

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

WECC Update Discussion
April 29, 2011

DISCUSSION STARTING AT 3:30 PM EDT

Bob Klueber- Midwest ISO

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

Balancing Authority ACE Limit Proof-of-Concept Field Trial

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}

PrevailingTime	PTimeZone	FreqError	ActualFreq	SchedFreq
3/22/11 10:50	PDT	-0.0790	59.9210	60.0000
3/26/11 15:52	PDT	-0.0897	59.9303	60.0200
PrevailingTime	PTimeZone	FreqError	ActualFreq	SchedFreq
NONE				

03/22/2011 – Total loss of 1542 MW in SW region

03/26/2011 – Loss of 1107 MW in SW region.

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_Number	BAAL _{Low}	BAAL _{High}	ATL _{Low}	ATL _{High}	BAAL _{Low}	BAAL _{High}	ATL _{Low}	ATL _{High}	BAAL _{Low} or ATL _{Low}	BAAL _{High} or ATL _{High}
	Max_MinCtLow	Max_MinCtHigh	Max_MinCtLow2	Max_MinCtHigh2	Max_MinCtLow	Max_MinCtHigh	Max_MinCtLow2	Max_MinCtHigh2	Max_LowLimitCt	Max_HighLimitCt
BA05	44	42	58	49	26	27	27	26	29	27
BA06	16	15	13	15	12	8	6	3	12	8
BA07	25	36	29	41	25	20	7	7	25	20
BA08	22	41	19	34	1	18	5	1	5	18
BA09	11	9	15	55	5	2	3	10	5	10
BA11	10	14	16	7	7	4	0	0	7	4
BA12	14	13	14	17	14	4	14	8	14	8
BA13	7	27	12	45	2	5	1	1	2	5
BA14	23	31	13	55	8	6	0	0	8	6
BA15	5	7	7	5	0	1	0	0	0	1
BA16	14	20	25	34	12	20	9	11	12	20
BA18	10	13	25	15	10	5	10	1	10	5
BA19	23	26	30	34	23	26	25	5	26	26
BA22	7	10	15	14	7	9	1	3	7	9
BA23	20	18	13	27	8	10	4	14	8	14
BA25	15	22	21	14	12	19	1	5	12	19
BA26	13	23	43	41	8	23	7	15	8	23
BA27	23	22	16	15	5	0	0	0	5	0
BA28	13	24	38	39	8	10	10	22	10	22
BA29	17	9	16	16	3	4	4	2	4	4
BA30	19	18	47	39	3	3	5	2	5	3
BA31	20	16	29	28	16	14	18	11	18	14
BA33	26	16	28	58	19	16	21	6	21	16
BA34	16	17	23	29	8	7	16	15	20	15
BA36	69	25	114	25	15	25	10	20	15	25

MinCtLow = Count of consecutive clock-minutes BAAL_{Low} was exceeded
 MinCtHigh = Count of consecutive clock-minutes BAAL_{High} was exceeded
 MinCtLow2 = Count of consecutive clock-minutes ATL_{Low} was exceeded
 MinCtHigh2 = Count of consecutive clock-minutes ATL_{High} was exceeded

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

Statistics of BAAL being exceeded > 20 consecutive clock-minutes :

Date	Time	TimeZone	ActualFreq	SchedFreq	MinCtLow	MinCtHigh	CPS1	ACPS1	MinCtLow2	MinCtHigh2	LowLimitCt	HighLimitCt
03/02/11	23:39	MST	60.0344	60.00	0	21	-16911.7	-16911.7	0	16	0	21
03/02/11	23:40	MST	60.0241	60.00	0	22	-12489.2	-12489.2	0	17	0	22
03/02/11	23:41	MST	60.0203	60.00	0	23	-11167.1	-11167.1	0	18	0	23
03/02/11	23:42	MST	60.0172	60.00	0	24	-10172.9	-10172.9	0	19	0	24
03/02/11	23:43	MST	60.0297	60.00	0	25	-19001.3	-19001.3	0	20	0	25
03/02/11	23:44	MST	60.0286	60.00	0	26	-11253.9	-11253.9	0	21	0	26
03/02/11	23:45	MST	60.0314	60.00	0	27	-1078.6	-1078.6	0	0	0	27
03/04/11	05:47	MST	59.9450	59.98	21	0	-1125.7	-1883.3	0	0	21	0
03/04/11	05:48	MST	59.9450	59.98	22	0	-1125.7	-1883.3	0	0	22	0
03/04/11	05:49	MST	59.9450	59.98	23	0	-1125.7	-1883.3	0	0	23	0
03/04/11	05:50	MST	59.9441	59.98	24	0	-1100.3	-1824.6	0	0	24	0
03/04/11	06:44	MST	59.9690	59.98	21	0	-134.4	-740.8	0	0	21	0
03/04/11	06:45	MST	59.9717	59.98	22	0	-63.2	-694.4	0	0	22	0
03/04/11	06:46	MST	59.9711	59.98	23	0	-76.5	-695.7	0	0	23	0
03/04/11	06:47	MST	59.9693	59.98	24	0	-118.3	-715.1	0	0	24	0
03/04/11	06:48	MST	59.9641	59.98	25	0	-282.8	-889.6	0	0	25	0
03/05/11	13:33	MST	60.0394	60.02	0	21	-2244.5	-4764.6	0	0	0	21
03/05/11	13:34	MST	60.0352	60.02	0	22	-1930.5	-4733.9	0	0	0	22
03/05/11	13:35	MST	60.0380	60.02	0	23	-1945.0	-4328.4	0	0	0	23
03/05/11	14:00	MST	60.0140	60.02	0	21	2329.5	-4768.8	0	16	0	21
03/05/11	14:01	MST	60.0131	60.02	0	22	2659.1	-4468.7	0	17	0	22
03/05/11	14:02	MST	60.0234	60.02	0	23	-1066.4	-8515.5	0	18	0	23
03/05/11	14:03	MST	60.0232	60.02	0	24	-995.6	-8467.8	0	19	0	24
03/05/11	14:04	MST	60.0258	60.02	0	25	-2008.7	-9625.0	0	20	0	25
03/05/11	14:05	MST	60.0303	60.02	0	26	-3726.0	-11349.4	0	21	0	26
03/05/11	14:06	MST	60.0213	60.02	0	27	94.9	-1522.3	0	0	0	27
03/05/11	14:31	MST	60.0311	60.02	0	21	-8903.9	-25307.2	0	21	0	21
03/05/11	14:32	MST	60.0318	60.02	0	22	-9464.4	-25844.7	0	22	0	22
03/05/11	14:33	MST	60.0348	60.02	0	23	-12163.9	-28871.9	0	23	0	23
03/05/11	14:34	MST	60.0294	60.02	0	24	-7713.7	-24551.2	0	24	0	24
03/05/11	14:35	MST	60.0332	60.02	0	25	-11076.4	-28161.9	0	25	0	25
03/05/11	14:36	MST	60.0233	60.02	0	26	-2257.1	-17148.6	0	26	0	26
03/05/11	15:01	MST	60.0140	60.00	0	21	-6195.0	-7585.2	0	20	0	21
03/05/11	15:02	MST	60.0075	60.00	0	22	-3739.7	-3739.7	0	21	0	22
03/05/11	15:03	MST	60.0038	60.00	0	23	-1666.2	-1666.2	0	22	0	23
03/05/11	15:04	MST	60.0047	60.00	0	24	-1917.0	-1917.0	0	23	0	24
03/07/11	09:35	MST	59.9874	60.00	21	0	-1519.8	-1519.8	21	0	21	0
03/07/11	09:36	MST	59.9852	60.00	22	0	-1543.0	-1543.0	22	0	22	0
03/07/11	09:37	MST	59.9875	60.00	23	0	-1154.2	-1154.2	23	0	23	0

Statistics of BAAL being exceeded > 20 consecutive clock-minutes :

Date	Time	TimeZone	ActualFreq	SchedFreq	MinCtLow	MinCtHigh	CPS1	ACPS1	MinCtLow2	MinCtHigh2	LowLimitCt	HighLimitCt
03/10/11	04:21	MST	59.9839	60.00	21	0	-2869.0	-2869.0	0	0	24	0
03/10/11	04:22	MST	59.9646	60.00	22	0	-7849.7	-7849.7	0	0	25	0
03/10/11	04:23	MST	59.9689	60.00	23	0	-1840.8	-1840.8	0	0	26	0
03/10/11	04:24	MST	59.9685	60.00	24	0	-932.8	-932.8	0	0	27	0
03/10/11	23:52	MST	60.0182	60.00	0	21	-822.9	-822.9	0	0	0	21
03/11/11	10:02	MST	59.9866	60.00	21	0	-3353.7	-3353.7	0	0	21	0
03/11/11	10:03	MST	59.9935	60.00	22	0	-1531.5	-1531.5	0	0	22	0
03/11/11	17:14	PST	60.0226	60.00	0	21	-799.1	-799.1	0	0	0	21
03/13/11	13:46	PDT	60.0489	60.02	0	21	-1043.2	-1903.5	0	0	0	21
03/13/11	13:47	PDT	60.0411	60.02	0	22	-527.6	-1216.0	0	0	0	22
03/13/11	13:48	PDT	60.0417	60.02	0	23	-554.0	-1248.0	0	0	0	23
03/13/11	13:49	PDT	60.0376	60.02	0	24	-307.9	-886.5	0	0	0	24
03/13/11	13:50	PDT	60.0358	60.02	0	25	-235.4	-787.7	0	0	0	25
03/15/11	05:38	MDT	59.9711	60.00	21	0	-14971.7	-14971.7	12	0	21	0
03/15/11	05:39	MDT	59.9759	60.00	22	0	-12440.0	-12440.0	13	0	22	0
03/15/11	05:40	MDT	59.9650	60.00	23	0	-18648.3	-18648.3	14	0	23	0
03/15/11	05:41	MDT	59.9686	60.00	24	0	-18595.5	-18595.5	15	0	24	0
03/15/11	05:42	MDT	59.9641	60.00	25	0	-19944.6	-19944.6	16	0	25	0
03/15/11	05:43	MDT	59.9757	60.00	26	0	-5407.7	-5407.7	0	0	26	0
03/18/11	04:06	MDT	59.9743	60.00	21	0	-3128.3	-3128.3	0	0	21	0
03/18/11	04:07	MDT	59.9698	60.00	22	0	-964.6	-964.6	0	0	22	0
03/20/11	06:12	MDT	60.0391	60.02	0	21	-421.2	-1071.6	0	0	0	21
03/20/11	06:13	MDT	60.0391	60.02	0	22	-362.9	-952.3	0	0	0	22
03/20/11	06:14	MDT	60.0364	60.02	0	23	-261.6	-824.4	0	0	0	23
03/27/11	01:26	MDT	59.9813	60.00	21	0	-1262.3	-1262.3	0	0	21	0
03/27/11	01:27	MDT	59.9846	60.00	22	0	-1005.3	-1005.3	0	0	22	0
03/27/11	01:28	MDT	59.9849	60.00	23	0	-983.1	-983.1	0	0	23	0
03/27/11	11:05	MST	60.0317	60.02	0	21	-1432.0	-1432.0	0	0	0	21
03/27/11	11:06	MST	60.0341	60.02	0	22	-1561.2	-1561.2	0	0	0	22
03/27/11	11:07	MST	60.0329	60.02	0	23	-1462.8	-1462.8	0	0	0	23
03/27/11	11:08	MST	60.0353	60.02	0	24	-1217.2	-1217.2	0	0	0	24
03/27/11	11:09	MST	60.0327	60.02	0	25	-1348.7	-1348.7	0	0	0	25
03/27/11	11:10	MST	60.0229	60.02	0	26	-811.0	-811.0	0	0	0	26
03/29/11	05:54	MDT	59.9838	60.00	21	0	-2754.6	-2754.6	0	0	21	0
03/29/11	05:55	MDT	59.9838	60.00	22	0	-1321.8	-1321.8	0	0	22	0
03/30/11	12:54	MDT	60.0094	60.00	0	21	-2332.8	-2332.8	0	0	0	21
03/30/11	22:37	MDT	60.0131	60.00	0	21	-856.2	-856.2	0	0	0	21

Statistics of ATL (4 x L₁₀) being exceeded > 20 consecutive clock-minutes :

Date	Time	TimeZone	ActualFreq	SchedFreq	MinCtLow	MinCtHigh	CPS1	ACPS1	MinCtLow2	MinCtHigh2	LowLimitCt	HighLimitCt
03/02/11	23:44	MST	60.0286	60.00	0	26	-11253.9	-11253.9	0	21	0	26
03/03/11	08:46	MST	60.0159	60.00	0	0	12665.7	12665.7	21	0	21	0
03/03/11	09:08	MST	59.9927	60.00	1	0	-1952.4	-1952.4	21	0	21	0
03/03/11	09:09	MST	59.9856	60.00	2	0	-4177.5	-4177.5	22	0	22	0
03/03/11	09:10	MST	59.9961	60.00	3	0	-1007.0	-1007.0	23	0	23	0
03/04/11	13:37	MST	60.0047	60.00	0	0	2217.1	2217.1	21	0	21	0
03/04/11	13:38	MST	60.0033	60.00	0	0	1601.4	1601.4	22	0	22	0
03/04/11	13:39	MST	60.0060	60.00	0	0	2764.6	2764.6	23	0	23	0
03/04/11	13:40	MST	60.0047	60.00	0	0	2251.0	2251.0	24	0	24	0
03/04/11	13:41	MST	60.0042	60.00	0	0	2070.7	2070.7	25	0	25	0
03/04/11	13:42	MST	60.0014	60.00	0	0	824.8	824.8	26	0	26	0
03/04/11	13:43	MST	59.9926	60.00	1	0	-2408.2	-2408.2	27	0	27	0
03/05/11	14:05	MST	60.0303	60.02	0	26	-3726.0	-11349.4	0	21	0	26
03/05/11	14:31	MST	60.0311	60.02	0	21	-8903.9	-25307.2	0	21	0	21
03/05/11	14:32	MST	60.0318	60.02	0	22	-9464.4	-25844.7	0	22	0	22
03/05/11	14:33	MST	60.0348	60.02	0	23	-12163.9	-28871.9	0	23	0	23
03/05/11	14:34	MST	60.0294	60.02	0	24	-7713.7	-24551.2	0	24	0	24
03/05/11	14:35	MST	60.0332	60.02	0	25	-11076.4	-28161.9	0	25	0	25
03/05/11	14:36	MST	60.0233	60.02	0	26	-2257.1	-17148.6	0	26	0	26
03/05/11	15:02	MST	60.0075	60.00	0	22	-3739.7	-3739.7	0	21	0	22
03/05/11	15:03	MST	60.0038	60.00	0	23	-1666.2	-1666.2	0	22	0	23
03/05/11	15:04	MST	60.0047	60.00	0	24	-1917.0	-1917.0	0	23	0	24
03/05/11	15:05	MST	59.9984	60.00	0	0	873.6	873.6	0	24	0	25
03/05/11	15:06	MST	60.0113	60.00	0	1	-4354.4	-4354.4	0	25	0	26
03/07/11	09:35	MST	59.9874	60.00	21	0	-1519.8	-1519.8	21	0	21	0
03/07/11	09:36	MST	59.9852	60.00	22	0	-1543.0	-1543.0	22	0	22	0
03/07/11	09:37	MST	59.9875	60.00	23	0	-1154.2	-1154.2	23	0	23	0
03/07/11	09:38	MST	59.9981	60.00	0	0	9.6	9.6	24	0	24	0
03/07/11	09:39	MST	59.9890	60.00	1	0	-875.5	-875.5	25	0	25	0
03/09/11	17:21	MST	59.9996	60.00	0	0	41.6	41.6	21	0	21	0

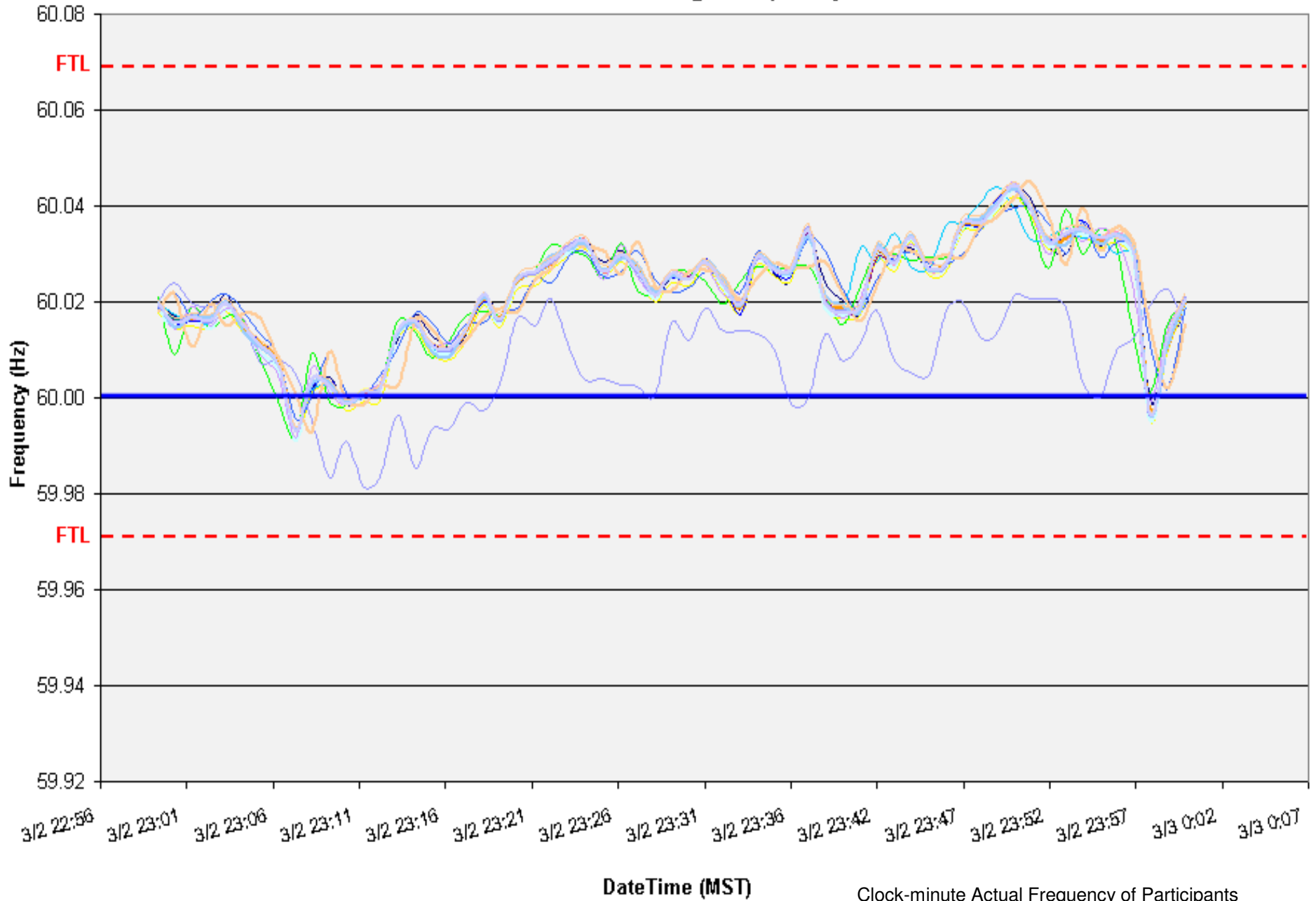
Statistics of ATL ($4 \times L_{10}$) being exceeded > 20 consecutive clock-minutes :

Date	Time	TimeZone	ActualFreq	SchedFreq	MinCtLow	MinCtHigh	CPS1	ACPS1	MinCtLow2	MinCtHigh2	LowLimitCt	HighLimitCt
03/10/11	06:21	MST	59.9752	60.00	12	0	-7453.5	-7453.5	21	0	21	0
03/10/11	06:22	MST	59.9766	60.00	13	0	-7268.4	-7268.4	22	0	22	0
03/10/11	06:23	MST	59.9809	60.00	14	0	-5941.8	-5941.8	23	0	23	0
03/10/11	06:24	MST	59.9788	60.00	15	0	-6726.1	-6726.1	24	0	24	0
03/10/11	17:35	MST	60.0127	60.00	0	0	8913.0	8913.0	21	0	21	0
03/10/11	17:36	MST	60.0087	60.00	0	0	6027.3	6027.3	22	0	22	0
03/11/11	02:38	MST	59.9911	60.00	7	0	-3106.5	-3106.5	21	0	21	0
03/13/11	13:43	MDT	60.0394	60.02	0	0	10853.5	21836.6	21	0	21	0
03/16/11	09:11	MDT	59.9906	60.00	6	0	-2704.8	-2704.8	21	0	21	0
03/17/11	06:22	MST	59.9890	60.00	0	0	-350.8	-350.8	21	0	21	0
03/26/11	15:20	PDT	60.0184	60.00	0	0	-223.7	-223.7	0	21	0	21
03/26/11	15:21	PDT	60.0243	60.00	0	0	-367.4	-367.4	0	22	0	22

EXAMPLE 1

03/02/11 ending 23:45 MST
27 minute duration above BAAL_{High}

Clock-Minute Average Frequency

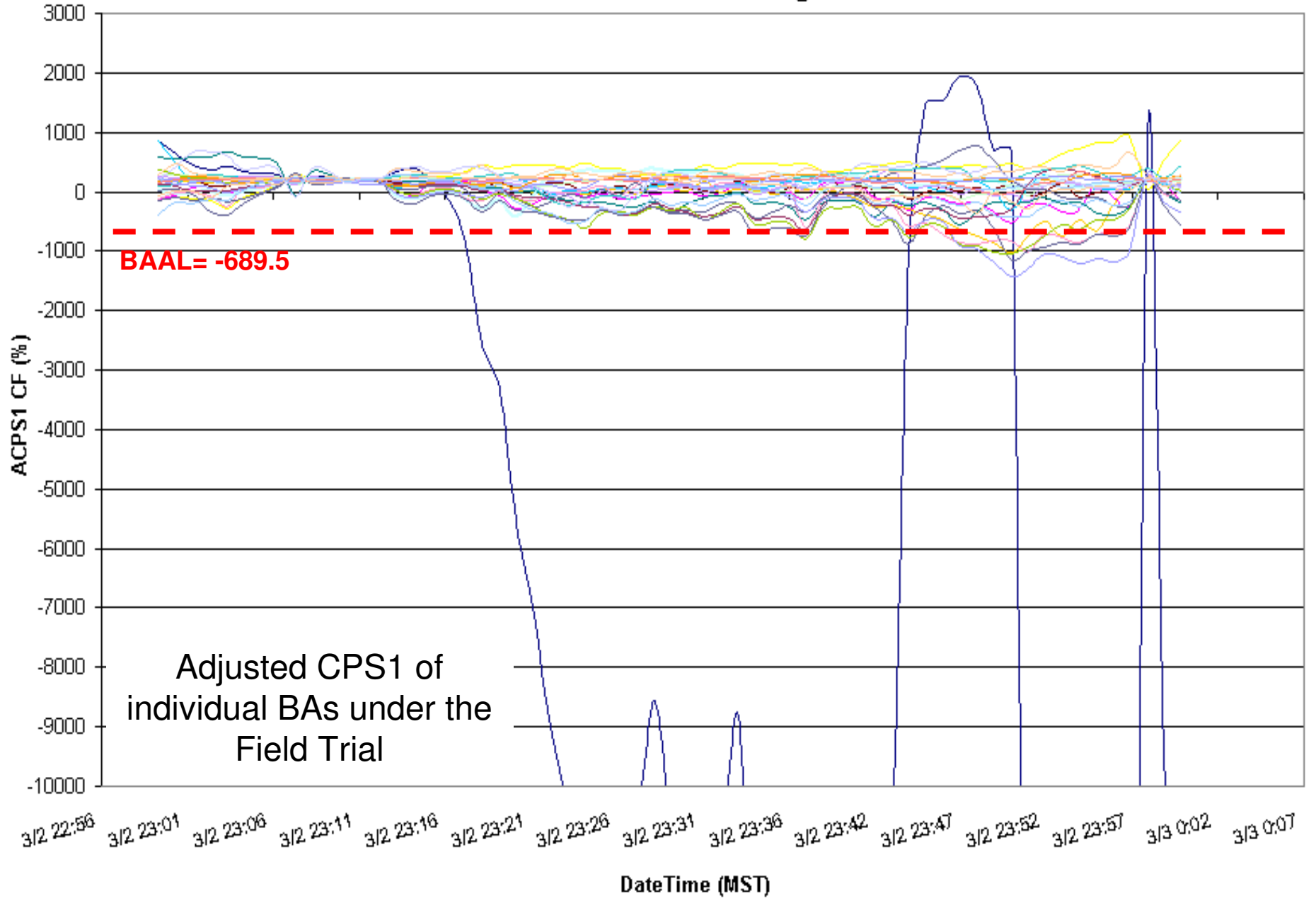


Clock-minute Actual Frequency of Participants

03/02/11 ending 23:45 MST

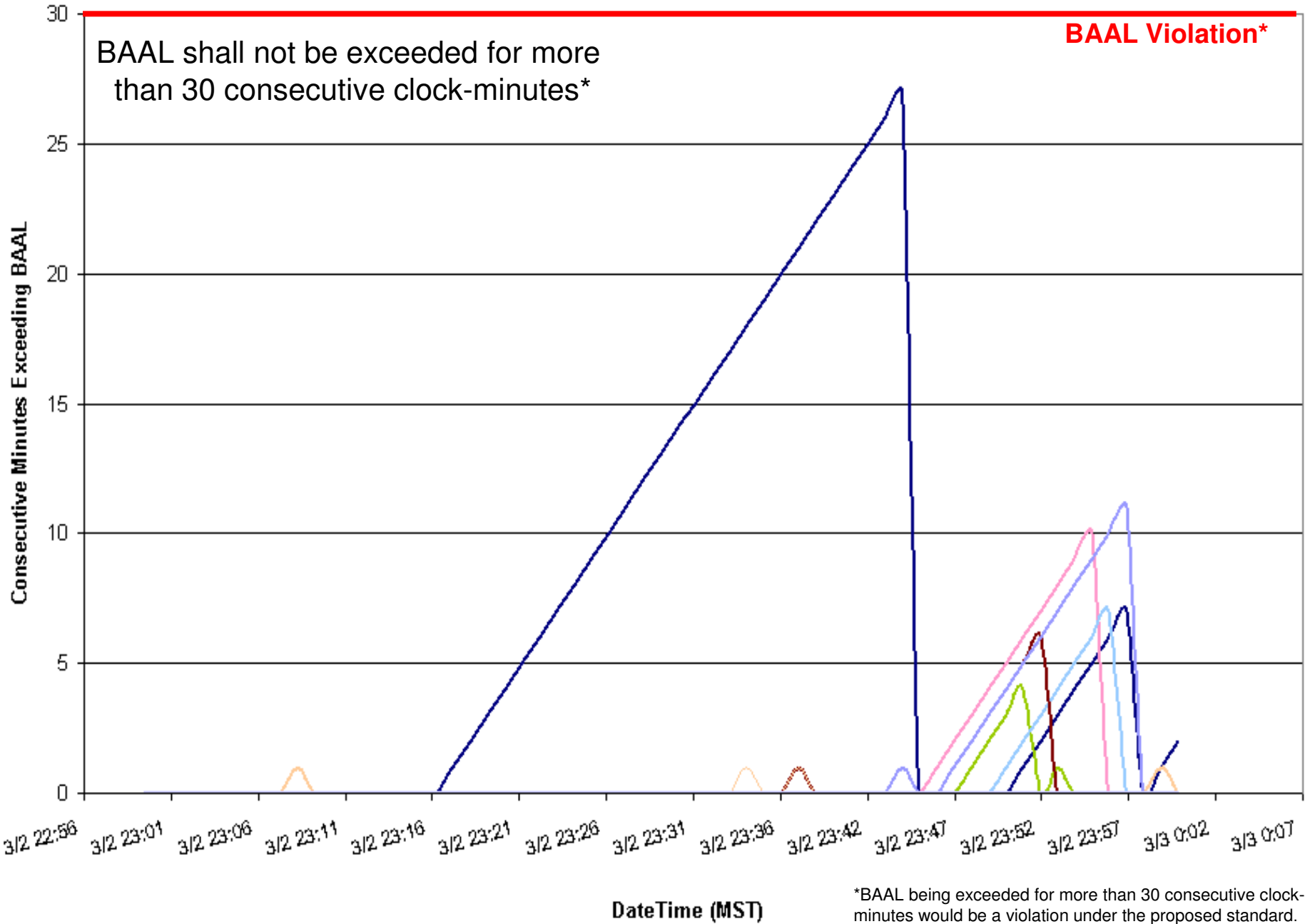
27 minute duration above BAAL_{High}

ACPS1 Clock-Minute Averages



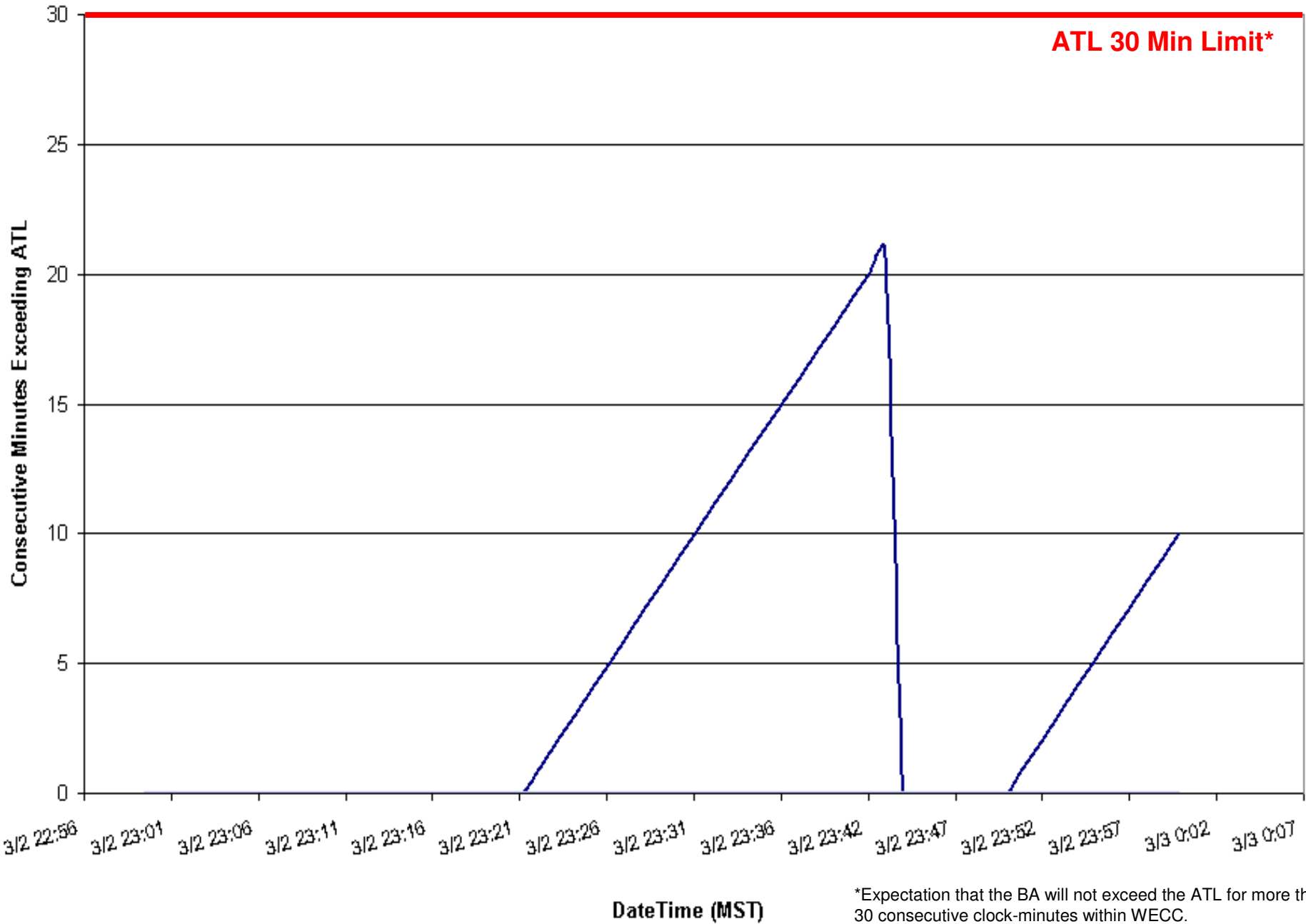
03/02/11 ending 23:45 MST
27 minute duration above BAAL_{High}

Consecutive Minutes Exceeding BAAL



03/02/11 ending 23:45 MST
27 minute duration above BAAL_{High}

Consecutive Minutes Exceeding ATL



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

EXAMPLE 2

03/04/11 ending 06:48 MST
25 minute duration below BAAL_{Low}
59.98 Scheduled Frequency TEC

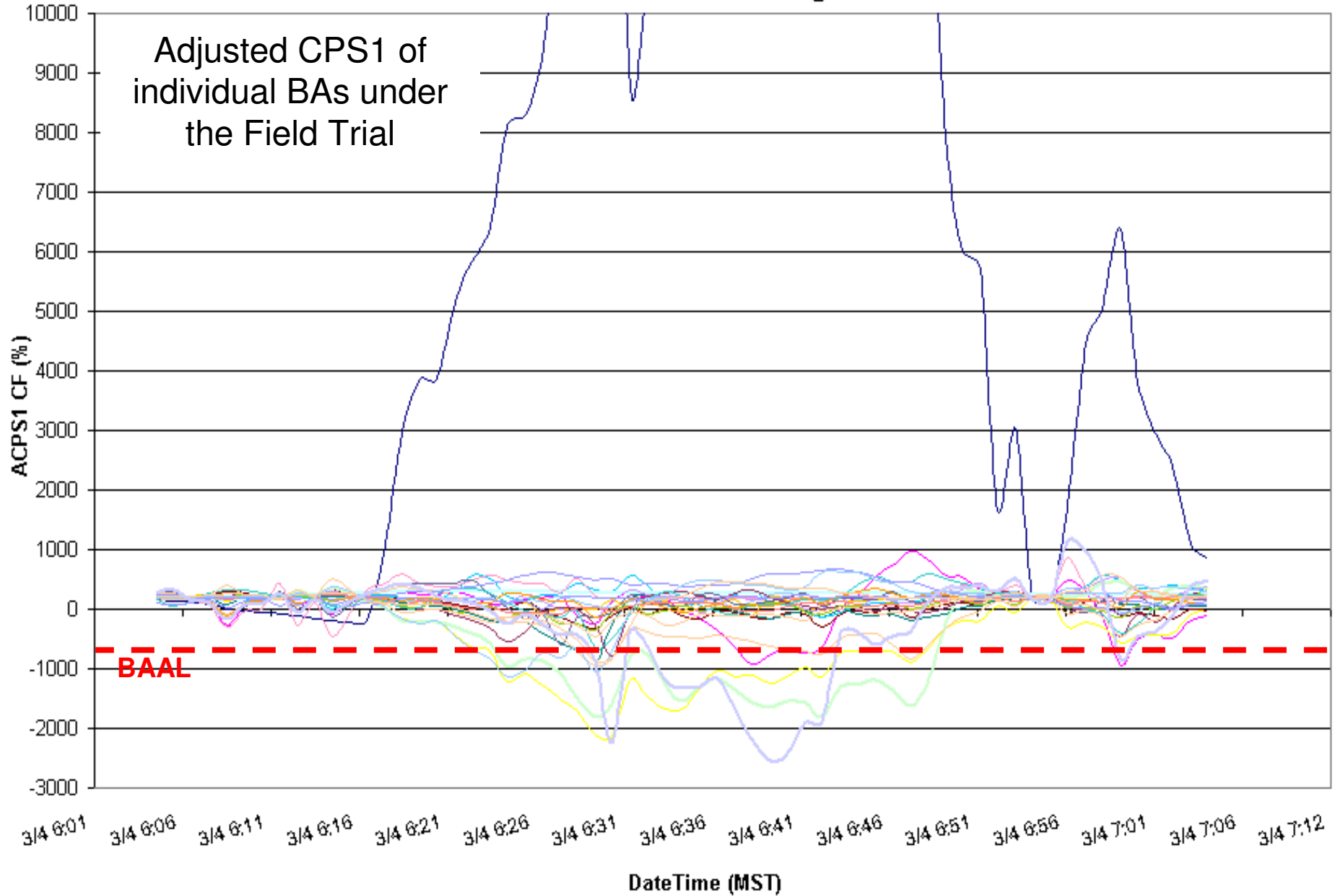
Clock-Minute Average Frequency



Clock-minute Actual Frequency of Participants

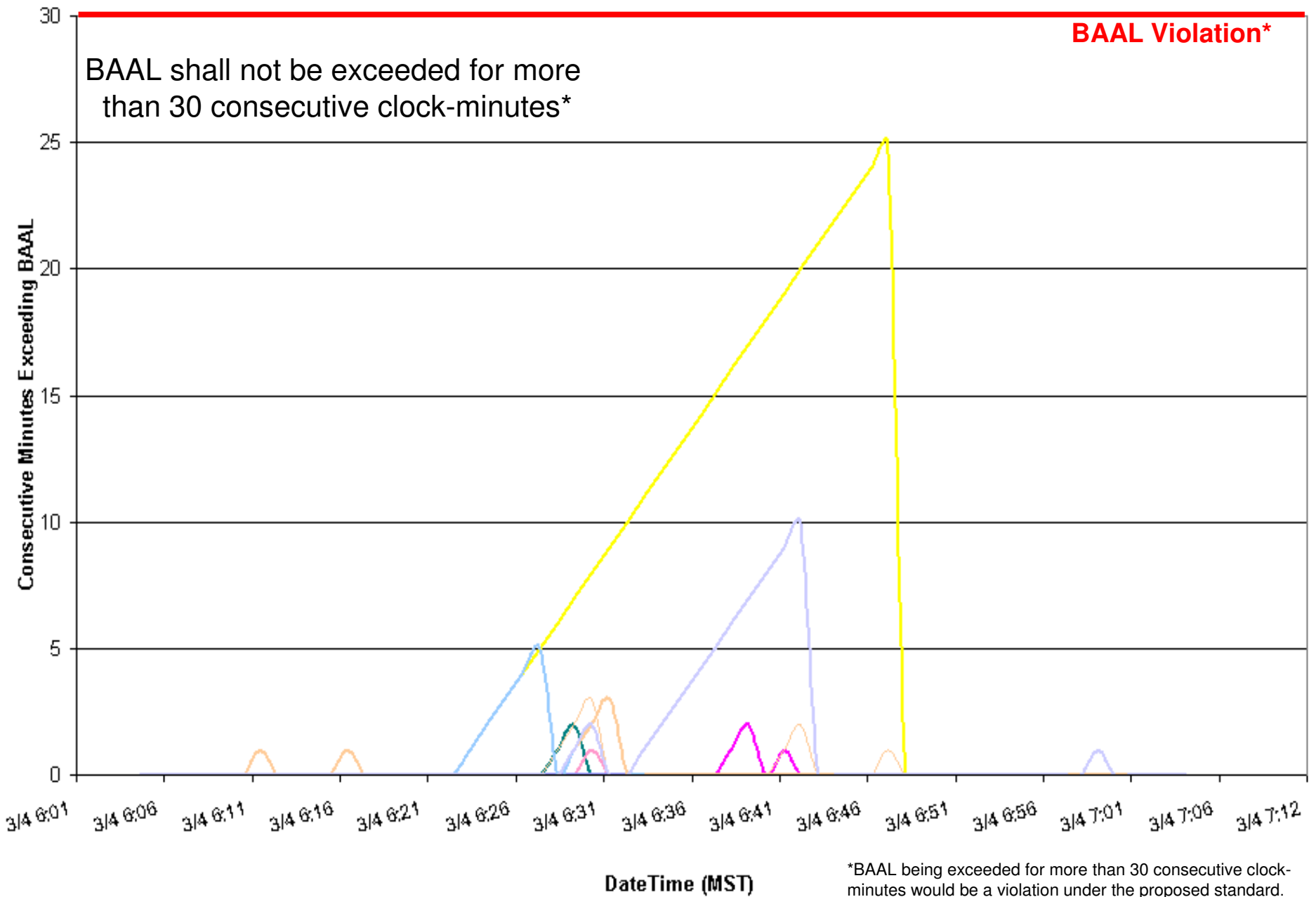
03/04/11 ending 06:48 MST
25 minute duration below BAAL_{Low}
59.98 Scheduled Frequency TEC

ACPS1 Clock-Minute Averages



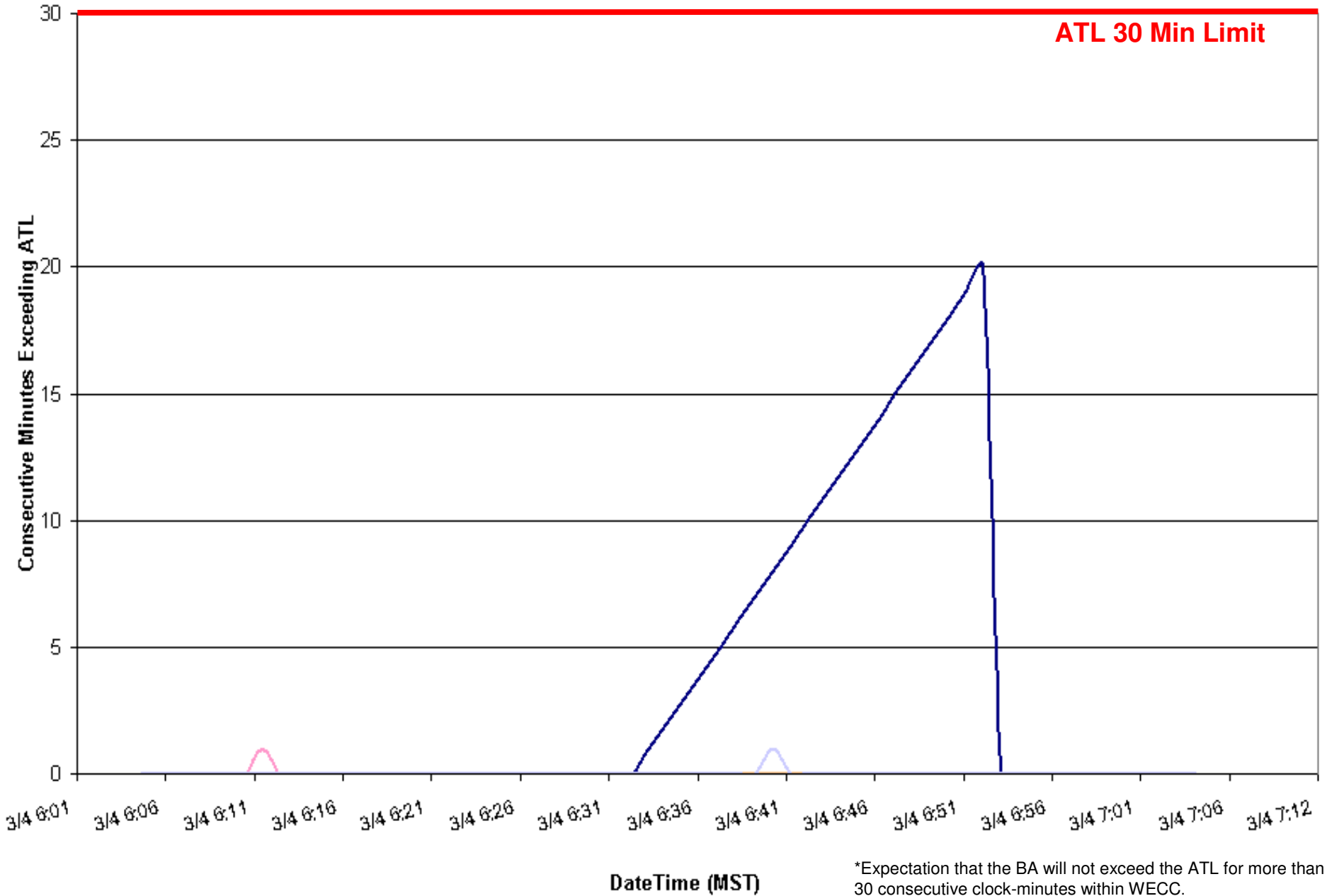
03/04/11 ending 06:48 MST
25 minute duration below BAAL_{Low}
59.98 Scheduled Frequency TEC

Consecutive Minutes Exceeding BAAL



03/04/11 ending 06:48 MST
25 minute duration below BAAL_{Low}
59.98 Scheduled Frequency TEC

Consecutive Minutes Exceeding ATL



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

EXAMPLE 3

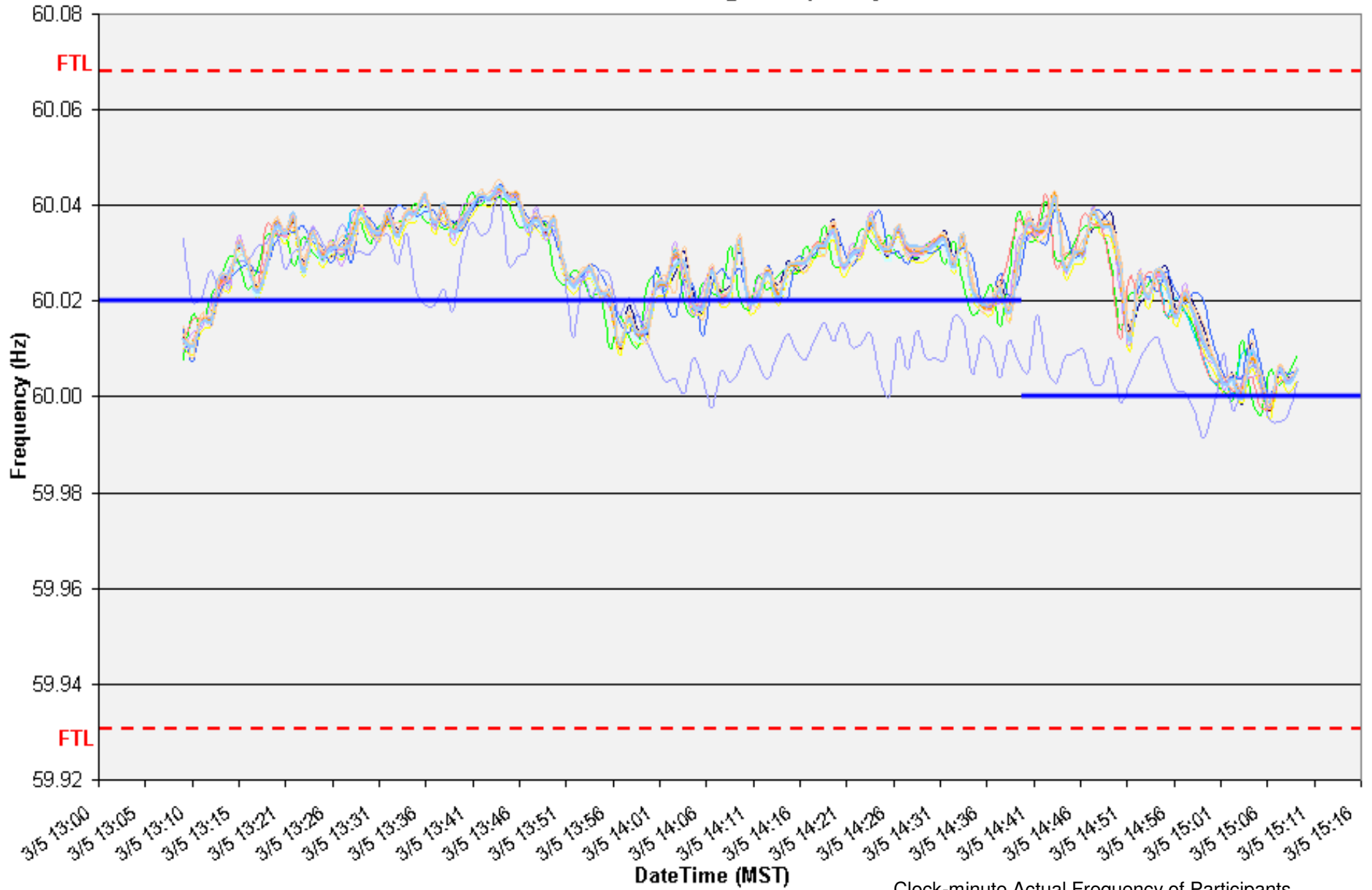
03/05/11 ending 13:35 MST
23 minutes above BAAL_{High}
60.02 Scheduled Frequency TEC

ending 14:06 MST
27 minutes above BAAL_{High}
60.02 Scheduled Frequency TEC

ending 14:36 MST
26 minutes above BAAL_{High}
60.02 Scheduled Frequency TEC

ending 15:04 MST
24 minutes above BAAL_{High}

Clock-Minute Average Frequency



Clock-minute Actual Frequency of Participants

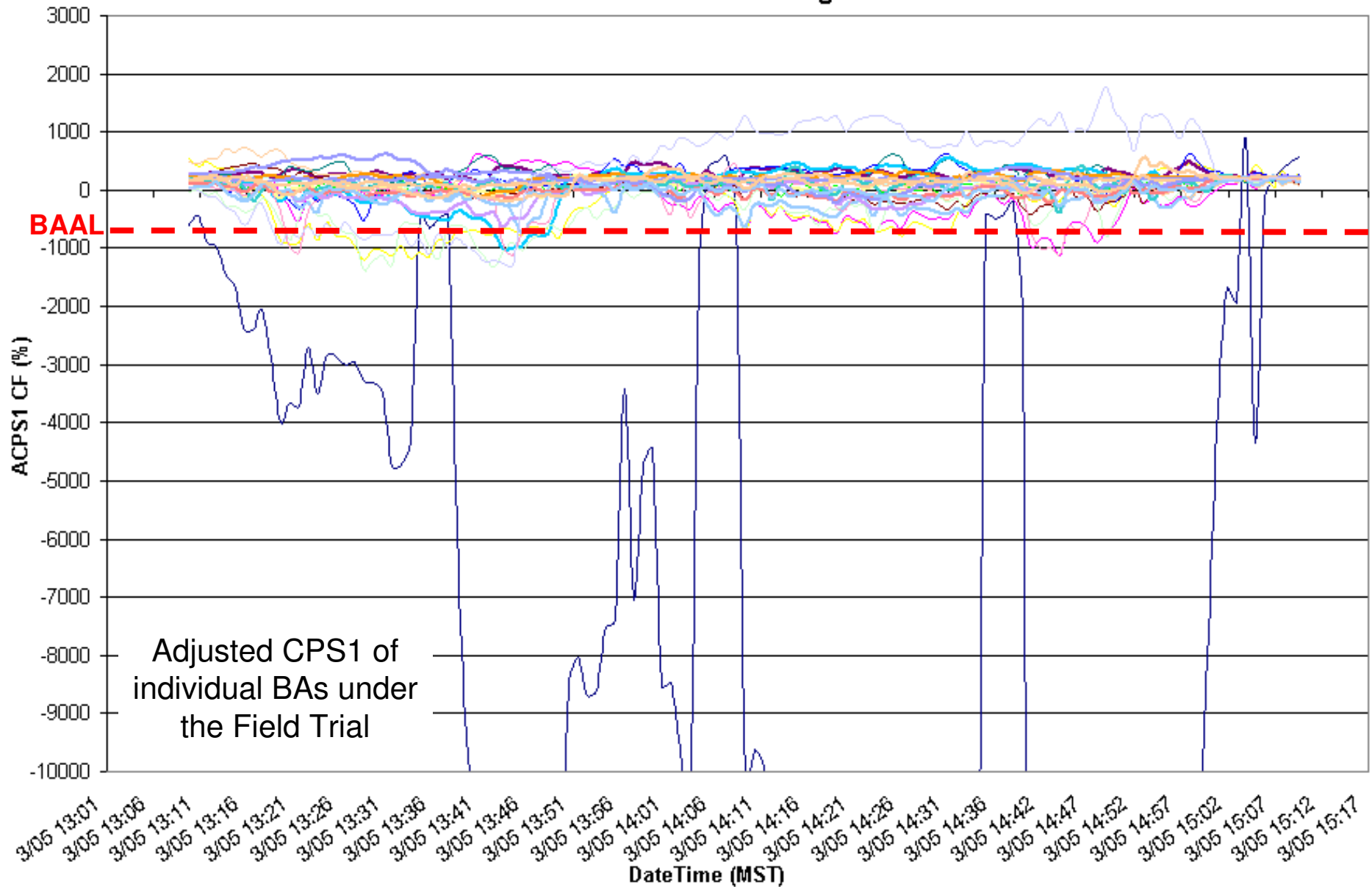
03/05/11 ending 13:35 MST
23 minutes above BAAL_{High}
60.02 Scheduled Frequency TEC

ending 14:06 MST
27 minutes above BAAL_{High}
60.02 Scheduled Frequency TEC

ending 14:36 MST
26 minutes above BAAL_{High}
60.02 Scheduled Frequency TEC

ending 15:04 MST
24 minutes above BAAL_{High}

ACPS1 One-Minute Averages



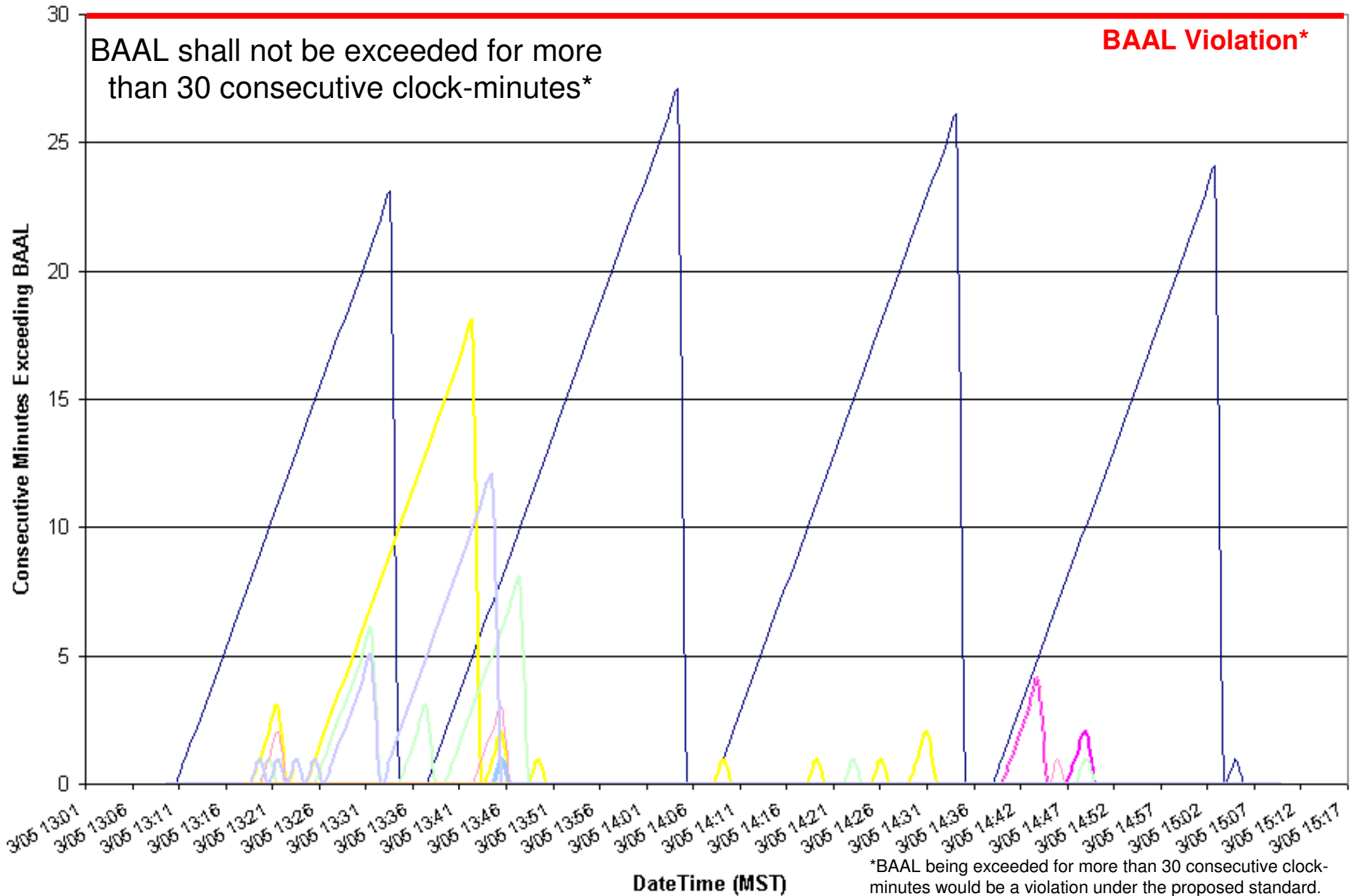
03/05/11 ending 13:35 MST
23 minutes above BAAL_{High}
60.02 Scheduled Frequency TEC

ending 14:06 MST
27 minutes above BAAL_{High}
60.02 Scheduled Frequency TEC

ending 14:36 MST
26 minutes above BAAL_{High}
60.02 Scheduled Frequency TEC

ending 15:04 MST
24 minutes 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.

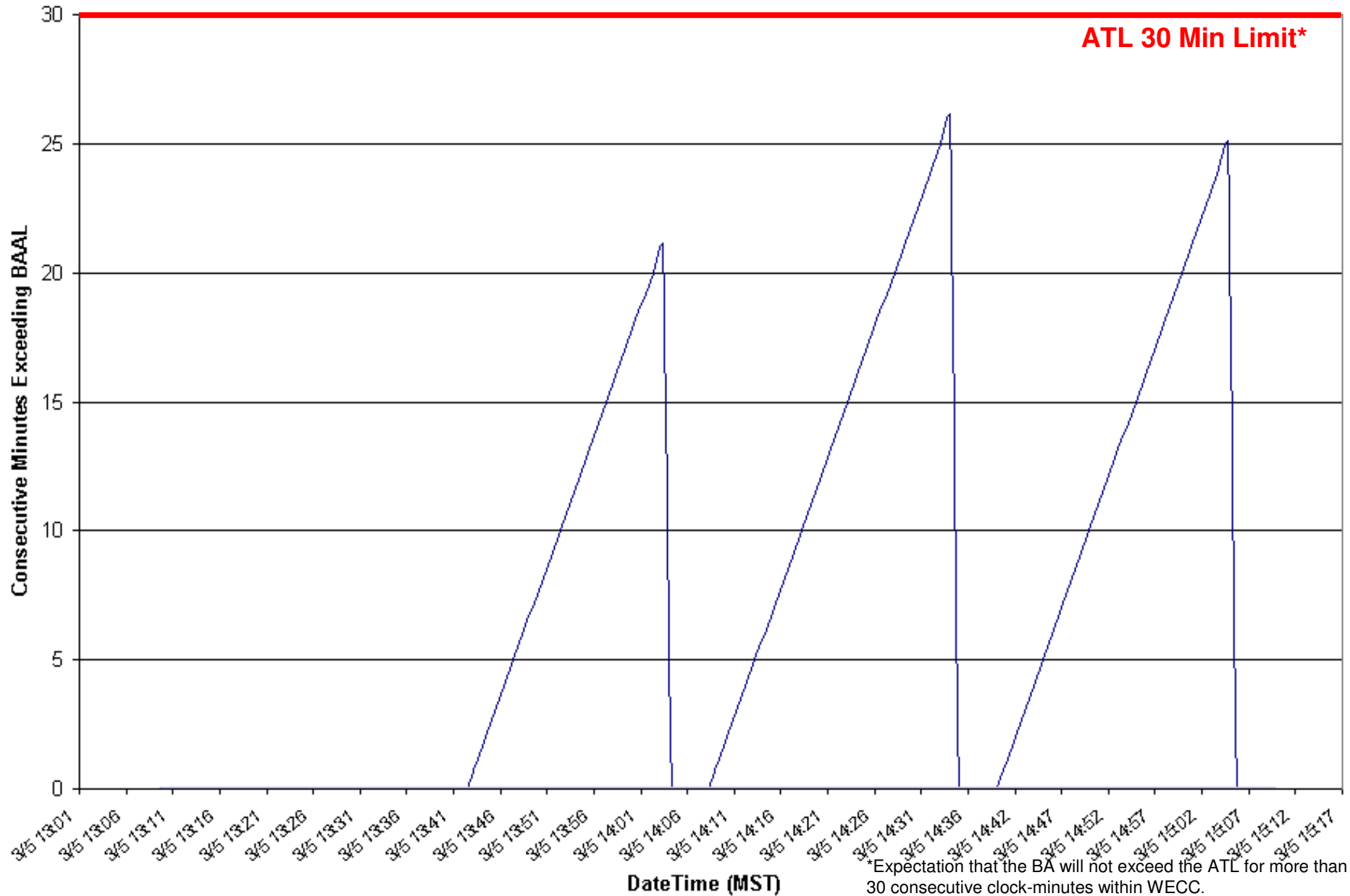
03/05/11 ending 13:35 MST
23 minutes above BAAL_{High}
60.02 Scheduled Frequency TEC

ending 14:06 MST
27 minutes above BAAL_{High}
60.02 Scheduled Frequency TEC

ending 14:36 MST
26 minutes above BAAL_{High}
60.02 Scheduled Frequency TEC

ending 15:04 MST
24 minutes above BAAL_{High}

Consecutive Minutes Exceeding ATL



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

EXAMPLE 4

03/15/11 ending 05:43 MDT

26 minute duration below BAAL_{Low}

Clock-Minute Average Frequency

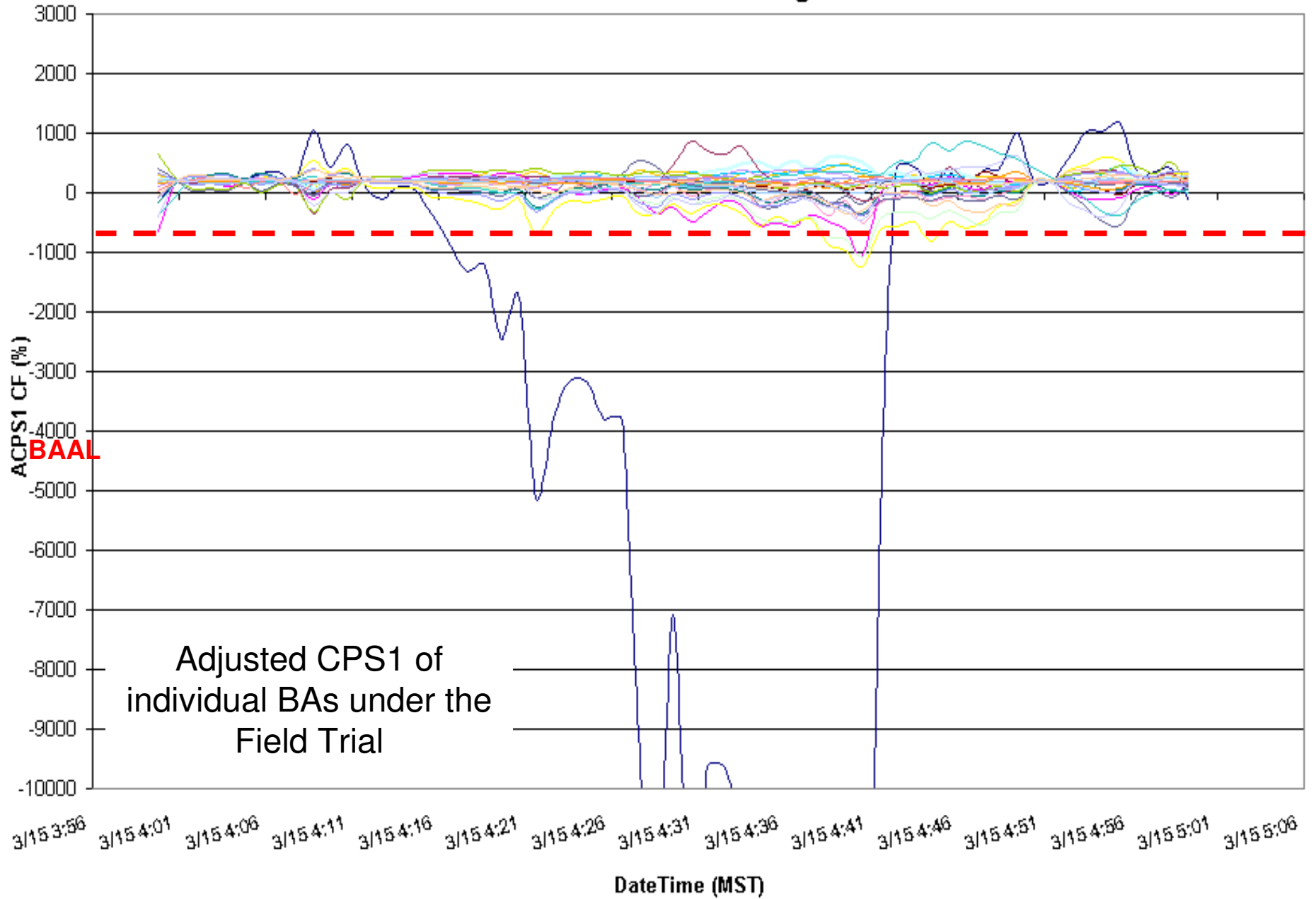


Clock-minute Actual Frequency of Participants

03/15/11 ending 05:43 MDT

26 minute duration below BAAL_{Low}

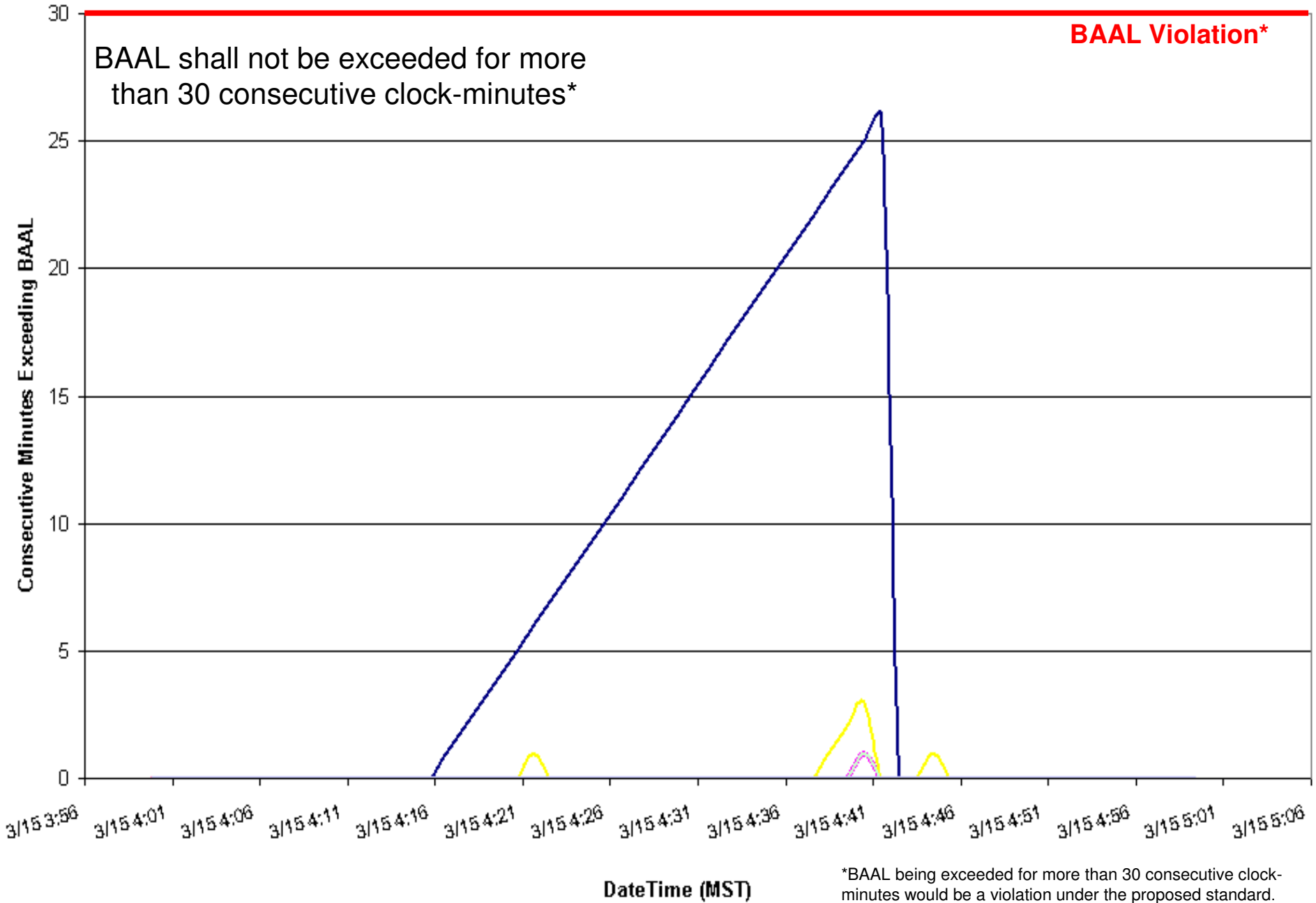
ACPS1 Clock-Minute Averages



03/15/11 ending 05:43 MDT

26 minute duration below BAAL_{Low}

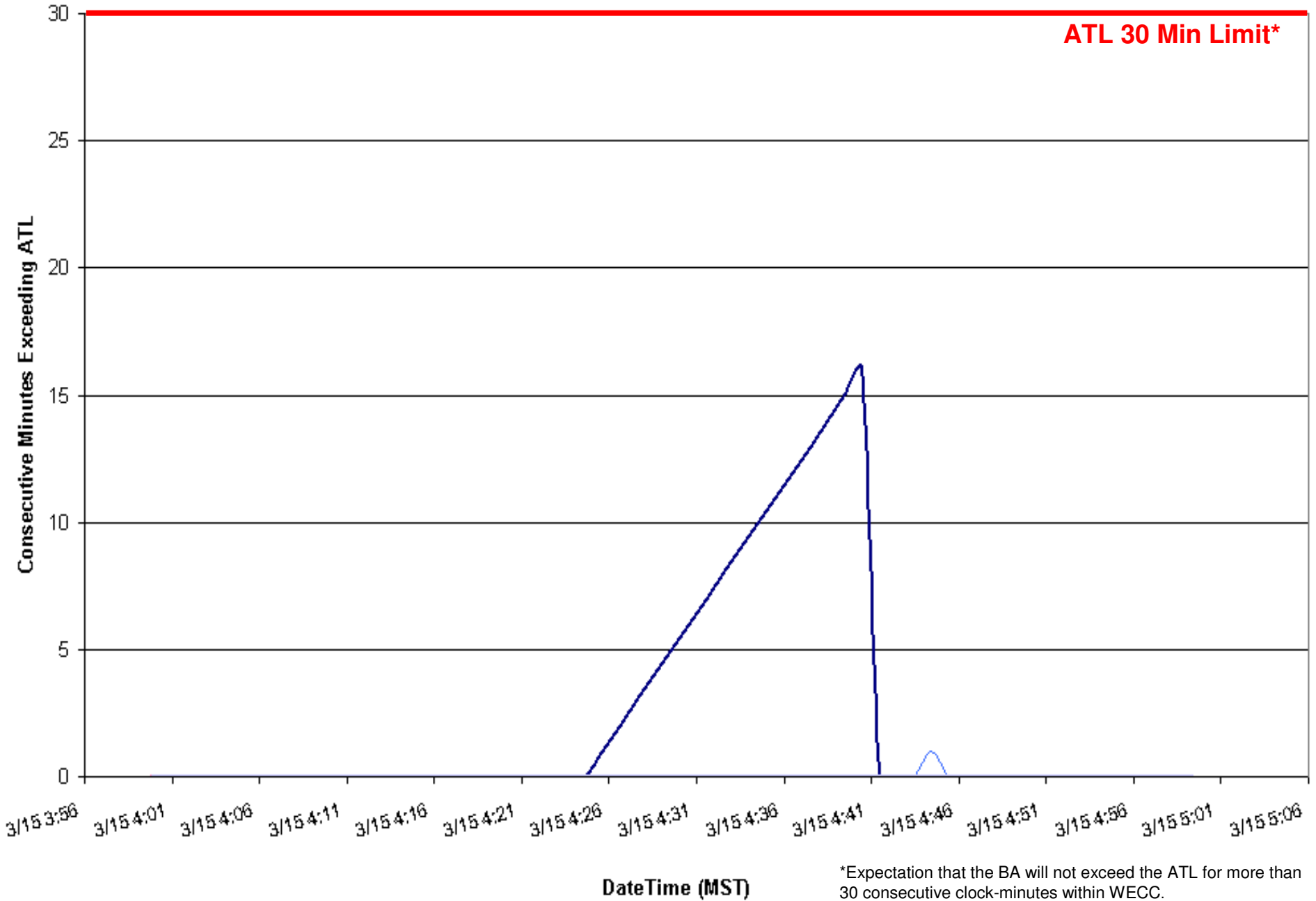
Consecutive Minutes Exceeding BAAL



03/15/11 ending 05:43 MDT

26 minute duration below BAAL_{Low}

Consecutive Minutes Exceeding ATL



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

EXAMPLE 5

03/27/11 ending 11:10 MST
26 minute duration above BAAL_{High}
60.02 Scheduled Frequency TEC

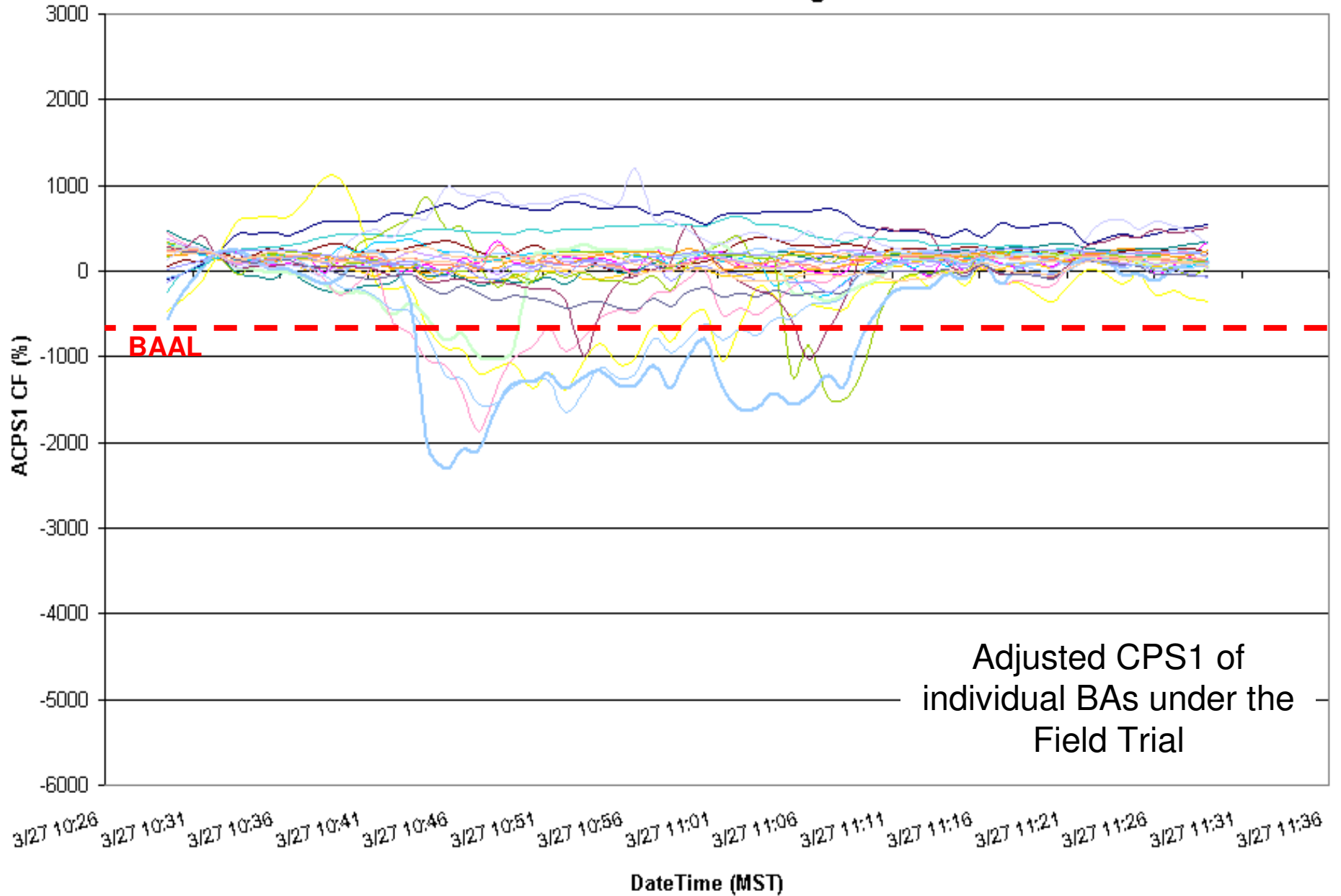
Clock-Minute Average Frequency



Clock-minute Actual Frequency of Participants

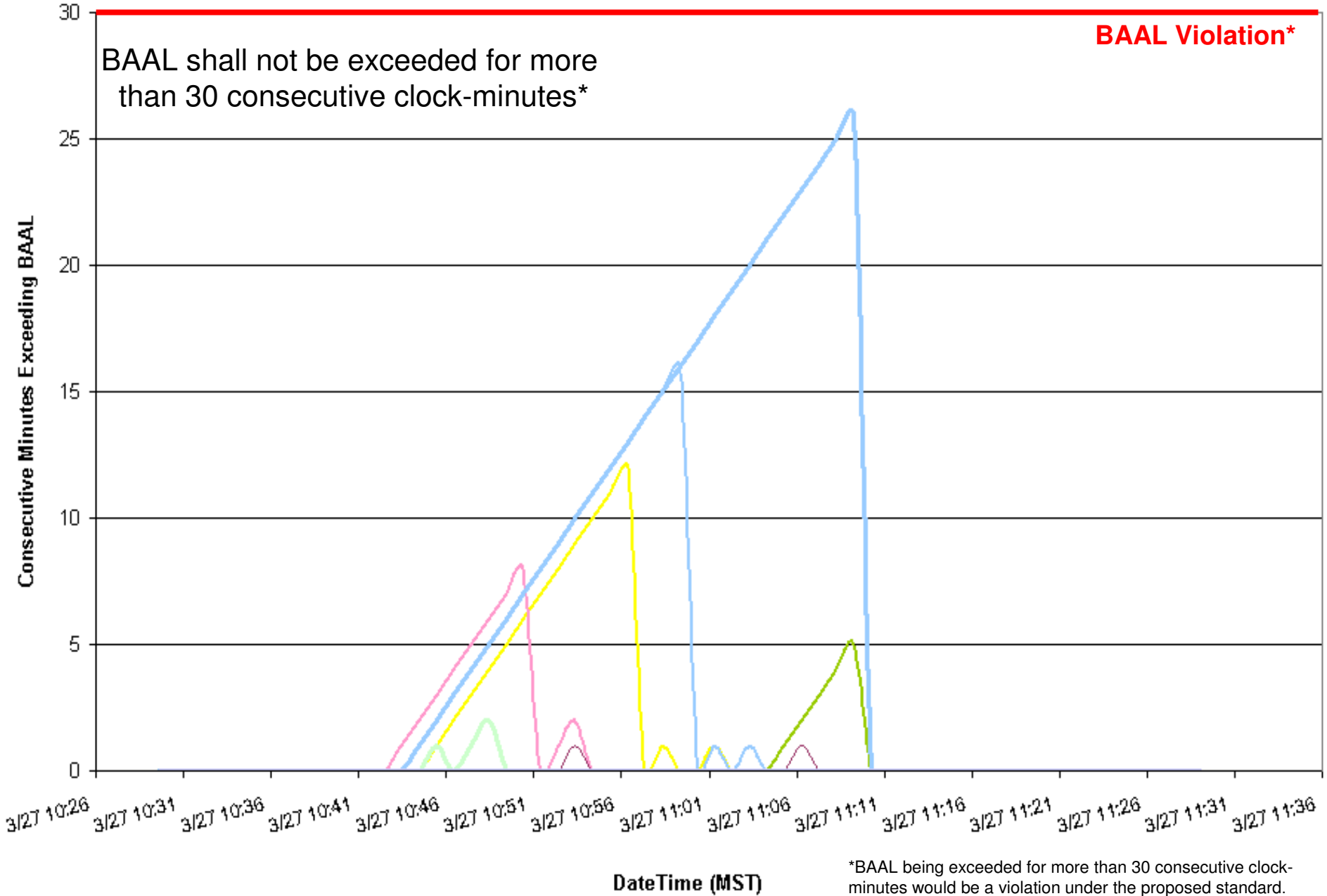
03/27/11 ending 11:10 MST
26 minute duration above BAAL_{High}
60.02 Scheduled Frequency TEC

ACPS1 Clock-Minute Averages



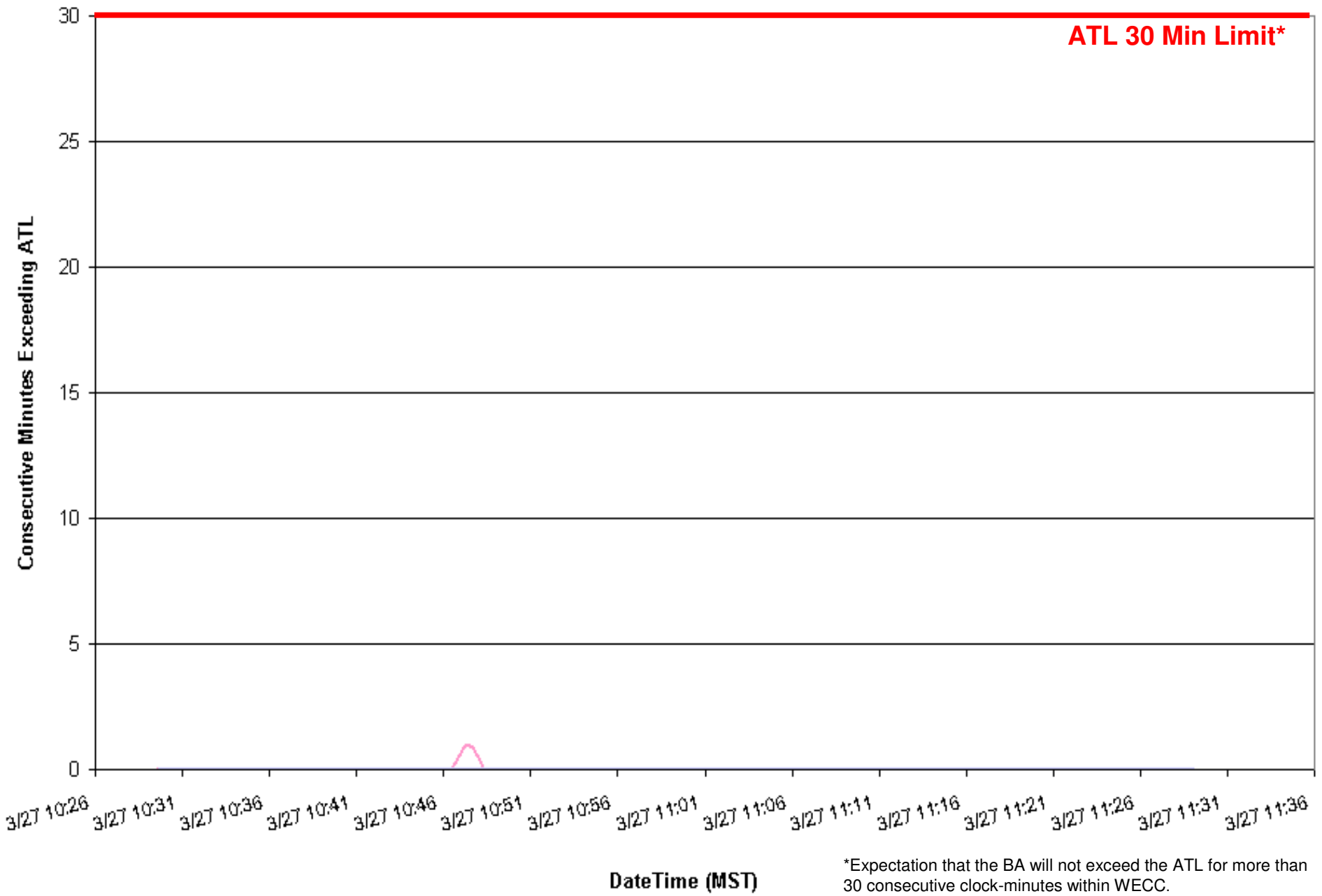
03/27/11 ending 11:10 MST
26 minute duration above BAAL_{High}
60.02 Scheduled Frequency TEC

Consecutive Minutes Exceeding BAAL



03/27/11 ending 11:10 MST
26 minute duration above BAAL_{High}
60.02 Scheduled Frequency TEC

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

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

On a monthly basis, each Balancing Authority will review its performance for the prior month and identify any periods where the ACE exceeded the low BAAL ("BAAL_{Low}"), the high BAAL ("BAAL_{High}"), the low ATL or high ATL for more than 30 consecutive clock-minutes. To help the RBCSDT gain a better understanding of the circumstances that all Balancing Authorities may be faced while operating under BAL-007, each Balancing Authority will provide a brief explanation of the circumstances related to any periods where the duration of consecutive clock-minutes exceeded 30 minutes. In the event that no period exceeded 30 minutes in the prior month, but the longest duration exceeded 25 minutes, the Balancing Authority will provide a brief explanation of the circumstances related to that longest-duration event.

Limit Exceeded (Enter one of the following: BAAL high, BAAL low, ATL high, ATL low)	Clock-minute of ACE exceeding the BAAL or ATL (mm/dd/yy hh:mm)	Clock-minute of ACE returning within the BAAL or ATL (mm/dd/yy hh:mm)	TimeZone	Total duration of ACE exceeding the BAAL or ATL (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
BAAL High	3/2/11 23:19	3/2/11 23:45	MST	27	0	0	Wind speed increased intra-hour causing generation to increase with frequency trending above 60 Hz. Forecast did not indicate an increase in wind speed. Operator deployed dec resources, but wind speed continued to increase, so operator capped generation to return ACE to zero.
ATL Low	3/4/11 13:17	3/4/11 13:43	MST	27	0	0	Wind speed was forecasted to stay level for the hour. Wind speed actually dropped early in the hour, causing ACE to go below the ATL Low limit. Operator deployed inc resources, but wind speed continued to fall. Operator curtailed NF schedules, wind speed increased, and ACE returned to near zero.
BAAL High	3/5/11 13:40	3/5/11 14:06	MST	27	0	0	Wind speed increased intra-hour causing generation to increase with frequency trending above 60 Hz. Forecast did not indicate an increase in wind speed. Operator deployed dec resources, but wind speed continued to increase, so operator capped generation to return ACE to zero.
ATL Low	3/7/11 9:15	3/7/11 9:39	MST	25	0	1	Low ACE was caused by a combination of three things occurring around the same time: 1) a generating unit tripped (it was under test and did not qualify for sharing group assistance) 2) an increase in large industrial load, and 3) a JOU not ramping as expected.
BAAL high	3/27/11 10:45	3/27/11 11:10	MST	26	0	0	It appears a telemetry error occurred causing ACE to be high.

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

Discussion

Bob Klueber- Midwest ISO

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

bklueber@midwestiso.org