

# **Balancing Authority ACE Limit Proof-of-Concept Field Trial**

WECC Update Discussion  
August 30, 2010

**DISCUSSION STARTING AT 3:30 PM EDT**

Doug Hils – Duke Energy

Reliability-Based Control Standard Drafting Team

# Balancing Authority ACE Limit Proof-of-Concept Field Trial

## Western Interconnection Field Trial Participation

Western Interconnection Balancing Authority Participants	2010 Frequency Bias	WECC Region	Reliability Coordinator	Start Date
Alberta Electric System Operator (AESO)	-125	NWPP	WECC	March 1, 2010
Arizona Public Service Company (AZPS)	-74.5	AZNMSNV	WECC	March 1, 2010
Bonneville Power Administration (BPAT)	-157.3	NWPP	WECC	March 1, 2010
British Columbia Transmission Corporation (BCTC)	-118	NWPP	WECC	April 1, 2010
California Independent System Operator (CISO)	-485	CAMX	WECC	March 1, 2010
El Paso Electric Company (EPE)	-19	AZNMSNV	WECC	March 1, 2010
NaturEner Power Watch , LLC(GWA)	-2.1	NWPP	WECC	March 1, 2010
Idaho Power Company (IPCO)	-40	NWPP	WECC	March 1, 2010
Los Angeles Department of Water and Power (LDWP)	-62.3	CAMX	WECC	March 1, 2010
Nevada Power Company (NEVP)	-62.29	AZNMSNV	WECC	March 1, 2010
PacifiCorp East (PACE)	-77	NWPP	WECC	March 1, 2010
PacifiCorp West (PACW)	-45	NWPP	WECC	March 1, 2010
Portland General Electric (PGE)	-50	NWPP	WECC	April 1, 2010
Public Service Company of Colorado (PSCO)	-80	RMPA	WECC	March 1, 2010
Public Utility District No.1 of Chelan County(CHPD)	-12	NWPP	WECC	March 1, 2010
Public Utility District No.1 of Douglas County (DOPD)	-7	NWPP	WECC	April 1, 2010
Public Utility District No.2 of Grant County (GCPD)	-25	NWPP	WECC	March 1, 2010
Seattle City Light (SCL)	-40	NWPP	WECC	March 1, 2010
Sacramento Municipal Utility District (SMUD)	-45.18	NWPP	WECC	March 1, 2010
Salt River Project (SRP)	-65.2	AZNMSNV	WECC	May 1, 2010
Sierra Pacific Power Company (SPPC)	-20.04	NWPP	WECC	March 1, 2010
Tucson Electric Power (TEPC)	-30.4	AZNMSNV	WECC	March 1, 2010
Turlock Irrigation District (TIDC)	-6.7	NWPP	WECC	March 1, 2010
Western Area Power Administration – Rocky Mountain Region (WACM)	-55	RMPA	WECC	March 1, 2010
Western Area Power Administration- Desert Southwest Region (WALC)	-54.8	AZNMSNV	WECC	March 1, 2010

## Clock-Minute Frequency Below 59.932 Hz $FTL_{Low}$ or Above 60.068 Hz $FTL_{High}$

DateTime	TimeZone	FreqError	ActualFreq	SchedFreq
7/5/10 22:00	PDT	0.05750	60.07750	60.02000
7/5/10 22:01	PDT	0.05010	60.07010	60.02000
7/5/10 22:42	PDT	0.04920	60.06920	60.02000
7/5/10 22:43	PDT	0.05300	60.07300	60.02000
7/5/10 22:44	PDT	0.04940	60.06940	60.02000
7/5/10 22:45	PDT	0.04990	60.06990	60.02000
DateTime	TimeZone	FreqError	ActualFreq	SchedFreq
7/15/10 7:02	PDT	-0.07240	59.92760	60.00000
7/15/10 7:03	PDT	-0.07030	59.92970	60.00000
7/15/10 7:04	PDT	-0.06940	59.93060	60.00000
7/15/10 7:05	PDT	-0.07000	59.93000	60.00000

# 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\*

BA	Max_MinCtLow	Max_MinCtHigh	Max_MinCtLow2	Max_MinCtHigh2	Max_LowLimitCt	Max_HighLimitCt
BA01	26	32	28	40	29	40
BA02	11	11	9	11	11	11
BA03	16	21	28	35	28	35
BA04	12	11	10	11	12	11
BA05	2	1	5	23	5	23
BA06	3	7	0	0	3	7
BA07	3	2	1	11	3	11
BA08	3	9	3	25	3	25
BA09	7	29	1	55	7	55
BA10	0	2	2	2	2	2
BA11	7	9	14	17	14	17
BA12	1	13	1	15	1	15
BA13	6	11	6	19	6	19
BA14	1	5	3	8	3	8
BA15	4	9	11	27	11	31
BA16	3	3	10	8	10	8
BA17	11	18	27	25	27	25
BA18	9	4	8	10	9	10
BA19	9	10	20	29	20	29
BA20	7	6	7	15	7	15
BA21	7	18	35	28	35	28
BA22	5	13	19	51	19	51
BA23	7	6	23	25	23	25
BA24	9	14	23	19	23	19

MinCtLow = Count of consecutive clock-minutes BAAL<sub>Low</sub> was exceeded  
 MinCtHigh = Count of consecutive clock-minutes BAAL<sub>High</sub> was exceeded  
 MinCtLow2 = Count of consecutive clock-minutes ATL<sub>Low</sub> was exceeded  
 MinCtHigh2 = Count of consecutive clock-minutes ATL<sub>High</sub> was exceeded

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

Date	Time	TimeZone	FreqError	ActualFreq	SchedFreq	MinCtLow	MinCtHigh	MinCtLow2	MinCtHigh2	LowLimitCt	HighLimitCt	DateTimeMST
07/04/10	10:46	PDT	0.0004	60.0004	60.00	0	0	25	0	25	0	7/4/2010 10:46
07/04/10	10:47	PDT	0.0002	60.0002	60.00	0	0	26	0	26	0	7/4/2010 10:47
07/04/10	10:48	PDT	0.0067	60.0067	60.00	0	0	27	0	27	0	7/4/2010 10:48
07/04/10	10:49	PDT	-0.0084	59.9916	60.00	0	0	28	0	28	0	7/4/2010 10:49
07/04/10	10:50	PDT	-0.0059	59.9942	60.00	0	0	29	0	29	0	7/4/2010 10:50
07/04/10	10:51	PDT	-0.0012	59.9988	60.00	0	0	30	0	30	0	7/4/2010 10:51
07/04/10	10:52	PDT	-0.0025	59.9975	60.00	0	0	31	0	31	0	7/4/2010 10:52
07/04/10	10:53	PDT	-0.0015	59.9986	60.00	0	0	32	0	32	0	7/4/2010 10:53
07/04/10	10:54	PDT	-0.0083	59.9917	60.00	0	0	33	0	33	0	7/4/2010 10:54
07/04/10	10:55	PDT	-0.0080	59.9920	60.00	0	0	34	0	34	0	7/4/2010 10:55
07/04/10	10:56	PDT	-0.0051	59.9949	60.00	0	0	35	0	35	0	7/4/2010 10:56
07/05/10	19:18	MDT	0.0027	60.0227	60.02	0	17	0	25	0	25	7/5/2010 18:18
07/05/10	19:19	MDT	-0.0004	60.0196	60.02	0	18	0	26	0	26	7/5/2010 18:19
07/05/10	19:20	MDT	-0.0042	60.0158	60.02	0	19	0	27	0	27	7/5/2010 18:20
07/05/10	19:21	MDT	-0.0013	60.0187	60.02	0	20	0	28	0	28	7/5/2010 18:21
07/05/10	19:22	MDT	-0.0041	60.0159	60.02	0	21	0	29	0	29	7/5/2010 18:22
07/05/10	19:23	MDT	0.0061	60.0261	60.02	0	22	0	30	0	30	7/5/2010 18:23
07/05/10	19:24	MDT	-0.0011	60.0189	60.02	0	23	0	31	0	31	7/5/2010 18:24
07/05/10	19:25	MDT	-0.0006	60.0194	60.02	0	24	0	32	0	32	7/5/2010 18:25
07/05/10	19:26	MDT	0.0035	60.0235	60.02	0	25	0	33	0	33	7/5/2010 18:26
07/05/10	19:27	MDT	0.0068	60.0269	60.02	0	26	0	34	0	34	7/5/2010 18:27
07/05/10	19:28	MDT	-0.0014	60.0186	60.02	0	27	0	35	0	35	7/5/2010 18:28
07/05/10	19:29	MDT	-0.0058	60.0142	60.02	0	28	0	36	0	36	7/5/2010 18:29
07/05/10	19:30	MDT	0.0059	60.0259	60.02	0	29	0	37	0	37	7/5/2010 18:30
07/05/10	19:31	MDT	0.0082	60.0282	60.02	0	30	0	38	0	38	7/5/2010 18:31
07/05/10	19:32	MDT	0.0089	60.0289	60.02	0	31	0	39	0	39	7/5/2010 18:32
07/05/10	19:33	MDT	0.0057	60.0257	60.02	0	32	0	40	0	40	7/5/2010 18:33
07/09/10	20:27	PDT	-0.0108	59.9892	60.00	0	0	25	0	25	0	7/9/2010 20:27
07/09/10	20:28	PDT	-0.0117	59.9883	60.00	0	0	26	0	26	0	7/9/2010 20:28
07/09/10	20:29	PDT	-0.0137	59.9863	60.00	0	0	27	0	27	0	7/9/2010 20:29
07/09/10	20:30	PDT	-0.0088	59.9912	60.00	0	0	28	0	28	0	7/9/2010 20:30
07/09/10	20:31	PDT	-0.0088	59.9912	60.00	0	0	29	0	29	0	7/9/2010 20:31
07/09/10	20:32	PDT	-0.0131	59.9869	60.00	0	0	30	0	30	0	7/9/2010 20:32
07/09/10	20:33	PDT	-0.0137	59.9863	60.00	0	0	31	0	31	0	7/9/2010 20:33
07/09/10	20:34	PDT	-0.0024	59.9976	60.00	0	0	32	0	32	0	7/9/2010 20:34
07/17/10	6:17	PDT	0.0281	60.0281	60.00	0	24	0	25	0	25	7/17/2010 6:17
07/17/10	6:18	PDT	0.0183	60.0183	60.00	0	0	0	26	0	26	7/17/2010 6:18
07/17/10	6:19	PDT	0.0250	60.0250	60.00	0	1	0	27	0	27	7/17/2010 6:19
07/17/10	6:20	PDT	0.0138	60.0138	60.00	0	0	0	28	0	28	7/17/2010 6:20
07/17/10	6:21	PDT	0.0099	60.0099	60.00	0	0	0	29	0	29	7/17/2010 6:21
07/17/10	6:22	PDT	0.0121	60.0121	60.00	0	0	0	30	0	30	7/17/2010 6:22
07/17/10	6:23	PDT	-0.0007	59.9993	60.00	0	0	0	31	0	31	7/17/2010 6:23

Date	Time	TimeZone	FreqError	ActualFreq	SchedFreq	MinCtLow	MinCtHigh	MinCtLow2	MinCtHigh2	LowLimitCt	HighLimitCt	DateTimeMST
07/19/10	11:15	PDT	-0.0236	59.9764	60.00	1	0	25	0	25	0	7/19/2010 11:15
07/19/10	11:16	PDT	-0.0208	59.9792	60.00	0	0	26	0	26	0	7/19/2010 11:16
07/19/10	11:17	PDT	-0.0213	59.9787	60.00	1	0	27	0	27	0	7/19/2010 11:17
07/19/10	11:18	PDT	-0.0229	59.9771	60.00	2	0	28	0	28	0	7/19/2010 11:18
07/19/10	11:19	PDT	-0.0206	59.9794	60.00	3	0	29	0	29	0	7/19/2010 11:19
07/19/10	11:20	PDT	-0.0198	59.9802	60.00	4	0	30	0	30	0	7/19/2010 11:20
07/19/10	11:21	PDT	-0.0071	59.9929	60.00	0	0	31	0	31	0	7/19/2010 11:21
07/20/10	2:27	MST	0.0094	60.0094	60.00	0	0	0	25	0	25	7/20/2010 2:27
07/20/10	2:28	MST	0.0084	60.0084	60.00	0	0	0	26	0	26	7/20/2010 2:28
07/20/10	2:29	MST	0.0095	60.0095	60.00	0	0	0	27	0	27	7/20/2010 2:29
07/20/10	2:30	MST	0.0023	60.0023	60.00	0	0	0	28	0	28	7/20/2010 2:30
07/20/10	2:31	MST	0.0084	60.0084	60.00	0	0	0	29	0	29	7/20/2010 2:31
07/20/10	2:32	MST	0.0032	60.0032	60.00	0	0	0	30	0	30	7/20/2010 2:32
07/20/10	2:33	MST	0.0021	60.0021	60.00	0	0	0	31	0	31	7/20/2010 2:33
07/20/10	2:34	MST	0.0049	60.0049	60.00	0	0	0	32	0	32	7/20/2010 2:34
07/20/10	2:35	MST	0.0051	60.0051	60.00	0	0	0	33	0	33	7/20/2010 2:35
07/20/10	2:36	MST	0.0012	60.0012	60.00	0	0	0	34	0	34	7/20/2010 2:36
07/20/10	2:37	MST	0.0153	60.0153	60.00	0	0	0	35	0	35	7/20/2010 2:37
07/20/10	2:38	MST	0.0164	60.0164	60.00	0	0	0	36	0	36	7/20/2010 2:38
07/20/10	2:39	MST	-0.0049	59.9951	60.00	0	0	0	37	0	37	7/20/2010 2:39
07/20/10	2:40	MST	0.0136	60.0136	60.00	0	0	0	38	0	38	7/20/2010 2:40
07/20/10	2:41	MST	0.0093	60.0093	60.00	0	0	0	39	0	39	7/20/2010 2:41
07/20/10	2:42	MST	0.0095	60.0095	60.00	0	0	0	40	0	40	7/20/2010 2:42
07/20/10	2:43	MST	0.0031	60.0031	60.00	0	0	0	41	0	41	7/20/2010 2:43
07/20/10	2:44	MST	0.0046	60.0046	60.00	0	0	0	42	0	42	7/20/2010 2:44
07/20/10	2:45	MST	0.0099	60.0099	60.00	0	0	0	43	0	43	7/20/2010 2:45
07/20/10	2:46	MST	0.0084	60.0084	60.00	0	0	0	44	0	44	7/20/2010 2:46
07/20/10	2:47	MST	0.0025	60.0025	60.00	0	0	0	45	0	45	7/20/2010 2:47
07/20/10	2:48	MST	0.0101	60.0101	60.00	0	0	0	46	0	46	7/20/2010 2:48
07/20/10	2:49	MST	-0.0019	59.9981	60.00	0	0	0	47	0	47	7/20/2010 2:49
07/20/10	2:50	MST	-0.0069	59.9931	60.00	0	0	0	48	0	48	7/20/2010 2:50
07/20/10	2:51	MST	-0.0001	59.9999	60.00	0	0	0	49	0	49	7/20/2010 2:51
07/20/10	2:52	MST	-0.0113	59.9887	60.00	0	0	0	50	0	50	7/20/2010 2:52
07/20/10	2:53	MST	-0.0211	59.9789	60.00	0	0	0	51	0	51	7/20/2010 2:53

Date	Time	TimeZone	FreqError	ActualFreq	SchedFreq	MinCtLow	MinCtHigh	MinCtLow2	MinCtHigh2	LowLimitCt	HighLimitCt	DateTimeMST
07/22/10	23:24	PDT	0.0135	60.0135	60.00	0	2	0	25	0	25	7/22/2010 23:24
07/22/10	23:25	PDT	0.0131	60.0131	60.00	0	3	0	26	0	26	7/22/2010 23:25
07/22/10	23:26	PDT	0.0073	60.0073	60.00	0	4	0	27	0	27	7/22/2010 23:26
07/22/10	23:27	PDT	0.0163	60.0163	60.00	0	5	0	28	0	28	7/22/2010 23:27
07/22/10	23:28	PDT	0.0099	60.0099	60.00	0	6	0	29	0	29	7/22/2010 23:28
07/22/10	23:29	PDT	0.0171	60.0171	60.00	0	7	0	30	0	30	7/22/2010 23:29
07/22/10	23:30	PDT	0.0196	60.0196	60.00	0	8	0	31	0	31	7/22/2010 23:30
07/22/10	23:31	PDT	0.0199	60.0199	60.00	0	9	0	32	0	32	7/22/2010 23:31
07/22/10	23:32	PDT	0.0344	60.0344	60.00	0	10	0	33	0	33	7/22/2010 23:32
07/22/10	23:33	PDT	0.0273	60.0273	60.00	0	11	0	34	0	34	7/22/2010 23:33
07/22/10	23:34	PDT	0.0366	60.0366	60.00	0	12	0	35	0	35	7/22/2010 23:34
07/22/10	23:35	PDT	0.0310	60.0310	60.00	0	13	0	36	0	36	7/22/2010 23:35
07/22/10	23:36	PDT	0.0245	60.0245	60.00	0	14	0	37	0	37	7/22/2010 23:36
07/22/10	23:37	PDT	0.0075	60.0075	60.00	0	15	0	38	0	38	7/22/2010 23:37
07/22/10	23:38	PDT	0.0183	60.0183	60.00	0	16	0	39	0	39	7/22/2010 23:38
07/22/10	23:39	PDT	0.0205	60.0205	60.00	0	17	0	40	0	40	7/22/2010 23:39
07/22/10	23:40	PDT	0.0245	60.0245	60.00	0	18	0	41	0	41	7/22/2010 23:40
07/22/10	23:41	PDT	0.0285	60.0285	60.00	0	19	0	42	0	42	7/22/2010 23:41
07/22/10	23:42	PDT	0.0247	60.0247	60.00	0	20	0	43	0	43	7/22/2010 23:42
07/22/10	23:43	PDT	0.0235	60.0235	60.00	0	21	0	44	0	44	7/22/2010 23:43
07/22/10	23:44	PDT	0.0267	60.0267	60.00	0	22	0	45	0	45	7/22/2010 23:44
07/22/10	23:45	PDT	0.0223	60.0223	60.00	0	23	0	46	0	46	7/22/2010 23:45
07/22/10	23:46	PDT	0.0213	60.0213	60.00	0	24	0	47	0	47	7/22/2010 23:46
07/22/10	23:47	PDT	0.0346	60.0346	60.00	0	25	0	48	0	48	7/22/2010 23:47
07/22/10	23:48	PDT	0.0255	60.0255	60.00	0	26	0	49	0	49	7/22/2010 23:48
07/22/10	23:49	PDT	0.0279	60.0279	60.00	0	27	0	50	0	50	7/22/2010 23:49
07/22/10	23:50	PDT	0.0318	60.0318	60.00	0	28	0	51	0	51	7/22/2010 23:50
07/22/10	23:51	PDT	0.0263	60.0263	60.00	0	29	0	52	0	52	7/22/2010 23:51
07/22/10	23:52	PDT	-0.0065	59.9935	60.00	0	0	0	53	0	53	7/22/2010 23:52
07/22/10	23:53	PDT	-0.0114	59.9886	60.00	0	0	0	54	0	54	7/22/2010 23:53
07/22/10	23:54	PDT	-0.0068	59.9932	60.00	0	0	0	55	0	55	7/22/2010 23:54
07/24/10	6:02	MST	0.0259	60.0259	60.00	0	2	0	20	0	20	7/24/2010 6:02
07/24/10	6:03	MST	0.0246	60.0246	60.00	0	3	0	21	0	21	7/24/2010 6:03
07/24/10	6:04	MST	0.0183	60.0183	60.00	0	4	0	22	0	22	7/24/2010 6:04
07/24/10	6:05	MST	0.0217	60.0217	60.00	0	5	0	23	0	23	7/24/2010 6:05
07/24/10	6:06	MST	0.0189	60.0189	60.00	0	6	0	24	0	24	7/24/2010 6:06
07/24/10	6:07	MST	0.0221	60.0221	60.00	0	7	0	25	0	25	7/24/2010 6:07
07/24/10	6:08	MST	0.0250	60.0250	60.00	0	8	0	26	0	26	7/24/2010 6:08
07/24/10	6:09	MST	0.0279	60.0279	60.00	0	9	0	27	0	27	7/24/2010 6:09
07/24/10	6:10	MST	0.0285	60.0285	60.00	0	10	0	28	0	28	7/24/2010 6:10
07/24/10	6:11	MST	0.0293	60.0293	60.00	0	11	0	29	0	29	7/24/2010 6:11
07/24/10	6:12	MST	0.0301	60.0301	60.00	0	12	0	30	0	30	7/24/2010 6:12
07/24/10	6:13	MST	0.0239	60.0239	60.00	0	13	0	31	0	31	7/24/2010 6:13
07/24/10	6:14	MST	0.0172	60.0172	60.00	0	0	0	32	0	32	7/24/2010 6:14
07/24/10	6:15	MST	0.0023	60.0023	60.00	0	0	0	33	0	33	7/24/2010 6:15
07/24/10	6:16	MST	0.0017	60.0017	60.00	0	0	0	34	0	34	7/24/2010 6:16
07/24/10	6:17	MST	-0.0061	59.9940	60.00	0	0	0	35	0	35	7/24/2010 6:17

Dates in this presentation:

Clock-minute Frequency greater than  $FTL_{High}$  on July 5, 2010,  
ending 22:45 PDT: 6 consecutive clock-minutes<sup>1</sup> during 60.02 Hz TEC

Clock-minute Frequency less than  $FTL_{Low}$  on July 15, 2010,  
ending 7:05 PDT: 4 consecutive clock-minutes

Clock-minute ACE more positive than the  $BAAL_{High}$  on July 5, 2010,  
ending 18:33 PDT: 32 consecutive clock-minutes with 40 min  $ATL_{High}$  during  
60.02 Hz TEC.

Clock-minute ACE more positive than the  $ATL_{High}$  on July 20, 2010,  
ending 2:53 PDT: 51 consecutive clock-minutes<sup>1</sup>

Clock-minute ACE more positive than the  $ATL_{High}$  on July 22, 2010,  
ending 23:54 PDT: 55 consecutive clock-minutes

Clock-minute ACE more positive than the  $ATL_{High}$  on July 24, 2010,  
ending 6:17 PDT: 35 consecutive clock-minutes

<sup>1</sup> Under draft BAL-008, a proposed  $FTL_{Low}$  violation would occur when the actual frequency is lower than  $FTL_{Low}$  for more than 30 consecutive clock-minutes and a proposed  $FTL_{High}$  violation would occur when the actual frequency is greater than  $FTL_{High}$  for more than 30 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.

7/05/2010 ending 22:45 PDT

6 minute duration above  $FTL_{High}$   
during TEC at 60.02 Hz.

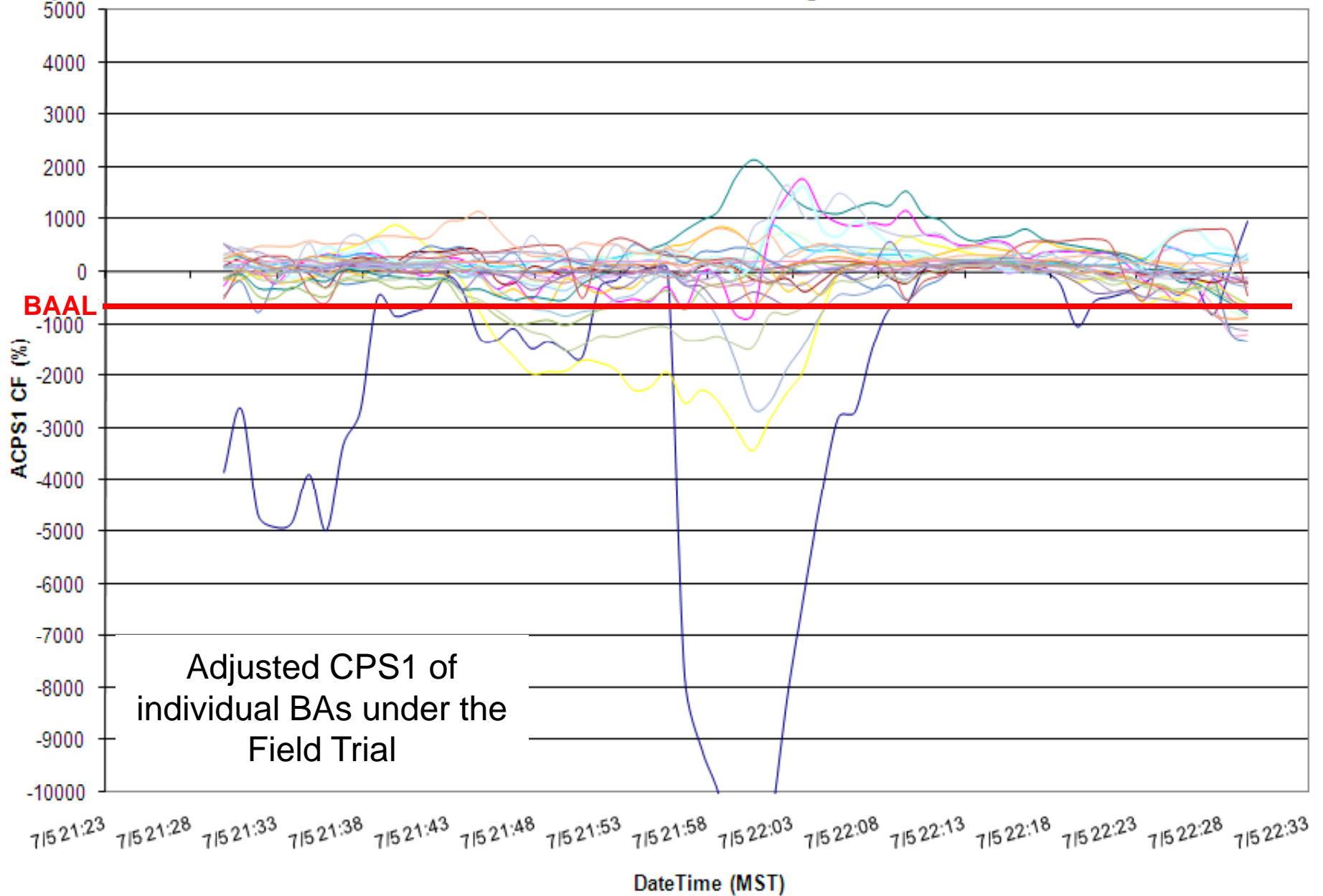
### Clock-Minute Average Frequency



7/05/2010 ending 22:45 PDT

6 minute duration above  $FTL_{High}$   
during TEC at 60.02 Hz.

### ACPS1 Clock-Minute Averages



7/05/2010 ending 22:45 PDT

6 minute duration above  $FTL_{High}$   
during TEC at 60.02 Hz.

### Consecutive Minutes Exceeding BAAL

**BAAL Violation\***

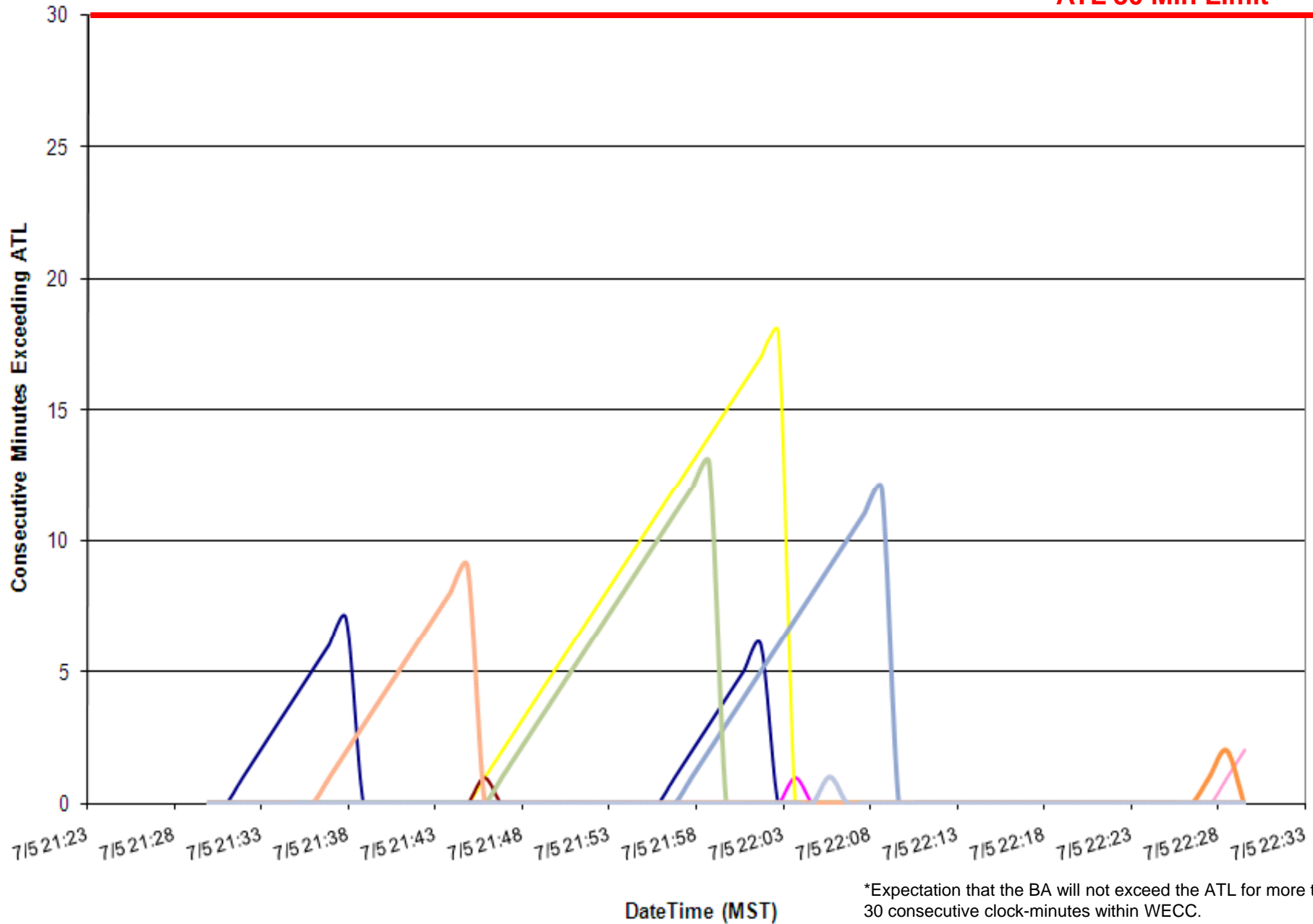


7/05/2010 ending 22:45 PDT

6 minute duration above  $FTL_{High}$   
during TEC at 60.02 Hz.

### Consecutive Minutes Exceeding ATL

**ATL 30 Min Limit\***

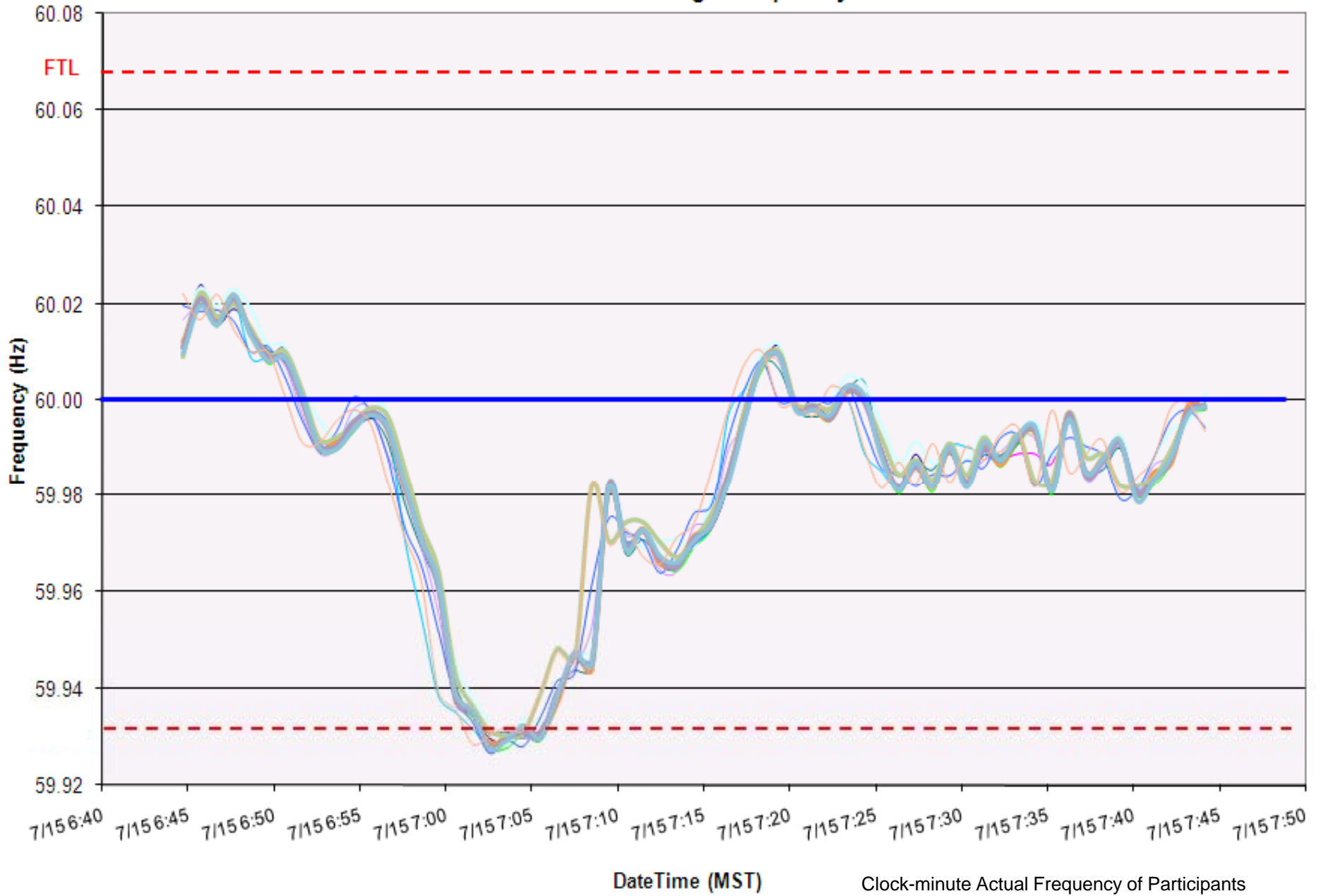


\*Expectation that the BA will not exceed the ATL for more than 30 consecutive clock-minutes within WECC.

7/15/2010 ending 7:05 PDT

4 minute duration below  $FTL_{Low}$

### Clock-Minute Average Frequency

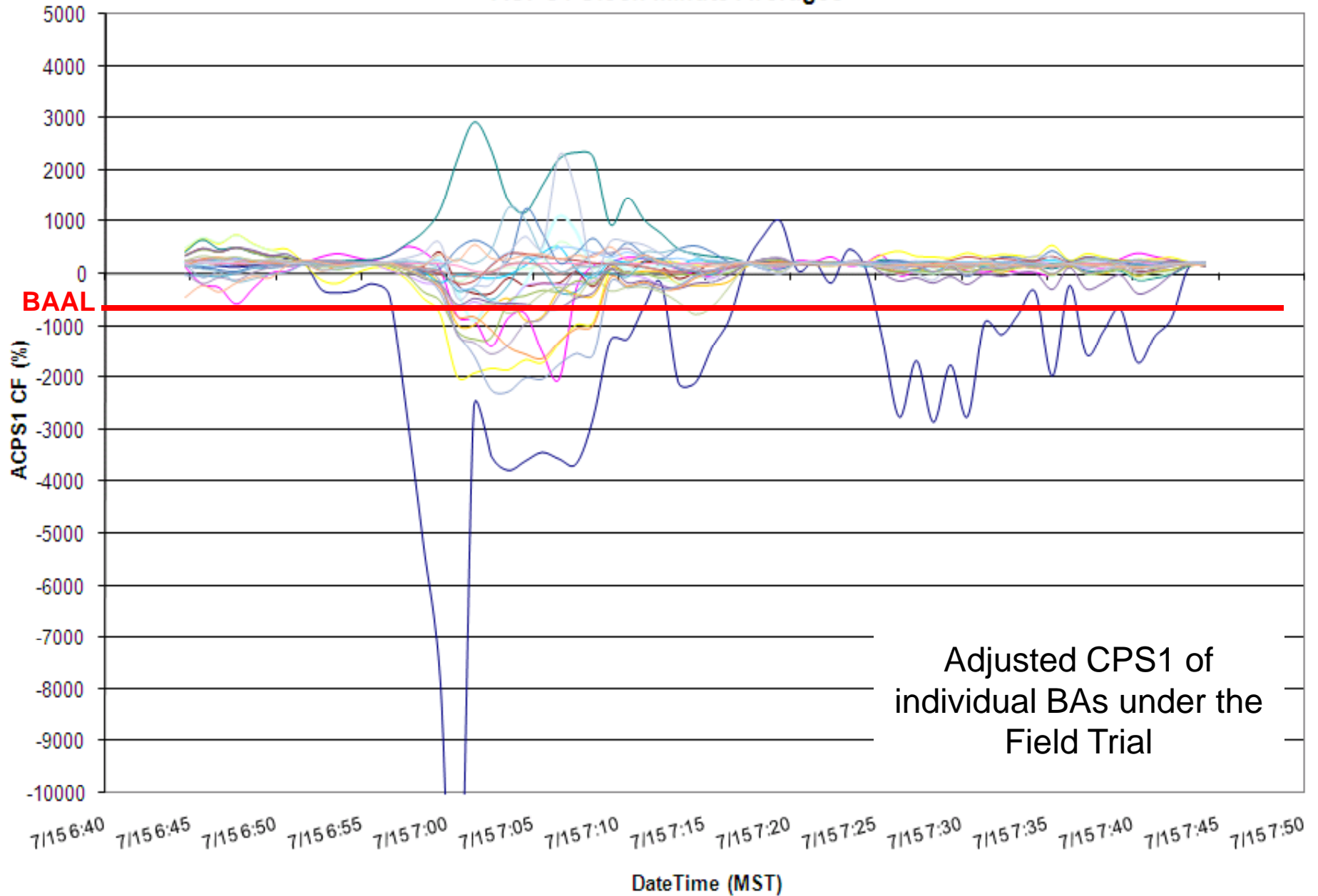


Clock-minute Actual Frequency of Participants

7/15/2010 ending 7:05 PDT

4 minute duration below FTL<sub>Low</sub>

### ACPS1 Clock-Minute Averages



Adjusted CPS1 of individual BAs under the Field Trial

7/15/2010 ending 7:05 PDT  
4 minute duration below FTL<sub>Low</sub>

### Consecutive Minutes Exceeding BAAL

**BAAL Violation\***



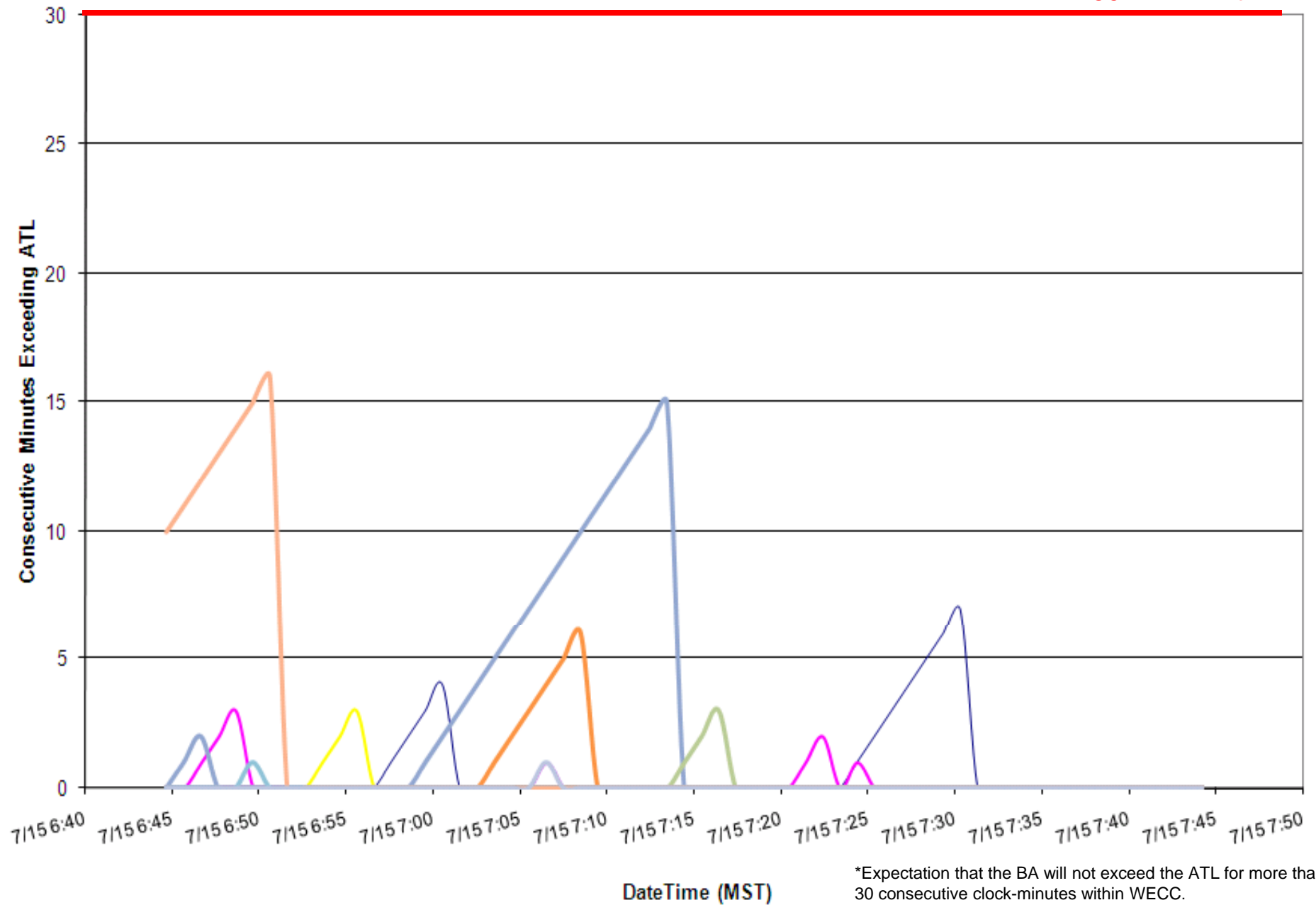
\*BAAL being exceeded for more than 30 consecutive clock-minutes would be a violation under the proposed standard.

7/15/2010 ending 7:05 PDT

4 minute duration below FTL<sub>Low</sub>

### Consecutive Minutes Exceeding ATL

**ATL 30 Min Limit**



\*Expectation that the BA will not exceed the ATL for more than 30 consecutive clock-minutes within WECC.

7/05/2010 ending 18:33 PDT  
32 minute duration above BAAL<sub>High</sub>  
during TEC at 60.02 Hz.

### Clock-Minute Average Frequency

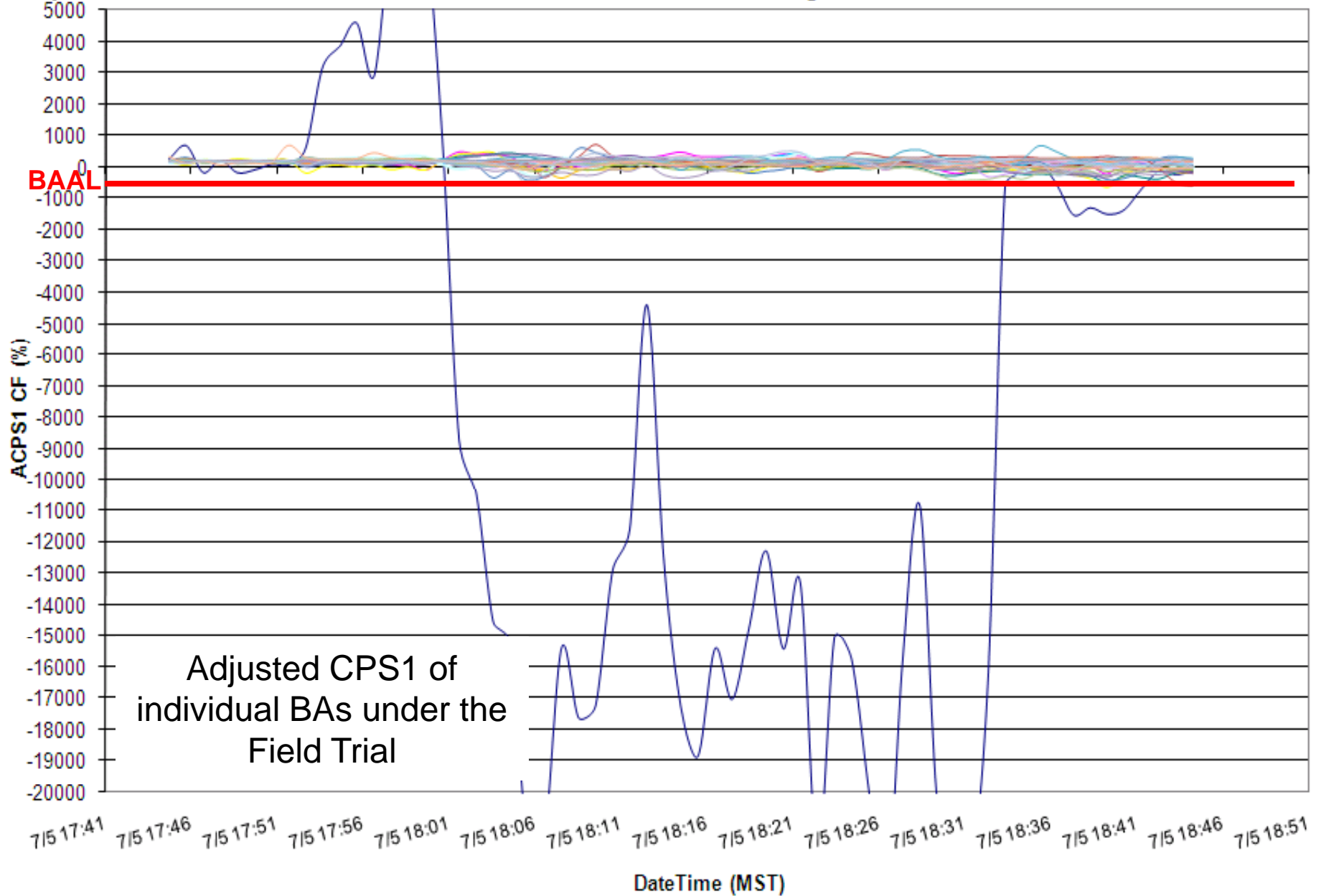


Clock-minute Actual Frequency of Participants

7/05/2010 ending 18:33 PDT

32 minute duration above BAAL<sub>High</sub>  
during TEC at 60.02 Hz.

### ACPS1 Clock-Minute Averages

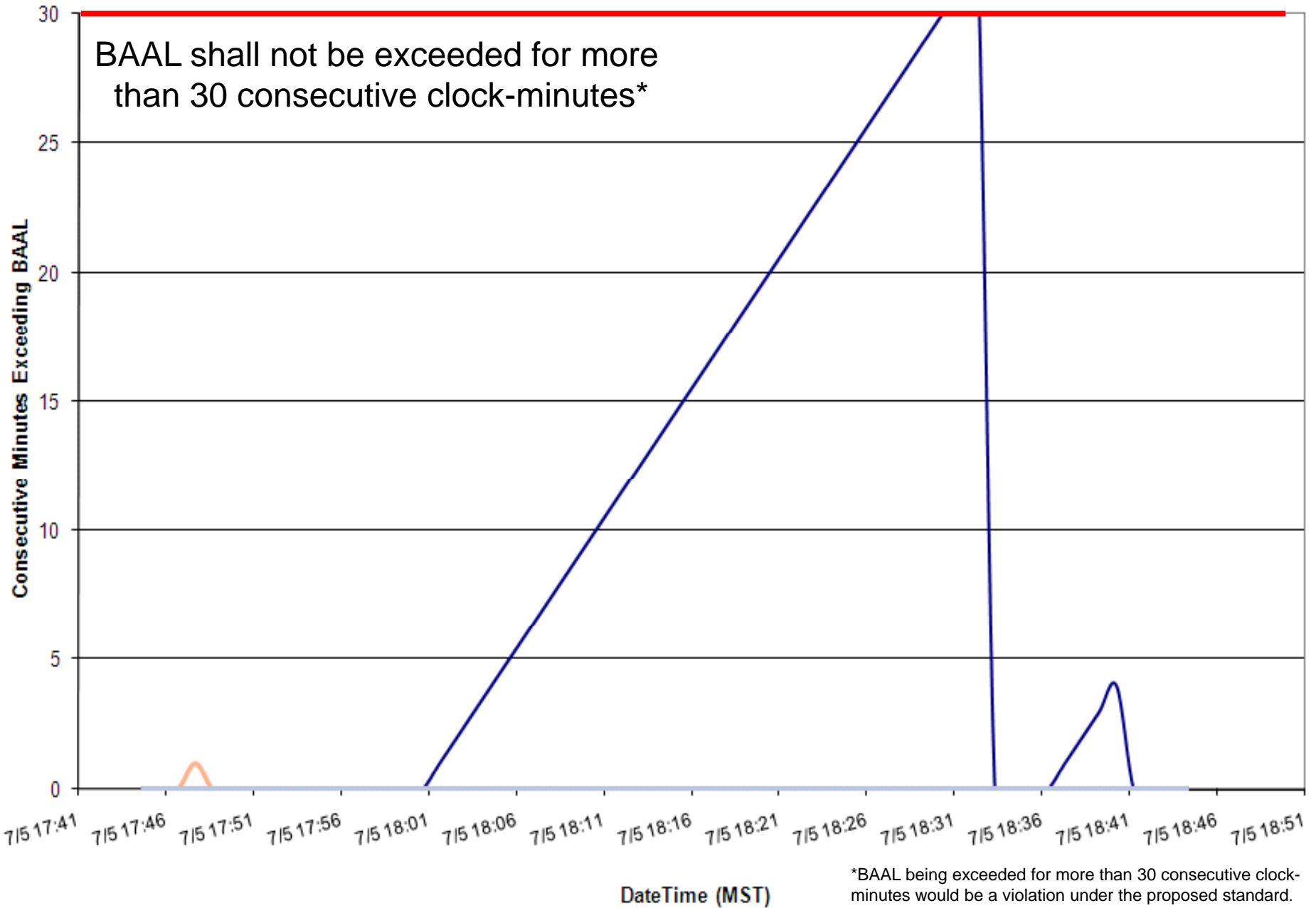


7/05/2010 ending 18:33 PDT

32 minute duration above BAAL<sub>High</sub>  
during TEC at 60.02 Hz.

### Consecutive Minutes Exceeding BAAL

**BAAL Violation\***

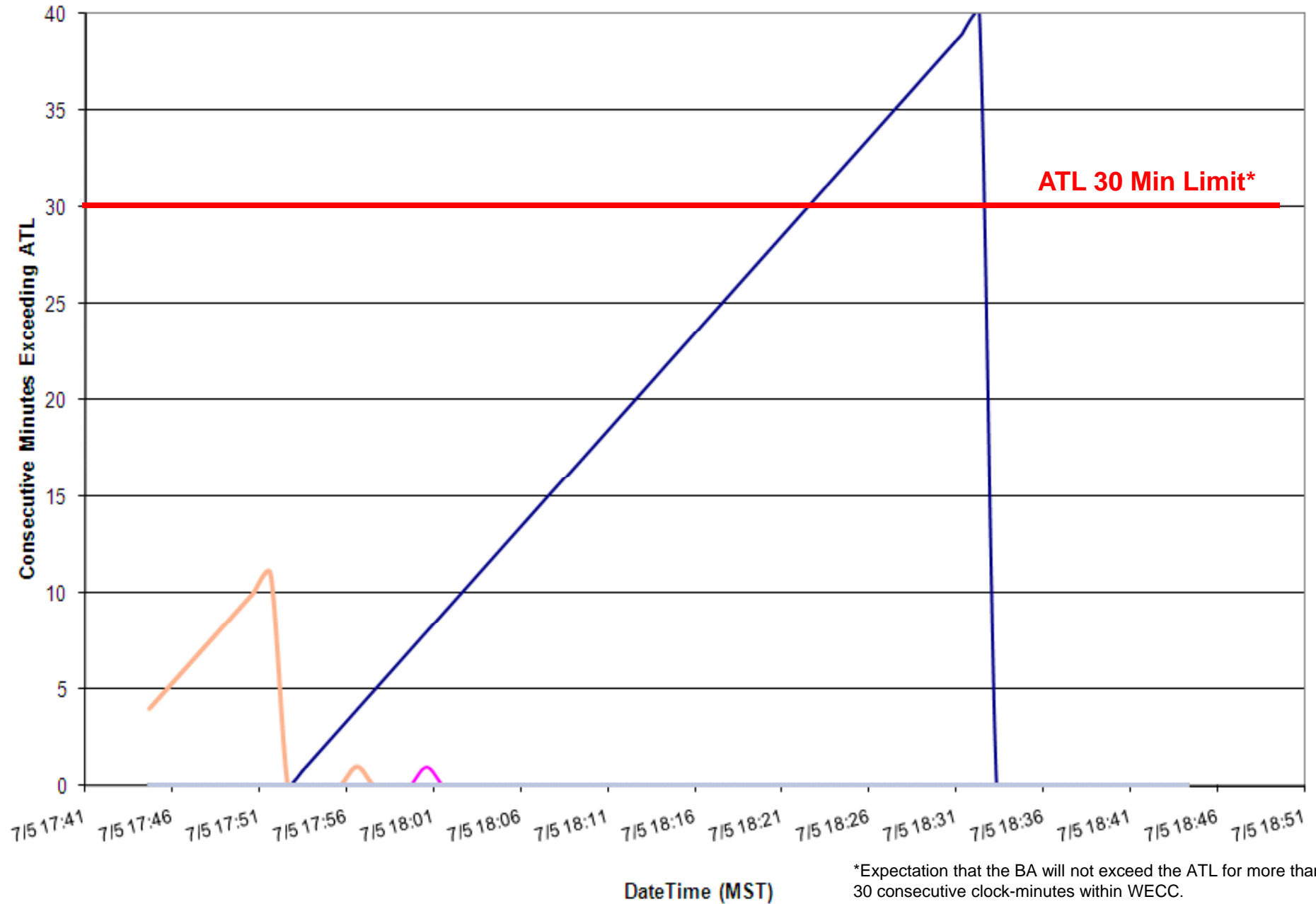


\*BAAL being exceeded for more than 30 consecutive clock-minutes would be a violation under the proposed standard.

7/05/2010 ending 18:33 PDT

32 minute duration above BAAL<sub>High</sub>  
during TEC at 60.02 Hz.

### Consecutive Minutes Exceeding ATL



\*Expectation that the BA will not exceed the ATL for more than 30 consecutive clock-minutes within WECC.

7/20/2010 ending 2:53 PDT  
51-minute duration above ATL<sub>High</sub>

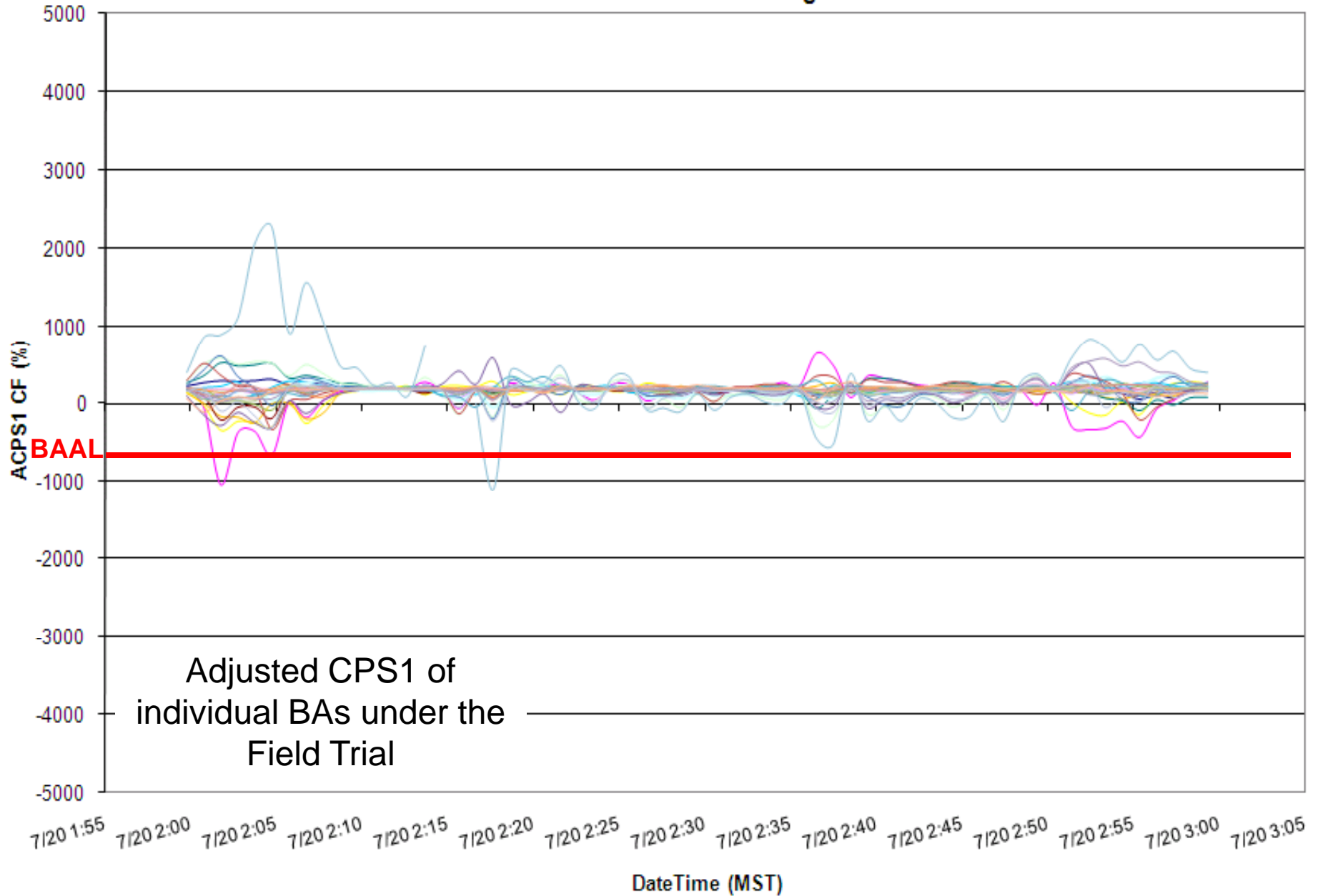
### Clock-Minute Average Frequency



Clock-minute Actual Frequency of Participants

7/20/2010 ending 2:53 PDT  
51-minute duration above ATL<sub>High</sub>

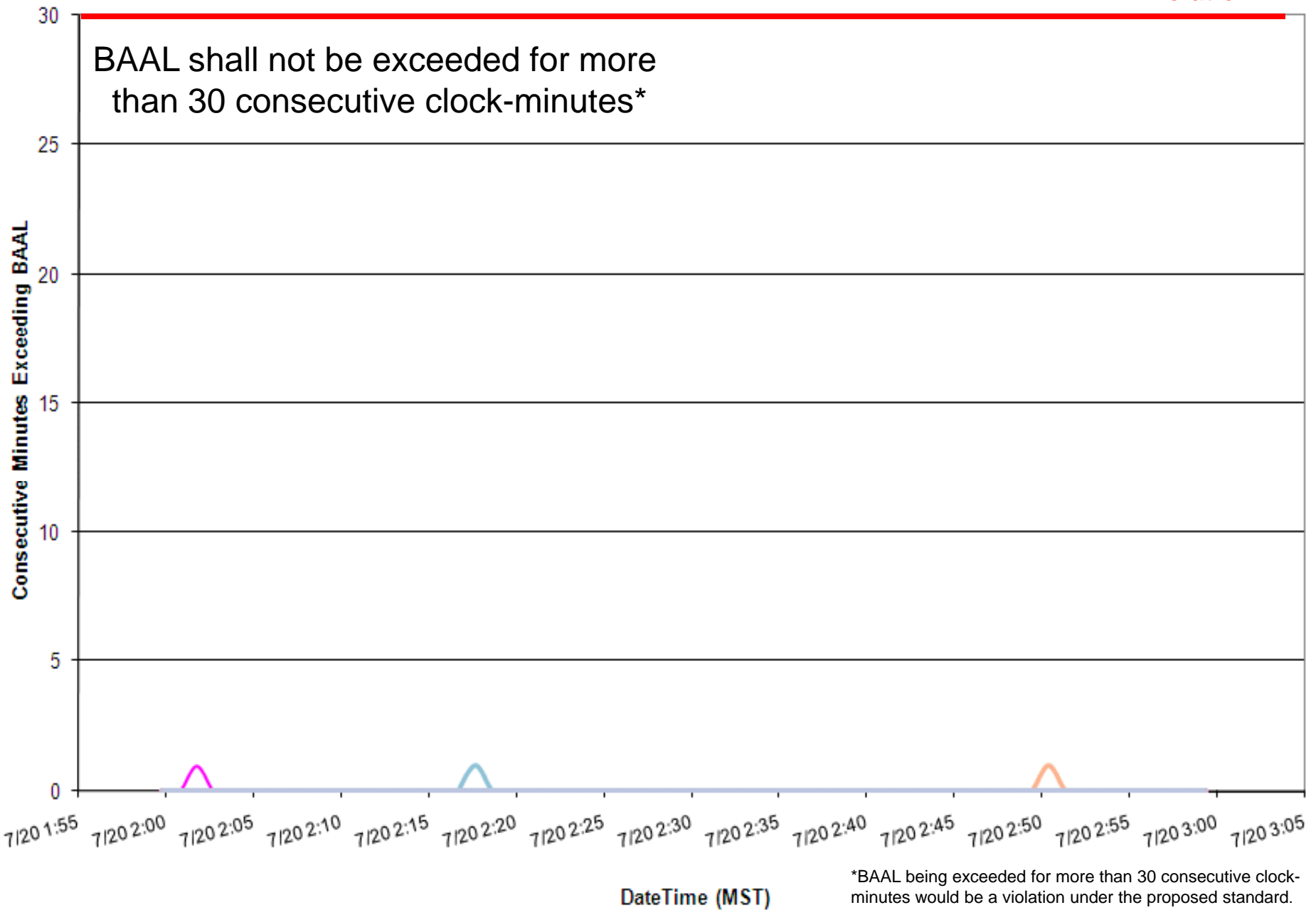
### ACPS1 Clock-Minute Averages



7/20/2010 ending 2:53 PDT  
51-minute duration above ATL<sub>High</sub>

### Consecutive Minutes Exceeding BAAL

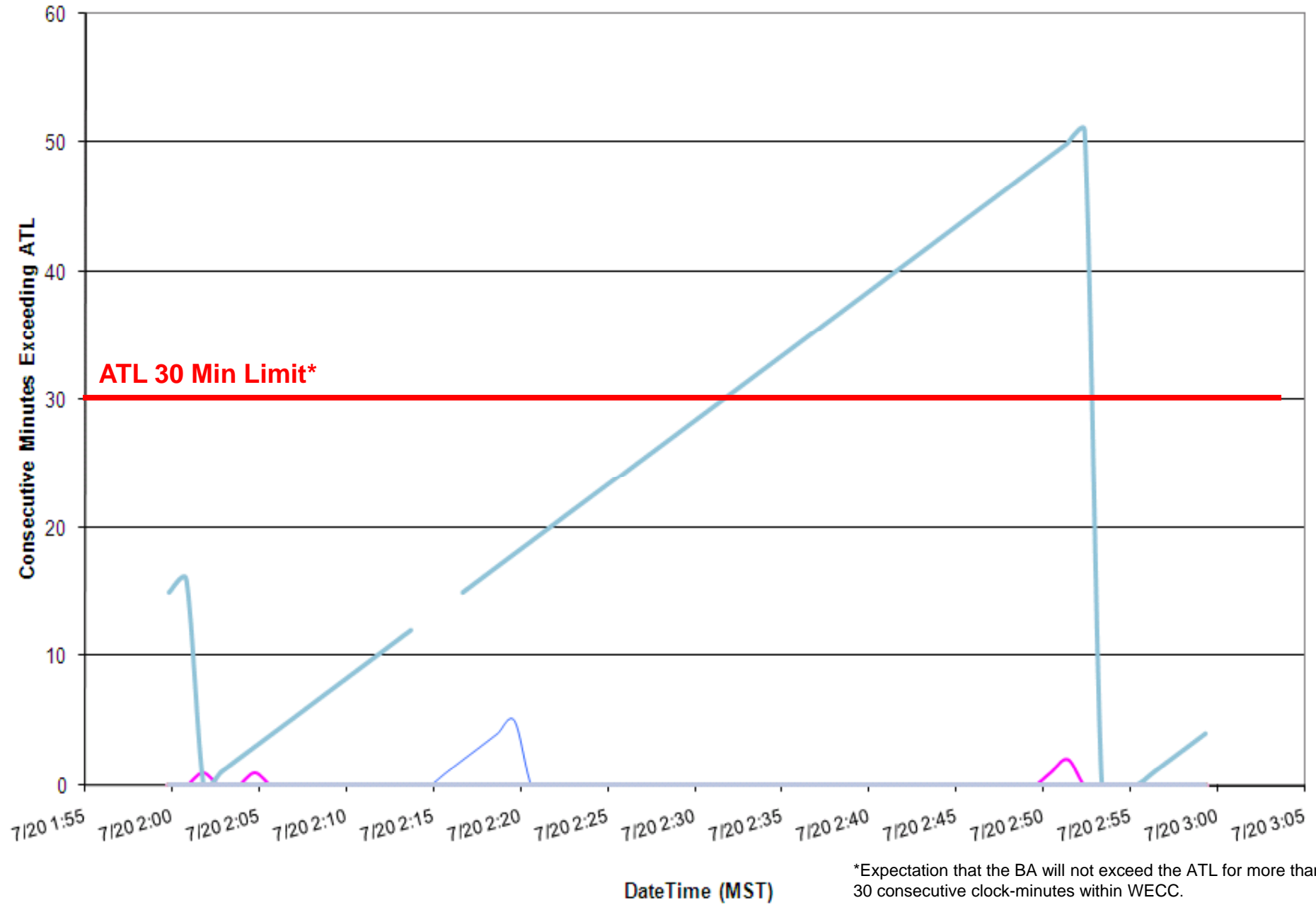
**BAAL Violation\***



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

7/20/2010 ending 2:53 PDT  
51-minute duration above ATL<sub>High</sub>

### Consecutive Minutes Exceeding ATL



\*Expectation that the BA will not exceed the ATL for more than 30 consecutive clock-minutes within WECC.

7/22/2010 ending 23:54 PDT

55-minute duration above ATL<sub>High</sub>

### Clock-Minute Average Frequency

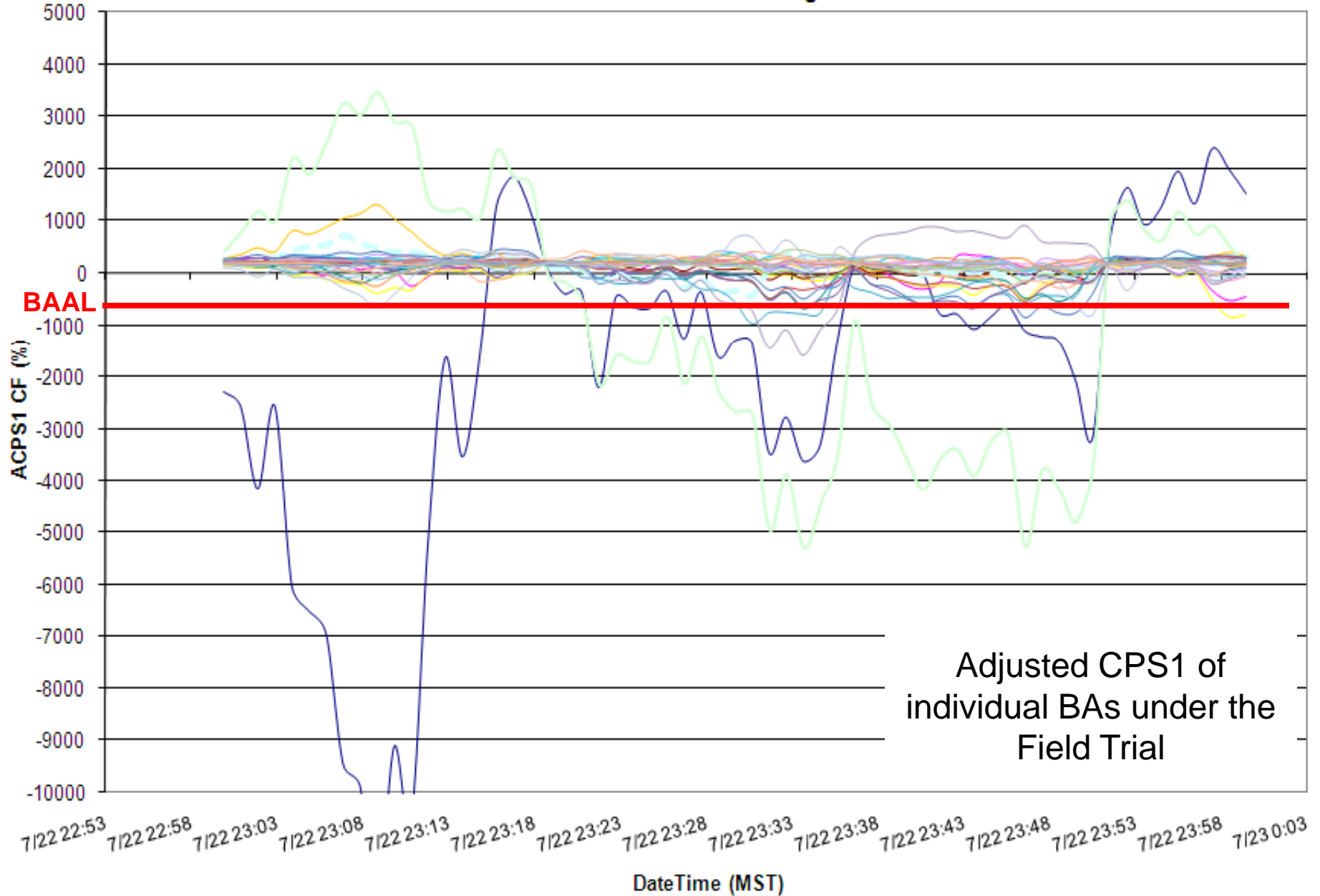


Clock-minute Actual Frequency of Participants

7/22/2010 ending 23:54 PDT

55-minute duration above ATL<sub>High</sub>

### ACPS1 Clock-Minute Averages

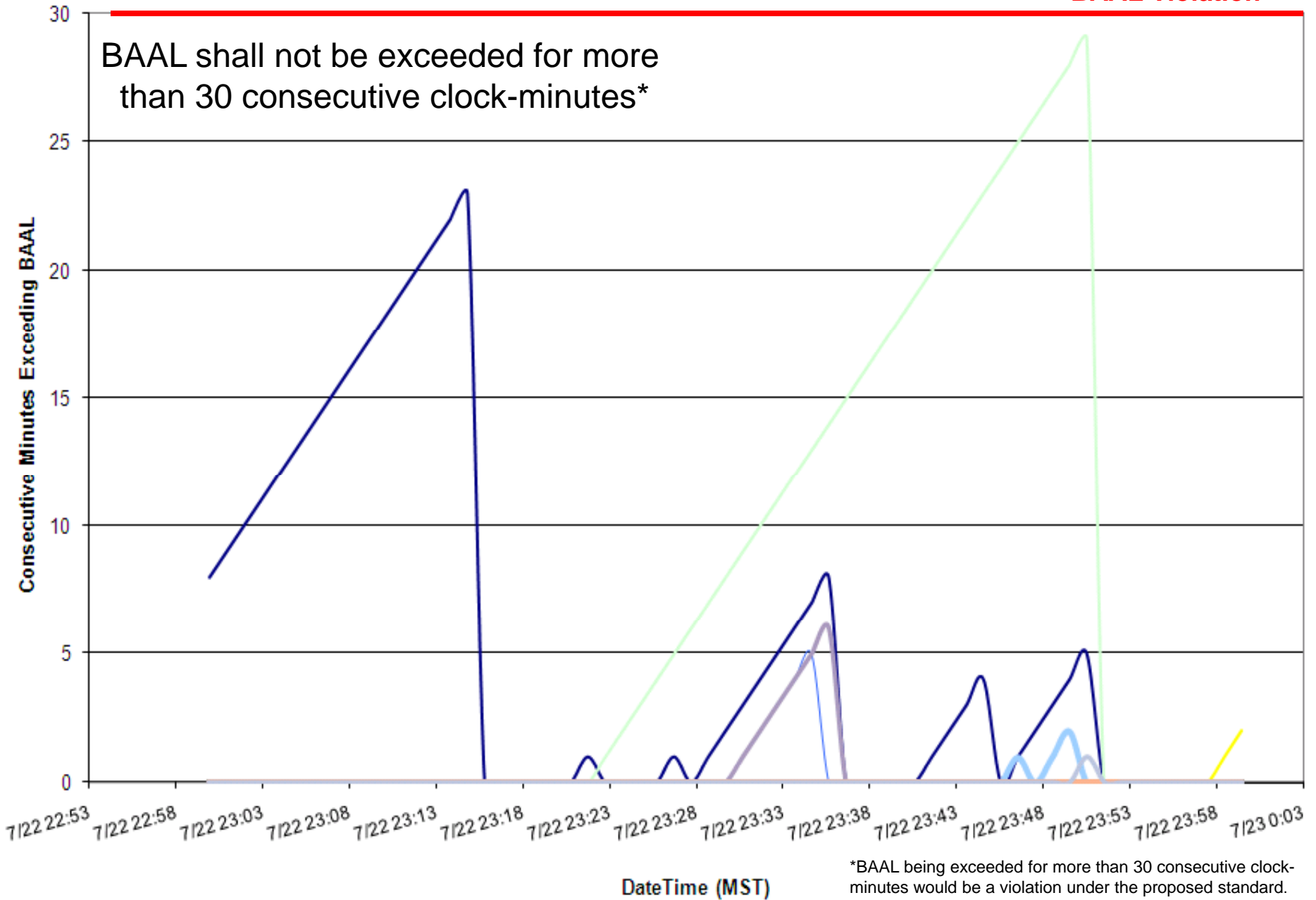


Adjusted CPS1 of individual BAs under the Field Trial

7/22/2010 ending 23:54 PDT  
55-minute duration above ATL<sub>High</sub>

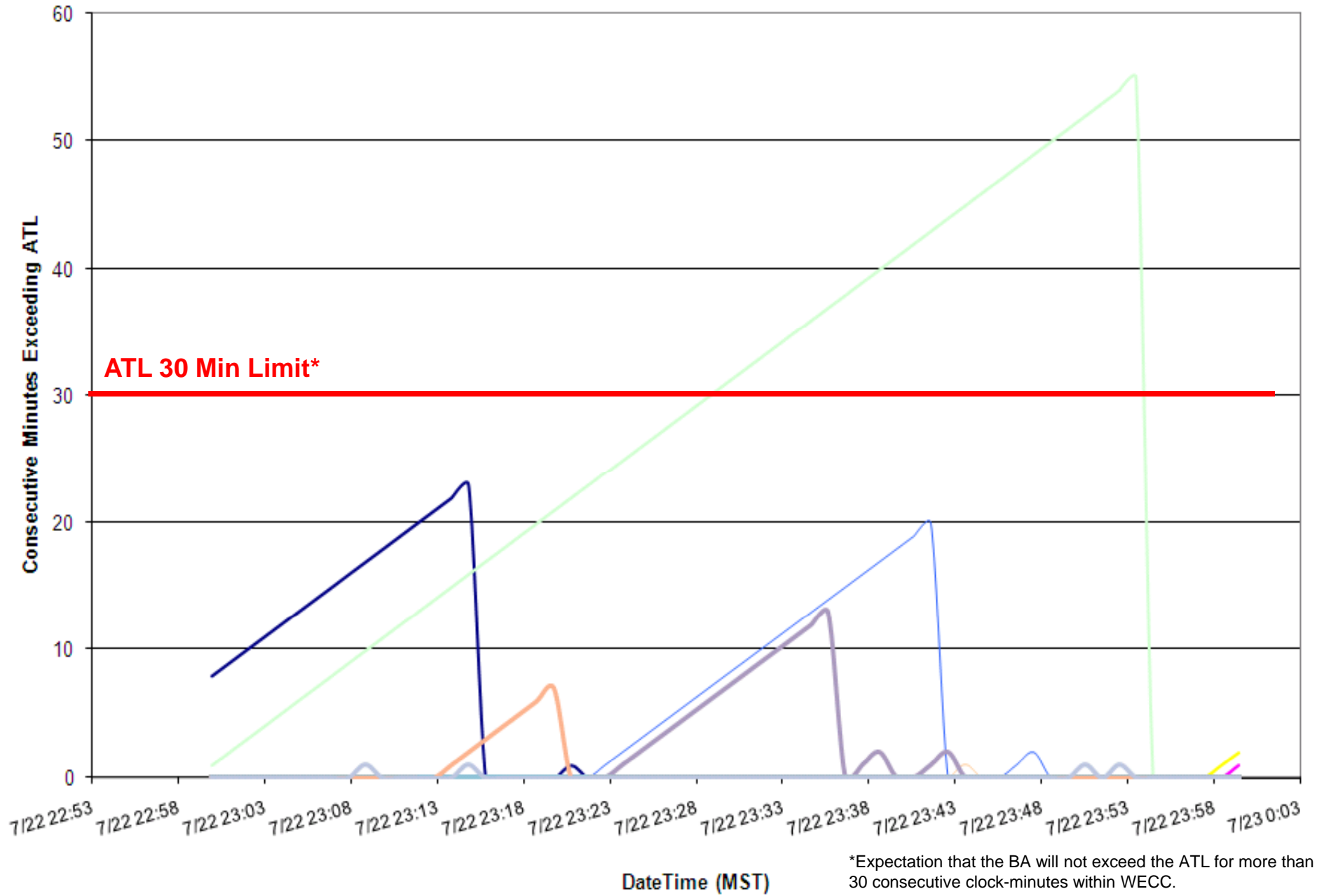
### Consecutive Minutes Exceeding BAAL

**BAAL Violation\***



7/22/2010 ending 23:54 PDT  
55-minute duration above ATL<sub>High</sub>

### Consecutive Minutes Exceeding ATL



\*Expectation that the BA will not exceed the ATL for more than 30 consecutive clock-minutes within WECC.

7/24/2010 ending 6:17 PDT  
35-minute duration above ATL<sub>High</sub>

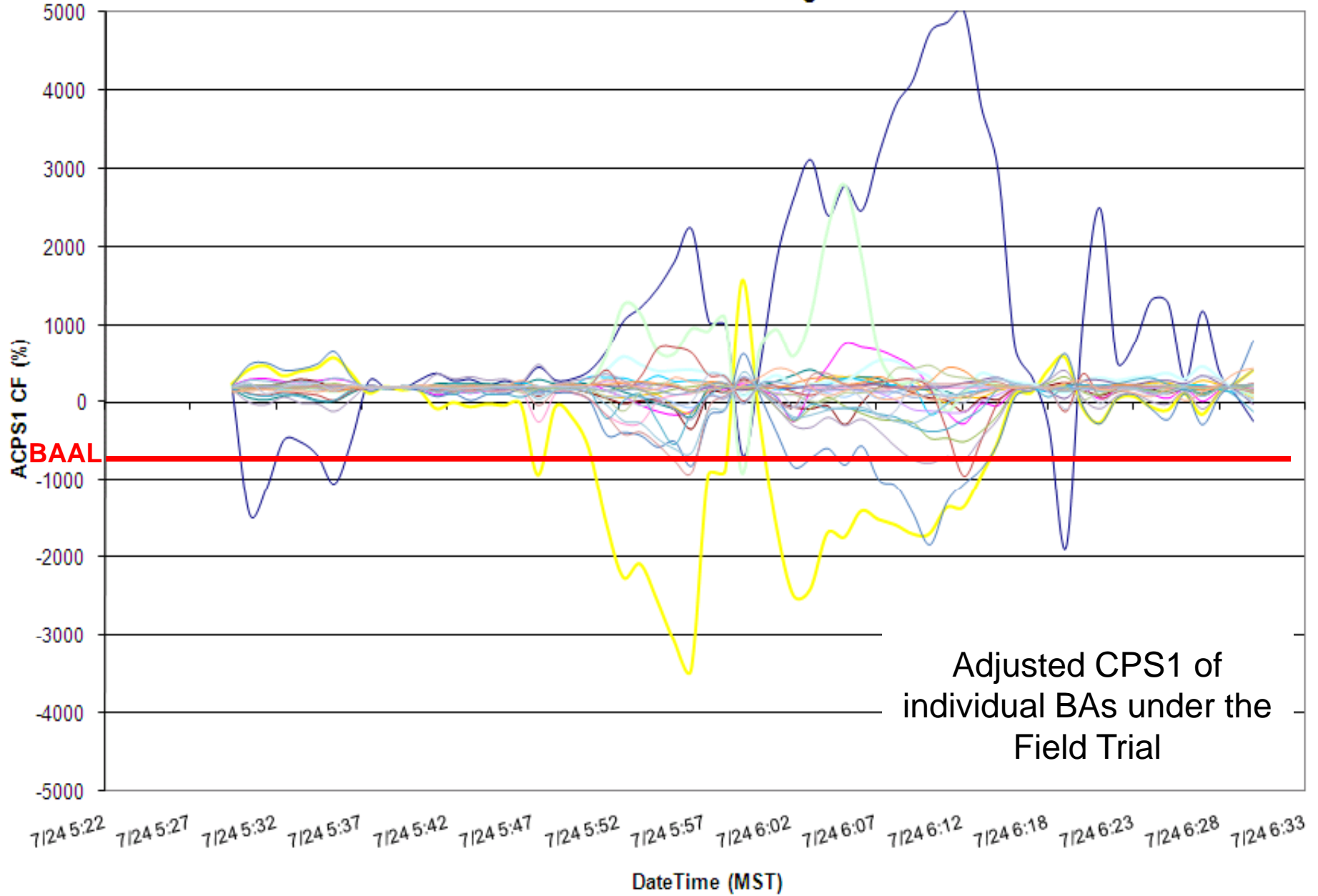
### Clock-Minute Average Frequency



Clock-minute Actual Frequency of Participants

7/24/2010 ending 6:17 PDT  
35-minute duration above ATL<sub>High</sub>

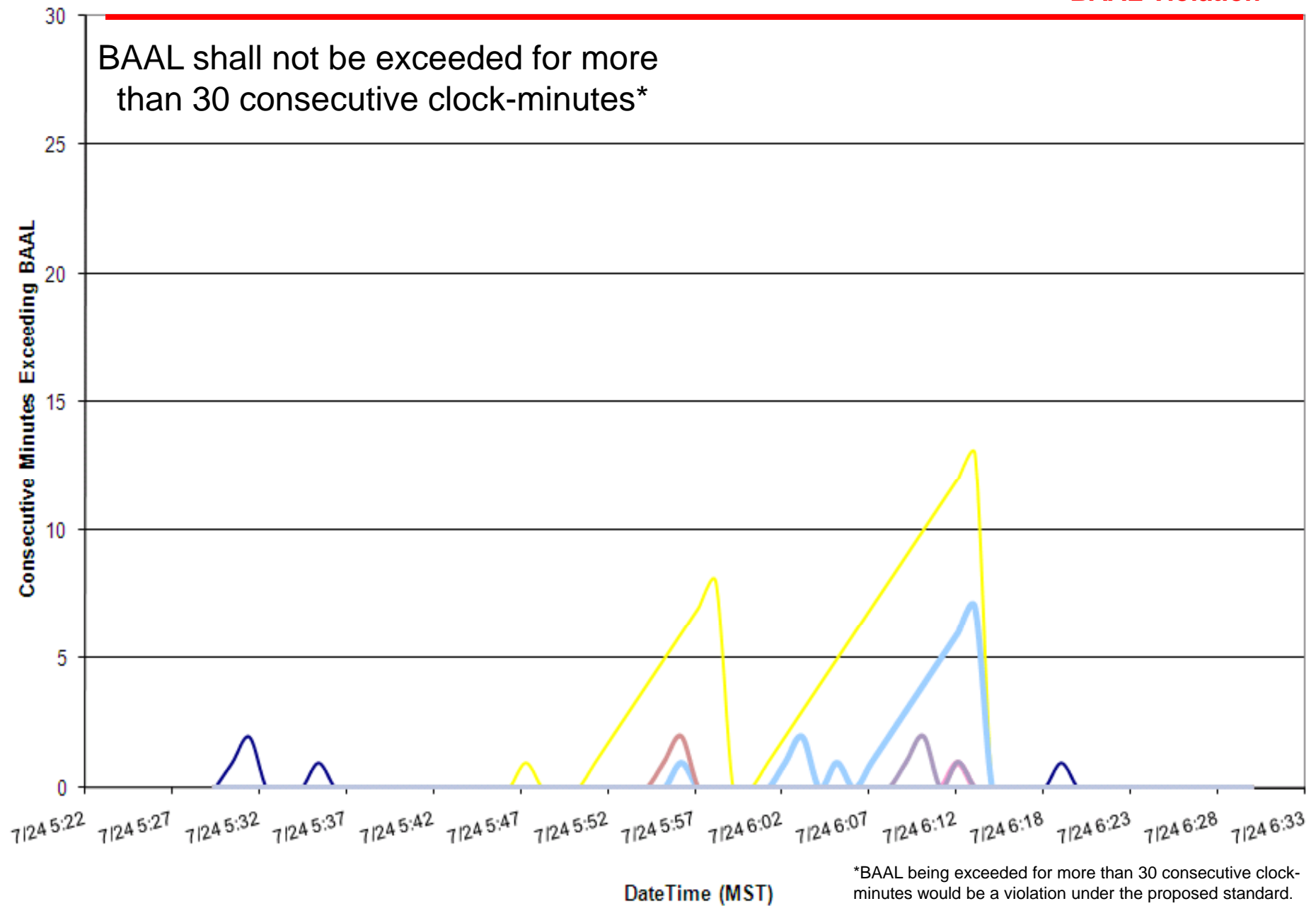
### ACPS1 Clock-Minute Averages



7/24/2010 ending 6:17 PDT  
35-minute duration above ATL<sub>High</sub>

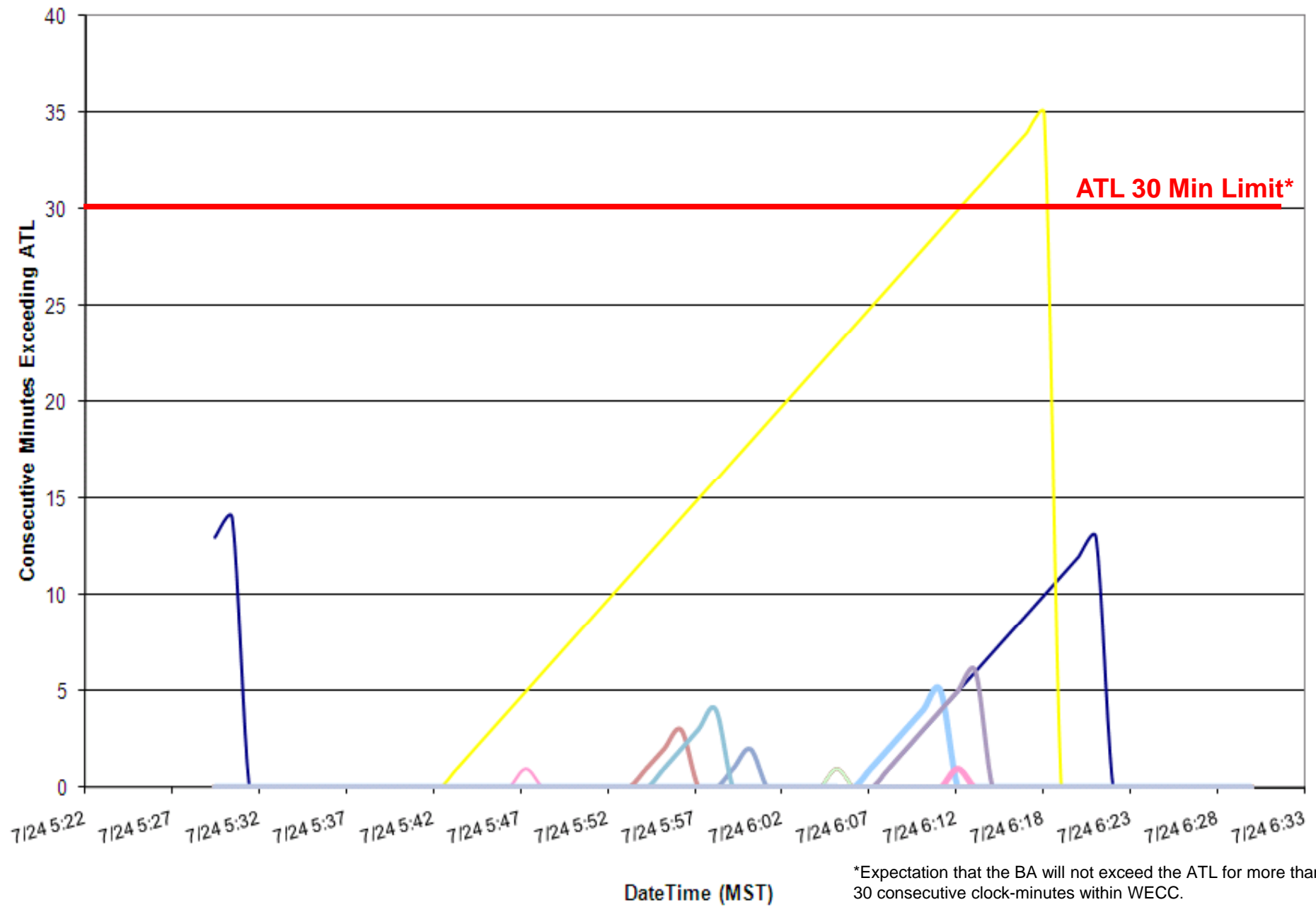
### Consecutive Minutes Exceeding BAAL

**BAAL Violation\***



7/24/2010 ending 6:17 PDT  
35-minute duration above ATL<sub>High</sub>

### Consecutive Minutes Exceeding ATL



\*Expectation that the BA will not exceed the ATL for more than 30 consecutive clock-minutes within WECC.

# **Balancing Authority ACE Limit Proof-of-Concept Field Trial**

## Discussion

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