

Balancing Authority ACE Limit Proof-of-Concept Field Trial Project 2010-14

Eastern Interconnection Update Discussion
April 29, 2011

DISCUSSION STARTING AT 2:30 PM EDT

Bob Klueber – Midwest ISO

Balancing Authority Reliability-based Control Standard Drafting Team
(BARCSDT)

Balancing Authority ACE Limit Proof-of-Concept Field Trial

Eastern Interconnection Field Trial Participation

Participation reflects approximately 67% of the projected 2010 peak load for the Eastern Interconnection

Eastern Interconnection Balancing Authority Participants	2010 Frequency Bias	Region	Reliability Coordinator	Start Date
American Electric Power (CSWS)	-103.4	SPP	SPP	September 1, 2005
Associated Electric Cooperative, Inc. (AECI)	-45	SERC	TVA	April 1, 2010
Duke Energy Carolinas (DUK)	-196	SERC	VACS	April 1, 2009
East Kentucky Power Cooperative (EKPC)	-42.73	SERC	TVA	July 6, 2005
Entergy (EES)	-227.1	SERC	ICTE	July 6, 2005
EON-US (LGEE)	-74	SERC	TVA	April 1, 2008
Independent Electricity System Operator (IESO)	-245.8	NPCC	IESO	March 1, 2008
Manitoba Hydro (MHEB)	-43.3	MRO	MISO	July 6, 2005
Midwest Independent Transmission System Operator (MISO)	-1038.6	MRO, RFC, SERC	MISO	January 6, 2009
PJM Interconnection (PJM)	-1358	RFC	PJM	August 1, 2005
Santee Cooper (SC)	-61.52	SERC	VACS	March 1, 2006
Southern Company (SOCO)	-445	SERC	SOCO	October 15, 2005
Tennessee Valley Authority (TVA)	-317.6	SERC	TVA	October 1, 2005

Balancing Authority ACE Limit Proof-of-Concept Field Trial

The Balancing Authority ACE Limit (BAAL) shall not be exceeded for more than 30 consecutive clock-minutes*

	Longest exceedance of the Balancing Authority ACE Limit since starting operation under the Field Trial		March 2011 Performance under Field Trial	
	Max MinCtLow	Max MinCtHigh	Max MinCtLow	Max MinCtHigh
BA01	26	16	4	7
BA02	17	17	9	7
BA03	19	19	9	13
BA04	10	20	7	7
BA05	16	22	6	10
BA06	28	22	11	17
BA07	15	23	4	8
BA08	20	24	4	8
BA09	28	26	11	12
BA10	21	31	9	8
BA11	14	32	5	7
BA12	29	40	14	13
BA13	28	43	5	11

MinCtLow = Count of consecutive clock-minutes BAAL_{Low} was exceeded

MinCtHigh = Count of consecutive clock-minutes BAAL_{High} was exceeded

*BAAL being exceeded for more than 30 consecutive clock-minutes would be a violation under the proposed BAL-007 standard.

Frequency Statistics

Eastern Interconnection

Year	Month	Total Minutes FTL_Low at 59.98 Hz SF	Total Minutes FTL_Low at 60 Hz SF	Total FTL_Low Minutes	Percentage Low During TEC	FTL_Low Events	FTL_Low Max Duration	Total Minutes FTL_High at 60.02 Hz SF	Total Minutes FTL_High at 60 Hz SF	Total FTL_High Minutes	Percentage High During TEC	FTL_High Events	FTL_High Max Duration	Total FTL_Low and FTL_High Minutes at 60 Hz SF	Total FTL_Low and FTL_High Minutes
2005	7	28	30	58	48.28%	32	5	0	16	16	0.00%	11	3	46	74
2005	8	47	91	138	34.06%	56	10	0	35	35	0.00%	21	5	126	173
2005	9	32	39	71	45.07%	33	8	0	39	39	0.00%	21	7	78	110
2005	10	42	48	90	46.67%	43	11	0	33	33	0.00%	23	5	81	123
2005	11	65	43	108	60.19%	58	6	0	35	35	0.00%	22	7	78	143
2005	12	37	36	73	50.68%	41	7	0	27	27	0.00%	19	3	63	100
2006	1	42	33	75	56.00%	43	6	0	61	61	0.00%	27	5	94	136
2006	2	0	64	64	0.00%	39	6	2	43	45	4.44%	24	4	107	109
2006	3	28	51	79	35.44%	50	4	17	37	54	31.48%	33	8	88	133
2006	4	19	86	105	18.10%	58	5	0	76	76	0.00%	46	8	162	181
2006	5	52	67	119	43.70%	54	8	0	72	72	0.00%	39	5	139	191
2006	6	45	34	79	56.96%	41	5	0	59	59	0.00%	24	10	93	138
2006	7	31	40	71	43.66%	34	9	0	50	50	0.00%	29	4	90	121
2006	8	16	85	101	15.84%	49	5	0	58	58	0.00%	26	8	143	159
2006	9	19	60	79	24.05%	39	6	0	53	53	0.00%	33	4	113	132
2006	10	53	42	95	55.79%	51	6	0	54	54	0.00%	28	8	96	149
2006	11	56	35	91	61.54%	47	5	1	36	37	2.70%	22	3	71	128
2006	12	34	18	52	65.38%	34	4	0	54	54	0.00%	29	6	72	106
2007	1	59	29	88	67.05%	44	7	0	55	55	0.00%	31	7	84	143
2007	2	17	31	48	35.42%	33	3	0	39	39	0.00%	21	4	70	87
2007	3	75	83	158	47.47%	76	15	0	78	78	0.00%	38	8	161	236
2007	4	36	41	77	46.75%	45	5	0	58	58	0.00%	31	4	99	135
2007	5	70	46	116	60.34%	64	5	0	95	95	0.00%	49	7	141	211
2007	6	62	30	92	67.39%	47	6	0	51	51	0.00%	25	7	81	143
2007	7	47	20	67	70.15%	33	6	0	39	39	0.00%	20	4	59	106
2007	8	37	25	62	59.68%	31	6	1	55	56	1.79%	32	5	80	118
2007	9	20	75	95	21.05%	41	8	0	27	27	0.00%	16	5	102	122
2007	10	57	65	122	46.72%	73	5	1	56	57	1.75%	36	5	121	179
2007	11	74	21	95	77.89%	60	4	0	34	34	0.00%	24	5	55	129
2007	12	37	22	59	62.71%	38	6	0	61	61	0.00%	38	4	83	120
2008	1	0	75	75	0.00%	34	8	0	48	48	0.00%	24	4	123	123
2008	2	18	71	89	20.22%	46	8	0	51	51	0.00%	24	8	122	140
2008	3	37	65	102	36.27%	55	6	0	40	40	0.00%	34	2	105	142
2008	4	41	65	106	38.68%	60	5	0	59	59	0.00%	33	6	124	165
2008	5	67	39	106	63.21%	63	4	0	40	40	0.00%	20	5	79	146
2008	6	40	21	61	65.57%	34	5	0	35	35	0.00%	19	5	56	96
2008	7	42	17	59	71.19%	29	7	0	17	17	0.00%	12	3	34	76
2008	8	41	19	60	68.33%	35	5	0	29	29	0.00%	17	6	48	89
2008	9	25	44	69	36.23%	39	4	0	55	55	0.00%	21	11	99	124
2008	10	35	33	68	51.47%	38	5	0	27	27	0.00%	19	3	60	95
2008	11	13	9	22	59.09%	13	5	0	13	13	0.00%	9	4	22	35
2008	12	16	34	50	32.00%	35	4	0	11	11	0.00%	8	3	45	61
2009	1	2	26	28	7.14%	16	4	0	19	19	0.00%	9	3	45	47
2009	2	0	34	34	0.00%	18	4	0	18	18	0.00%	11	6	52	52
2009	3	0	41	41	0.00%	23	5	0	25	25	0.00%	11	9	66	66
2009	4	0	59	59	0.00%	37	5	0	27	27	0.00%	20	3	86	86
2009	5	8	35	43	18.60%	31	4	0	27	27	0.00%	15	8	62	70
2009	6	30	28	58	51.72%	28	5	0	25	25	0.00%	16	3	53	83
2009	7	14	22	36	38.89%	22	3	0	28	28	0.00%	16	6	50	64
2009	8	16	10	26	61.54%	20	2	0	13	13	0.00%	10	2	23	39
2009	9	11	22	33	33.33%	21	3	0	20	20	0.00%	14	4	42	53
2009	10	44	45	89	49.44%	44	6	0	18	18	0.00%	10	3	63	107
2009	11	30	19	49	61.22%	33	3	0	34	34	0.00%	21	4	53	83
2009	12	11	23	34	32.35%	20	5	0	22	22	0.00%	15	3	45	56
2010	1	36	26	62	58.06%	35	6	0	16	16	0.00%	9	3	42	78
2010	2	23	16	39	58.97%	24	3	0	26	26	0.00%	16	2	42	65
2010	3	38	71	109	34.86%	65	6	0	40	40	0.00%	22	6	111	149
2010	4	63	38	101	62.38%	65	5	0	54	54	0.00%	34	6	92	155
2010	5	72	30	102	70.59%	60	6	0	40	40	0.00%	29	4	70	142
2010	6	10	28	38	26.32%	27	2	0	10	10	0.00%	9	2	38	48
2010	7	8	19	27	29.63%	17	4	0	30	30	0.00%	13	5	49	57
2010	8	16	29	45	35.56%	24	4	0	17	17	0.00%	11	3	46	62
2010	9	0	56	56	0.00%	31	4	0	22	22	0.00%	11	4	78	78
2010	10	1	60	61	1.64%	40	5	0	19	19	0.00%	15	4	79	80
2010	11	0	59	59	0.00%	44	3	5	26	31	16.13%	20	3	85	90
2010	12	8	12	20	40.00%	18	2	3	30	33	9.09%	20	5	42	53
2011	1	5	30	35	14.29%	25	3	0	9	9	0.00%	6	4	39	44
2011	2	1	21	22	4.55%	18	2	0	22	22	0.00%	15	3	43	44
2011	3	1	42	43	2.33%	31	3	0	19	19	0.00%	10	7	61	62

This chart is a summary of frequency-related statistics gathered since the start of the Field Trial. Of particular interest is the drop in operation outside of the FTL bounds, trending lower in the latter part of 2008 with November 2008 having the least number of clock-minutes of operation outside the FTL bounds, followed by August 2009, over the dataset.

Frequency Statistics

Eastern Interconnection

Year	Month	Total Minutes FTL_Low at 59.98 Hz SF	Total Minutes FTL_Low at 60 Hz SF	Year	Month	Total Minutes FTL_Low at 59.98 Hz SF	Total Minutes FTL_Low at 60 Hz SF	Total FTL_Low Minutes	Percentage Low During TEC	FTL_Low Events	FTL_Low Max Duration	L_High Max uration	Total FTL_Low and FTL_High Minutes at 60 Hz SF	Total FTL_Low and FTL_High Minutes
2005	7	28	30									3	46	74
2005	8	47	91									5	126	173
2005	9	32	39									7	78	110
2005	10	42	48									5	81	123
2005	11	65	43	2008	1	0	75	75	0.00%	34	8	7	78	143
2005	12	37	38	2008	2	18	71	89	20.22%	46	8	3	63	100
2006	1	42	33	2008	3	37	65	102	36.27%	55	6	5	94	136
2006	2	0	64	2008	4	41	65	106	38.68%	60	5	4	107	109
2006	3	28	57	2008	5	67	39	106	63.21%	63	4	8	88	133
2006	4	19	88	2008	6	40	21	61	65.57%	34	5	8	162	181
2006	5	52	67	2008	7	42	17	59	71.19%	29	7	5	139	191
2006	6	45	34	2008	8	41	19	60	68.33%	35	5	10	93	138
2006	7	31	40	2008	9	25	44	69	36.23%	39	4	4	90	121
2006	8	16	84	2008	10	35	33	68	51.47%	38	5	8	143	169
2006	9	19	60	2008	11	13	9	22	59.09%	13	5	4	113	132
2006	10	53	42	2008	12	16	34	50	32.00%	35	4	8	96	149
2006	11	56	34	2009	1	2	26	28	7.14%	16	4	7	71	128
2006	12	34	18	2009	2	0	34	34	0.00%	18	4	6	72	106
2007	1	59	29	2009	3	0	41	41	0.00%	23	5	7	84	143
2007	2	17	31	2009	4	0	59	59	0.00%	37	5	4	70	87
2007	3	75	83	2009	5	8	35	43	18.60%	31	4	8	161	236
2007	4	36	41	2009	6	30	28	58	51.72%	28	5	4	99	135
2007	5	70	48	2009	7	14	22	36	38.89%	22	3	7	141	211
2007	6	62	36	2009	8	16	10	26	61.54%	20	2	7	81	143
2007	7	47	20	2009	9	11	22	33	33.33%	21	3	4	59	106
2007	8	37	29	2009	10	44	45	89	49.44%	44	6	5	80	118
2007	9	20	74	2009	11	30	19	49	61.22%	33	3	5	102	122
2007	10	57	64	2009	12	11	23	34	32.35%	20	5	5	121	179
2007	11	74	21	2010	1	36	26	62	58.06%	35	6	5	55	129
2007	12	37	22	2010	2	23	16	39	58.97%	24	3	4	83	120
2008	1	0	74	2010	3	38	71	109	34.86%	65	6	6	123	123
2008	2	18	77	2010	4	63	38	101	62.38%	65	5	11	122	140
2008	3	37	64	2010	5	72	30	102	70.59%	60	6	3	105	142
2008	4	41	64	2010	6	10	28	38	26.32%	27	2	4	124	165
2008	5	67	39	2010	7	8	19	27	29.63%	17	4	5	79	146
2008	6	40	21	2010	8	16	29	45	35.56%	24	4	6	56	96
2008	7	42	17	2010	9	0	56	56	0.00%	31	4	3	34	76
2008	8	41	19	2010	10	1	60	61	1.64%	40	5	6	48	89
2008	9	25	44	2010	11	0	59	59	0.00%	44	3	3	48	89
2008	10	35	33	2010	12	8	12	20	40.00%	18	2	3	99	124
2008	11	13	36	2011	1	5	30	35	14.29%	25	3	4	60	95
2008	12	16	34	2011	2	1	21	22	4.55%	18	2	4	22	35
2009	1	2	26	2011	3	1	42	43	2.33%	31	3	3	45	61
2009	2	0	34									3	45	47
2009	3	0	41									6	52	52
2009	4	0	54									9	66	66
2009	5	8	36									3	86	86
2009	6	30	28									8	62	70
2009	7	14	22									3	53	83
2009	8	16	10									6	50	64
2009	9	11	22									2	23	39
2009	10	44	49									4	42	53
2009	11	30	19									3	63	107
2009	12	11	23									4	53	83
2010	1	36	26									3	45	56
2010	2	23	16									3	42	78
2010	3	38	71									2	42	65
2010	4	63	38									6	111	149
2010	5	72	30									6	92	155
2010	6	10	28									4	70	142
2010	7	8	19									2	38	48
2010	8	16	29									5	49	57
2010	9	0	59									3	46	62
2010	10	1	60									4	78	78
2010	11	0	59									4	79	80
2010	12	8	12									3	85	90
2011	1	5	30									5	42	53
2011	2	1	21									4	39	44
2011	3	1	42									3	43	44
2011	3	1	42									7	61	62

This chart is a summary of frequency-related statistics gathered since the start of the Field Trial. Of particular interest is the drop in operation outside of the FTL bounds, trending lower in the latter part of 2008 with November 2008 having the least number of clock-minutes of operation outside the FTL bounds, followed by August 2009, over the dataset.

Frequency Statistics

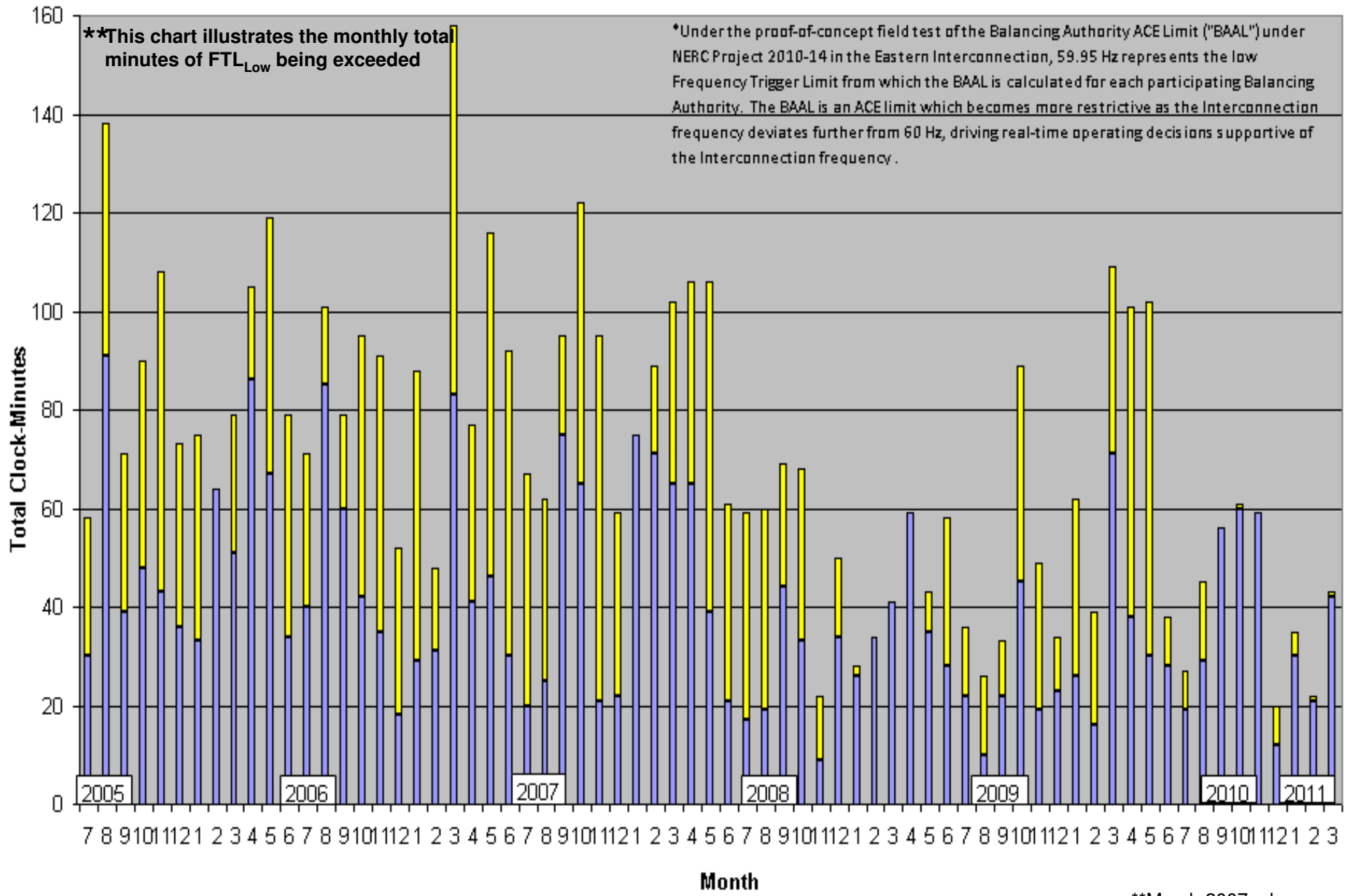
Eastern Interconnection

Year	Month	Total Minutes FTL_Low at 59.98 Hz SF	Year	Month	Total Minutes FTL_High at 60.02 Hz SF	Total Minutes FTL_High at 60 Hz SF	Total FTL_High Minutes	Percentage High During TEC	FTL_High Events	FTL_High Max Duration	Total FTL_Low and FTL_High Minutes at 60 Hz SF	Total FTL_Low and FTL_High Minutes	L_Low_High at 60 SF	Total FTL_Low and FTL_High Minutes
2005	7												46	74
2005	8												126	173
2005	9												78	110
2005	10												81	123
2005	11		2008	1	0	48	48	0.00%	24	4	123	123	78	143
2005	12		2008	2	0	51	51	0.00%	24	8	122	140	63	100
2006	1		2008	3	0	40	40	0.00%	34	2	105	142	94	136
2006	2		2008	4	0	59	59	0.00%	33	6	124	165	107	109
2006	3		2008	5	0	40	40	0.00%	20	5	79	146	88	133
2006	4		2008	6	0	35	35	0.00%	19	5	56	96	162	181
2006	5		2008	7	0	17	17	0.00%	12	3	34	76	139	191
2006	6		2008	8	0	29	29	0.00%	17	6	48	89	93	138
2006	7		2008	9	0	55	55	0.00%	21	11	99	124	90	121
2006	8		2008	10	0	27	27	0.00%	19	3	60	95	143	159
2006	9		2008	11	0	13	13	0.00%	9	4	22	35	113	132
2006	10		2008	12	0	11	11	0.00%	8	3	45	61	96	149
2006	11		2009	1	0	19	19	0.00%	9	3	45	47	71	128
2006	12		2009	2	0	18	18	0.00%	11	6	52	52	72	106
2007	1		2009	3	0	25	25	0.00%	11	9	66	66	84	143
2007	2		2009	4	0	27	27	0.00%	20	3	86	86	70	87
2007	3		2009	5	0	27	27	0.00%	15	8	62	70	161	236
2007	4		2009	6	0	25	25	0.00%	16	3	53	83	99	135
2007	5		2009	7	0	28	28	0.00%	16	6	50	64	141	211
2007	6		2009	8	0	13	13	0.00%	10	2	23	39	81	143
2007	7		2009	9	0	20	20	0.00%	14	4	42	53	59	106
2007	8		2009	10	0	18	18	0.00%	10	3	63	107	80	118
2007	9		2009	11	0	34	34	0.00%	21	4	53	83	102	122
2007	10		2009	12	0	22	22	0.00%	15	3	45	56	121	179
2007	11		2010	1	0	16	16	0.00%	9	3	42	78	55	129
2007	12		2010	2	0	26	26	0.00%	16	2	42	65	83	120
2008	1		2010	3	0	40	40	0.00%	22	6	111	149	123	123
2008	2		2010	4	0	54	54	0.00%	34	6	92	155	122	140
2008	3		2010	5	0	40	40	0.00%	29	4	70	142	105	142
2008	4		2010	6	0	10	10	0.00%	9	2	38	48	124	165
2008	5		2010	7	0	30	30	0.00%	13	5	49	57	79	146
2008	6		2010	8	0	17	17	0.00%	11	3	46	62	56	96
2008	7		2010	9	0	22	22	0.00%	11	4	78	78	34	76
2008	8		2010	10	3	30	33	9.09%	20	5	42	53	48	89
2008	9		2010	11	5	26	31	16.13%	20	3	85	90	99	124
2008	10		2010	12	0	19	19	0.00%	15	4	79	80	60	95
2008	11		2011	1	0	9	9	0.00%	6	4	39	44	22	35
2008	12		2011	2	0	22	22	0.00%	15	3	43	44	45	61
2009	1		2011	3	0	19	19	0.00%	10	7	61	62	45	47
2009	2												52	52
2009	3												66	66
2009	4												86	86
2009	5												62	70
2009	6												53	83
2009	7												50	64
2009	8												23	39
2009	9												42	53
2009	10												63	107
2009	11												53	83
2009	12												45	56
2010	1												42	78
2010	2												42	65
2010	3												111	149
2010	4												92	155
2010	5												70	142
2010	6												38	48
2010	7												49	57
2010	8												46	62
2010	9												78	78
2010	10												79	80
2010	11												85	90
2010	12												42	53
2011	1												39	44
2011	2												43	44
2011	3												61	62

This chart is a summary of frequency-related statistics gathered since the start of the Field Trial. Of particular interest is the drop in operation outside of the FTL bounds, trending lower in the latter part of 2008 with November 2008 having the least number of clock-minutes of operation outside the FTL bounds, followed by August 2009, over the dataset.

Total Clock-Minutes of Frequency below 59.95 Hz*

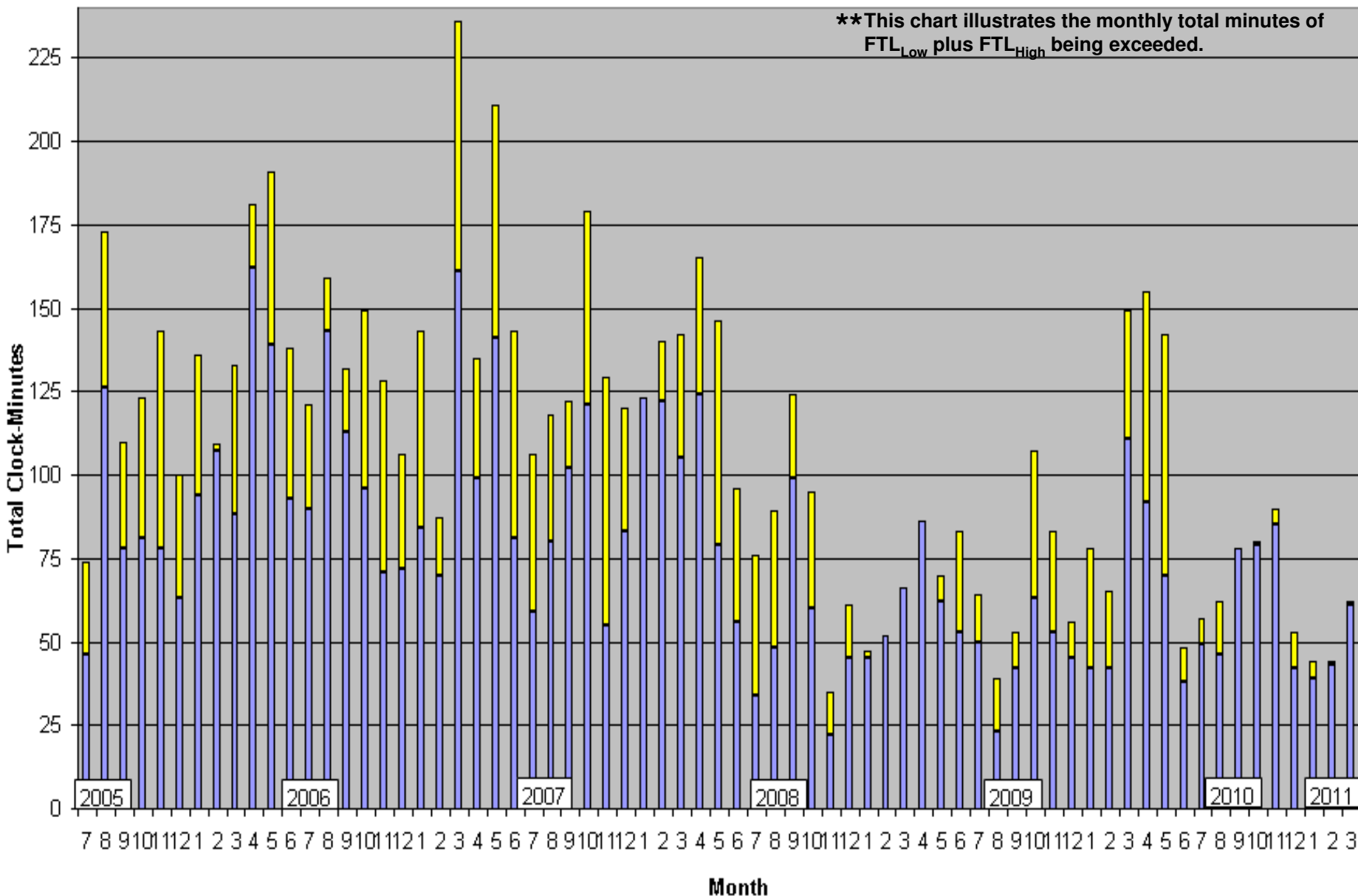
Eastern Interconnection



■ Total Minutes at 60 Hz ■ Addition Minutes During Time-Error Corrections

**March 2007- change to the new Daylight Saving Time.

Total Clock-Minutes less than 59.95 Hz or greater than 60.05 Hz Eastern Interconnection



■ Total Minutes at 60 Hz
 ■ Addition Minutes During Time-Error Corrections

**March 2007- change to the new Daylight Saving Time.

Date	Time	TimeZone	FreqError	ActualFreq	SchedFreq	MinCtLow	MinCtHigh	ACPS1
03/06/11	22:42	CST	0.0181	60.0181	60	0	11	-1448.06
03/06/11	22:43	CST	0.0126	60.0126	60	0	12	-938.32
03/06/11	22:44	CST	0.0264	60.0264	60	0	13	-2363.63
03/06/11	22:45	CST	0.0178	60.0178	60	0	14	-1558.00
03/06/11	22:46	CST	0.01	60.01	60	0	15	-778.16
03/06/11	22:47	CST	0.0127	60.0127	60	0	16	-1072.92
03/06/11	22:48	CST	0.0175	60.0175	60	0	17	-1600.18

All durations of the BAAL being exceeded for more than 15 consecutive clock-minutes noted on left.

Periods of the FTL being exceeded for 3 consecutive clock minutes or more:

PrevailingTime	PTimeZone	FreqError	ActualFreq	SchedFreq
3/14/2011 18:00	EDT	0.0518	60.0518	60
3/14/2011 18:01	EDT	0.0557	60.0557	60
3/14/2011 18:02	EDT	0.0543	60.0543	60
3/14/2011 18:03	EDT	0.0513	60.0513	60
3/14/2011 18:04	EDT	0.0577	60.0577	60
3/14/2011 18:05	EDT	0.0589	60.0589	60
3/14/2011 18:06	EDT	0.0505	60.0505	60
3/17/2011 7:02	EDT	-0.05	59.95	60
3/17/2011 7:03	EDT	-0.0514	59.9486	60
3/17/2011 7:04	EDT	-0.0573	59.9427	60
3/21/2011 18:02	EDT	0.0562	60.0562	60
3/21/2011 18:03	EDT	0.0561	60.0561	60
3/21/2011 18:04	EDT	0.0514	60.0514	60
3/30/2011 15:10	EDT	-0.0525	59.9475	60
3/30/2011 15:11	EDT	-0.0571	59.9429	60
3/30/2011 15:12	EDT	-0.0507	59.9493	60

Date	Time	TimeZone	FreqError	ActualFreq	SchedFreq	MinCtLow	MinCtHigh	ACPS1
03/06/11	22:42	C						
03/06/11	22:43	C						
03/06/11	22:44	C						
03/06/11	22:45	C						
03/06/11	22:46	C						
03/06/11	22:47	C						
03/06/11	22:48	C						

All durations of the BAAL being

secutive

Dates in this presentation:

Clock-minute Frequency greater than FTL_{High} on March 14, 2011, ending 18:06 EDT: 7 consecutive clock-minutes.

Clock-minute Frequency less than FTL_{Low} on March 17, 2011, ending 00:05 EDT: 3 consecutive clock-minutes.

Clock-minute Frequency greater than FTL_{High} on March 21, 2011, ending 18:04 EDT: 3 consecutive clock-minutes.

Clock-minute Frequency less than FTL_{Low} on March 30, 2011, ending 15:12 EDT: 3 consecutive clock-minutes.

ded for
more:

Clock-minute ACE greater than the $BAAL_{High}$ on March 6, 2011, ending 22:48 EST: 17 consecutive clock-minutes.

Under the draft requirement, a proposed $BAAL_{Low}$ violation would occur when the ACE is lower than $BAAL_{Low}$ for more than 30 consecutive clock-minutes and a proposed $BAAL_{High}$ violation would occur when the ACE is greater than $BAAL_{High}$ for more than 30 consecutive clock-minutes.

Under prior work on draft BAL-008, a proposed FTL_{Low} violation would occur when the Frequency is lower than FTL_{Low} for more than 30 consecutive clock-minutes and a proposed FTL_{High} violation would occur when the Frequency is greater than FTL_{High} for more than 30 consecutive clock-minutes.

	SchedFreq
8	60
7	60
3	60
3	60
7	60
9	60
5	60
5	60
6	60
7	60
2	60
1	60
4	60

3/30/2011 15:10	EDT	-0.0525	59.9475	60
3/30/2011 15:11	EDT	-0.0571	59.9429	60
3/30/2011 15:12	EDT	-0.0507	59.9493	60

03/14/2011 ending 18:06 EDT

7-minute duration above FTL_{High}

EI Clock-Minute Average Frequency

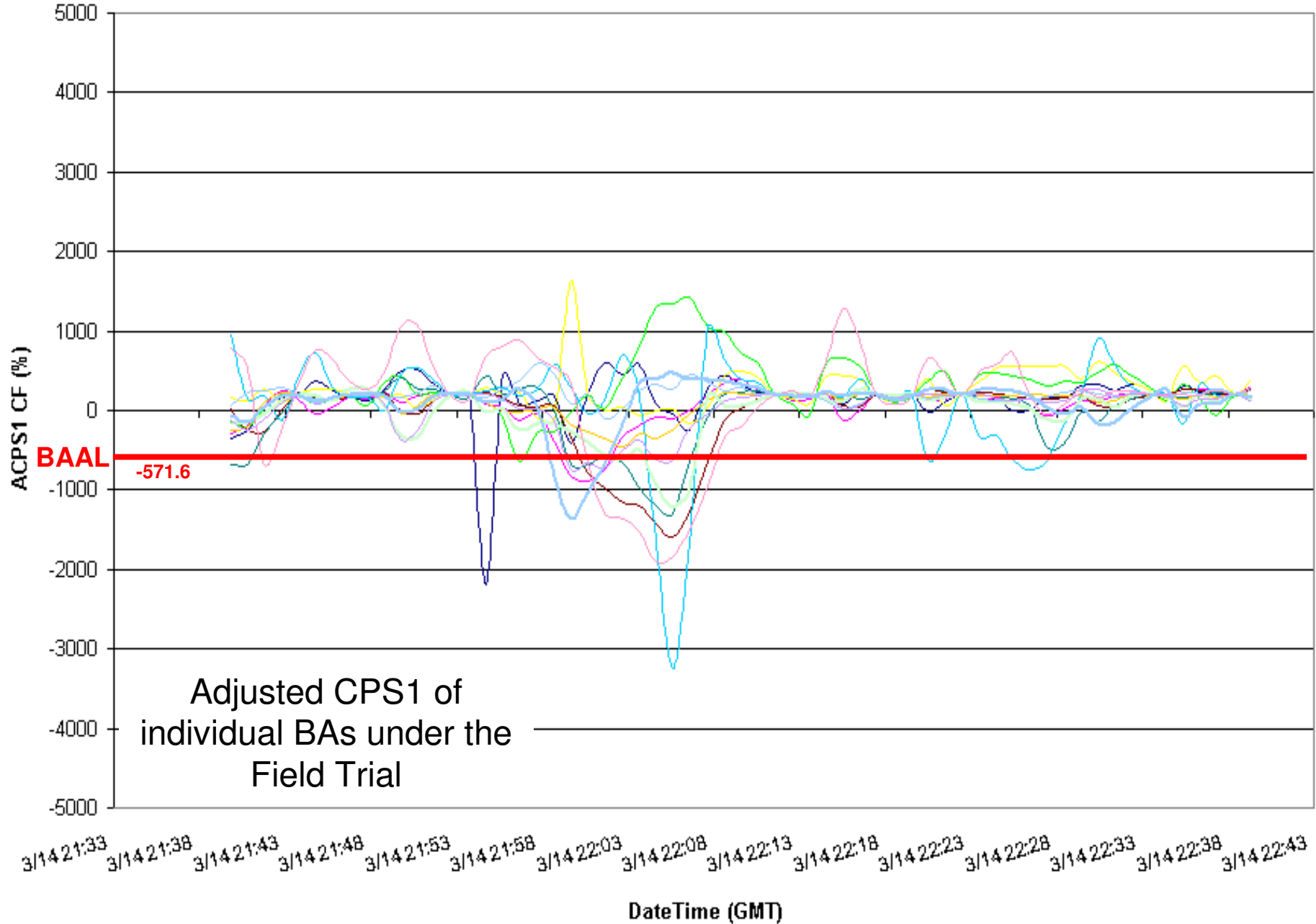


Clock-minute Actual Frequency of Participants

03/14/2011 ending 18:06 EDT

7-minute duration above FTL_{High}

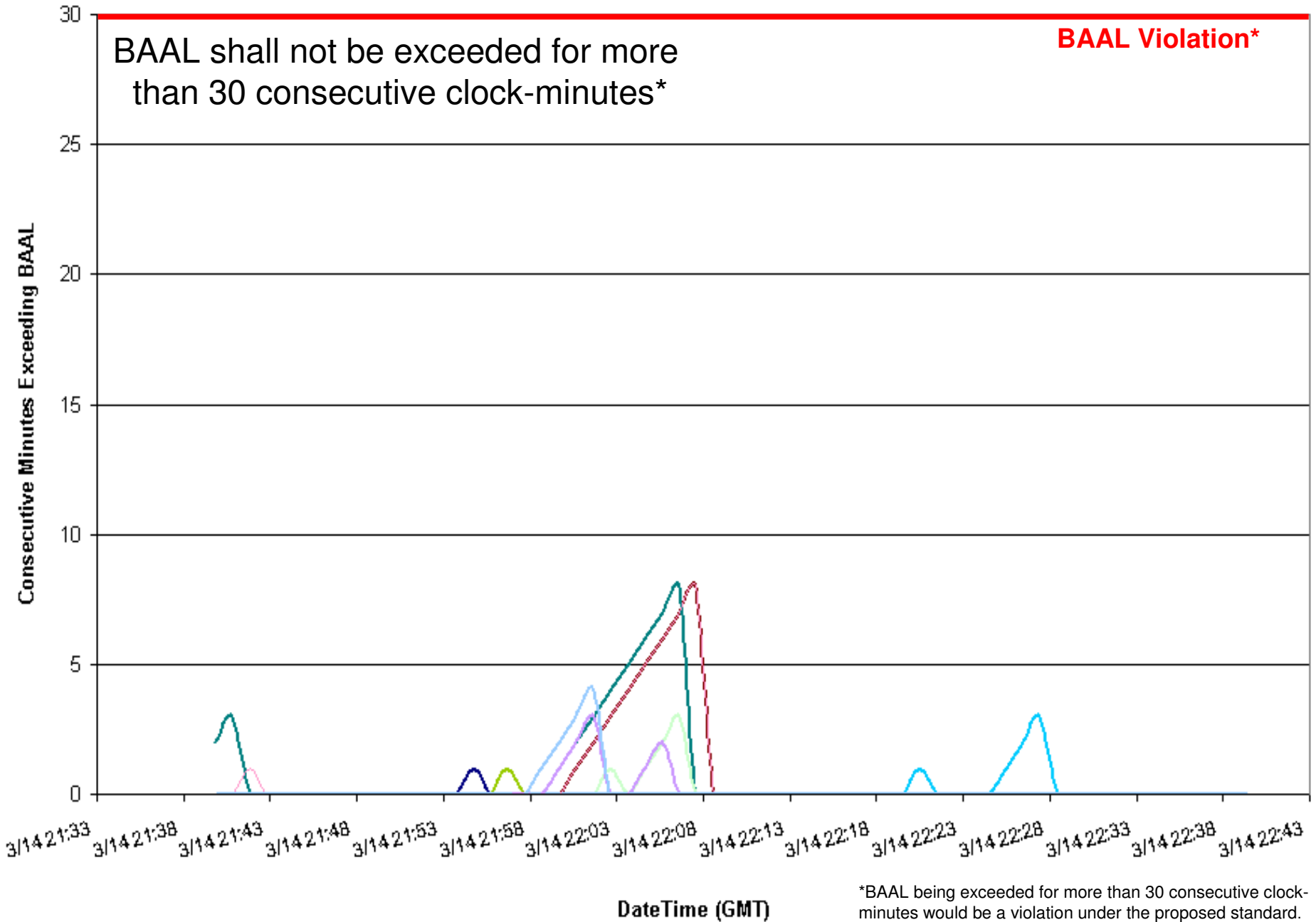
ACPS1 Clock-Minute Averages



03/14/2011 ending 18:06 EDT

7-minute duration above FTL_{High}

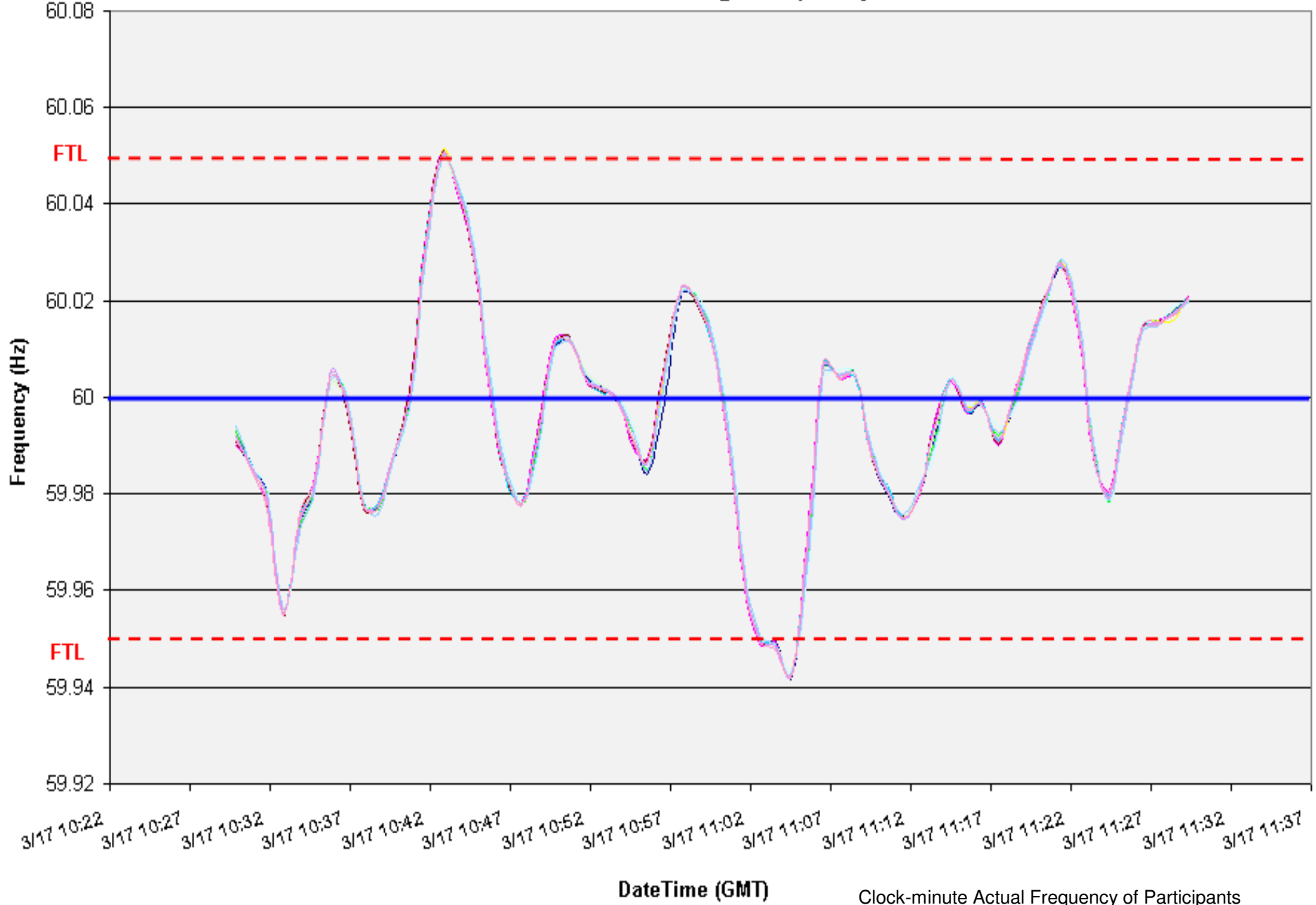
Consecutive Minutes Exceeding BAAL



03/17/2011 ending 07:04 EDT

3-minute duration below FTL_{Low}

EI Clock-Minute Average Frequency

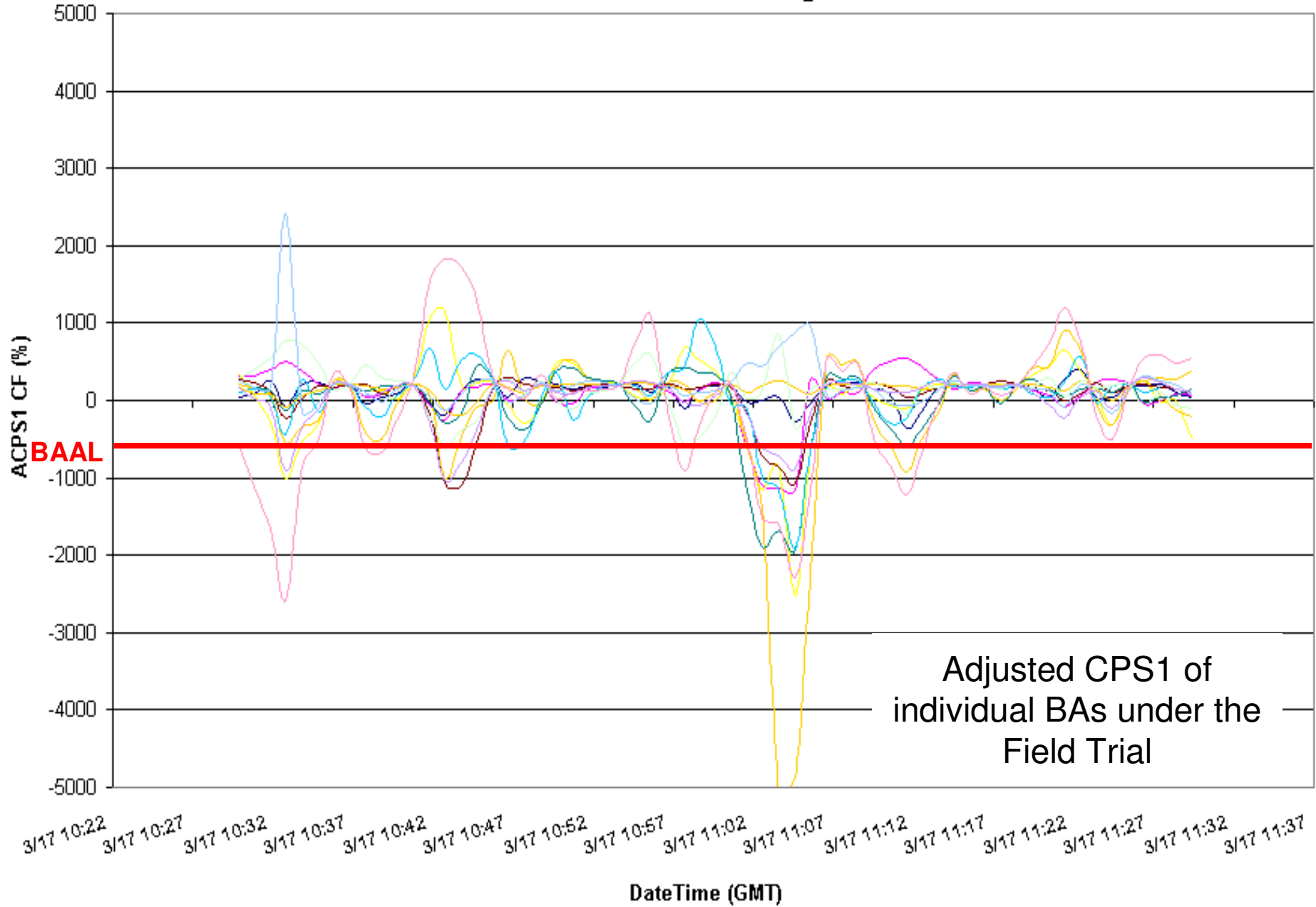


Clock-minute Actual Frequency of Participants

03/17/2011 ending 07:04 EDT

3-minute duration below FTL_{Low}

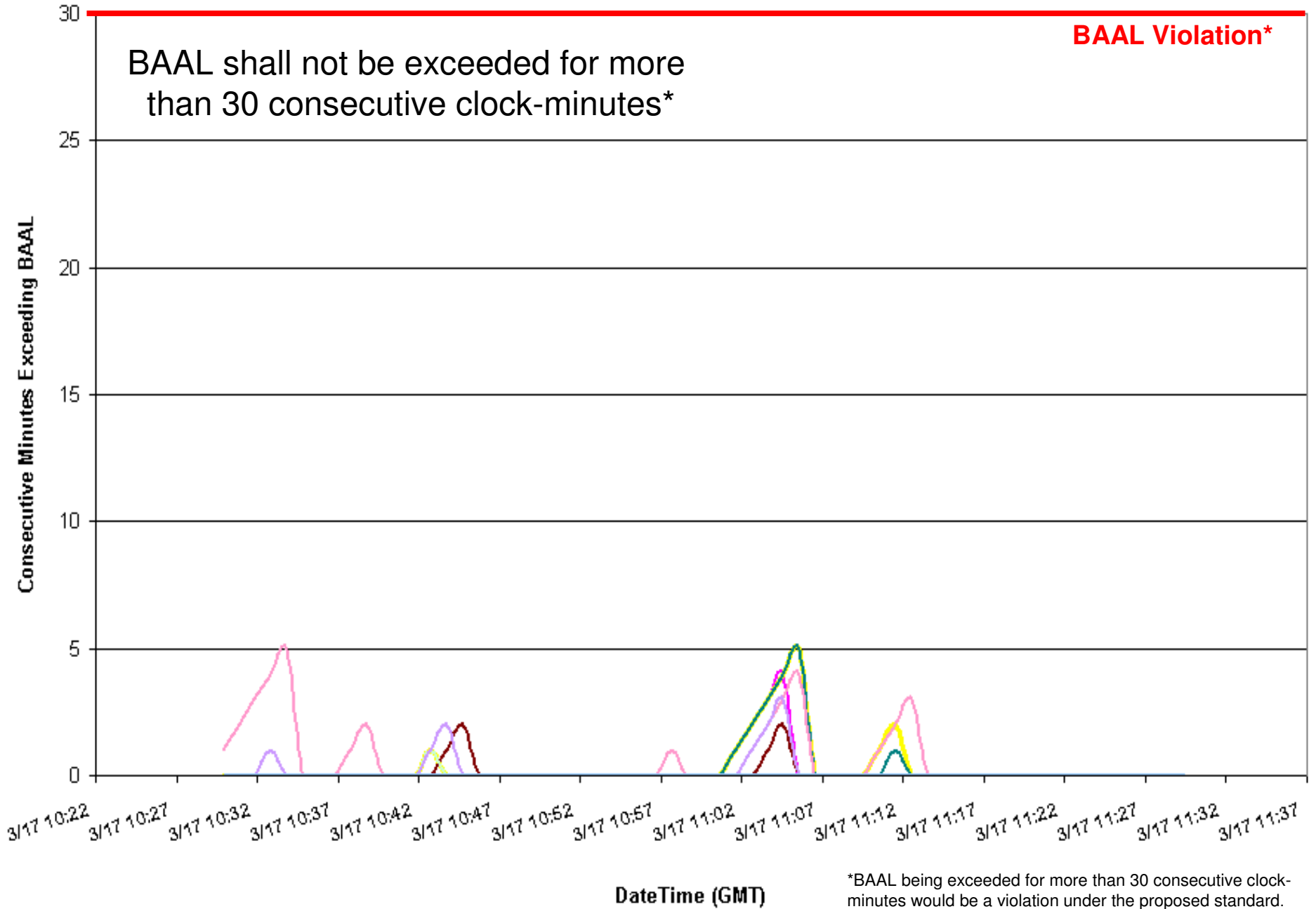
ACPS1 Clock-Minute Averages



03/17/2011 ending 07:04 EDT

3-minute duration below FTL_{Low}

Consecutive Minutes Exceeding BAAL

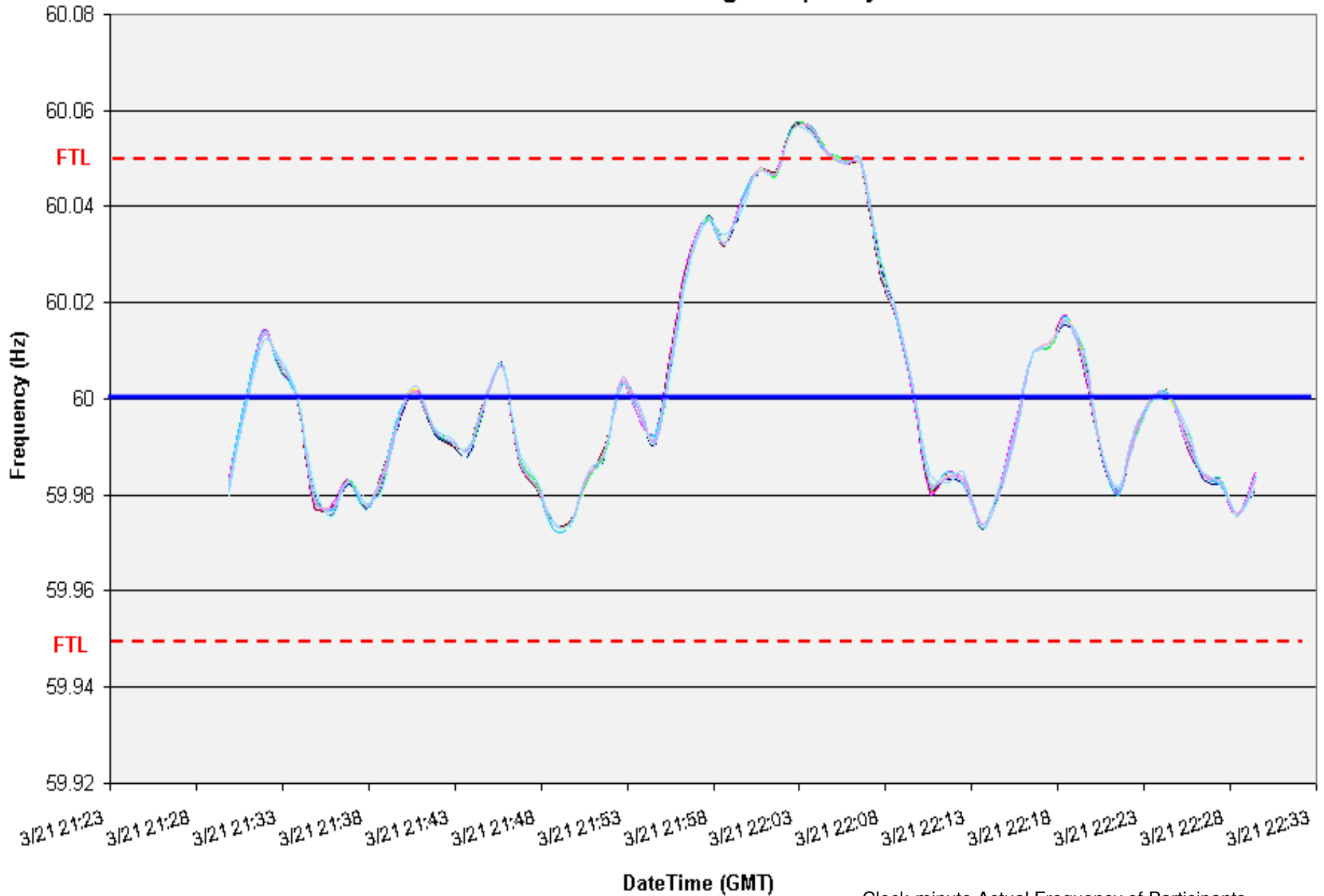


*BAAL being exceeded for more than 30 consecutive clock-minutes would be a violation under the proposed standard.

03/21/2011 ending 18:04 EDT

3-minute duration above FTL_{High}

EI Clock-Minute Average Frequency

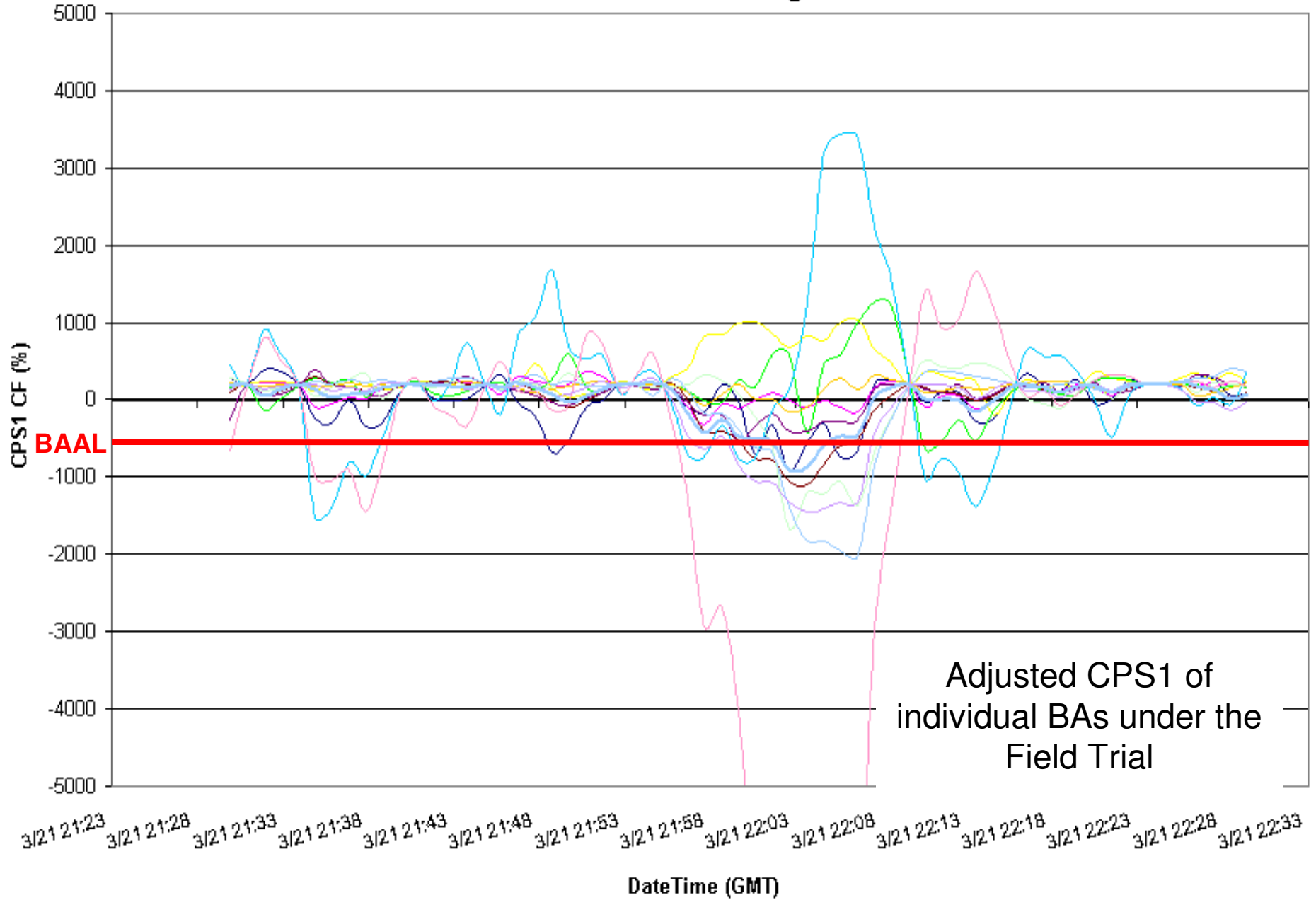


Clock-minute Actual Frequency of Participants

03/21/2011 ending 18:04 EDT

3-minute duration above FTL_{High}

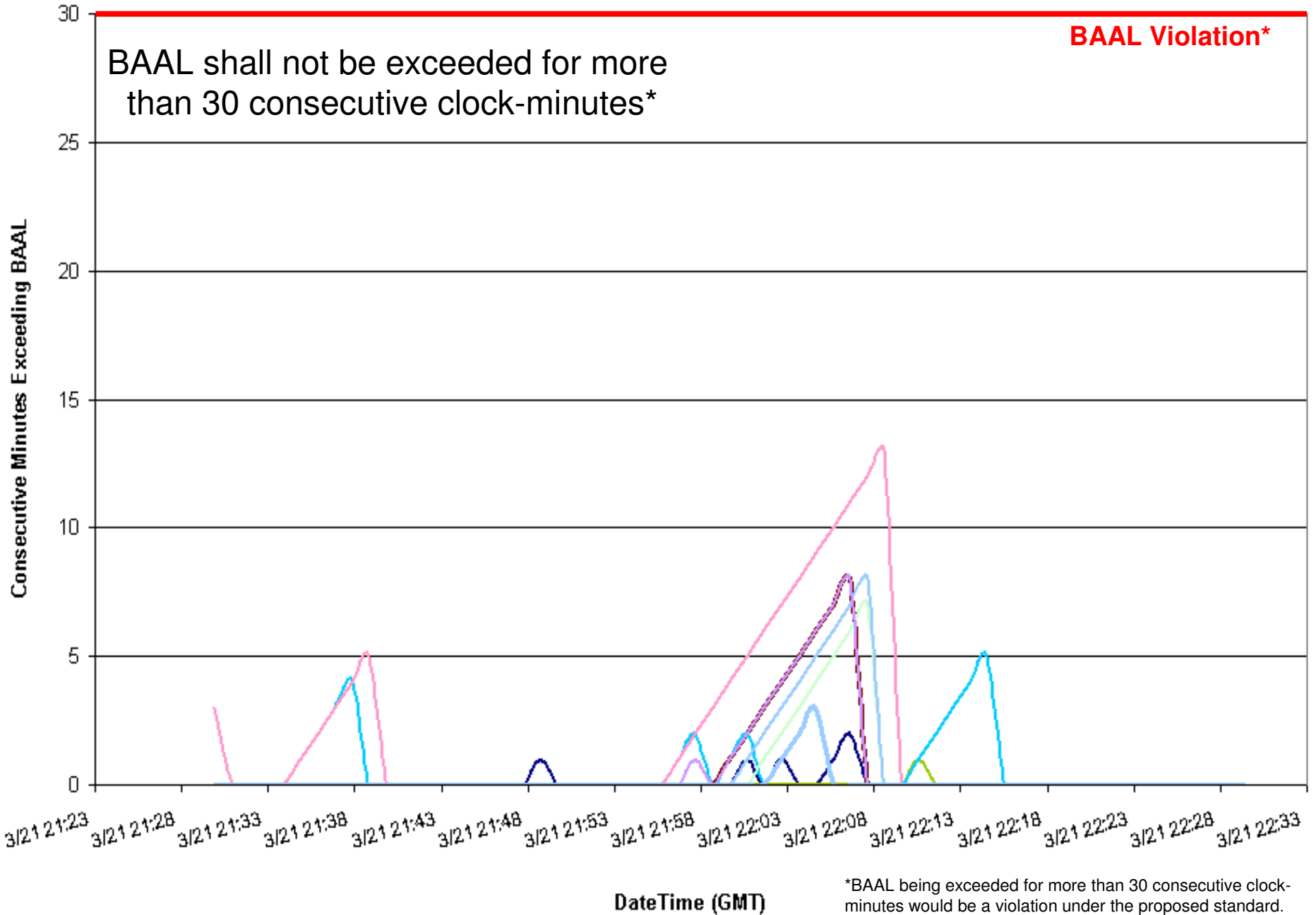
ACPS1 One-Minute Averages



03/21/2011 ending 18:04 EDT

3-minute duration above FTL_{High}

Consecutive Minutes Exceeding BAAL

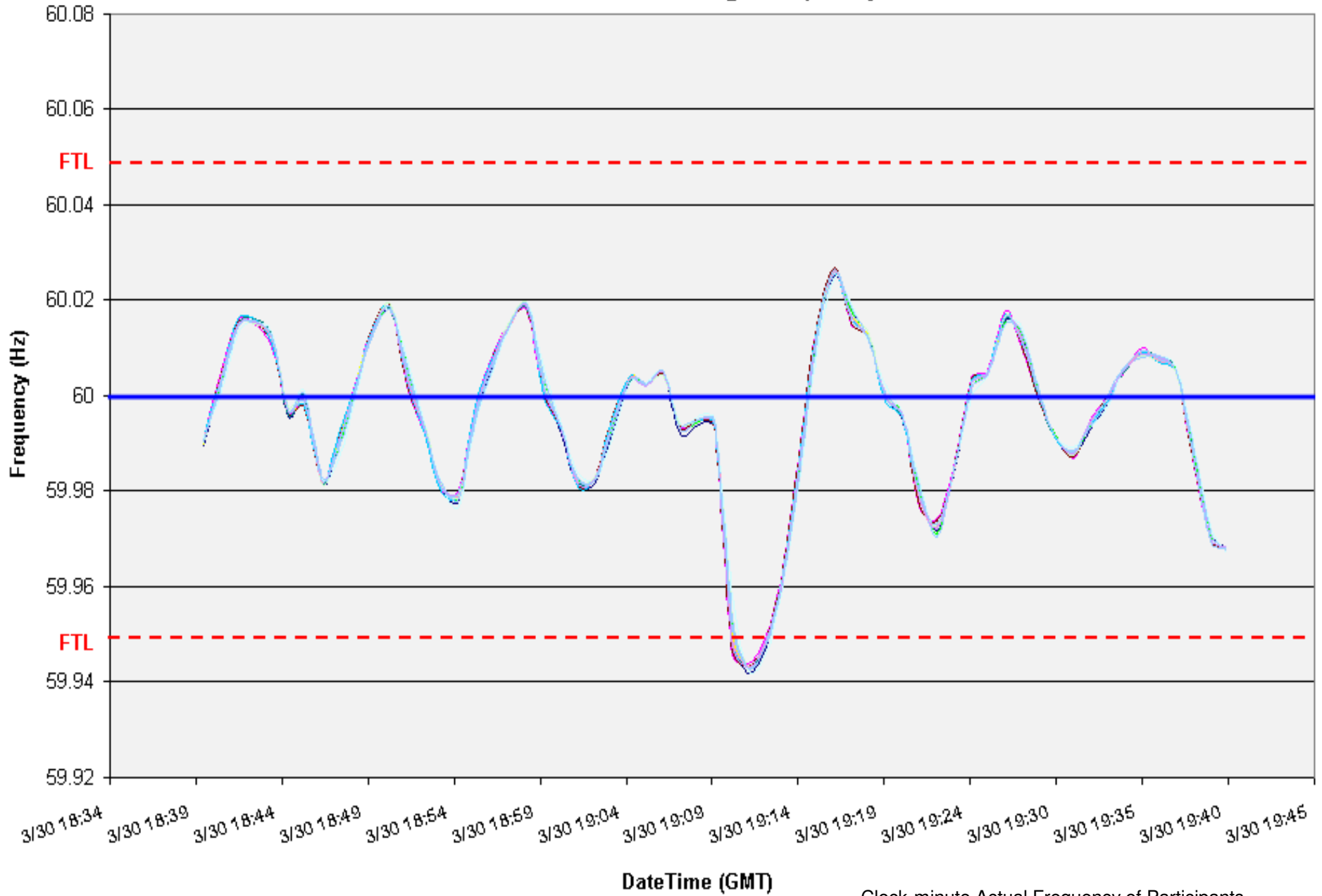


*BAAL being exceeded for more than 30 consecutive clock-minutes would be a violation under the proposed standard.

03/30/2011 ending 15:12 EDT

3-minute duration below FTL_{Low}

EI Clock-Minute Average Frequency

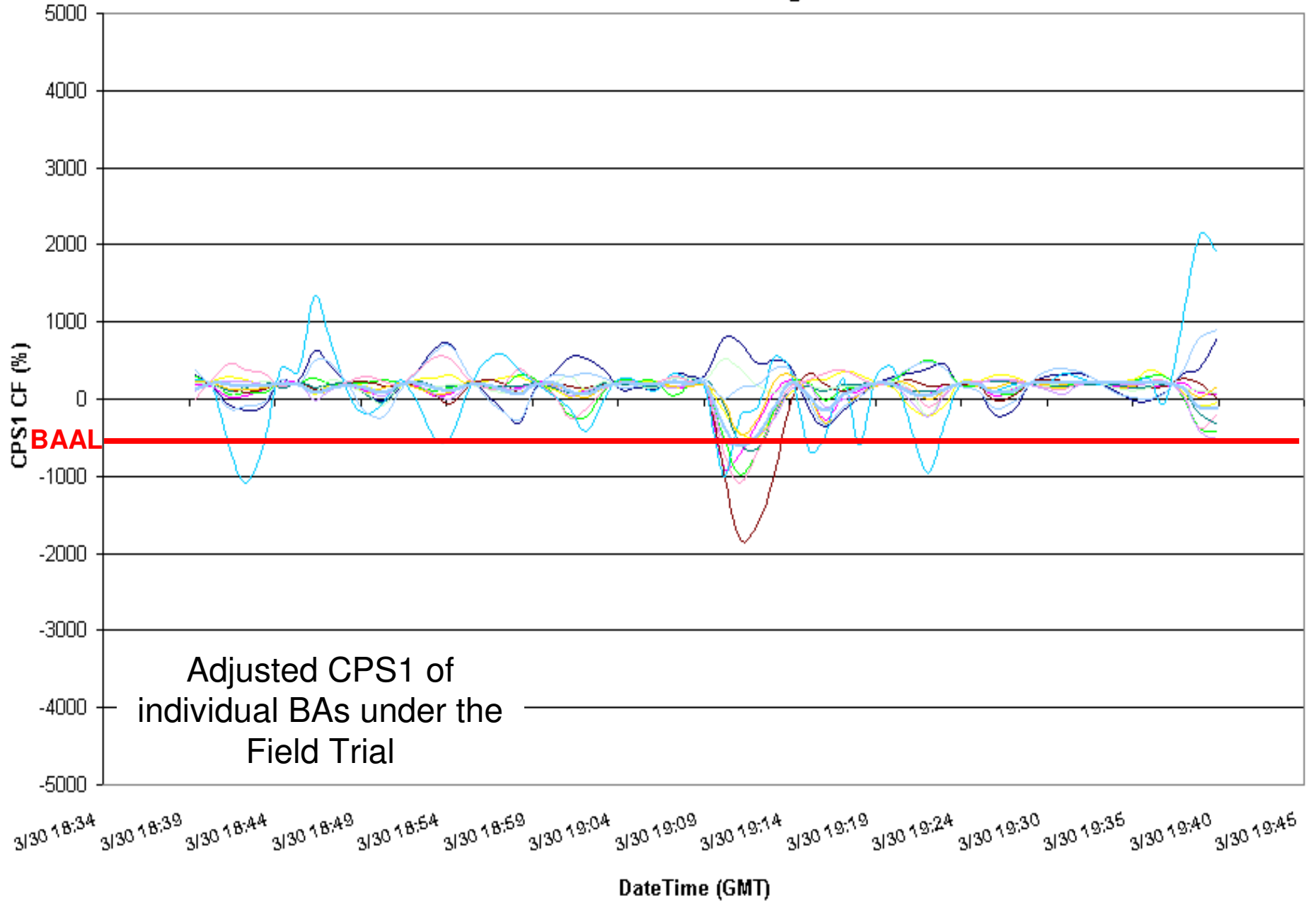


Clock-minute Actual Frequency of Participants

03/30/2011 ending 15:12 EDT

3-minute duration below FTL_{Low}

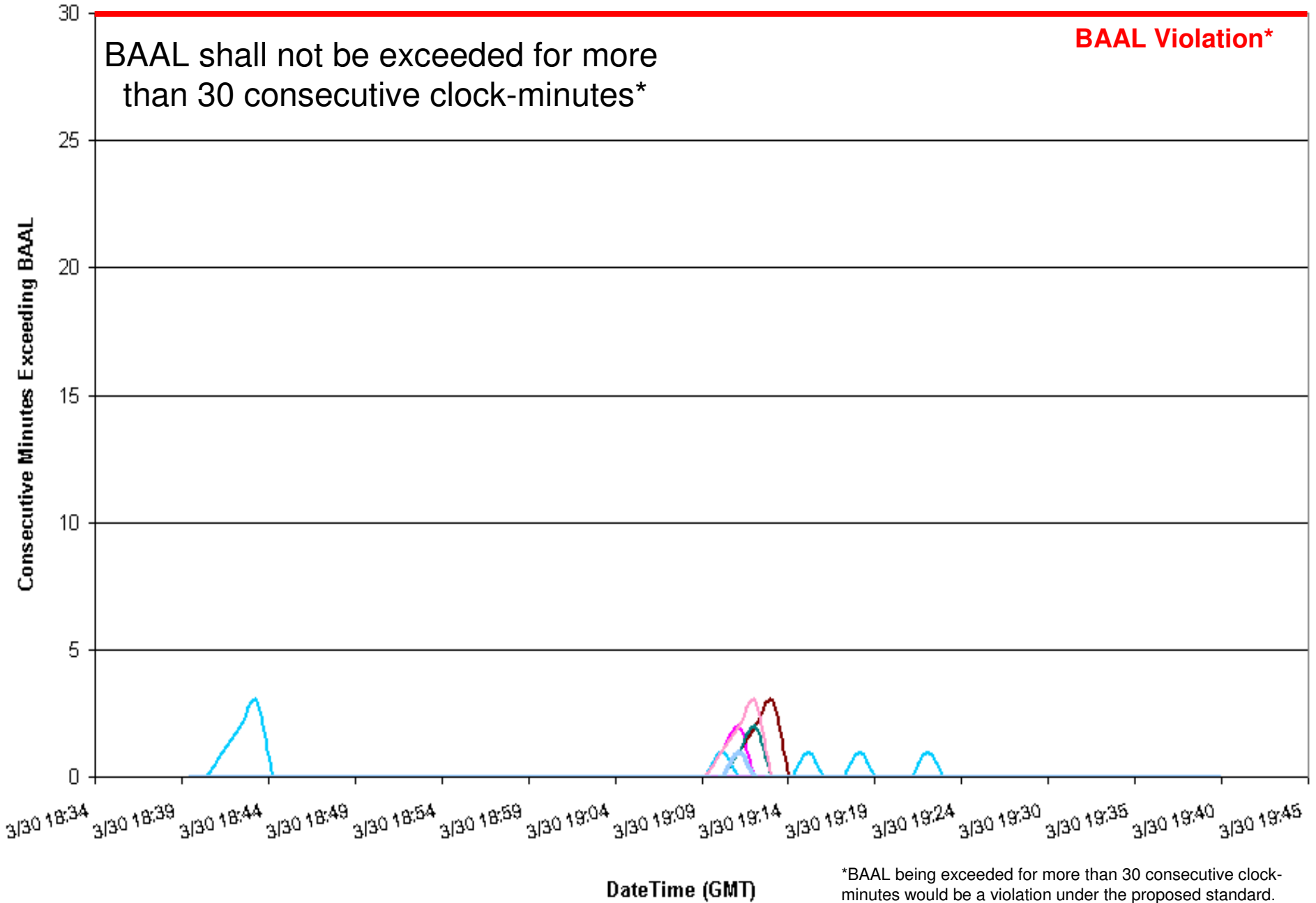
ACPS1 One-Minute Averages



03/30/2011 ending 15:12 EDT

3-minute duration below FTL_{Low}

Consecutive Minutes Exceeding BAAL



03/06/2011 ending 22:48 EDT
17-minute duration above BAAL_{High}

EI Clock-Minute Average Frequency

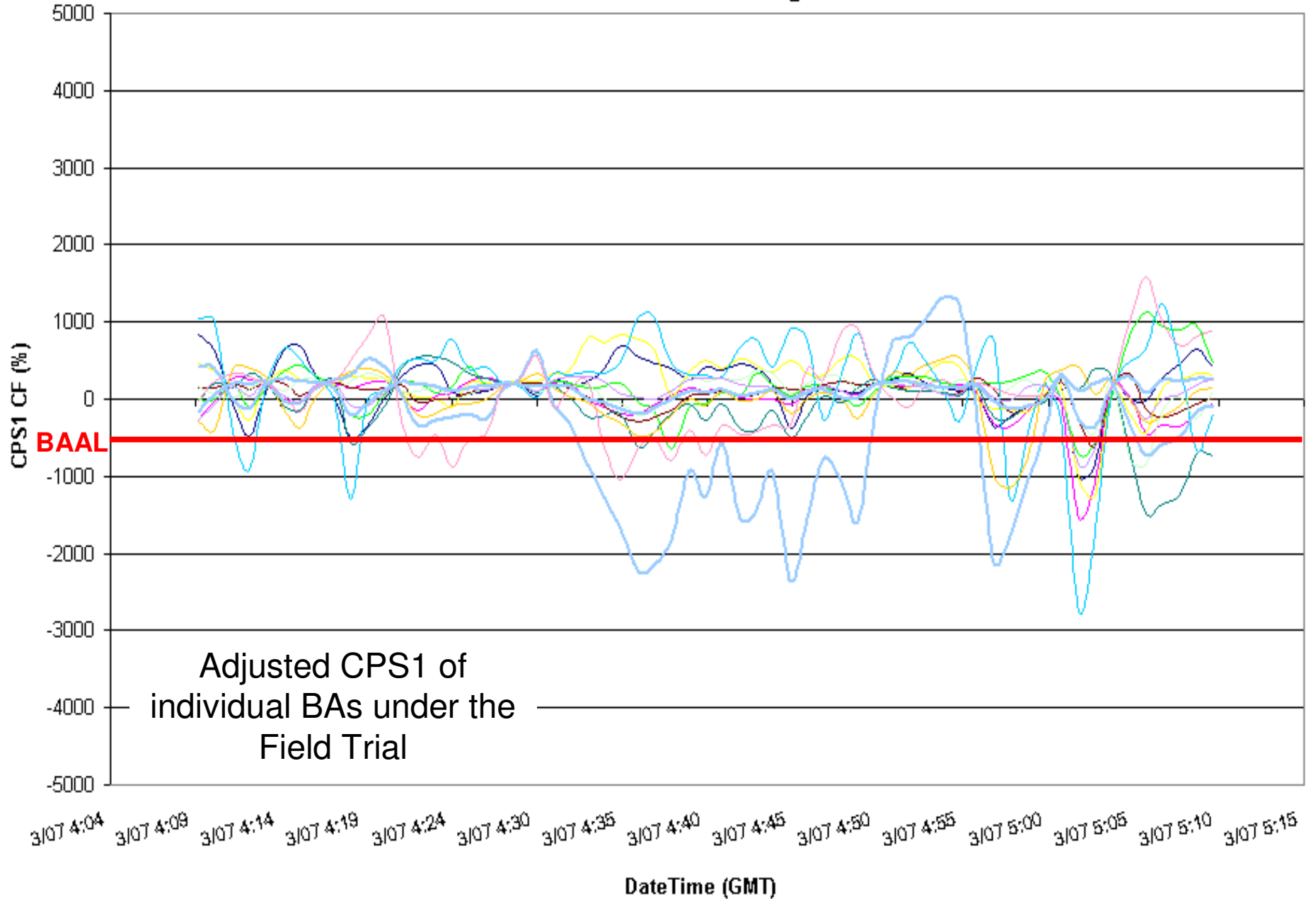


Clock-minute Actual Frequency of Participants

03/06/2011 ending 22:48 EDT

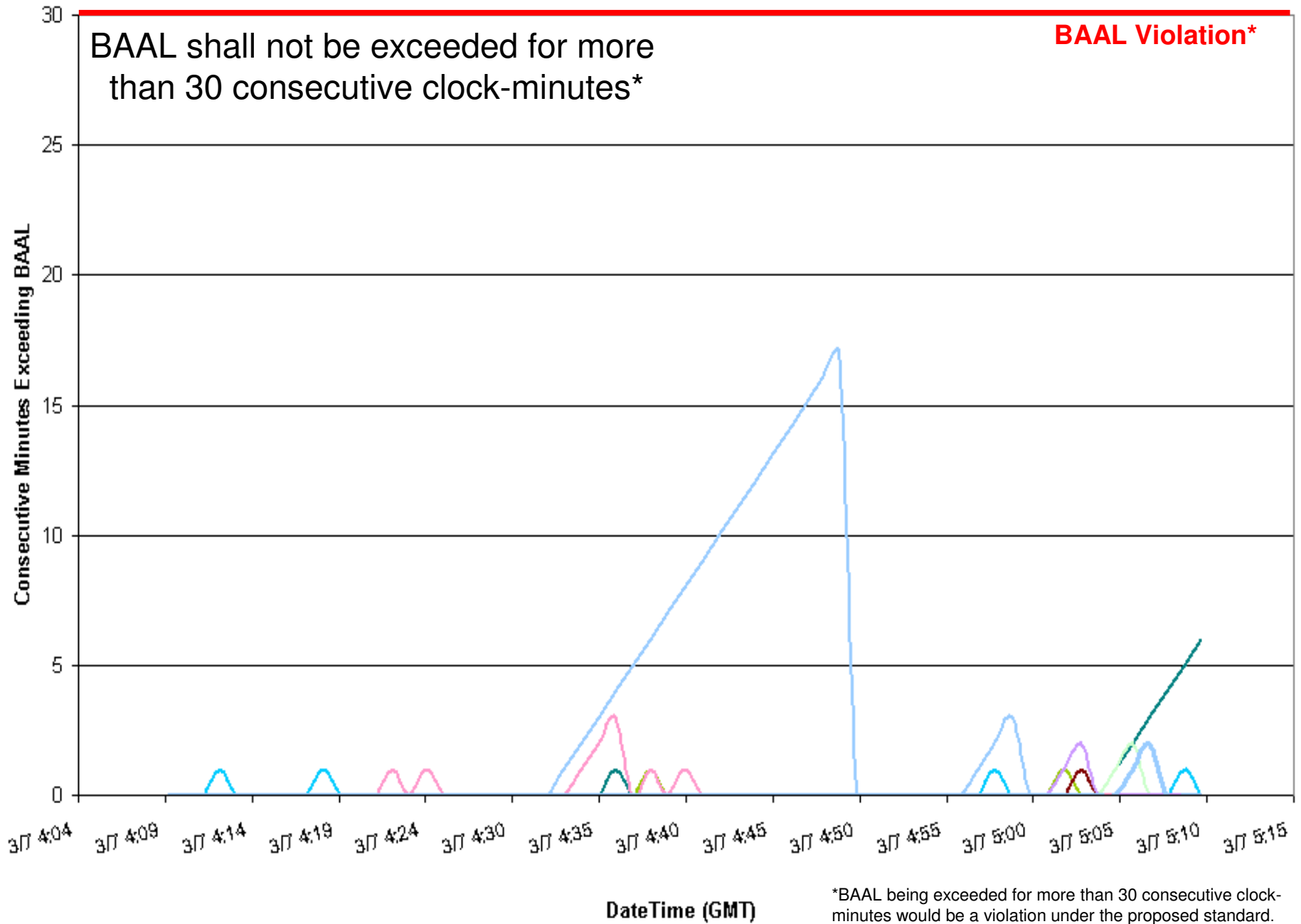
17-minute duration above BAAL_{High}

ACPS1 One-Minute Averages



03/06/2011 ending 22:48 EDT
17-minute duration above BAAL_{High}

Consecutive Minutes Exceeding BAAL



*BAAL being exceeded for more than 30 consecutive clock-minutes would be a violation under the proposed standard.

Balancing Authority ACE Limit Proof-of-Concept Field Trial

Examples of circumstances when BAAL was exceeded and actions taken if appropriate

Clock-minute of ACE exceeding the BAAL (mm/dd/yy hh:mm)	Clock-minute of ACE returning within the BAAL (mm/dd/yy hh:mm)	TimeZone	Total duration of ACE exceeding the BAAL (minutes)	Event associated with a DCS-Reportable Event? (0=No, 1=Yes)	Event associated with a resource loss other than a DCS-Reportable Event? (0=No, 1=Yes)	Brief explanation of circumstances and notable actions taken if applicable
3/21/11 17:59	3/21/11 18:09	CDT	0:11	0	1	BAAL High 1) Loss of 875 MW resulted in a request for contingency reserve assistance, with a native reserve deployment obligation of 549 MW. Due to reserve deployment, units were at top of declared maximums and could not pulse down quickly enough. 2) Lowered the units that were not being re-dispatched..
3/20/11 22:30	3/20/11 22:42	EST	0:13	0	0	BAAL High Large export transaction cut, Electric ARC Furnace shutdown and load decreasing - units having to remove equipment which slowed down their ramp rate
3/19/11 2:44	3/19/11 2:54	EST	0:11	0	0	BAAL-low
3/22/11 17:55	3/22/11 18:06	EST	0:12	0	0	BAAL High A large industrial customer (steel mill) experienced a brief pause in process, causing ACE to exceed BAAL-high. The operator decreased generation to bring ACE within limits.

Balancing Authority ACE Limit Proof-of-Concept Field Trial

Examples of circumstances when BAAL was exceeded and actions taken if appropriate

Clock-minute of ACE exceeding the BAAL (mm/dd/yy hh:mm)	Clock-minute of ACE returning within the BAAL (mm/dd/yy hh:mm)	TimeZone	Total duration of ACE exceeding the BAAL (minutes)	Event associated with a DCS-Reportable Event? (0=No, 1=Yes)	Event associated with a resource loss other than a DCS-Reportable Event? (0=No, 1=Yes)	Brief explanation of circumstances and notable actions taken if applicable
3/6/11 22:32	3/6/11 22:48	CST	0:17	0	0	BAAL High High frequency and high ACE, but large schedule change going out at top of hour. Did not want to make coal units chase the change down and then back up. 2 large units notified of potential need to quickly reduce output if BAAL exceedance continued befyo
3/8/11 20:59	3/8/11 21:13	CST	0:15	0	0	BAAL High
3/16/11 18:36	3/16/11 18:46	CST	0:11	0	0	BAAL Low
3/19/11 22:48	3/19/11 22:59	CST	0:12	0	0	BAAL High
3/11/11 18:38	3/11/11 18:50	EST	0:13	0	0	BAAL Low
3/15/11 6:03	3/15/11 6:13	EST	0:11	0	0	BAAL Low
3/21/11 16:57	3/21/11 17:09	EST	0:13	0	0	BAAL High
3/25/11 19:01	3/25/11 19:14	EST	0:14	0	0	BAAL Low We experienced an extended period of low frequency. Recovery was impacted by a need to increase generation to return ACE to the positive side.

Balancing Authority ACE Limit Proof-of-Concept Field Trial

Discussion

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