

Balancing Authority ACE Limit Proof-of-Concept Field Trial

Eastern Interconnection Update Discussion

August 30, 2010

Starting at 2:30 PM EDT

Doug Hils – Duke Energy

Reliability-Based Control Standard Drafting Team

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		July 2010 Performance under BAL-007	
	Max MinCtLow	Max MinCtHigh	Max MinCtLow	Max MinCtHigh
BA01	26	16	7	10
BA02	17	17	7	12
BA03	19	19	15	5
BA04	28	19	17	12
BA05	10	20	9	14
BA06	16	22	8	11
BA07	15	23	4	9
BA08	20	24	7	9
BA09	28	26	17	13
BA10	21	31	8	11
BA11	14	32	3	6
BA12	29	40	16	18
BA13	28	43	7	10

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

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	Total FTL_Low Minutes	Percentage Low During TEC	FTL_Low Events	FTL_Low Max Duration	Percentage 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	25	53	0.00%	11	3	0.00%	21	9	45	74
2005	8	47	25	72	0.00%	21	9	0.00%	21	9	126	173
2005	9	34	25	59	0.00%	21	7	0.00%	21	9	78	110
2005	10	44	25	69	0.00%	23	9	0.00%	22	7	81	123
2005	11	65	21	86	0.00%	22	7	0.00%	22	7	78	143
2005	12	31	21	52	0.00%	19	3	0.00%	19	3	63	100
2006	1	47	75	122	0.00%	27	9	0.00%	27	9	94	138
2006	2	70	65	135	4.44%	24	4	0.00%	24	4	107	169
2006	3	28	21	49	31.48%	33	8	0.00%	33	8	66	133
2006	4	19	21	40	0.00%	45	8	0.00%	45	8	152	181
2006	5	52	22	74	0.00%	39	9	0.00%	39	9	139	191
2006	6	48	22	70	0.00%	24	10	0.00%	24	10	93	138
2006	7	31	75	106	0.00%	29	4	0.00%	29	4	90	121
2006	8	15	75	90	0.00%	25	8	0.00%	25	8	143	159
2006	9	19	71	90	0.00%	33	4	0.00%	33	4	113	132
2006	10	59	65	124	0.00%	28	9	0.00%	28	9	95	149
2006	11	58	65	123	2.70%	22	3	0.00%	22	3	71	128
2006	12	34	65	99	0.00%	29	9	0.00%	29	9	72	108
2007	1	59	39	98	0.00%	31	7	0.00%	31	7	84	143
2007	2	11	21	32	0.00%	21	4	0.00%	21	4	70	87
2007	3	75	21	96	0.00%	38	8	0.00%	38	8	181	236
2007	4	35	17	52	0.00%	31	4	0.00%	31	4	95	138
2007	5	71	19	90	0.00%	49	7	0.00%	49	7	141	211
2007	6	62	19	81	0.00%	25	7	0.00%	25	7	81	143
2007	7	41	44	85	0.00%	20	4	0.00%	20	4	69	108
2007	8	31	44	75	1.75%	32	9	0.00%	32	9	80	118
2007	9	20	33	53	0.00%	15	9	0.00%	15	9	102	122
2007	10	51	9	60	1.75%	36	9	0.00%	36	9	121	179
2007	11	74	9	83	0.00%	24	9	0.00%	24	9	66	129
2007	12	31	34	65	0.00%	38	4	0.00%	38	4	83	120
2008	1	18	26	44	0.00%	24	4	0.00%	24	4	123	123
2008	2	18	26	44	0.00%	24	9	0.00%	24	9	122	140
2008	3	31	34	65	0.00%	34	2	0.00%	34	2	105	142
2008	4	41	34	75	0.00%	33	9	0.00%	33	9	124	169
2008	5	67	41	108	0.00%	20	9	0.00%	20	9	75	148
2008	6	40	59	99	0.00%	19	9	0.00%	19	9	58	98
2008	7	41	59	100	0.00%	12	3	0.00%	12	3	34	75
2008	8	41	35	76	0.00%	17	9	0.00%	17	9	48	89
2008	9	20	28	48	0.00%	21	11	0.00%	21	11	99	124
2008	10	51	28	79	0.00%	19	3	0.00%	19	3	60	98
2008	11	13	22	35	0.00%	9	4	0.00%	9	4	22	35
2008	12	15	34	49	0.00%	8	3	0.00%	8	3	45	61
2009	1	15	10	25	0.00%	9	3	0.00%	9	3	45	47
2009	2	10	22	32	0.00%	11	9	0.00%	11	9	52	62
2009	3	70	22	92	0.00%	11	9	0.00%	11	9	66	66
2009	4	70	45	115	0.00%	20	3	0.00%	20	3	66	66
2009	5	68	19	87	0.00%	15	9	0.00%	15	9	52	70
2009	6	30	19	49	0.00%	15	3	0.00%	15	3	53	63
2009	7	14	23	37	0.00%	15	9	0.00%	15	9	60	64
2009	8	15	23	38	0.00%	10	2	0.00%	10	2	29	39
2009	9	11	26	37	0.00%	14	4	0.00%	14	4	42	53
2009	10	44	16	60	0.00%	10	3	0.00%	10	3	53	107
2009	11	30	16	46	0.00%	21	4	0.00%	21	4	63	63
2009	12	11	71	82	0.00%	15	3	0.00%	15	3	45	56
2010	1	31	26	57	0.00%	9	3	0.00%	9	3	42	78
2010	2	23	38	61	0.00%	15	2	0.00%	15	2	42	58
2010	3	38	30	68	0.00%	22	9	0.00%	22	9	111	149
2010	4	72	30	102	0.00%	34	9	0.00%	34	9	92	159
2010	5	10	28	38	0.00%	29	4	0.00%	29	4	70	142
2010	6	10	28	38	0.00%	9	2	0.00%	9	2	38	48
2010	7	8	19	27	0.00%	13	9	0.00%	13	9	49	67

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.

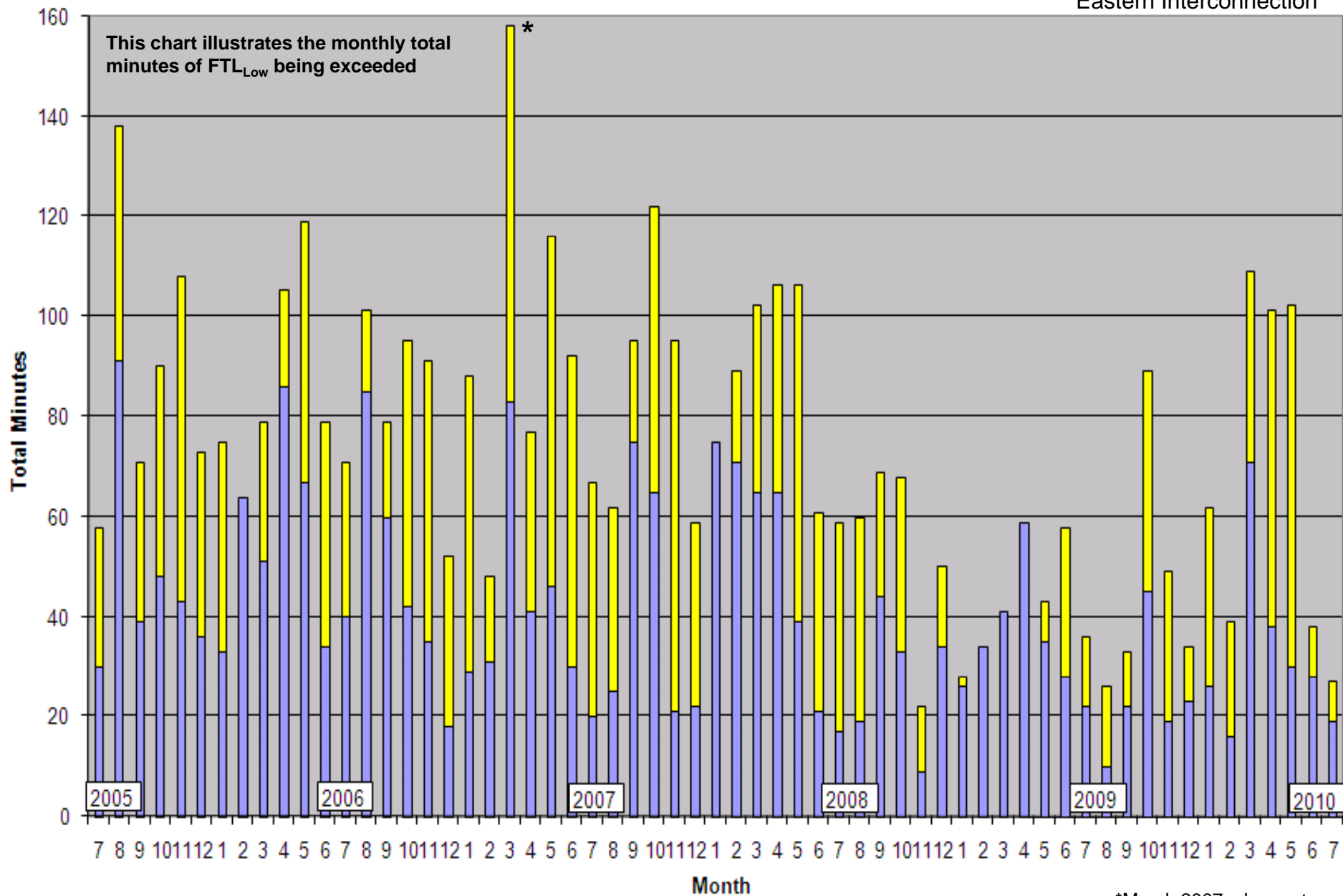
Frequency Statistics

Eastern Interconnection

Year	Month	Total Minutes FTL_Low at 59.98 Hz SF	Total Minutes FTL_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	FTL_Low FTL_High Minutes at 60 Hz SF	Total FTL_Low and FTL_High Minutes
2005	7	28	41	41	41						46	74
2005	8	41	34	34	34						126	173
2005	9	34	44	44	44						78	110
2005	10	44	65	65	65						81	123
2005	11	65	41	41	41						78	143
2005	12	31	41	41	41						83	100
2006	1	41	70	70	70						84	138
2006	2	70	23	23	23						107	109
2006	3	23	19	19	19						86	133
2006	4	19	52	52	52						152	181
2006	5	52	44	44	44						135	151
2006	6	44	31	31	31						83	138
2006	7	31	44	44	44						90	121
2006	8	15	15	15	15						143	159
2006	9	15	59	59	59						113	132
2006	10	59	44	44	44						95	145
2006	11	44	34	34	34						71	128
2006	12	34	55	55	55						72	108
2007	1	55	1	1	1						84	143
2007	2	1	75	75	75						70	87
2007	3	75	35	35	35						181	236
2007	4	35	71	71	71						95	139
2007	5	71	62	62	62						141	211
2007	6	62	41	41	41						81	143
2007	7	41	31	31	31						85	105
2007	8	31	55	55	55						80	118
2007	9	55	27	27	27						102	124
2007	10	27	19	19	19						60	95
2007	11	19	5	5	5						121	175
2007	12	5	74	74	74						66	125
2008	1	31	31	31	31						83	120
2008	2	18	18	18	18						123	123
2008	3	18	19	19	19						122	140
2008	4	31	18	18	18						105	142
2008	5	18	44	44	44						124	159
2008	6	44	65	65	65						75	145
2008	7	65	41	41	41						86	95
2008	8	41	44	44	44						34	75
2008	9	44	27	27	27						48	89
2008	10	27	27	27	27						15	69
2008	11	27	25	25	25						95	124
2008	12	25	35	35	35						60	95
2009	1	13	13	13	13						22	35
2009	2	13	11	11	11						45	61
2009	3	11	19	19	19						83	120
2009	4	19	0	0	0						123	123
2009	5	0	18	18	18						122	140
2009	6	18	18	18	18						105	142
2009	7	18	25	25	25						124	159
2009	8	25	0	0	0						75	145
2009	9	0	44	44	44						86	95
2009	10	44	27	27	27						34	75
2009	11	27	27	27	27						48	89
2009	12	27	15	15	15						15	69
2009	1	15	25	25	25						95	124
2009	2	25	16	16	16						60	95
2009	3	16	3	3	3						53	83
2009	4	3	53	53	53						22	35
2009	5	53	16	16	16						45	61
2009	6	16	28	28	28						45	61
2009	7	28	0	0	0						45	61
2009	8	0	13	13	13						23	39
2009	9	13	13	13	13						45	61
2009	10	13	20	20	20						52	62
2009	11	20	0	0	0						42	53
2009	12	0	20	20	20						56	66
2009	1	20	18	18	18						66	86
2009	2	18	18	18	18						86	95
2009	3	18	25	25	25						66	86
2009	4	25	0	0	0						86	95
2009	5	0	27	27	27						34	75
2009	6	27	27	27	27						48	89
2009	7	27	15	15	15						15	69
2009	8	15	25	25	25						95	124
2009	9	25	16	16	16						60	95
2009	10	16	3	3	3						53	83
2009	11	3	53	53	53						22	35
2009	12	53	16	16	16						45	61
2010	1	16	28	28	28						45	61
2010	2	28	0	0	0						45	61
2010	3	0	13	13	13						23	39
2010	4	13	13	13	13						45	61
2010	5	13	20	20	20						52	62
2010	6	20	0	0	0						42	53
2010	7	0	20	20	20						56	66
2010	8	20	18	18	18						66	86
2010	9	18	18	18	18						86	95
2010	10	18	25	25	25						66	86
2010	11	25	0	0	0						86	95
2010	12	0	27	27	27						34	75
2010	1	27	27	27	27						48	89
2010	2	27	15	15	15						15	69
2010	3	15	25	25	25						95	124
2010	4	25	16	16	16						60	95
2010	5	16	3	3	3						53	83
2010	6	3	53	53	53						22	35
2010	7	53	16	16	16						45	61
2010	8	16	28	28	28						45	61
2010	9	28	0	0	0						45	61
2010	10	0	13	13	13						23	39
2010	11	13	13	13	13						45	61
2010	12	13	20	20	20						52	62
2010	1	20	0	0	0						42	53
2010	2	0	20	20	20						56	66
2010	3	20	18	18	18						66	86
2010	4	18	18	18	18						86	95
2010	5	18	25	25	25						66	86
2010	6	25	0	0	0						86	95
2010	7	0	27	27	27						34	75
2010	8	27	27	27	27						48	89
2010	9	27	15	15	15						15	69
2010	10	15	25	25	25						95	124
2010	11	25	16	16	16						60	95
2010	12	16	3	3	3						53	83
2010	1	3	53	53	53						22	35
2010	2	53	16	16	16						45	61
2010	3	16	28	28	28						45	61
2010	4	28	0	0	0						45	61
2010	5	0	13	13	13						23	39
2010	6	13	13	13	13						45	61
2010	7	13	20	20	20						52	62
2010	8	20	0	0	0						42	53
2010	9	0	20	20	20						56	66
2010	10	20	18	18	18						66	86
2010	11	18	18	18	18						86	95
2010	12	18	25	25	25						66	86
2010	1	25	0	0	0						86	95
2010	2	0	27	27	27						34	75
2010	3	27	27	27	27						48	89
2010	4	27	15	15	15						15	69
2010	5	15	25	25	25						95	124
2010	6	25	16	16	16						60	95
2010	7	16	3	3	3						53	83
2010	8	3	53	53	53						22	35
2010	9	53	16	16	16						45	61
2010	10	16	28	28	28						45	61
2010	11	28	0	0	0						45	61
2010	12	0	13	13	13						23	39
2010	1	13	13	13	13						45	61
2010	2	13	20	20	20						52	62
2010	3	20	0	0	0						42	53
2010	4	0	20	20	20						56	66
2010	5	20	18	18	18						66	86
2010	6	18	18	18	18						86	95
2010	7	18	25	25	25						66	86
2010	8	25	0	0	0						86	95
2010	9	0	27	27	27						34	75

Total Minutes Exceeding Low FTL

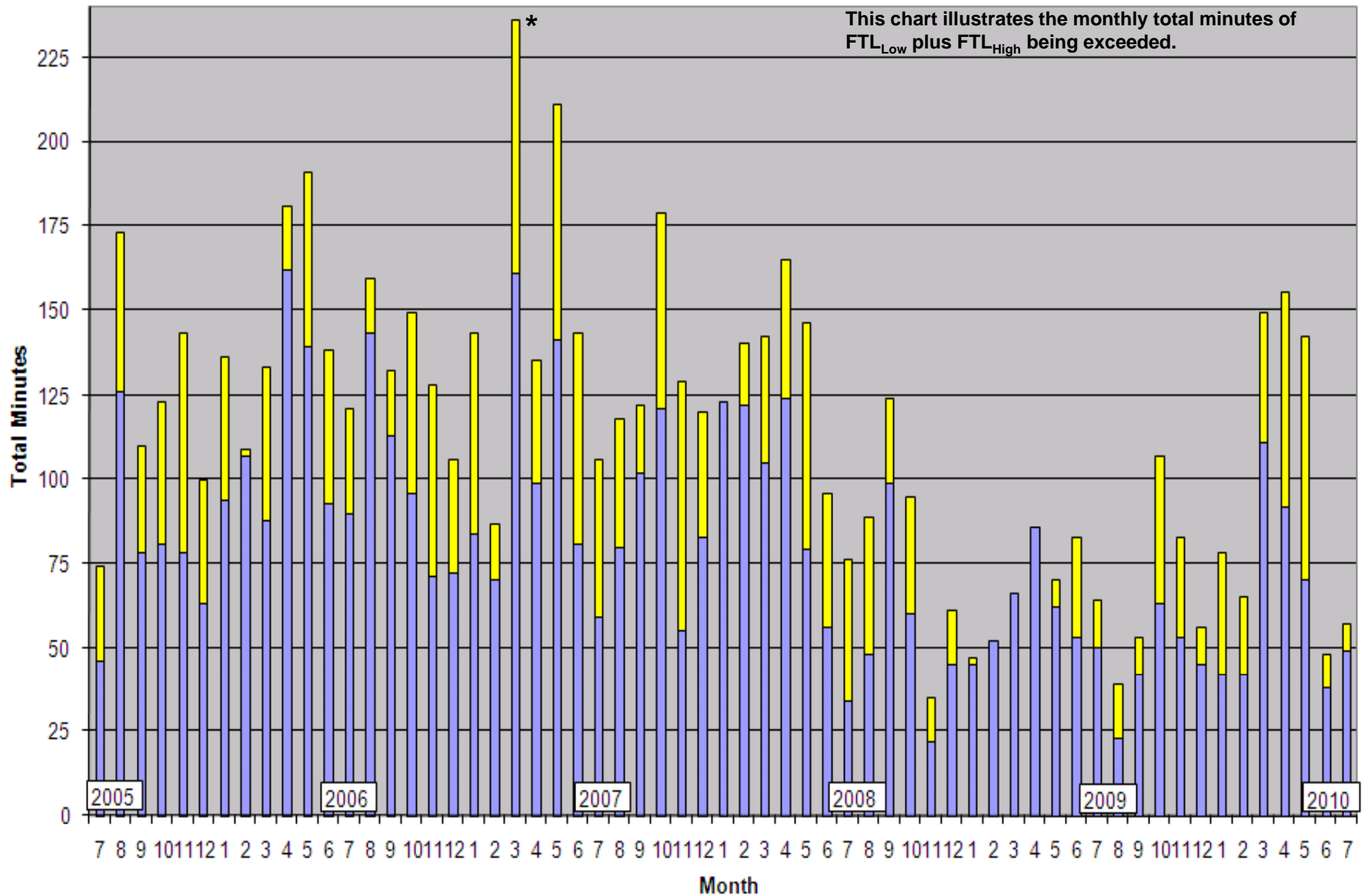
Eastern Interconnection



■ 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 Low FTL or greater than High FTL Eastern Interconnection



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

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

DateTime_EDT	ActualFreq	SchedFreq	MinCtLow	MinCtHigh	DateTime_GMT
7/24/10 11:43	59.9821	60	11	0	7/24/10 15:43
7/24/10 11:44	59.9798	60	12	0	7/24/10 15:44
7/24/10 11:45	59.981	60	13	0	7/24/10 15:45
7/24/10 11:46	59.9762	60	14	0	7/24/10 15:46
7/24/10 11:47	59.974	60	15	0	7/24/10 15:47
7/24/10 11:48	59.9712	60	16	0	7/24/10 15:48
7/24/10 11:49	59.9797	60	17	0	7/24/10 15:49
7/28/10 10:45	59.98114	60	11	0	7/28/10 14:45
7/28/10 10:46	59.98468	60	12	0	7/28/10 14:46
7/28/10 10:47	59.98963	60	13	0	7/28/10 14:47
7/28/10 10:48	59.98857	60	14	0	7/28/10 14:48
7/28/10 10:49	59.98303	60	15	0	7/28/10 14:49
7/28/10 10:50	59.97907	60	16	0	7/28/10 14:50
7/30/10 18:53	60.03124	60	0	11	7/30/10 22:53
7/30/10 18:54	60.02245	60	0	12	7/30/10 22:54
7/30/10 18:55	60.01482	60	0	13	7/30/10 22:55
7/30/10 18:56	60.01401	60	0	14	7/30/10 22:56
7/30/10 18:57	60.02076	60	0	15	7/30/10 22:57
7/30/10 18:58	60.03171	60	0	16	7/30/10 22:58
7/30/10 18:59	60.03693	60	0	17	7/30/10 22:59
7/30/10 19:00	60.03786	60	0	18	7/30/10 23:00
7/31/10 13:54	59.967	59.98	11	0	7/31/10 17:54
7/31/10 13:55	59.982	59.98	12	0	7/31/10 17:55
7/31/10 13:56	59.986	59.98	13	0	7/31/10 17:56
7/31/10 13:57	59.989	59.98	14	0	7/31/10 17:57
7/31/10 13:58	59.983	59.98	15	0	7/31/10 17:58
7/31/10 13:59	59.978	59.98	16	0	7/31/10 17:59
7/31/10 14:00	59.983	59.98	17	0	7/31/10 18:00

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

Periods of the FTL being exceeded for this presentation noted on right.

DATETIME_EDT	ActualFreq	SchedFreq	MinuteCount	DATETIME_GMT
7/6/10 22:01	60.0505	60	1	7/7/10 2:01
7/6/10 22:02	60.0531	60	2	7/7/10 2:02
7/6/10 22:03	60.0593	60	3	7/7/10 2:03
7/6/10 22:04	60.0583	60	4	7/7/10 2:04
7/6/10 22:05	60.0591	60	5	7/7/10 2:05
7/26/10 22:49	60.0567	60	1	7/27/10 2:49
7/26/10 22:50	60.0575	60	2	7/27/10 2:50
7/26/10 22:51	60.0533	60	3	7/27/10 2:51
7/26/10 22:52	60.0509	60	4	7/27/10 2:52
7/26/10 22:53	60.0511	60	5	7/27/10 2:53
7/29/10 23:02	59.9461	59.98	1	7/30/10 3:02
7/29/10 23:03	59.9369	59.98	2	7/30/10 3:03
7/29/10 23:04	59.9383	59.98	3	7/30/10 3:04
7/29/10 23:05	59.9456	59.98	4	7/30/10 3:05

DateTime_EDT	ActualFreq	SchedFreq	MinCtLow	MinCtHigh	DateTime_GMT
7/24/10 11:43	59.9821	60	11	0	7/24/10 15:43
7/24/10 11:44	59.9798	60	12	0	7/24/10 15:44
7/24/10 11:45	59.981	60	13	0	7/24/10 15:45
7/24/10 11:46					
7/24/10 11:47					
7/24/10 11:48					
7/24/10 11:49					
7/28/10 10:45	5				
7/28/10 10:46	5				
7/28/10 10:47	5				
7/28/10 10:48	5				
7/28/10 10:49	5				
7/28/10 10:50	5				
7/30/10 18:53	6				
7/30/10 18:54	6				
7/30/10 18:55	6				
7/30/10 18:56	6				
7/30/10 18:57	6				
7/30/10 18:58	6				
7/30/10 18:59	6				
7/30/10 19:00	6				
7/31/10 13:54					
7/31/10 13:55					
7/31/10 13:56					
7/31/10 13:57					
7/31/10 13:58					
7/31/10 13:59					
7/31/10 14:00					

Periods of the BAAL being exceeded for clock-minutes

Dates in this presentation:

Clock-minute Frequency greater than the FTL_{High} on July 7, 2010, ending 22:05 EDT: 5 consecutive clock-minutes

Clock-minute Frequency greater than the FTL_{High} on July 26, 2010, ending 22:53 EDT: 5 consecutive clock-minutes

Clock-minute Frequency less than the FTL_{Low} on July 29, 2010, ending 23:05 EDT: 4 consecutive clock-minutes

Clock-minute ACE less than the $BAAL_{Low}$ on July 24, 2010, ending 11:49 EDT: 17 consecutive clock-minutes

Clock-minute ACE greater than the $BAAL_{High}$ on July 30, 2010, ending 19:00 EDT: 18 consecutive clock-minutes

Under draft BAL-007, 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 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.

minuteCount	DATETIME_GMT
1	7/7/10 2:01
2	7/7/10 2:02
3	7/7/10 2:03
4	7/7/10 2:04
5	7/7/10 2:05
1	7/27/10 2:49
2	7/27/10 2:50
3	7/27/10 2:51
4	7/27/10 2:52
5	7/27/10 2:53
1	7/30/10 3:02
2	7/30/10 3:03
3	7/30/10 3:04
4	7/30/10 3:05

Periods
presenter

7/07/2010 ending 22:05 EDT

5-minute duration above FTL_{High}

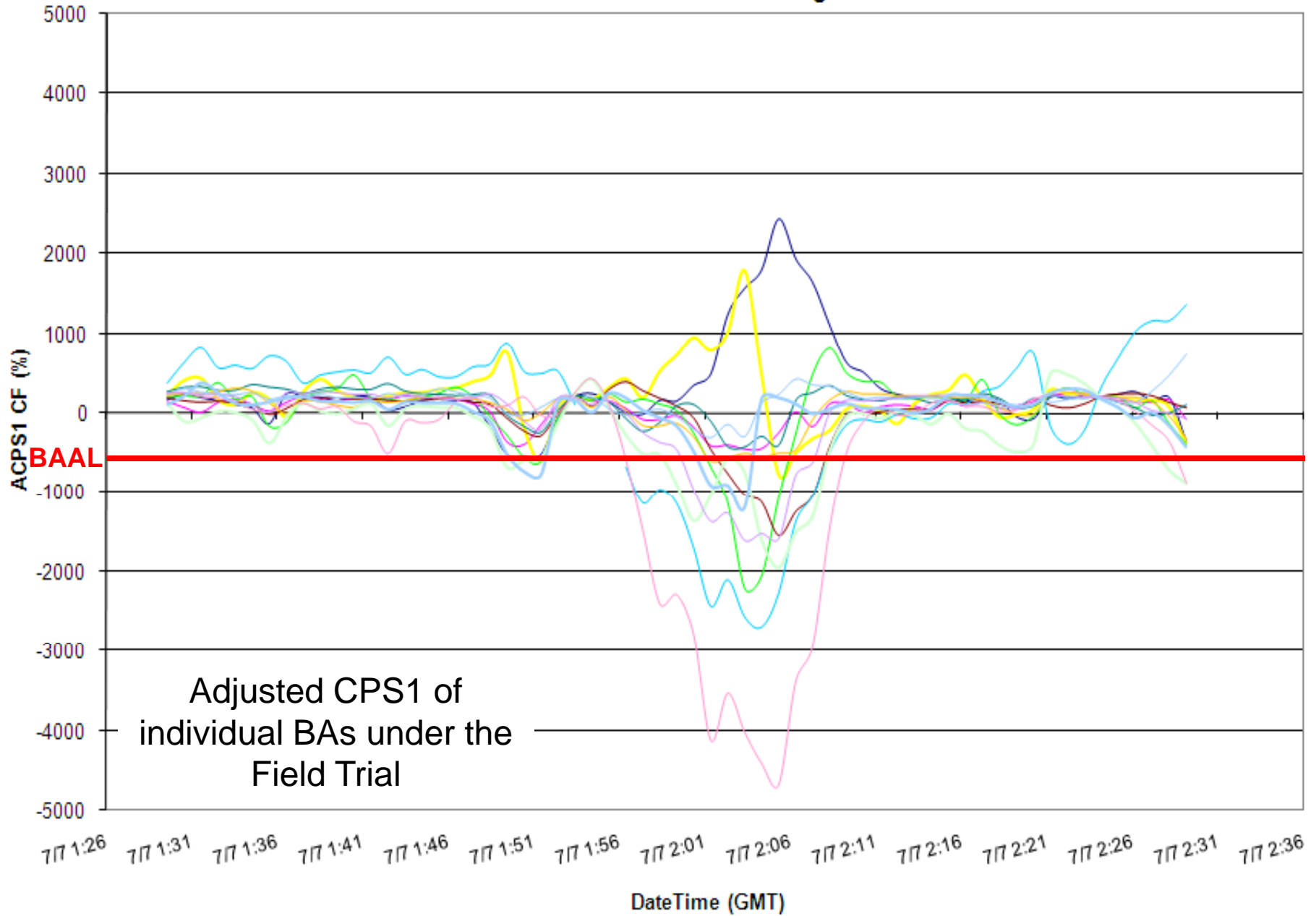
EI Clock-Minute Average Frequency



Clock-minute Actual Frequency of Participants

7/07/2010 ending 22:05 EDT
5-minute duration above FTL_{High}

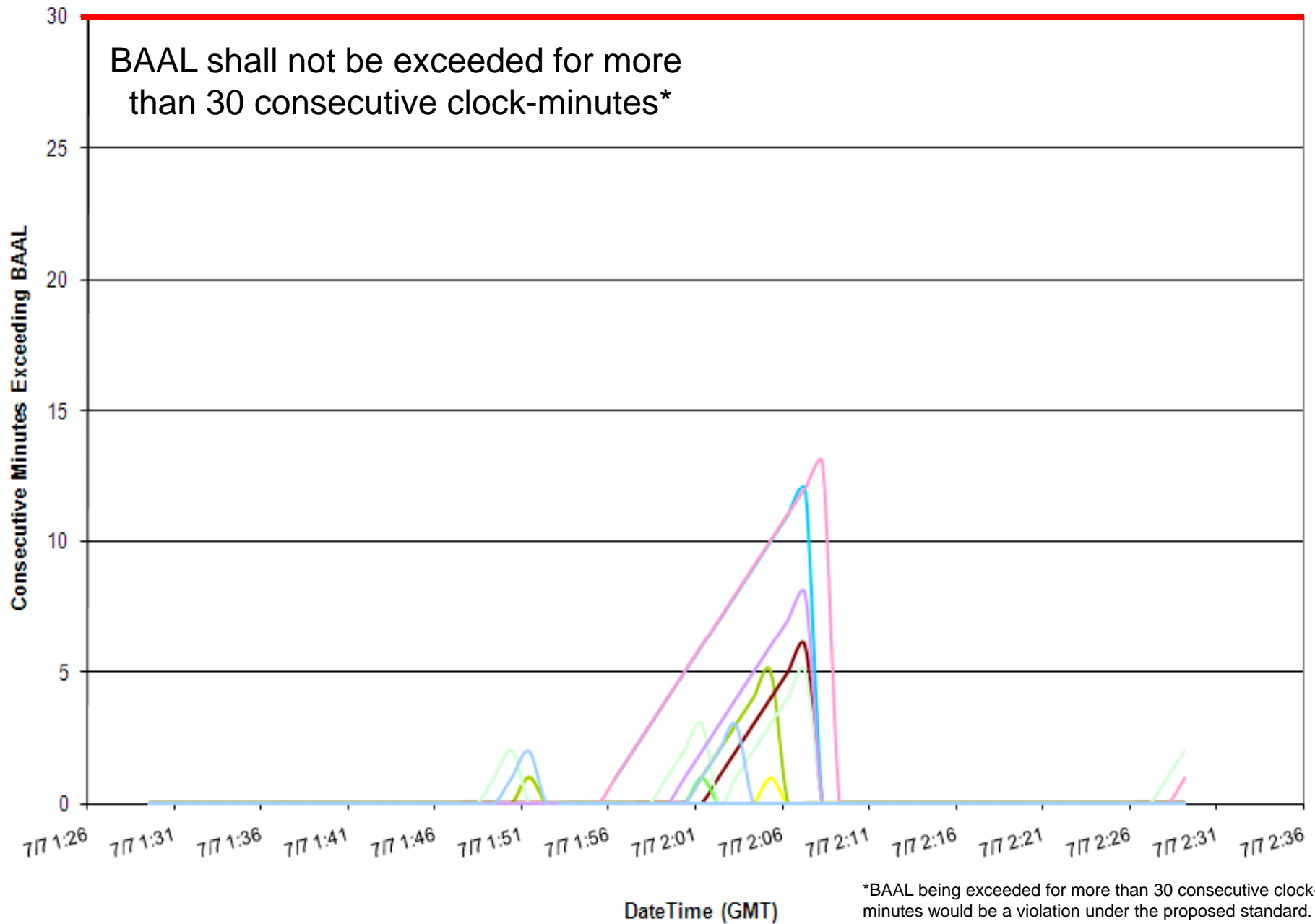
ACPS1 Clock-Minute Averages



7/07/2010 ending 22:05 EDT
5-minute duration above FTL_{High}

Consecutive Minutes Exceeding BAAL

BAAL Violation*



7/26/2010 ending 22:53 EDT

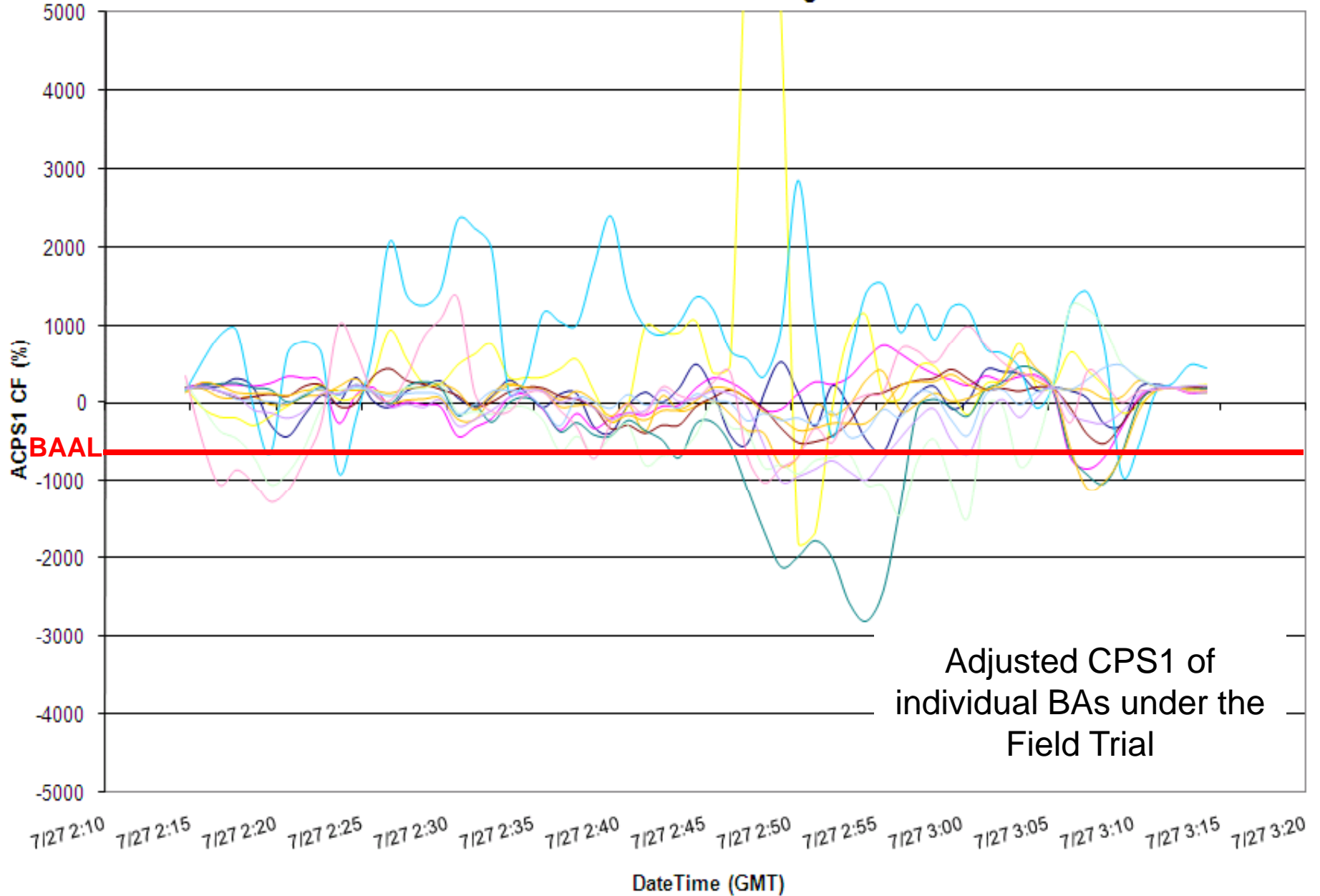
5-minute duration above FTL_{High}

EI Clock-Minute Average Frequency



7/26/2010 ending 22:53 EDT
5-minute duration above FTL_{High}

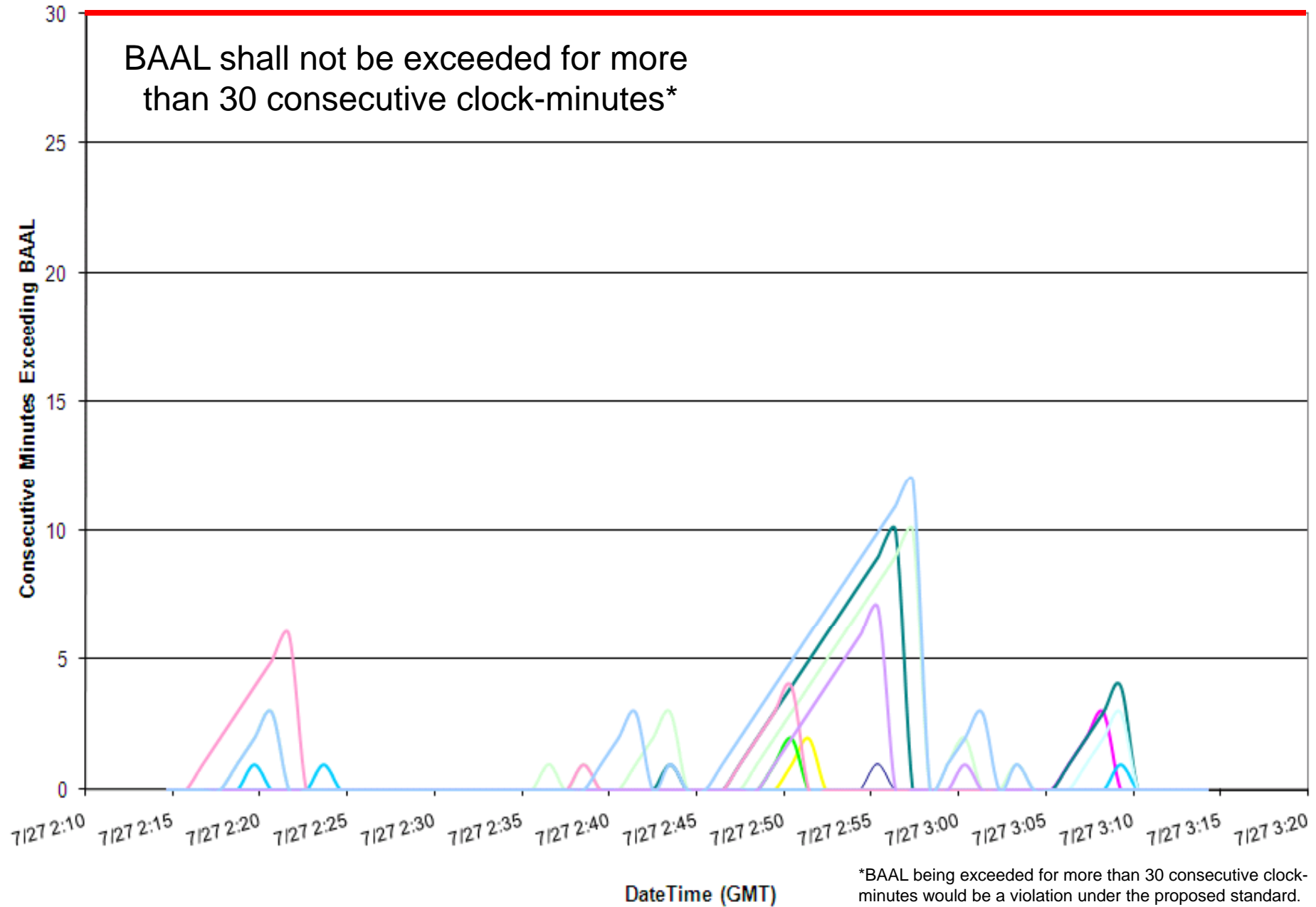
ACPS1 Clock-Minute Averages



7/26/2010 ending 22:53 EDT
5-minute duration above FTL_{High}

Consecutive Minutes Exceeding BAAL

BAAL Violation*



7/29/2010 ending 23:05 EDT

4-minute duration below FTL_{Low}

EI Clock-Minute Average Frequency

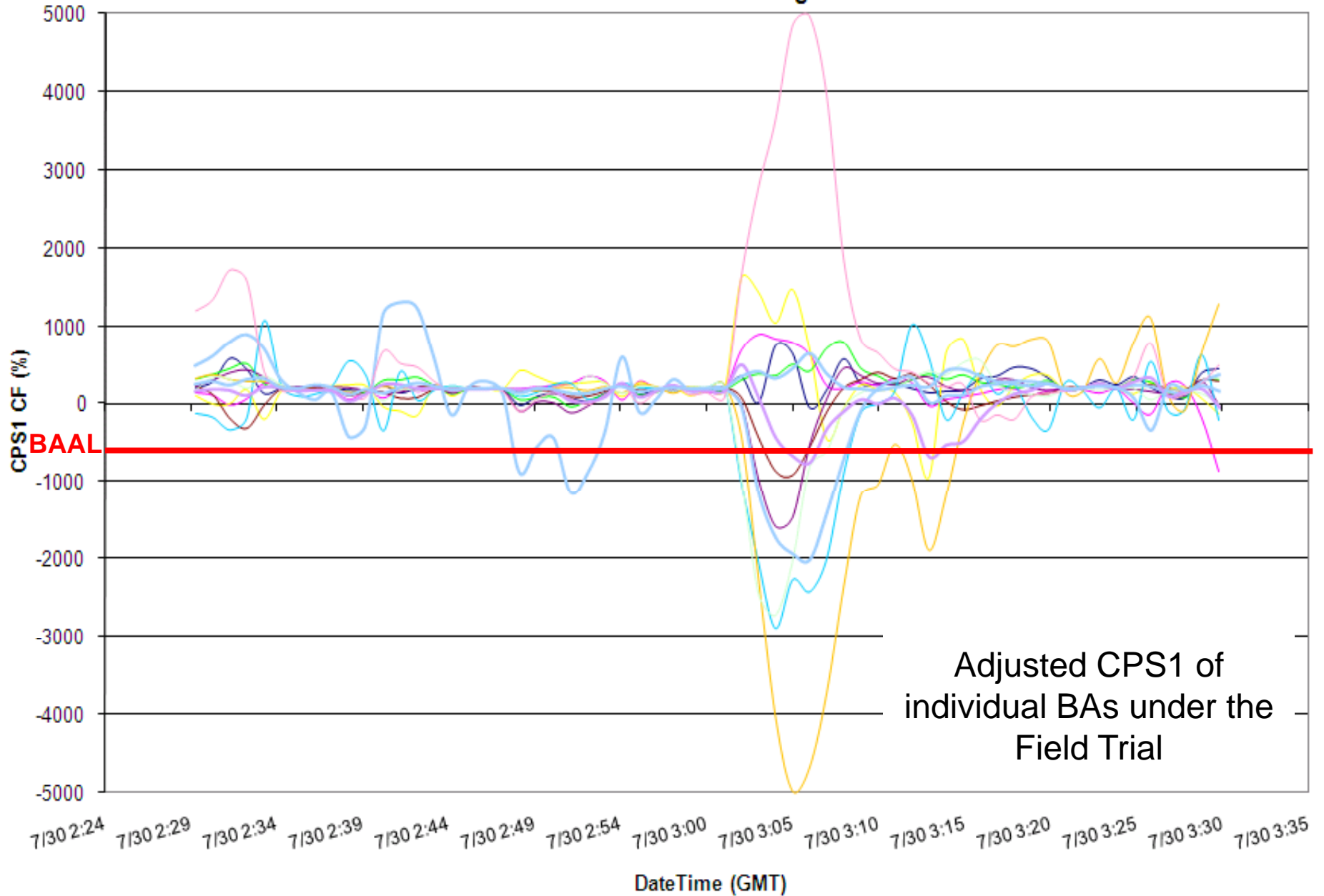


Clock-minute Actual Frequency of Participants

7/29/2010 ending 23:05 EDT

4-minute duration below FTL_{Low}

ACPS1 One-Minute Averages

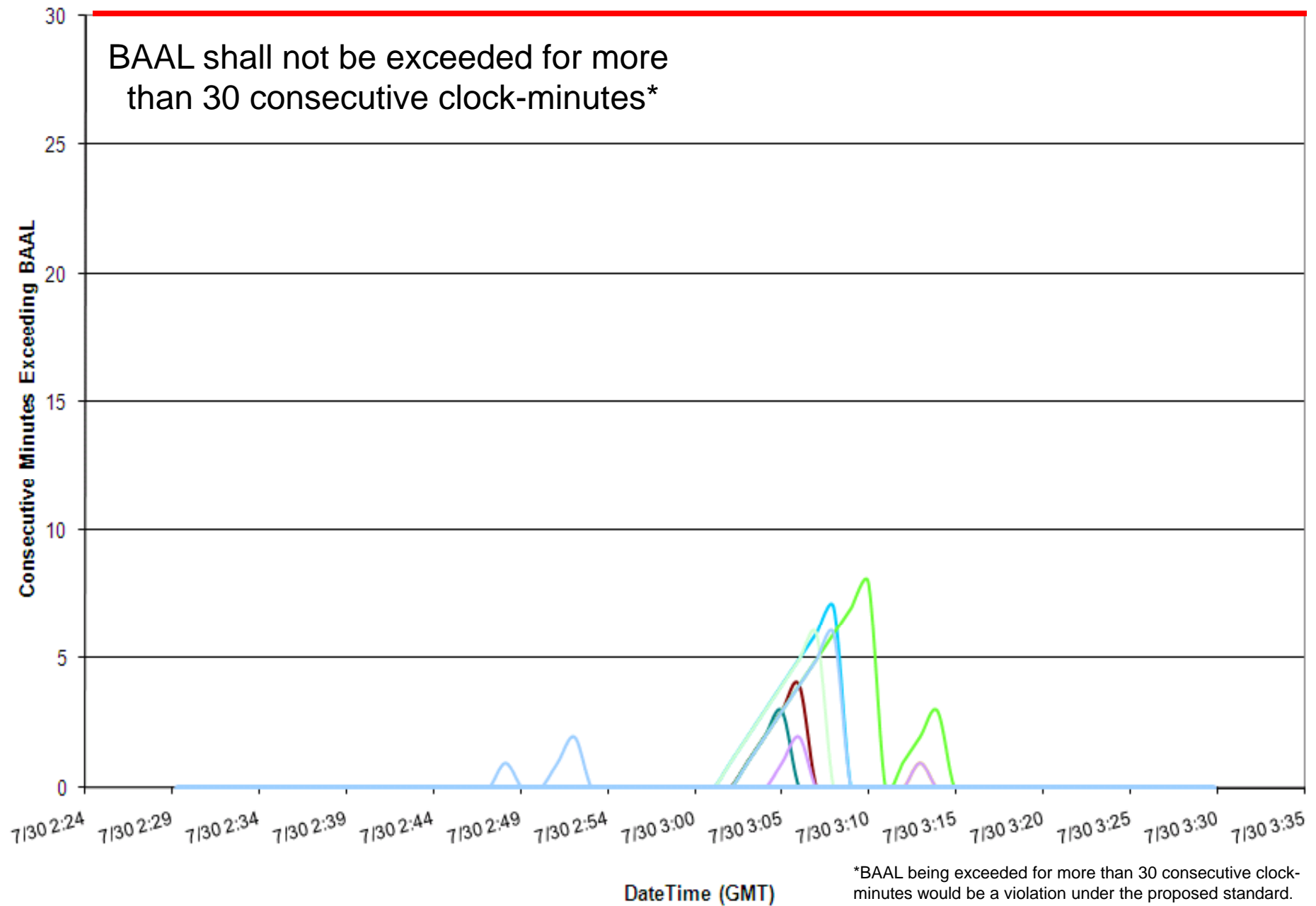


7/29/2010 ending 23:05 EDT

4-minute duration below FTL_{Low}

Consecutive Minutes Exceeding BAAL

BAAL Violation*



7/24/2010 ending 11:49 EDT
17-minute duration below BAAL_{Low}

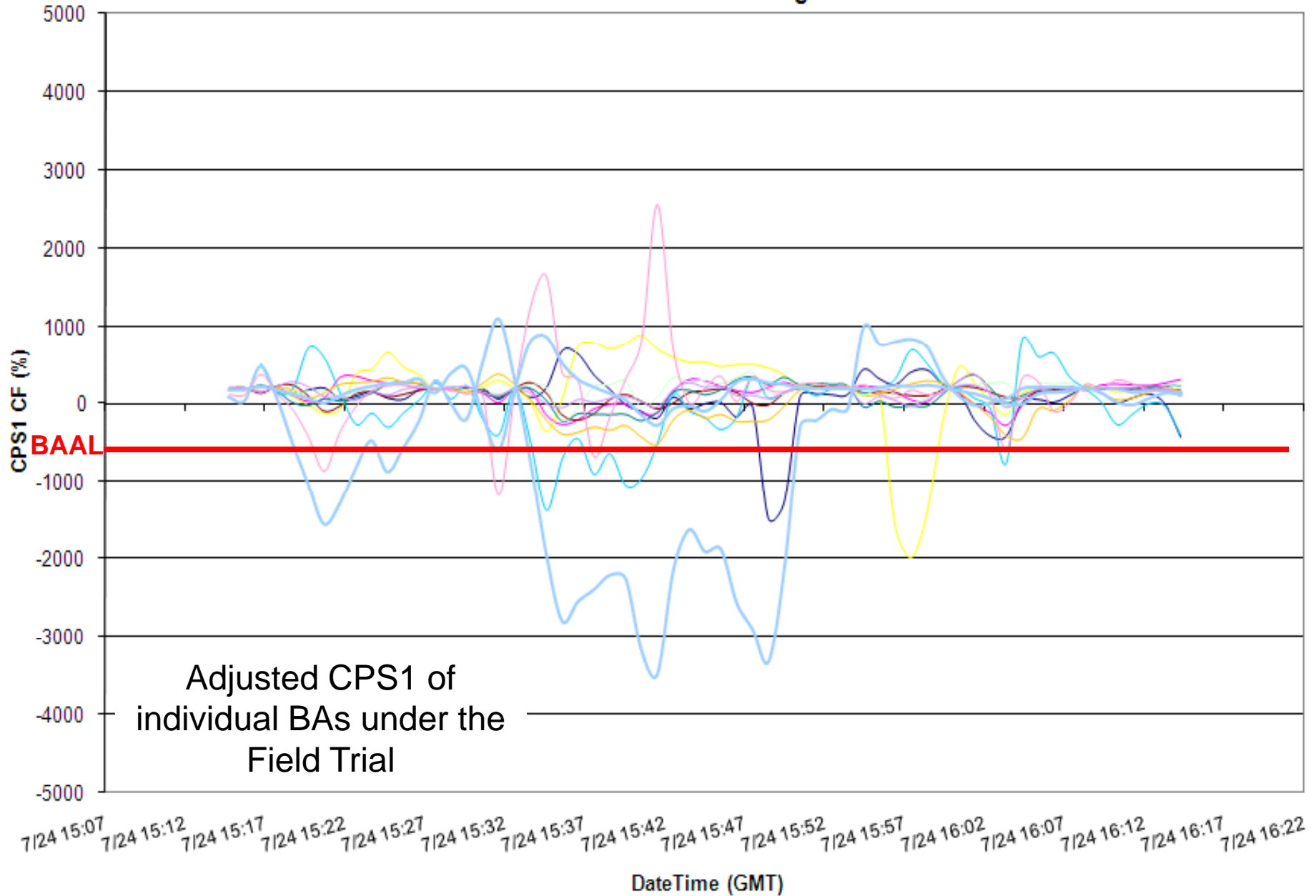
EI Clock-Minute Average Frequency



Clock-minute Actual Frequency of Participants

7/24/2010 ending 11:49 EDT
17-minute duration below BAAL_{Low}

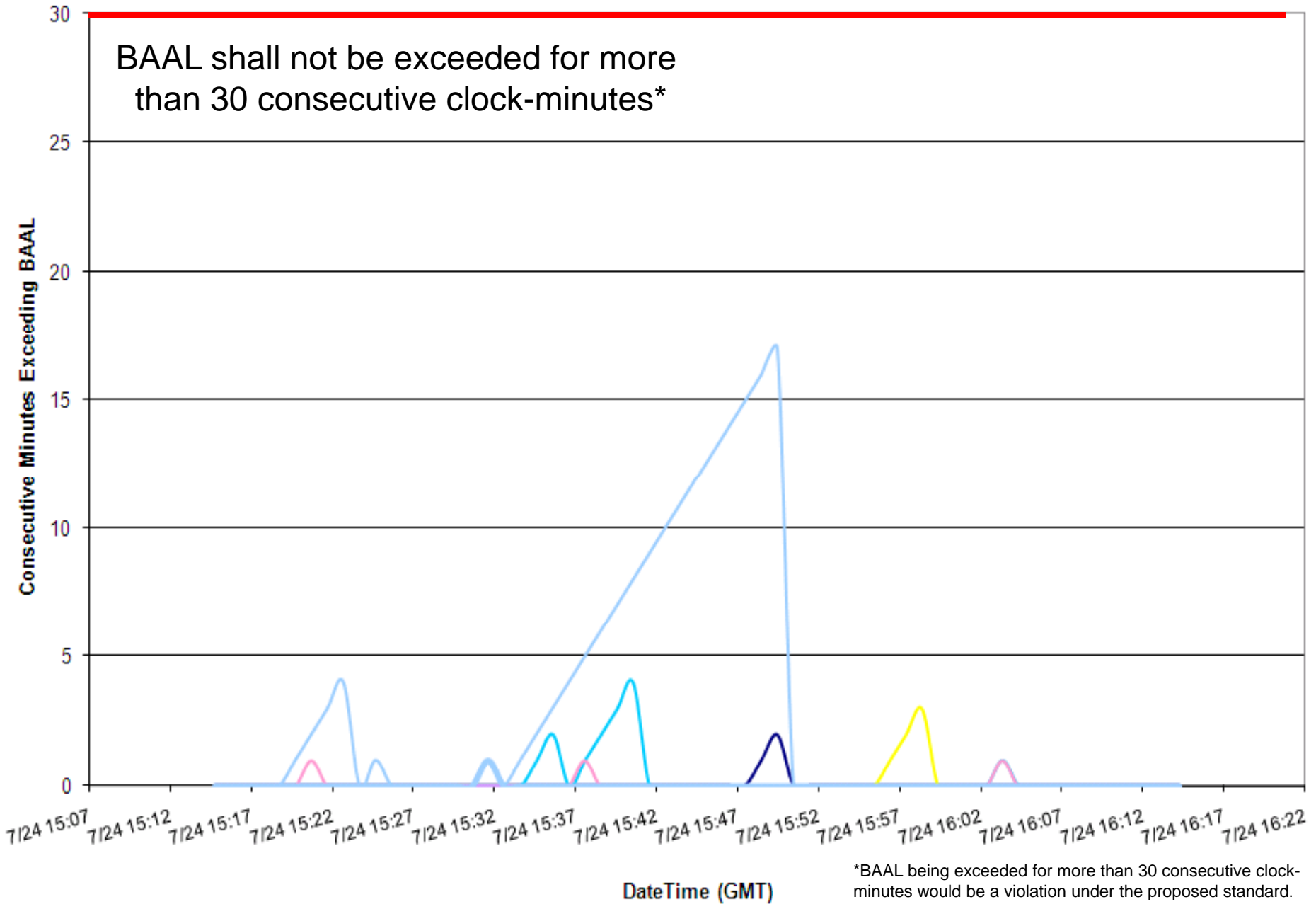
ACPS1 One-Minute Averages



7/24/2010 ending 11:49 EDT
17-minute duration below BAAL_{Low}

Consecutive Minutes Exceeding BAAL

BAAL Violation*



7/30/2010 ending 19:00 EDT
18-minute duration above BAAL_{High}

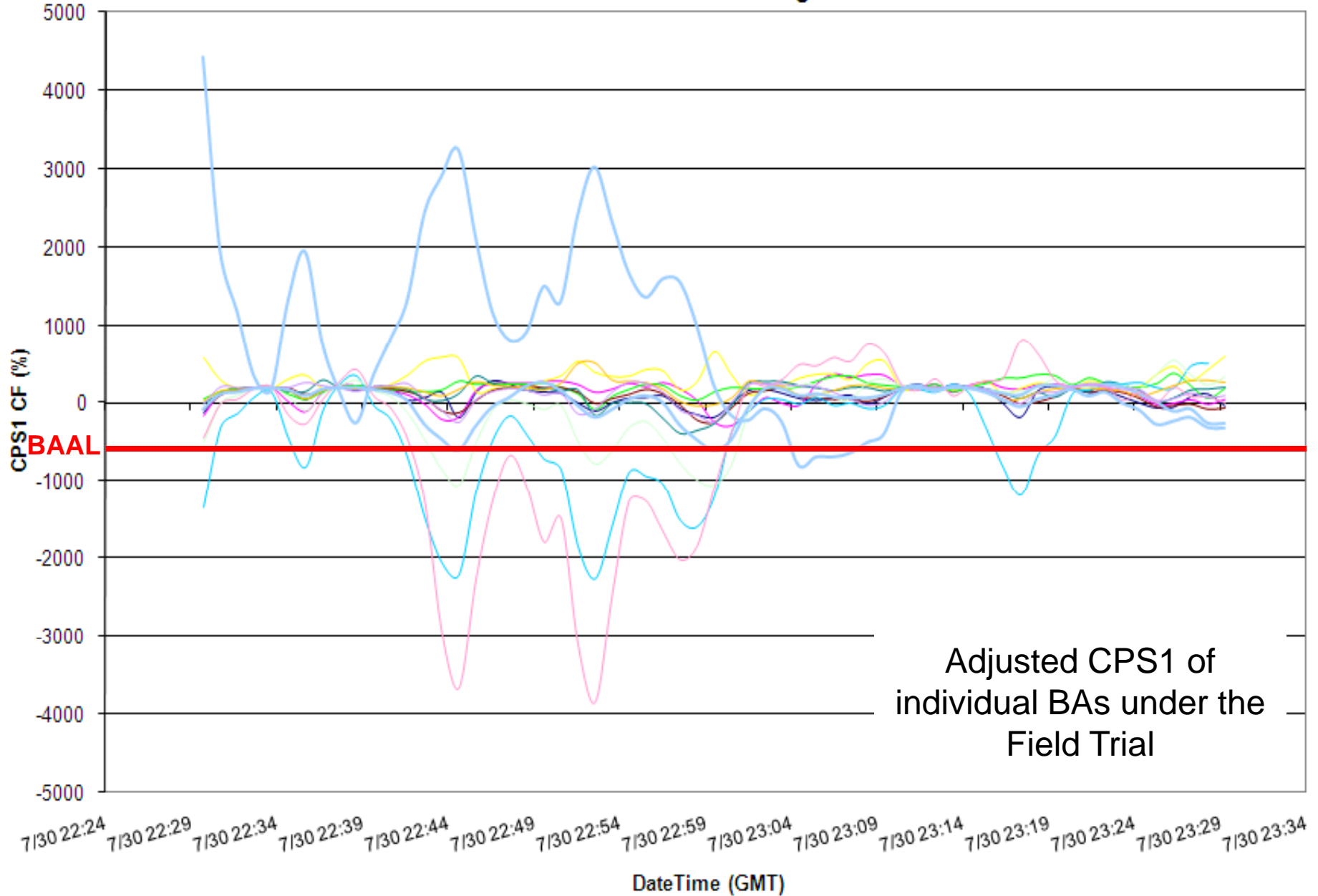
EI Clock-Minute Average Frequency



Clock-minute Actual Frequency of Participants

7/30/2010 ending 19:00 EDT
18-minute duration above BAAL_{High}

ACPS1 One-Minute Averages



7/30/2010 ending 19:00 EDT
18-minute duration above BAAL_{High}

Consecutive Minutes Exceeding BAAL

BAAL Violation*



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
7/3/10 5:32	7/3/10 5:33	CDT	0:10	0	0	Inexperienced dual rated supervisor on desk had not noticed that he hit the bottom limit of his regulating units, because he was looking at ACE and didn't immediately panic as load was going to be picking up. Started making adjustment after reading instruction but it was already too late to avoid problem.
7/15/10 22:19	7/15/10 22:33	EDT	0:14	0	0	Primary demand reduced faster than expected. Resources were dispatched down and regulation was placed on manual basepoint.
7/18/10 6:35	7/18/10 6:46	EPT	0:11	0	0	IPP Generation not matching scheduled output
7/24/10 10:33	7/24/10 10:50	CDT	0:17	0	0	A 250 MW combined cycle unit's expected output was sold while still in simple cycle mode. The system was short when the unit failed to go into combined cycle mode. A 110 MW peaker was requested to start at 10:49 and synchronized at 10:55. BAAL corrected due to average frequency returning above 60 HZ
7/29/10 6:56	7/29/10 7:07	EDT	0:11	0	0	A large reduction in exports and load coming in lighter than expected caused an overgenerated situation. No notable actions were taken
7/29/10 6:57	7/29/10 7:08	EDT	0:11	0	0	IPP Generation not matching scheduled output
7/31/10 12:44	7/31/10 13:01	EST	0:17	0	0	Generation was unable to keep up with the non-conforming load. The operator contacted the load to inform them of the situation and requested a 2 minute interruption to bring ACE back within compliance.

Balancing Authority ACE Limit Proof-of-Concept Field Trial

Discussion

Doug Hils

Reliability-Based Control Standard Drafting Team

Doug.Hils@duke-energy.com