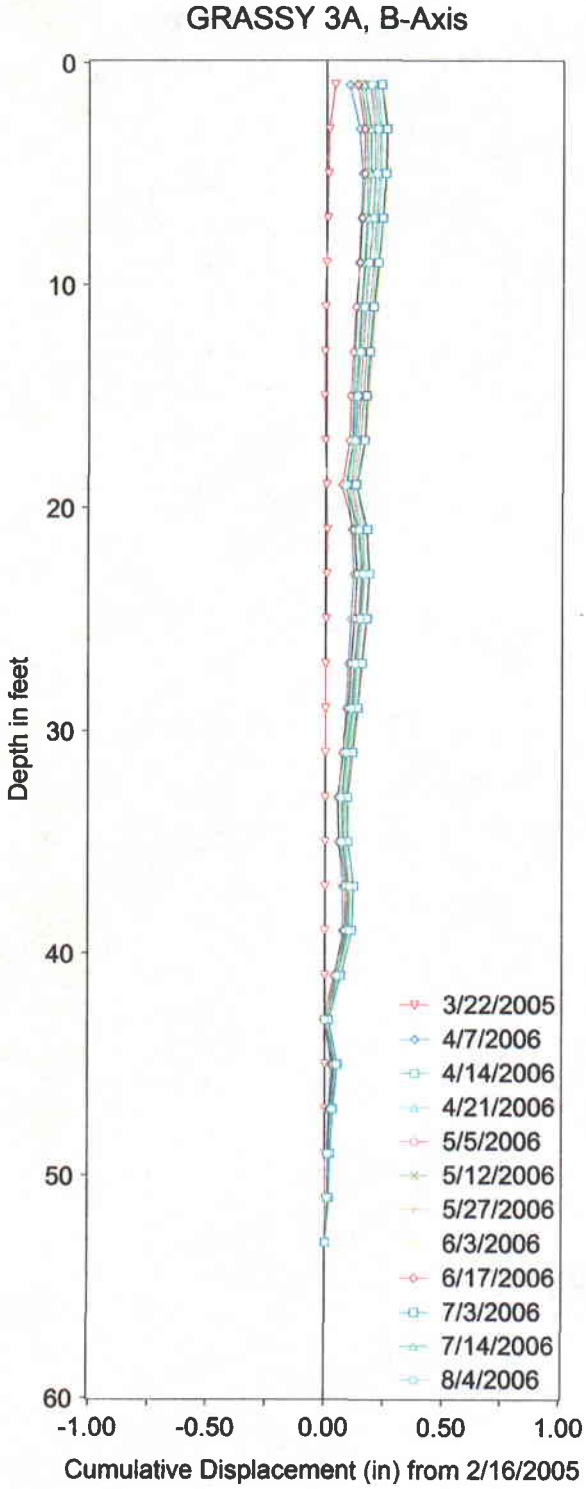

GRASSY 2A, B-Axis
Depth in feet
0
10
20
30
40
50
60
70
80
90
100
110
120
130
-1.00
-0.50
0.00
0.50
1.00
Cumulative Displacement (in) from 5/27/2006
6/3/2006
6/17/2006
7/3/2006
7/14/2006
8/4/2006


GRASSY 2A, A-Axis
Depth in feet
Cumulative Displacement (in) from 7/20/2004
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
12/8/2004
3/22/2005
7/20/2005
12/30/2005
3/17/2006
5/5/2006
5/12/2006
5/19/2006
5/27/2006
6/3/2006
6/17/2006
7/3/2006
7/14/2006
8/4/2006

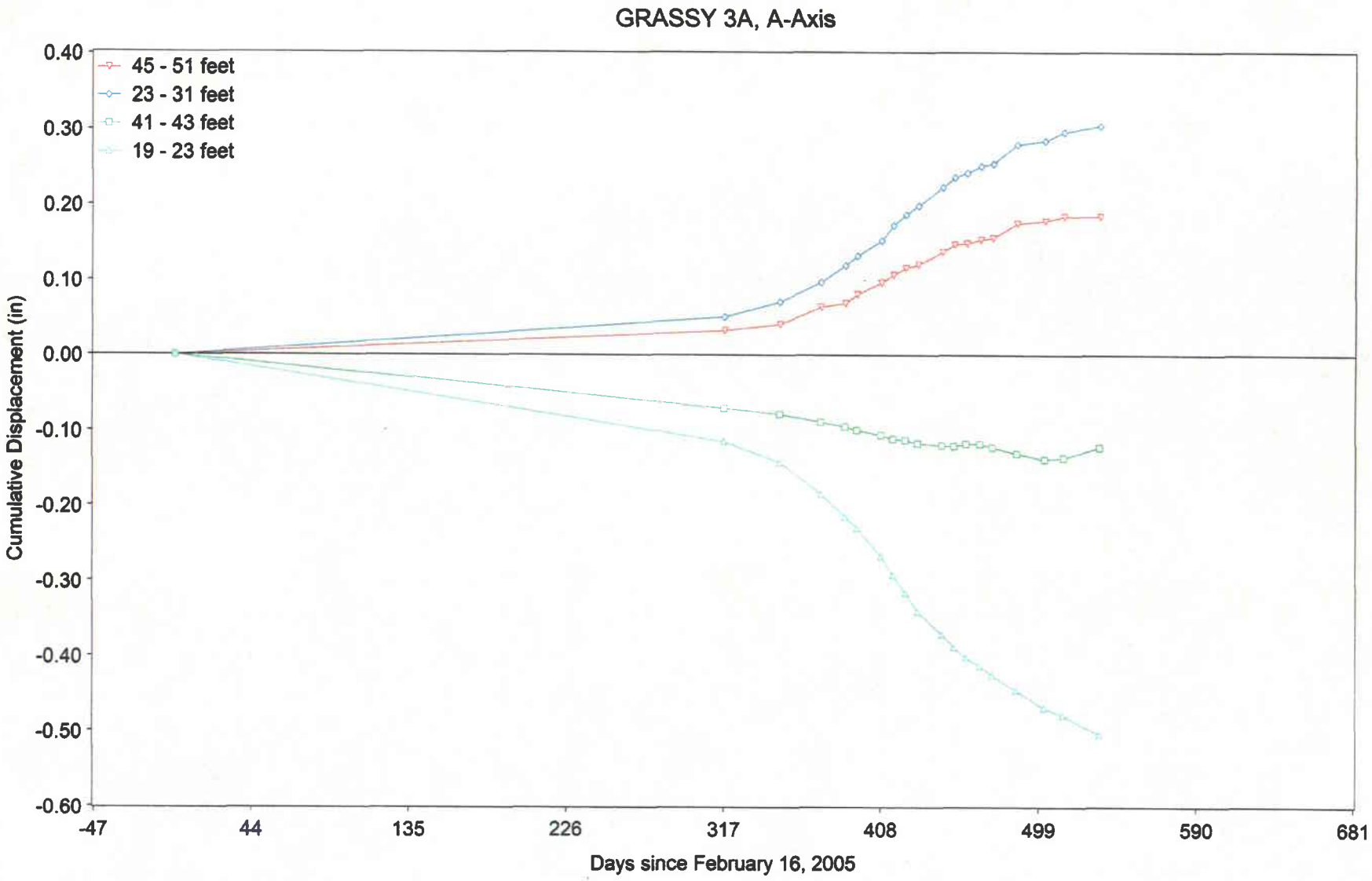

GRASSY 2A, B-Axis
Depth in feet
Cumulative Displacement (in) from 7/20/2004
0
10
20
30
40
50
60
70
80
90
100
110
120
130
-1.00
-0.50
0.00
0.50
1.00
2/16/2005
6/3/2006
6/17/2006
7/3/2006
7/14/2006
8/4/2006

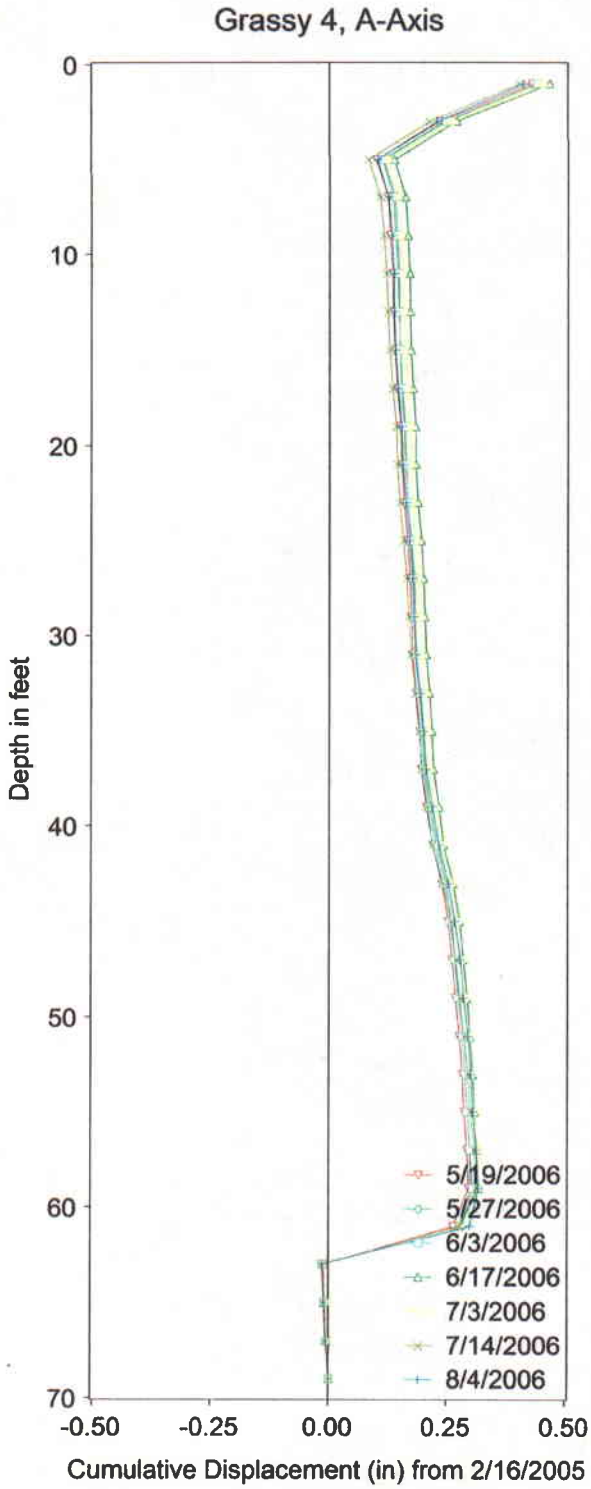

GRASSY 2A, A-Axis, -10 degree skew
Cumulative Displacement (in)
0.0
-0.5
-1.0
-1.5
-2.0
-2.5
-3.0
-3.5
-4.0
-47
44
135
226
317
408
499
590
681
Days since February 16, 2005
60 - 120 feet
120 - 126 feet
2 - 60 feet

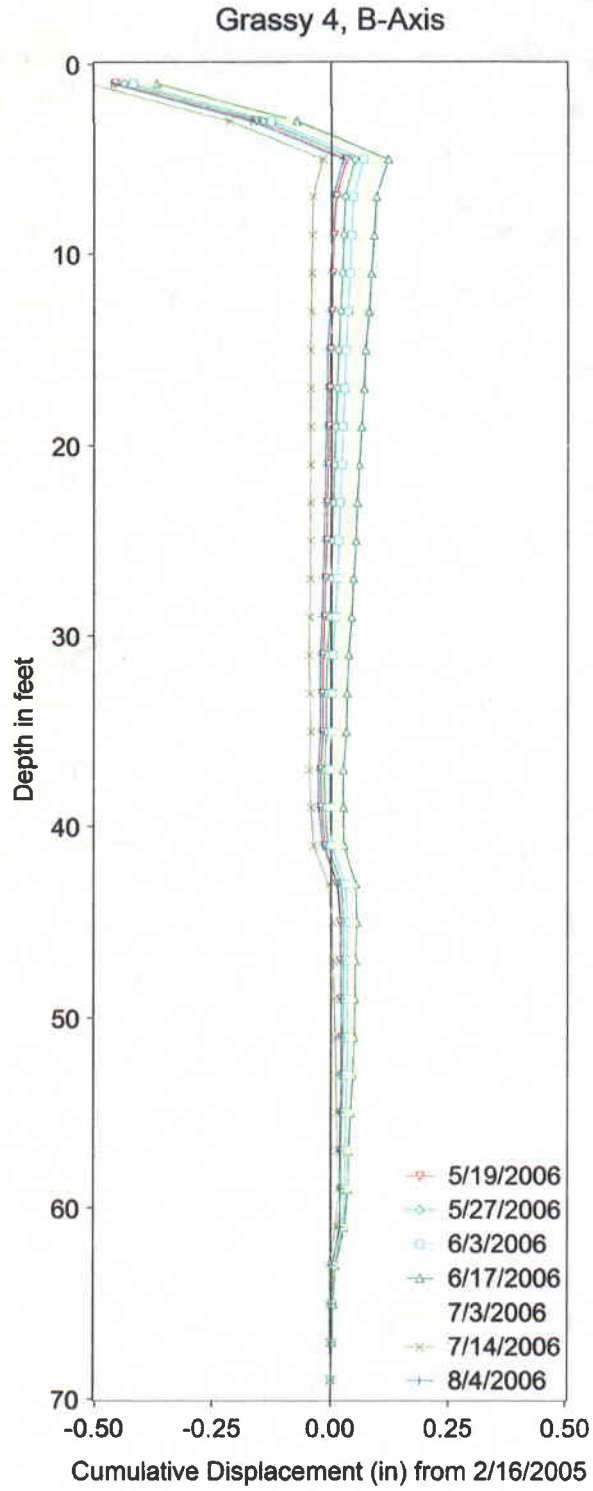


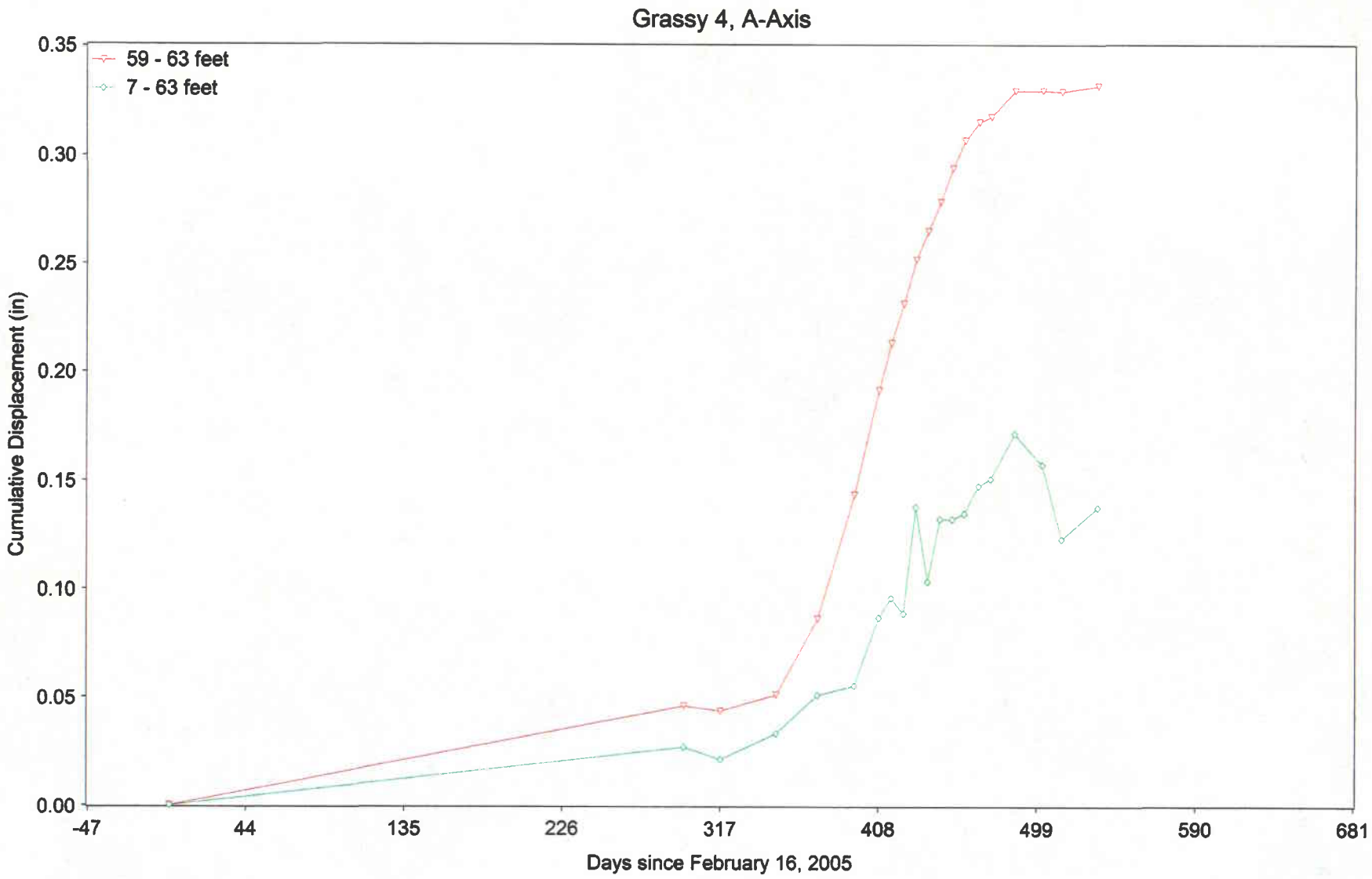


-30 degree skew


GRASSY 3A, A-Axis
45 - 51 feet
23 - 31 feet
41 - 43 feet
19 - 23 feet
Cumulative Displacement (in)
0.40
0.30
0.20
0.10
0.00
-0.10
-0.20
-0.30
-0.40
-0.50
-0.60
-47
44
135
226
317
408
499
590
681
Days since February 16, 2005

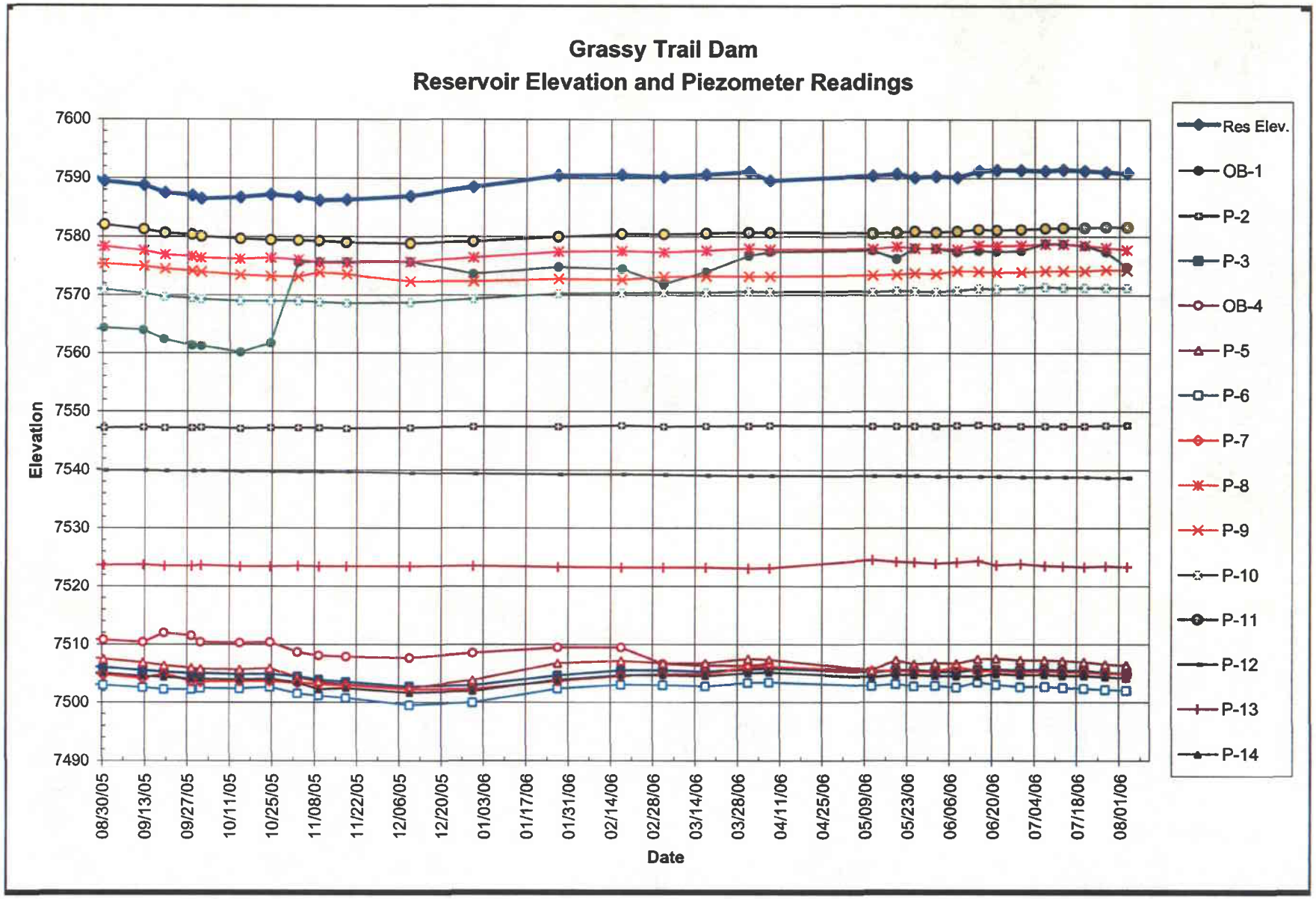

Grassy 4, A-Axis
Depth in feet
0
10
20
30
40
50
60
70
-0.50
-0.25
0.00
0.25
0.50
Cumulative Displacement (in) from 2/16/2005
5/19/2006
5/27/2006
6/3/2006
6/17/2006
7/3/2006
7/14/2006
8/4/2006


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
5/19/2006
5/27/2006
6/3/2006
6/17/2006
7/3/2006
7/14/2006
8/4/2006


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

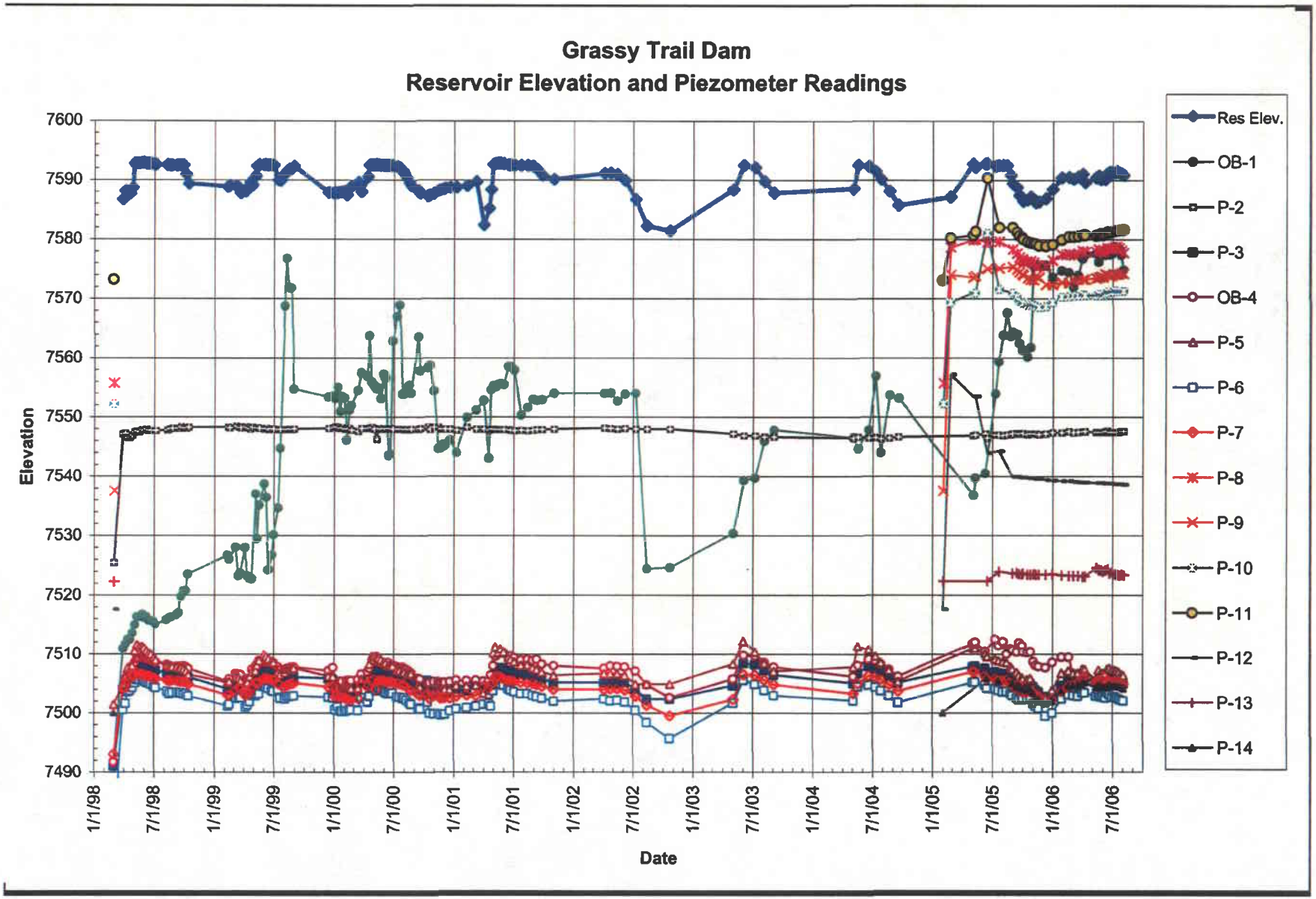
TAKE READINGS AT RIM ELEV.			05-2		79-4	98-3		05-4		79-3	05-3A	05-3		98-2	98-4	98-6
			5+62		5+15	4+14		~4+14		3+63	2+77	2+71				
Dam Crest Elev		7600.0	PIEZ.	PIEZ.	O.W.	PIEZ.		PIEZ.		O.W.	PIEZ	PIEZ	PIEZ	PIEZ	PIEZ	PIEZ
Spillway Elev.		7592.5	8	9	1	2	3	13	14	4	10	11	12	5	6	7
Rim Elev. (ft)			7601.5		7601.8	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	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'
8/30/05	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
7/7/06	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
7/13/06	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
7/20/06	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
7/27/06	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
8/3/06	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
Change since 7/7/06			-1.0	0.1	-4.0	0.1	-0.7	-0.2	-0.6		-0.1	0.2	-0.1	-0.9	-0.7	-0.5



RB&G ENGINEERING INC.
Provo, Utah

Figure Reservoir Elevation and Piezometer Readings
August 30, 2005 to August 3, 2006

Grassy Trail Dam and Reservoir



RB&G ENGINEERING INC.
Provo, Utah

Figure Reservoir Elevation and Piezometer Readings
March 1998 to August 3, 2006

Grassy Trail Dam and Reservoir