A Program of ASTM International

Test Monitoring Center

Carnegie Mellon University
6555 Penn Avenue, Pittsburgh, PA 15206, USA

http://astmtmc.cmu.edu
412-365-1000

MEMORANDUM: 10-062

DATE: November 24, 2010

TO: Becky Grinfield,
Chairman, Engine Oil Elastomer Compatibility Surveillance Panel

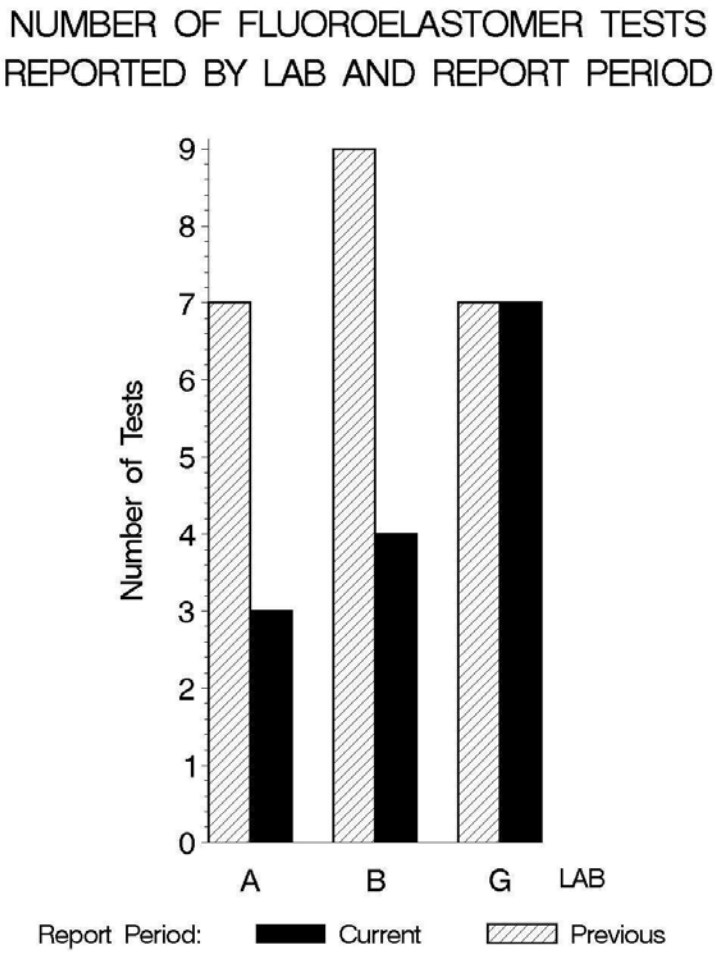
FROM: Michael T. Kasimirsky

SUBJECT: EOEC Testing from April 1, 2010 through September 30, 2010

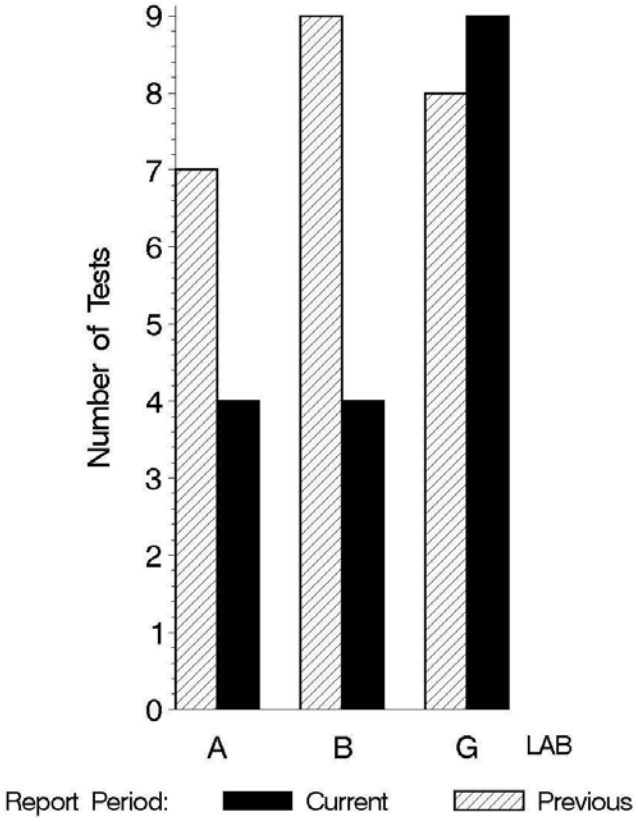
A total of 69 EOEC tests were reported to the Test Monitoring Center during the period from April 1, 2010 through September 30, 2010. Following is a summary of testing activity this period.

	Reporting Data
Number of Labs	3

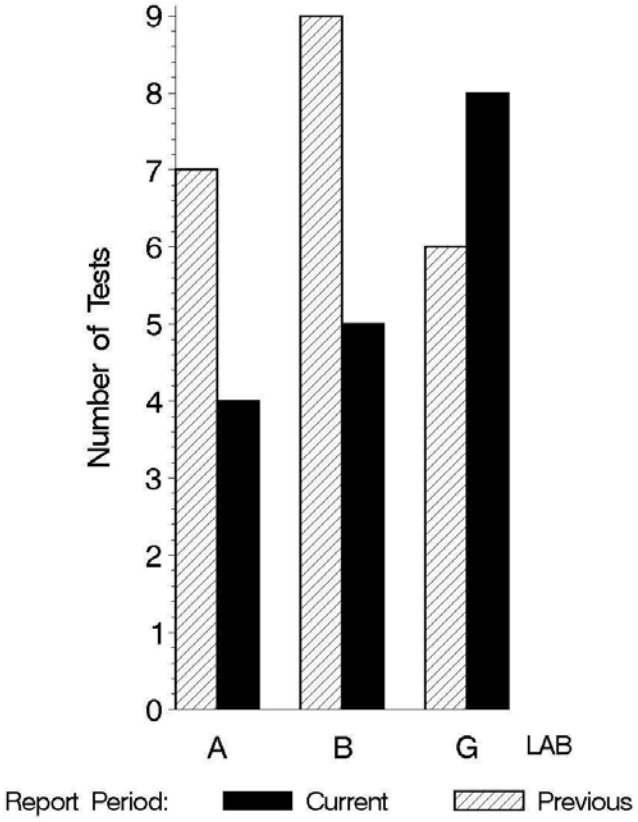
Tests reported this period were distributed as shown below:



NUMBER OF NITRILE TESTS
REPORTED BY LAB AND REPORT PERIOD



NUMBER OF POLYACRYLATE TESTS
REPORTED BY LAB AND REPORT PERIOD



NUMBER OF SILICONE TESTS
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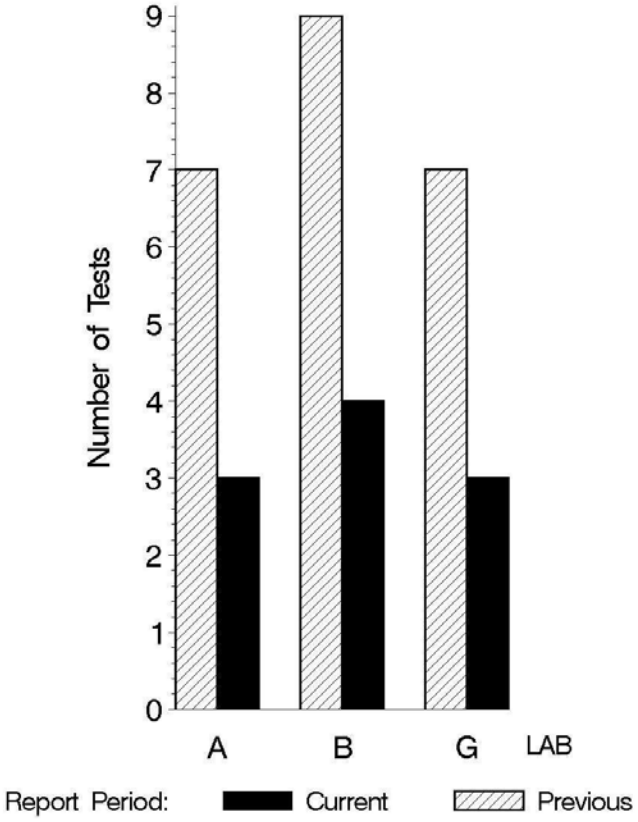
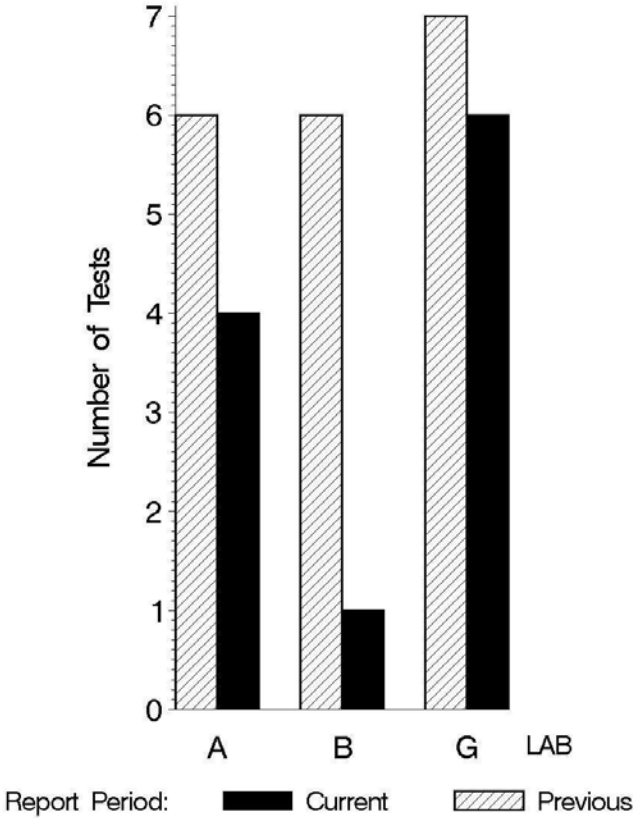
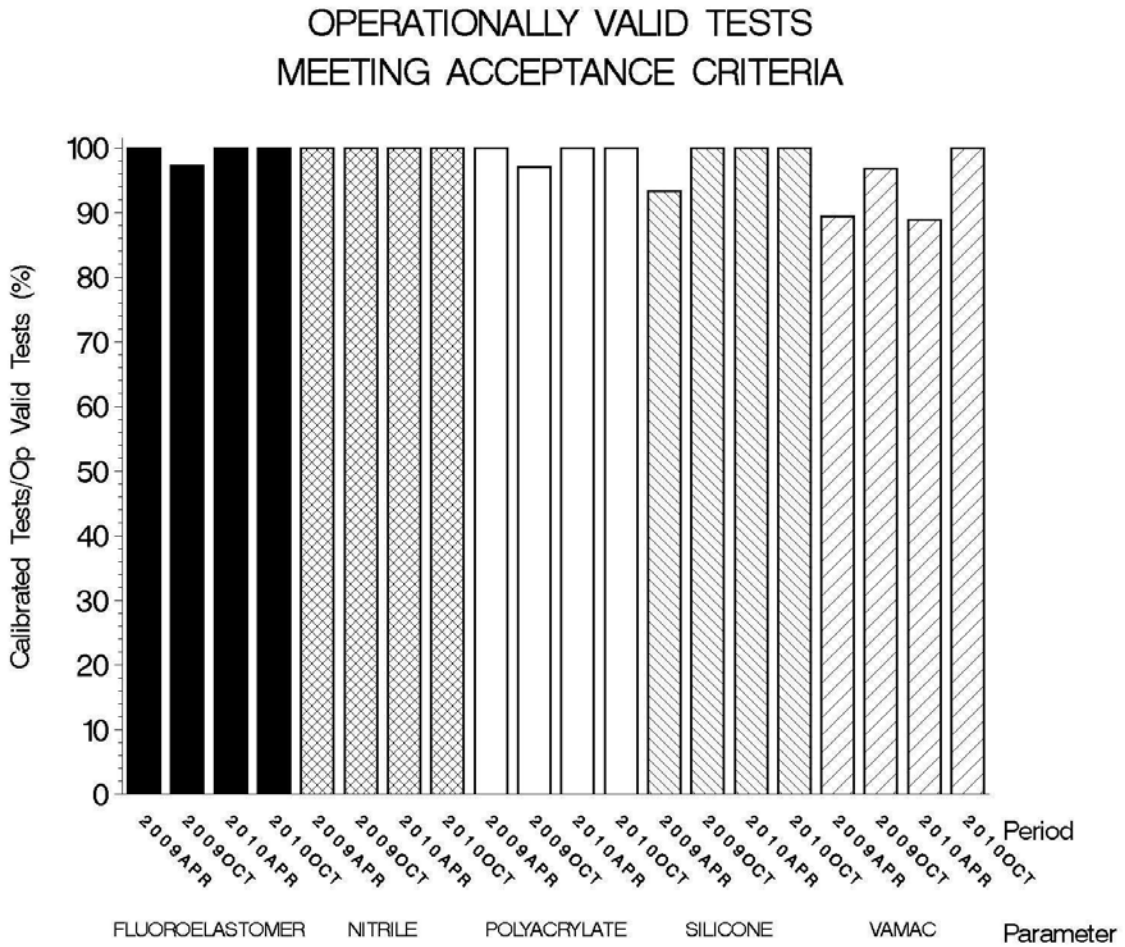


NUMBER OF VAMAC TESTS
REPORTED BY LAB AND REPORT PERIOD



Test Distribution by Oil and Validity

		Fluoroelastomer	Nitrile	Polyacrylate	Silicone	Vamac	Totals This Period	Totals Last Period
Accepted for Calibration	AC	14	17	16	10	10	67	108
Rejected	OC	0	0	0	0	0	0	3
Information Run (not for calibration)	NI	0	0	0	0	0	0	0
Operationally Invalid (lab)	LC	0	0	1	0	1	2	0
Operationally Invalid (lab/TMC)	RC	0	0	0	0	0	0	0
Aborted Calibration	XC	0	0	0	0	0	0	0
Total		14	17	17	10	11	69	111



The above chart shows the percentage of accepted operationally valid tests. This period no tests failed to meet the acceptance criteria.

Lost Tests per Start by Lab and Elastomer Type

	Fluoroelastomer			**Nitrile**			**Polyacrylate**			**Silicone**			**Vamac**			Total		
Lab	Lost	Starts	%	Lost	Starts	%	Lost	Starts	%	Lost	Starts	%	Lost	Starts	%	Lost	Starts	%
A	0	3	0	0	4	0	0	4	0	0	3	0	1	4	25	1	18	5
B	0	4	0	0	4	0	1	5	20	0	4	0	0	1	0	1	18	5
G	0	7	0	0	9	0	0	8	0	0	3	0	0	6	0	0	33	0
Total	0	14	0	0	17	0	1	17	6	0	10	0	1	11	9	2	69	3

Lost tests are those that were aborted or operationally invalid.

Causes for Lost Tests

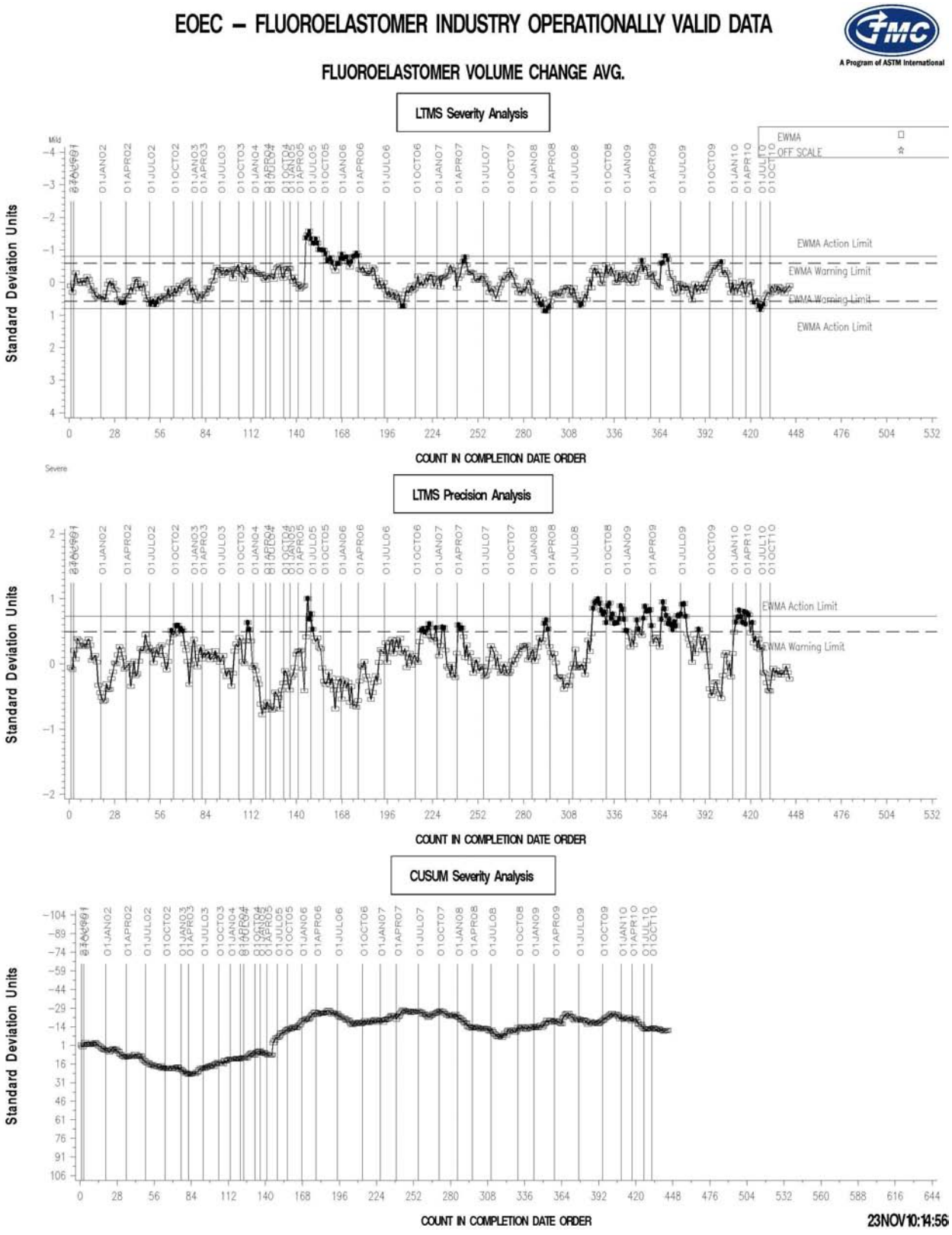
Lab	Cause	Elastomer: Fluoroelastomer	Nitrile	Polyacrylate	Silicone	VAMAC	Validity: LC	RC	XC	Loss Rate: Lost	Starts	%
A	Wrong Elastomer Used					●	●			1	69	1%
B	Initial Measurement Error			●			●			1	69	1%
	Lost	0	0	1	0	1	2	0	0			
	Starts	14	17	17	10	11	69	69	69			
	%	0%	0%	6%	0%	9%	0%	0%	0%			

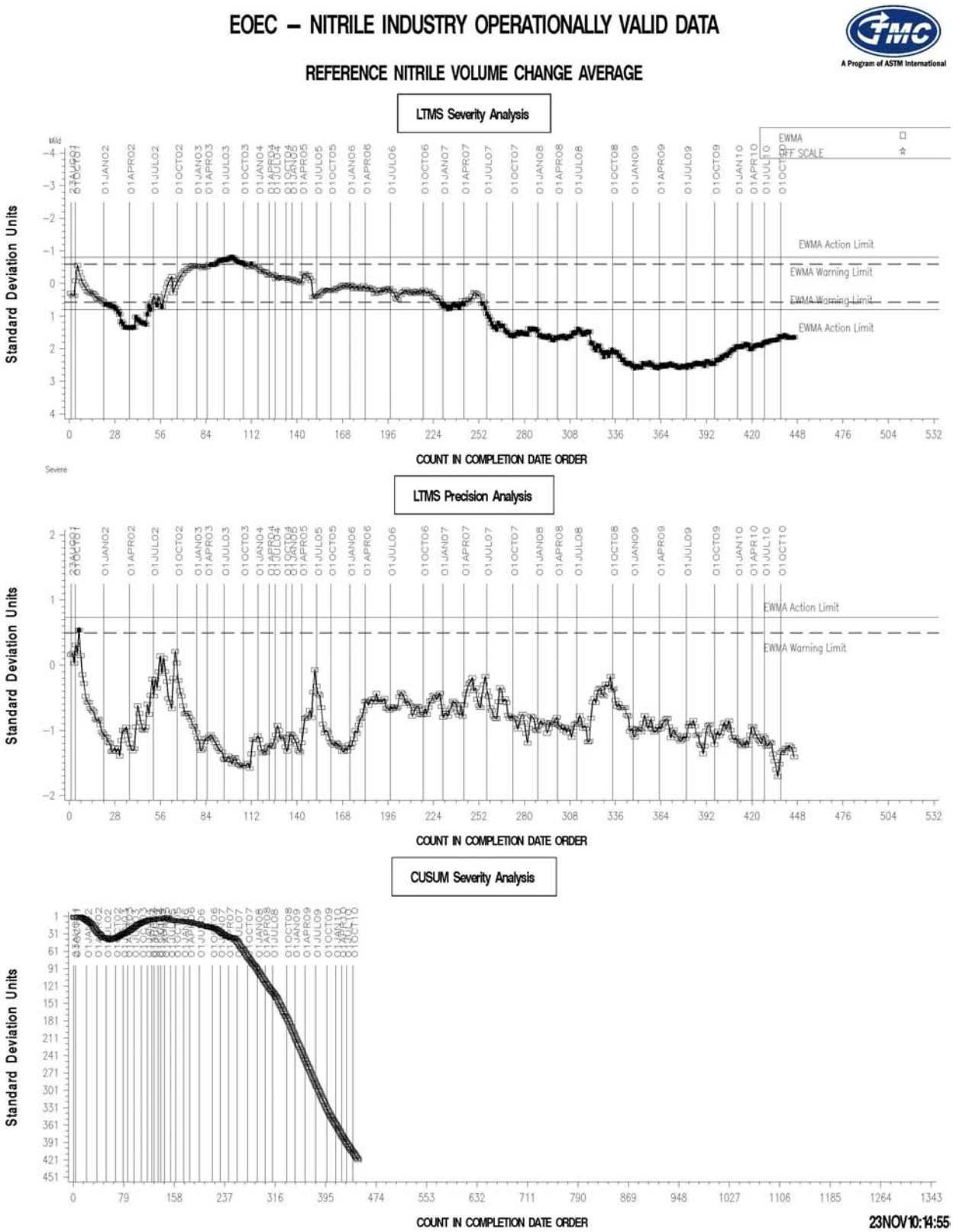
Average Δ/s by Lab						
Elastomer	Lab	n	VOLCYI	HARDYI	TENSYI	ELONYI
Fluoroelastomer	A	3	-0.428	0.167	-0.596	-1.069
	B	4	-0.135	0.432	-0.205	-0.935
	G	7	1.081	-0.526	0.602	-0.230
	Industry	14	0.410	-0.104	0.115	-0.611
Nitrile	A	4	1.616	0.328	-0.990	0.563
	B	4	1.872	0.186	-0.543	0.080
	G	9	1.619	-0.127	-0.570	-0.330
	Industry	17	1.678	0.054	-0.662	-0.023
Polyacrylate	A	4	1.401	-0.411	-0.291	0.251
	B	4	1.595	-0.967	0.835	0.234
	G	8	1.439	0.144	0.547	0.683
	Industry	16	1.469	-0.272	0.409	0.463
Silicone	A	3	-1.286	0.090	-1.249	-0.429
	B	4	1.127	0.542	-0.931	0.968
	G	3	0.972	0.785	-1.155	0.324
	Industry	10	0.356	0.479	-1.094	0.355
VAMAC	A	3	0.756	-1.660	2.123	0.327
	B	1	1.222	-0.958	1.975	-0.251
	G	6	1.771	-0.607	1.432	0.137
	Industry	10	1.412	-0.958	1.694	0.156

Individual test results can be viewed at the links shown in the following table:

Links to Individual Test Result Data	
Elastomer Type	**Web Link to Data**
Fluoroelastomer	ftp://ftp.astmtmc.cmu.edu/refdata/bench/eoecf/data/
Nitrile	ftp://ftp.astmtmc.cmu.edu/refdata/bench/eoecn/data/
Polyacrylate	ftp://ftp.astmtmc.cmu.edu/refdata/bench/eoecp/data/
Silicone	ftp://ftp.astmtmc.cmu.edu/refdata/bench/eoecs/data/
VAMAC	ftp://ftp.astmtmc.cmu.edu/refdata/bench/eoecv/data/

LTMS CONTROL CHARTS




EOEC – NITRILE INDUSTRY OPERATIONALLY VALID DATA
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REFERENCE NITRILE VOLUME CHANGE AVERAGE
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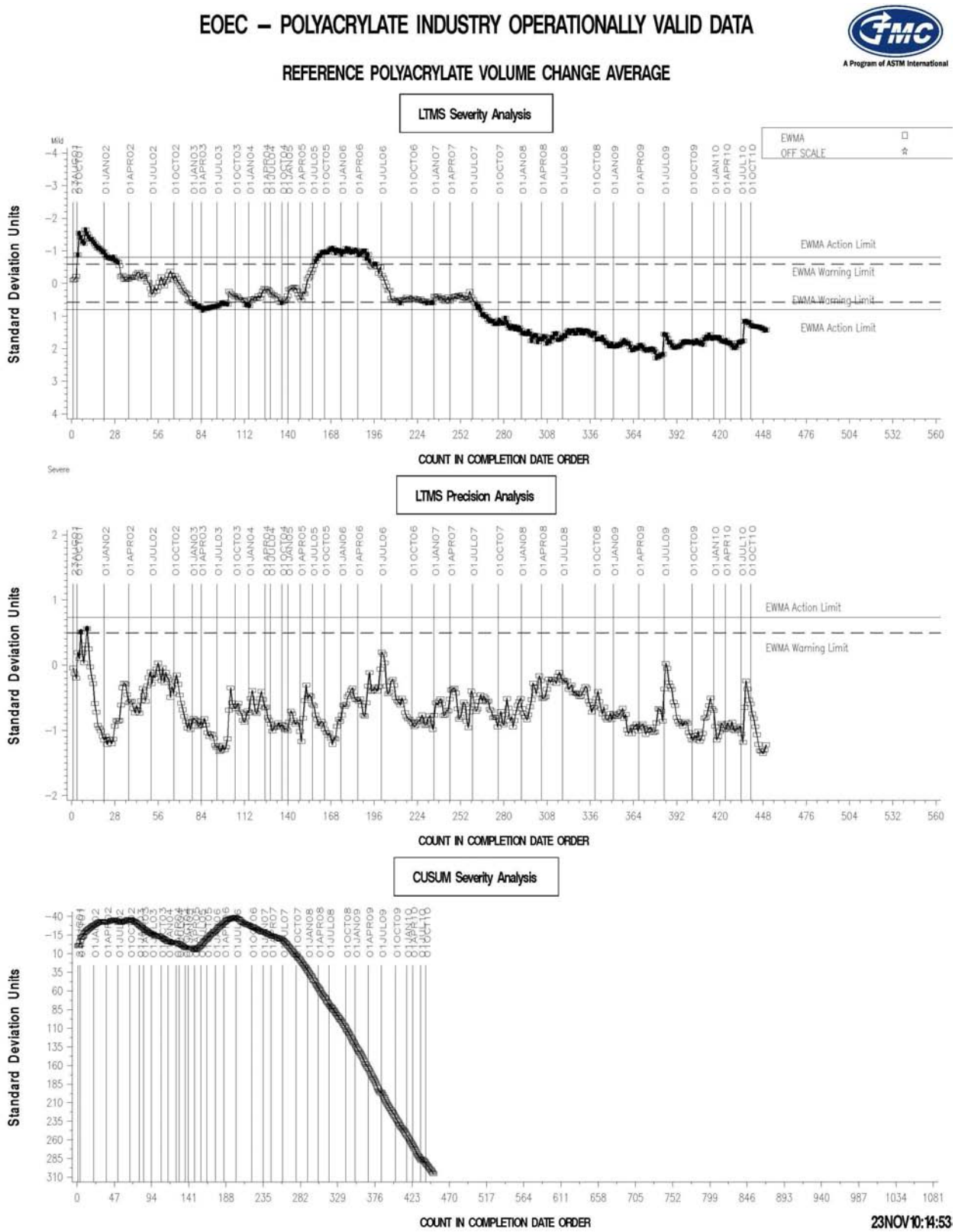
EOEC – POLYACRYLATE INDUSTRY OPERATIONALLY VALID DATA
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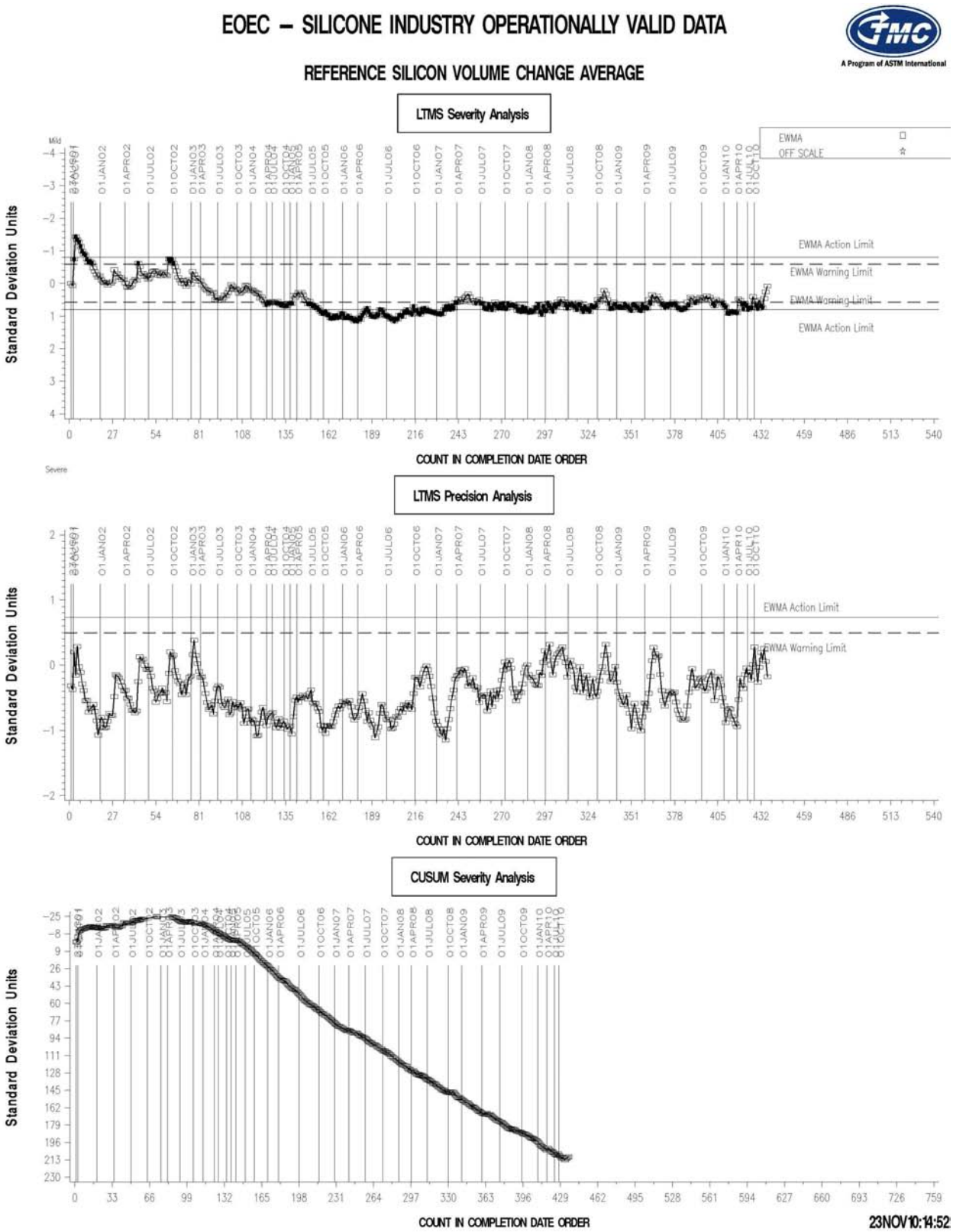
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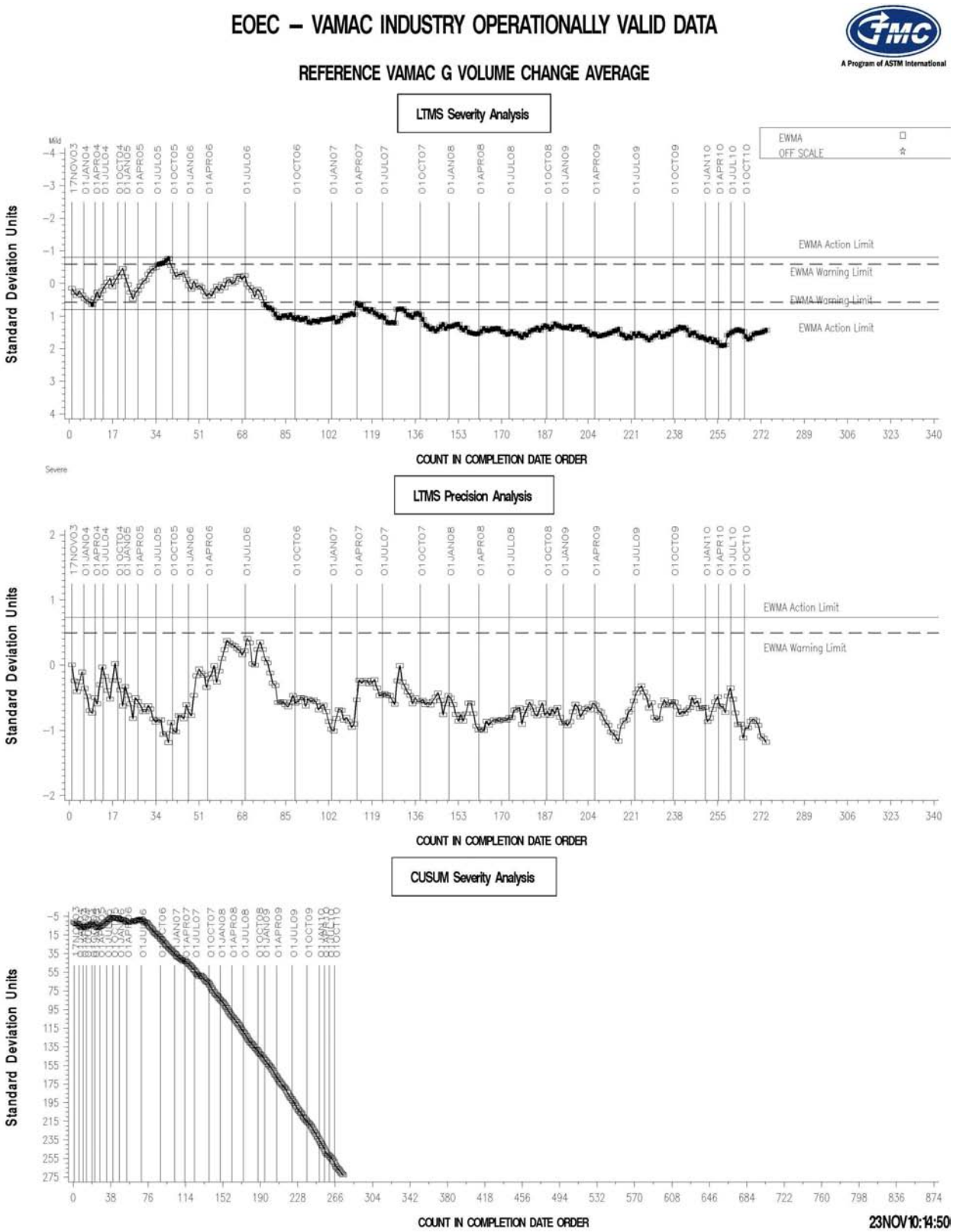
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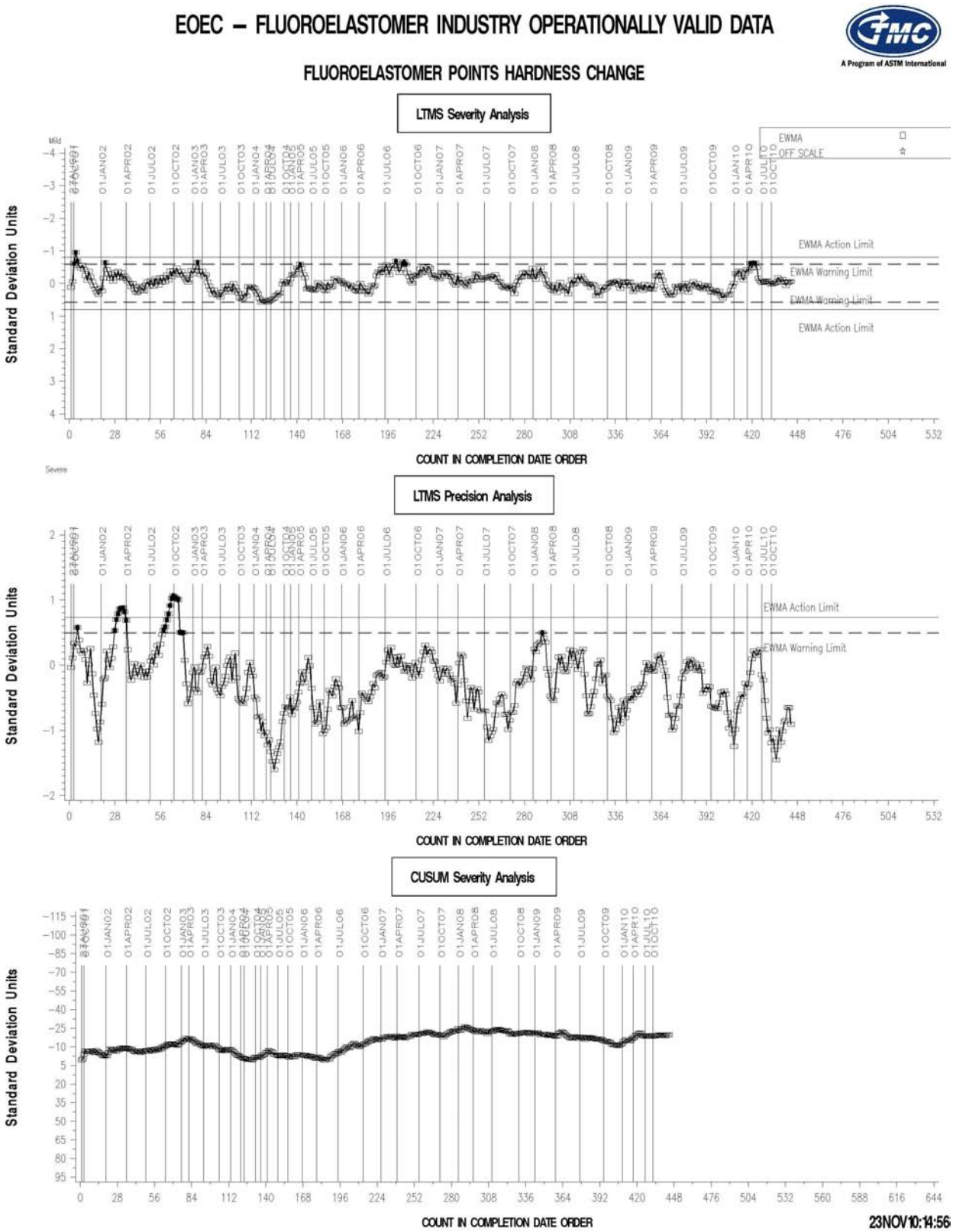
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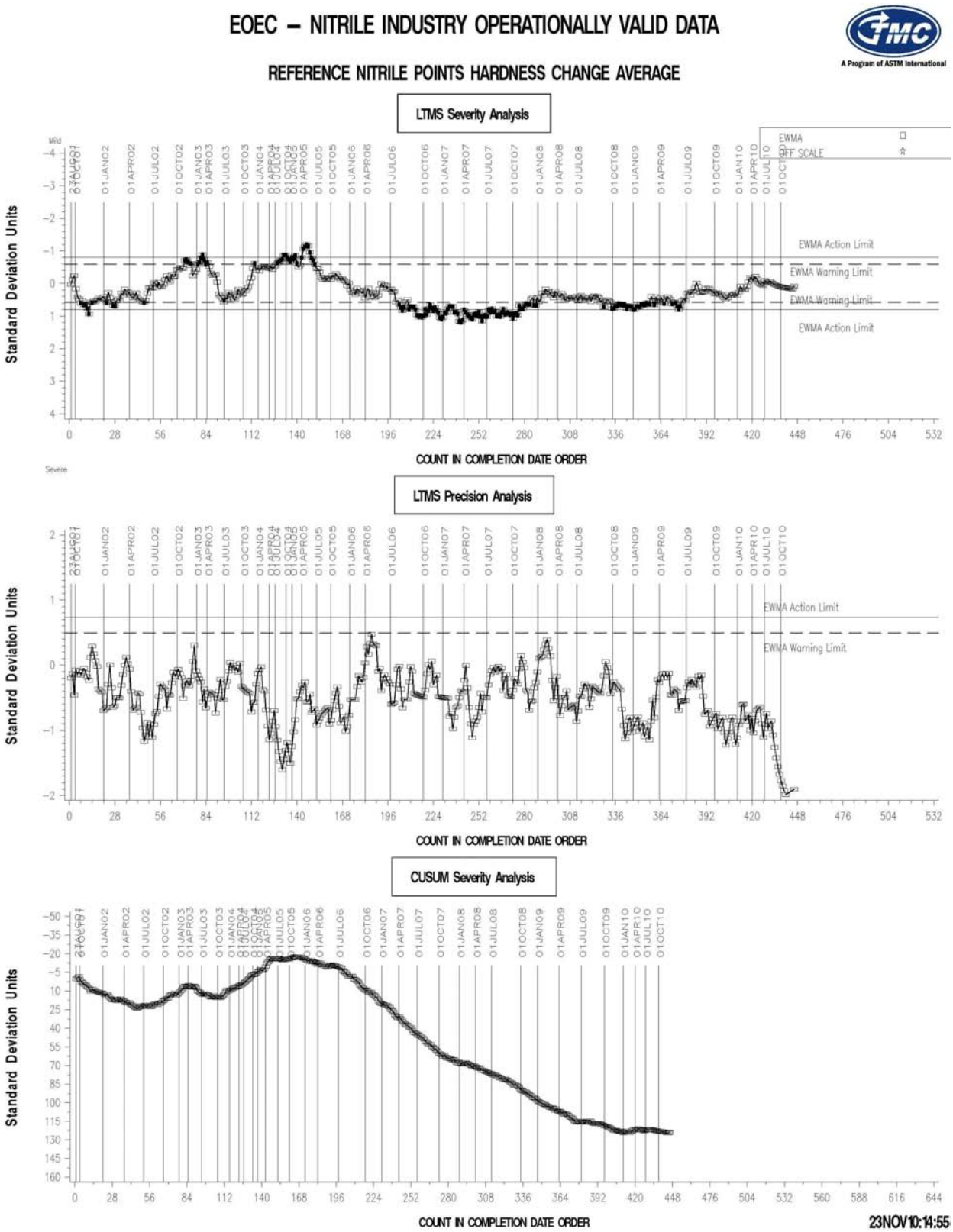
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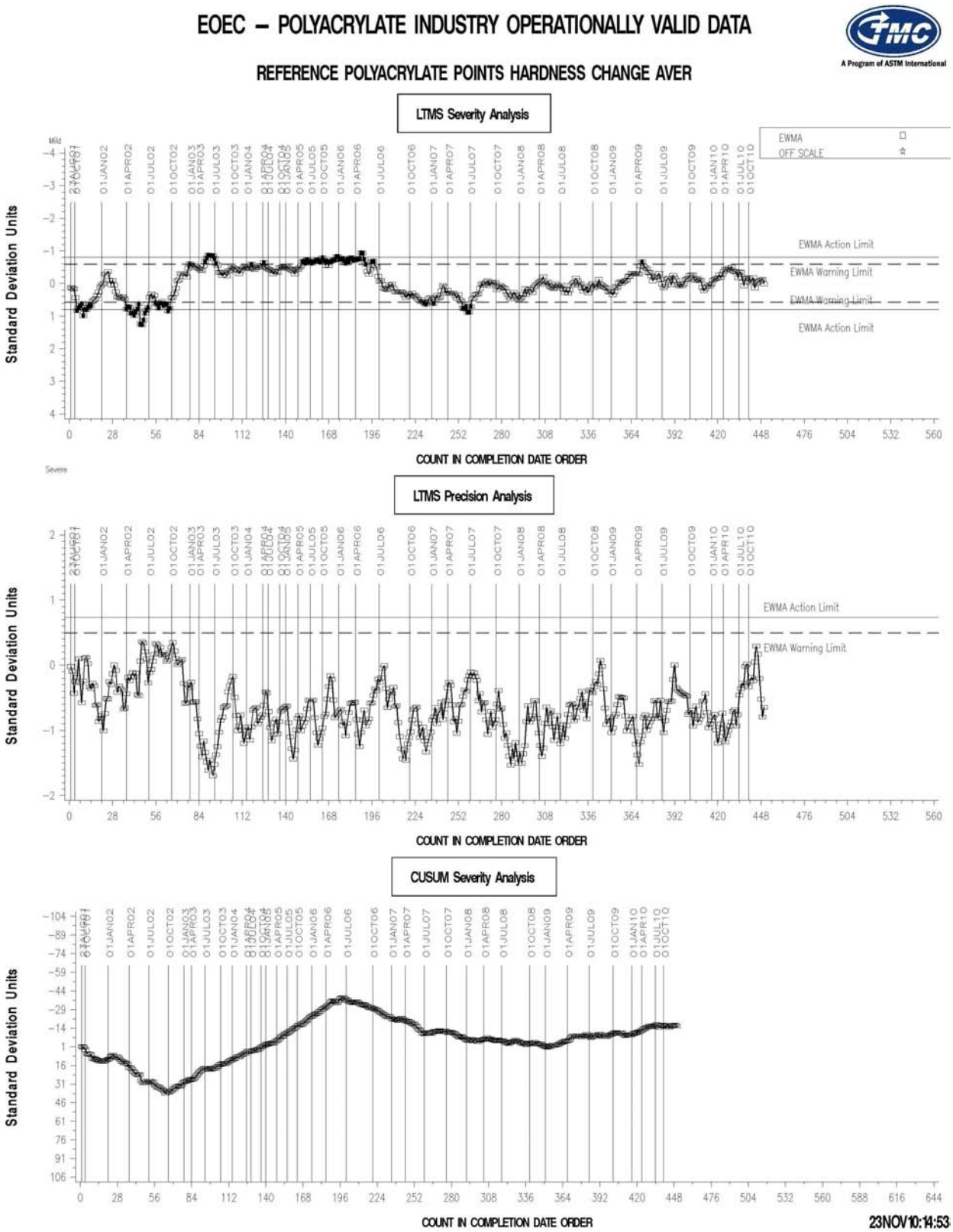
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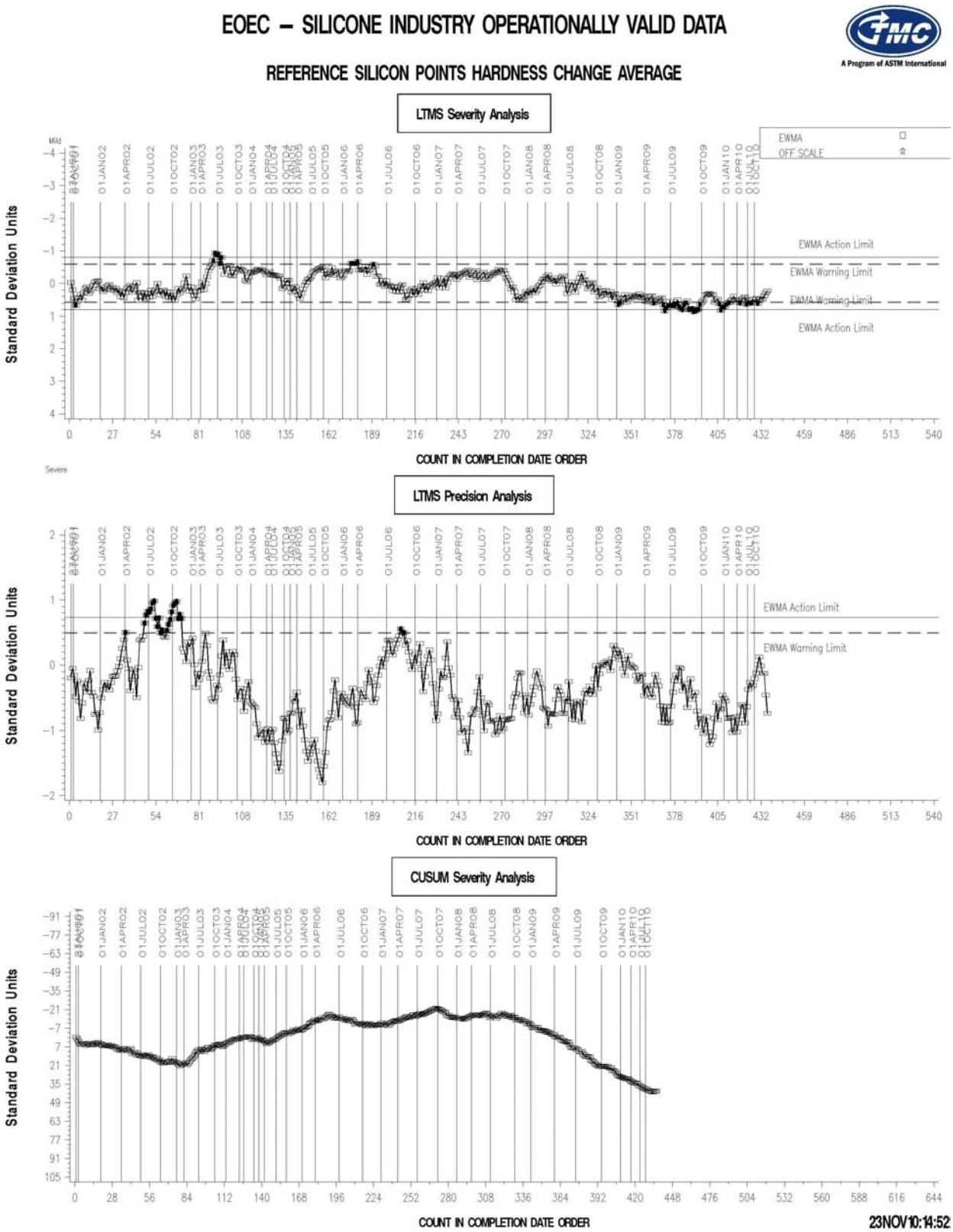
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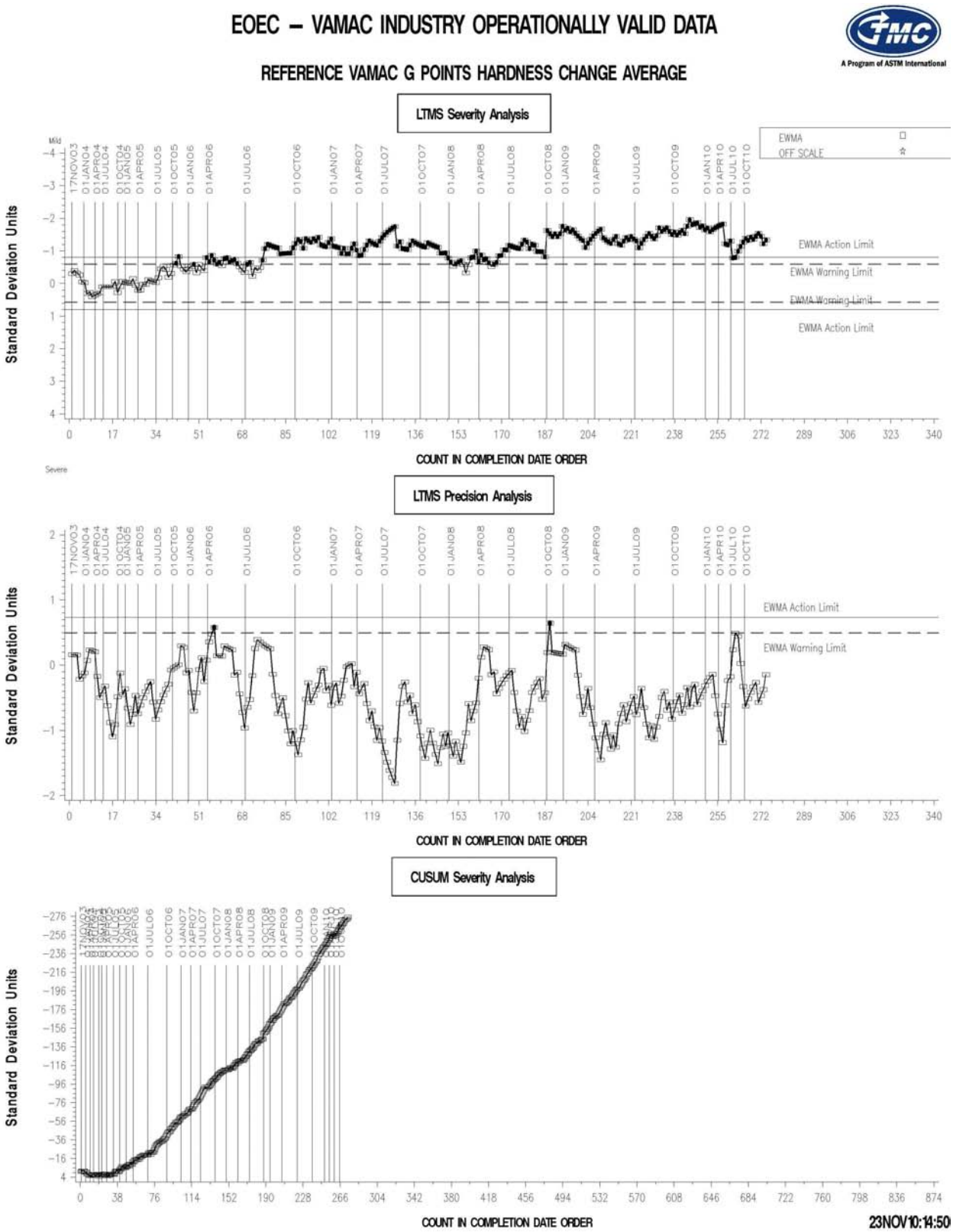
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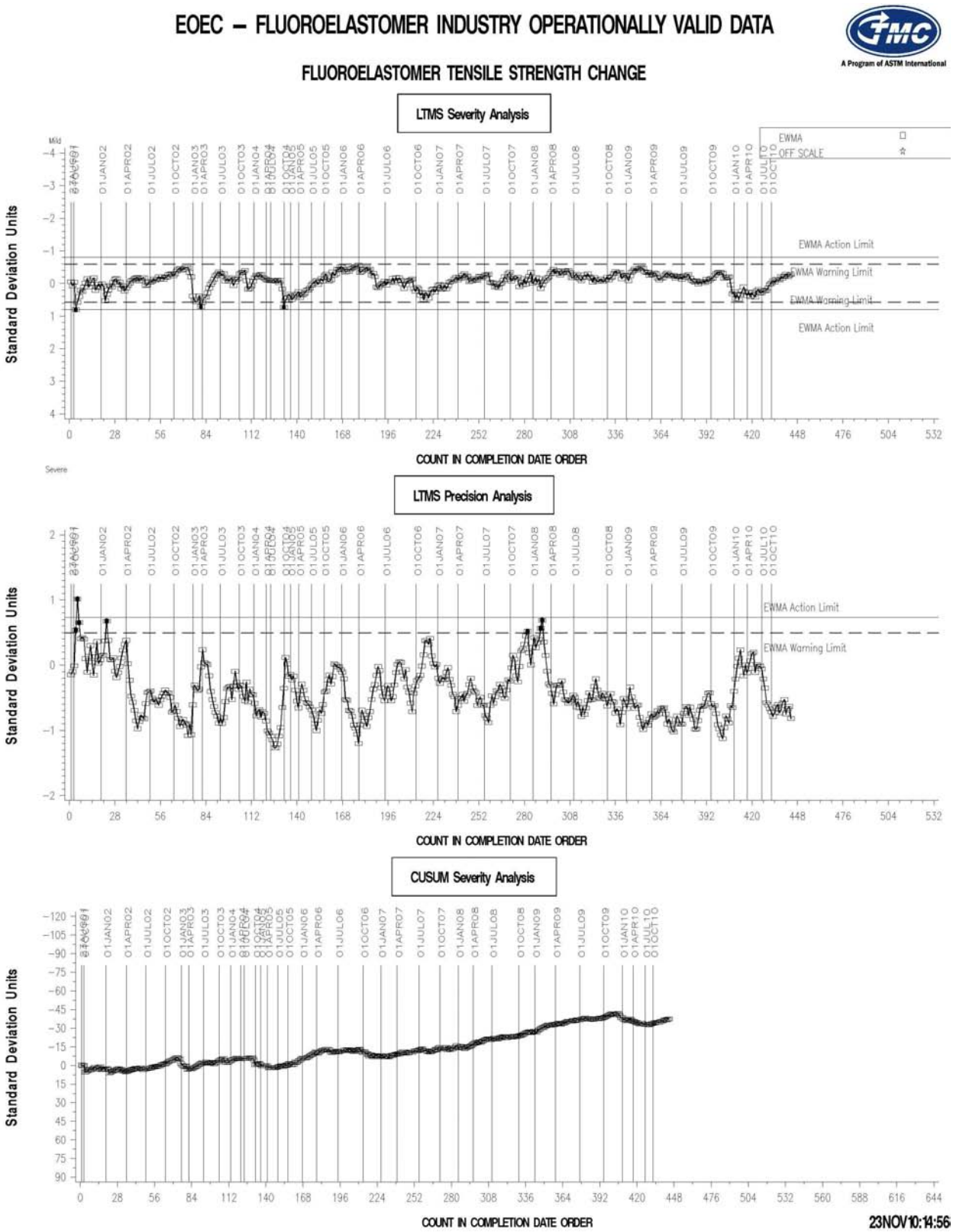
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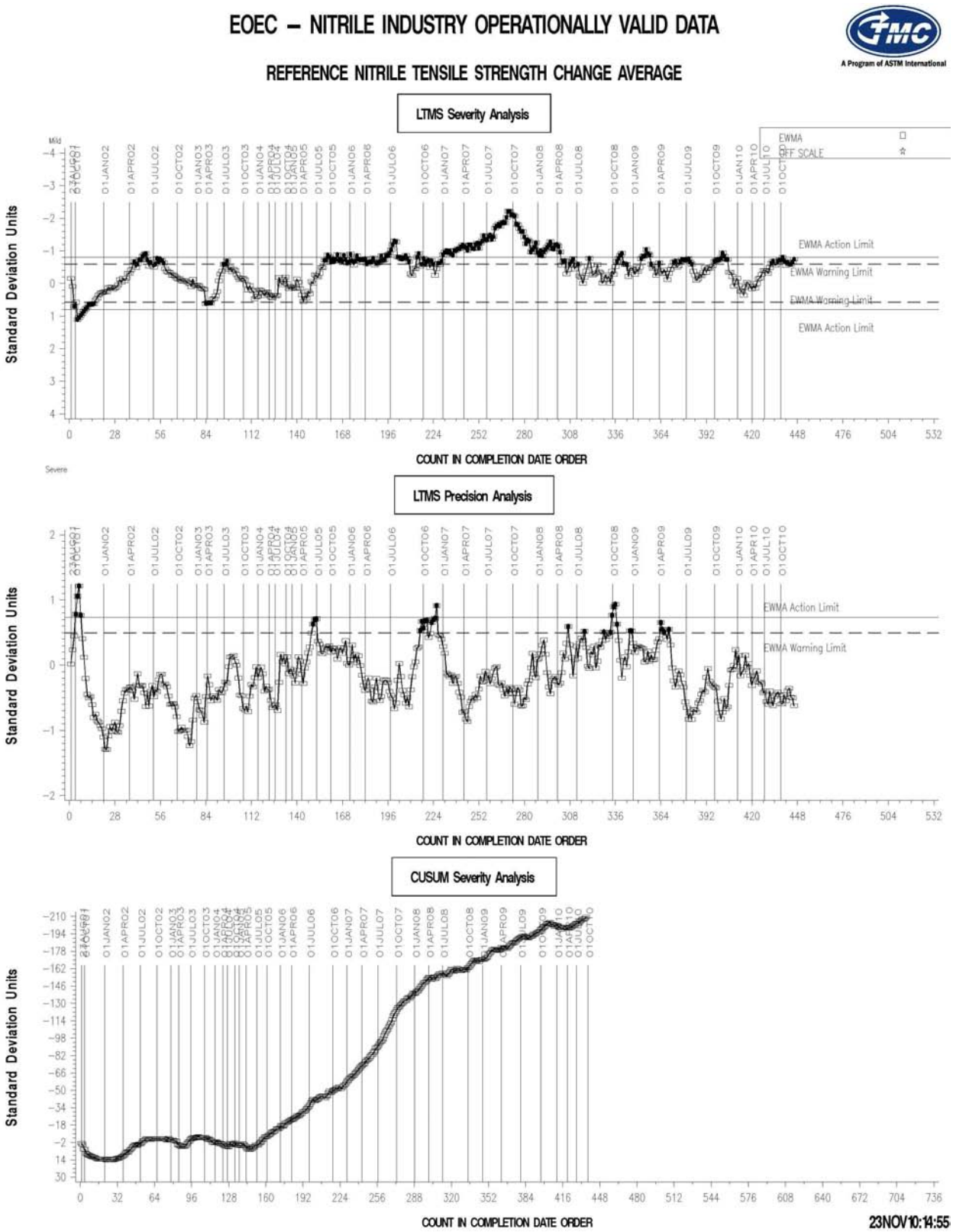
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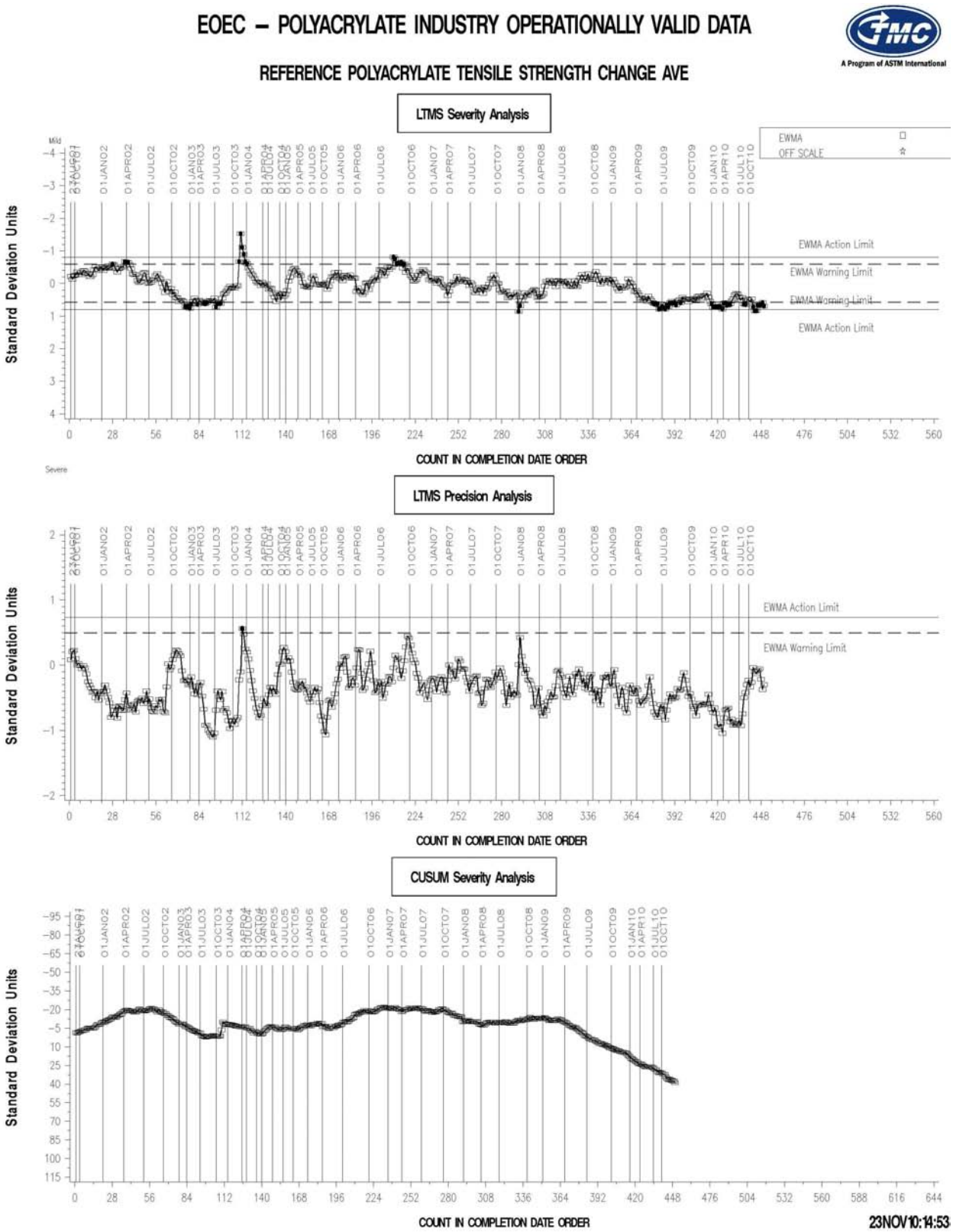
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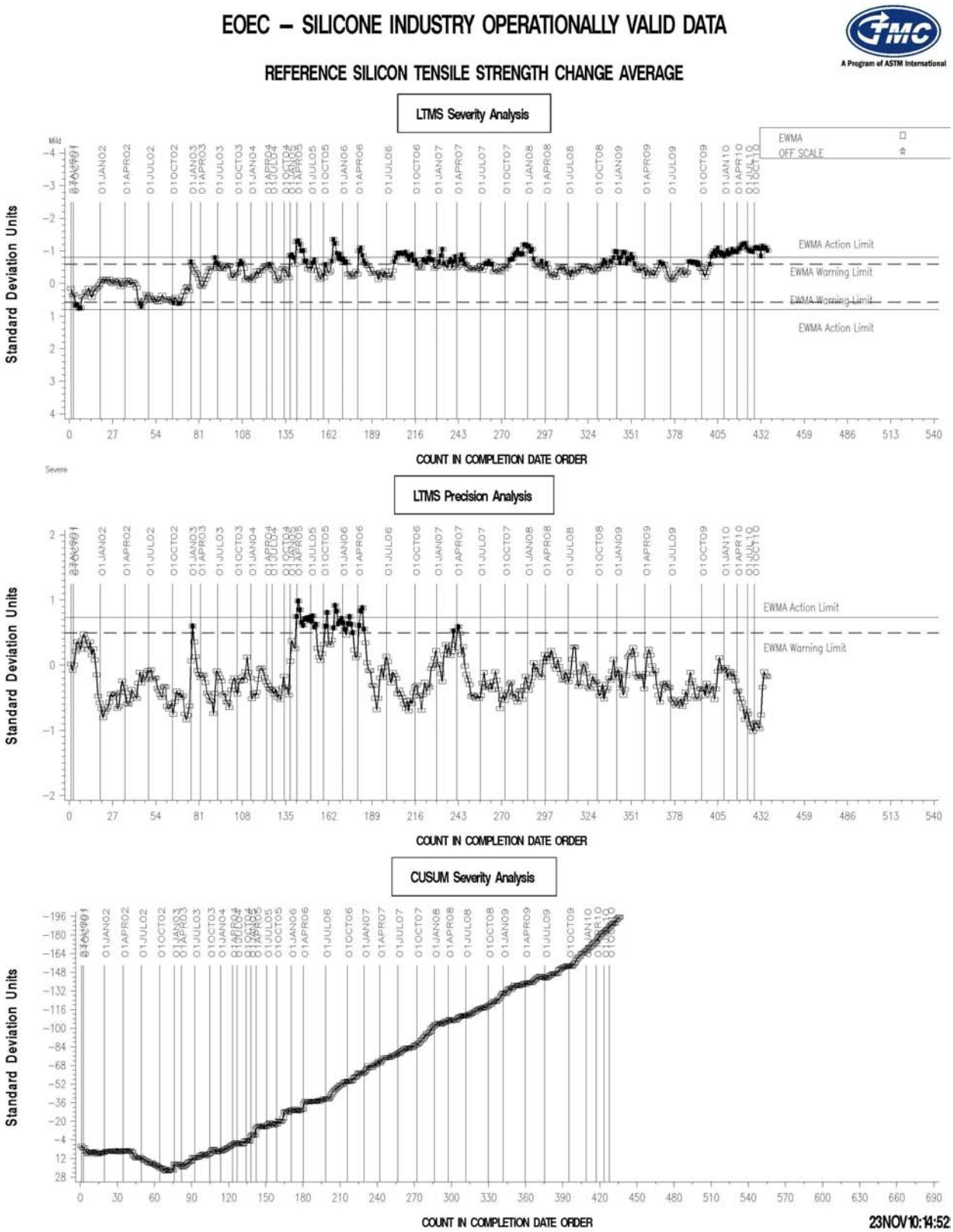
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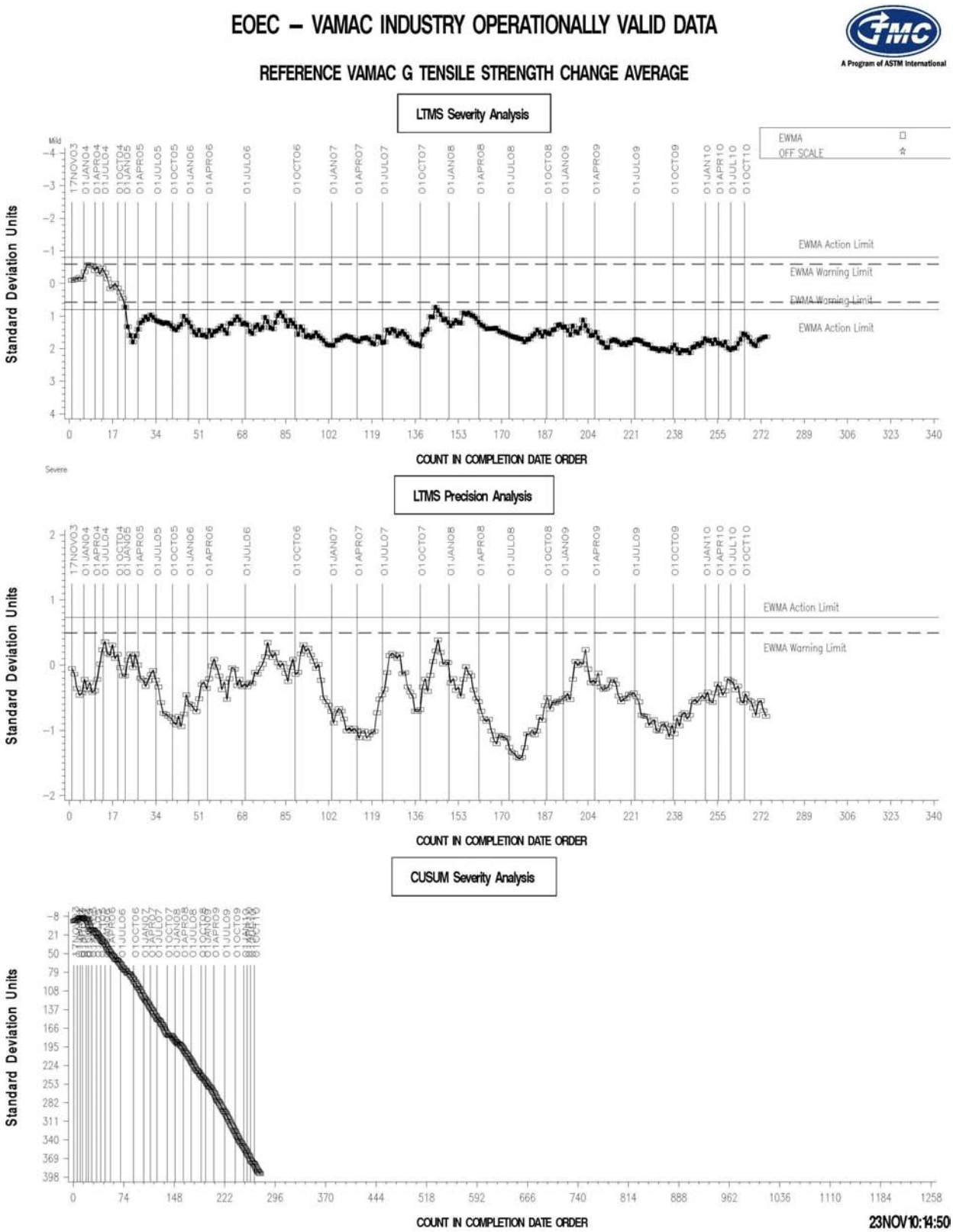
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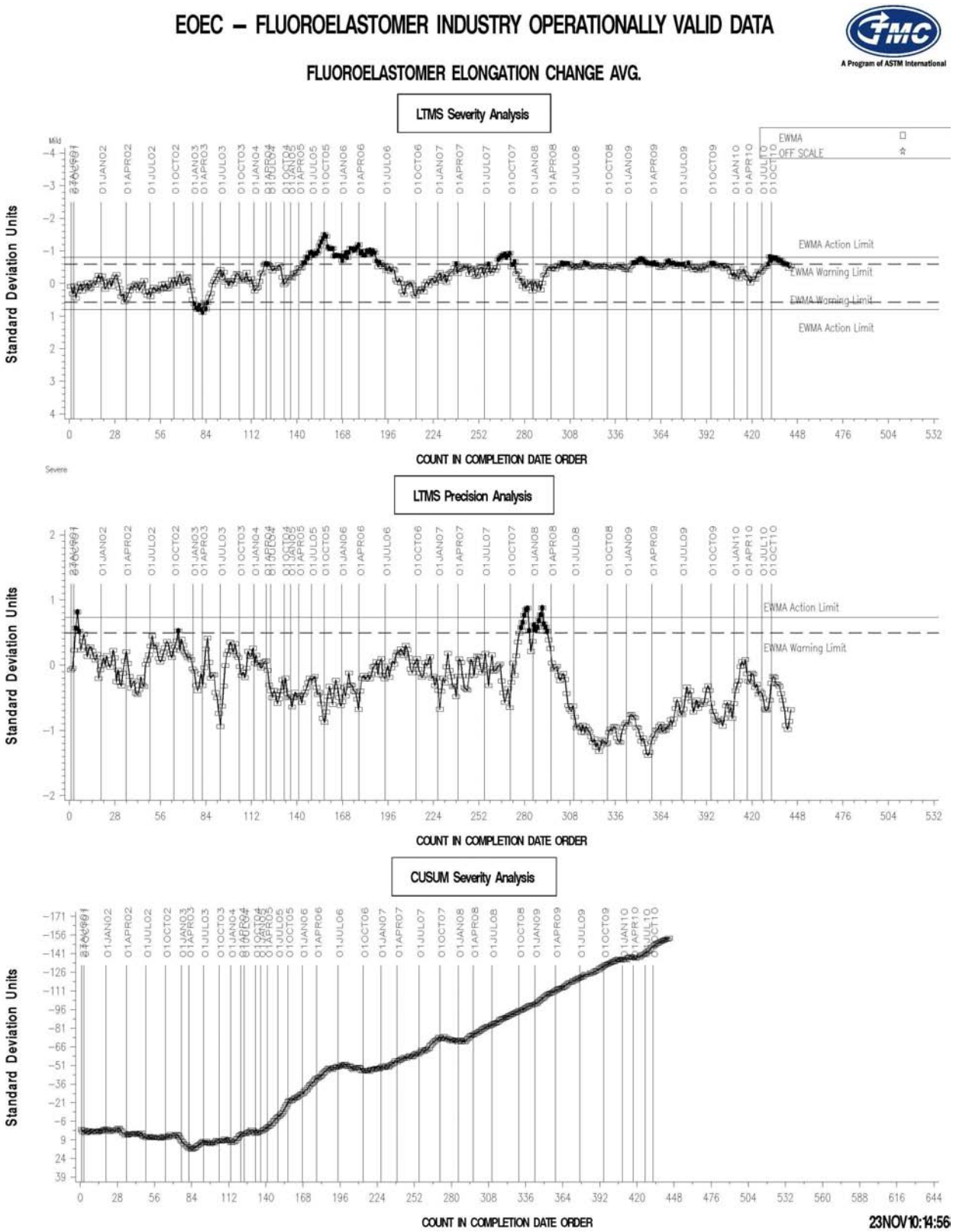
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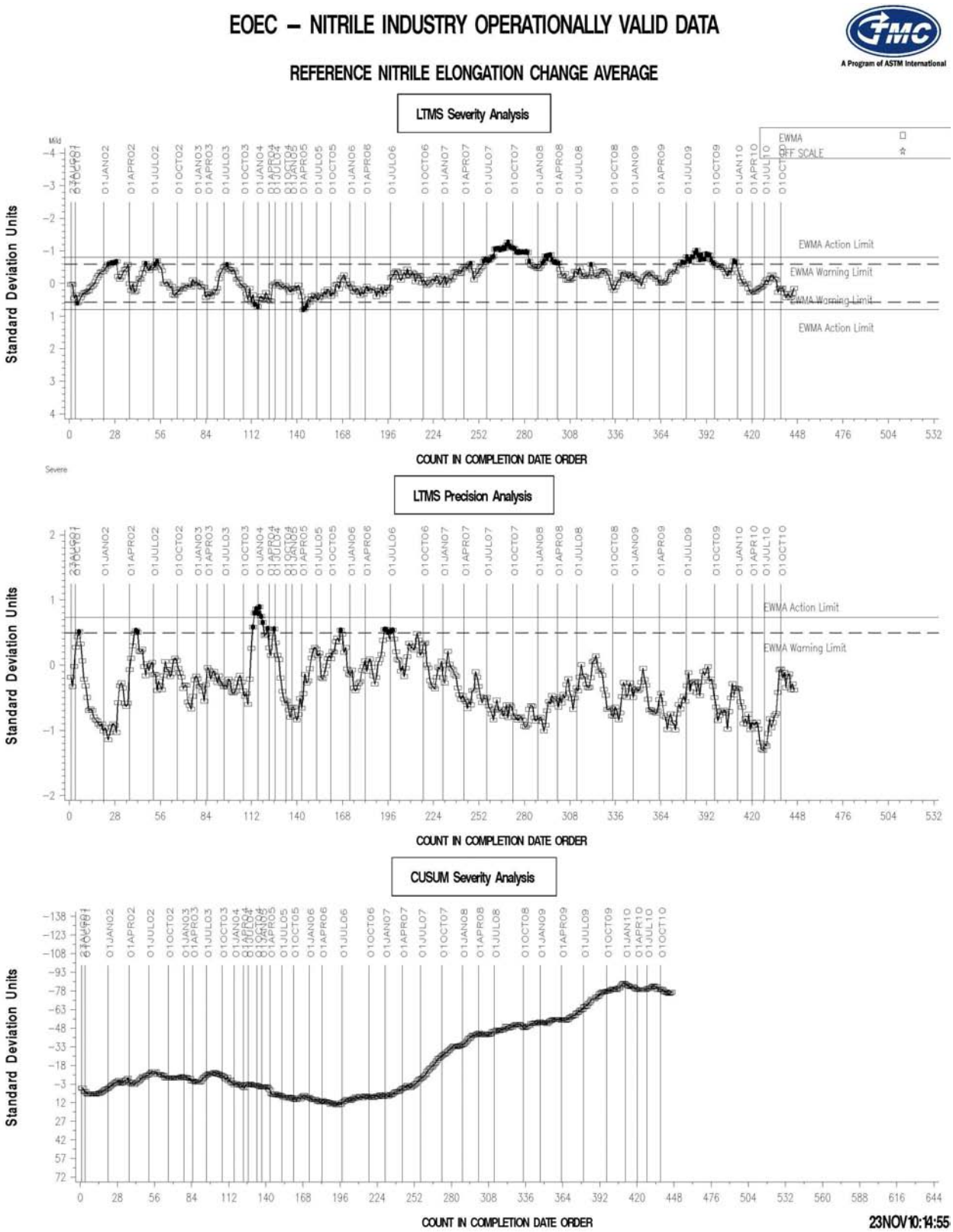
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EOEC – POLYACRYLATE INDUSTRY OPERATIONALLY VALID DATA

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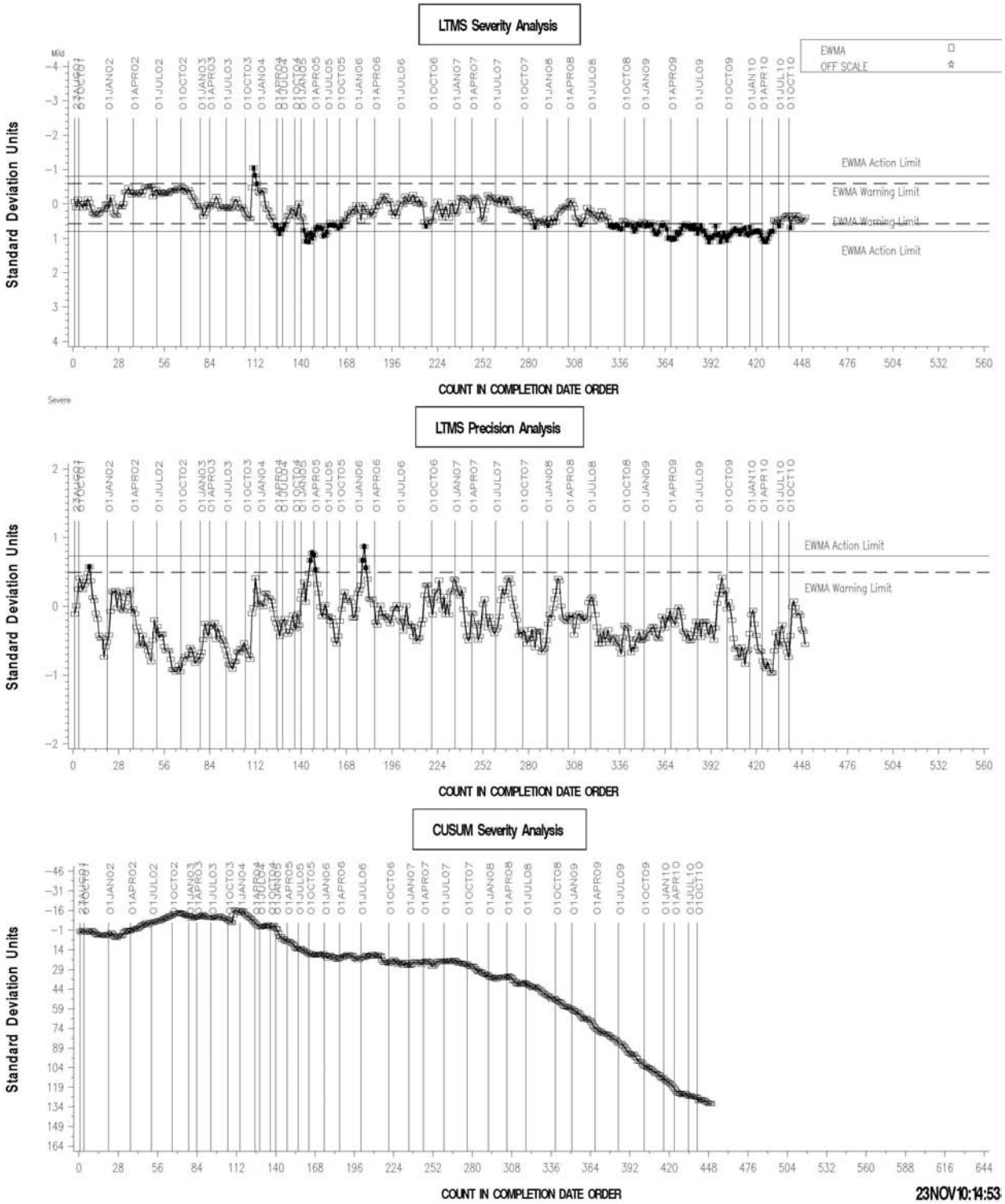
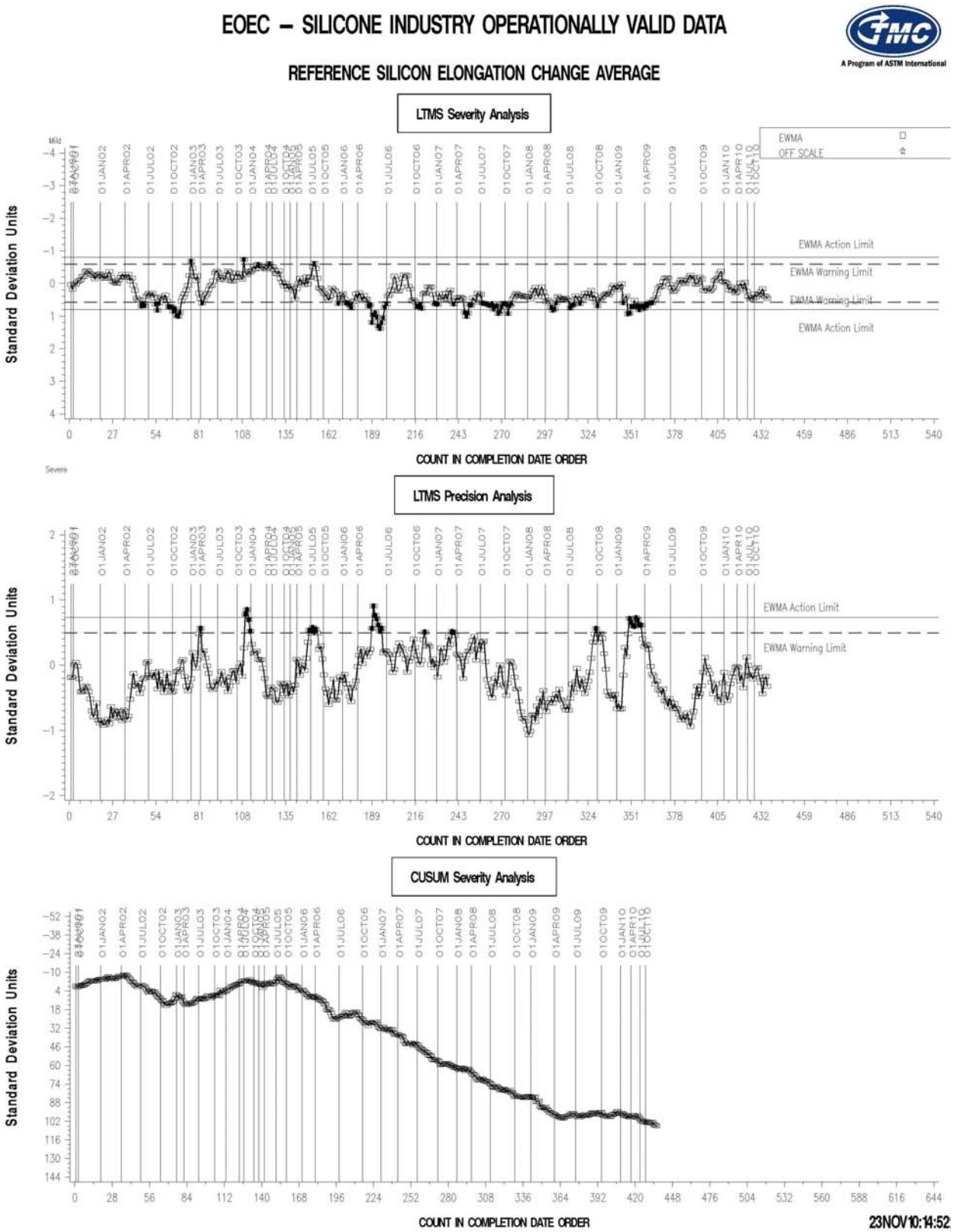
REFERENCE POLYACRYLATE ELONGATION CHANGE AVERAGE

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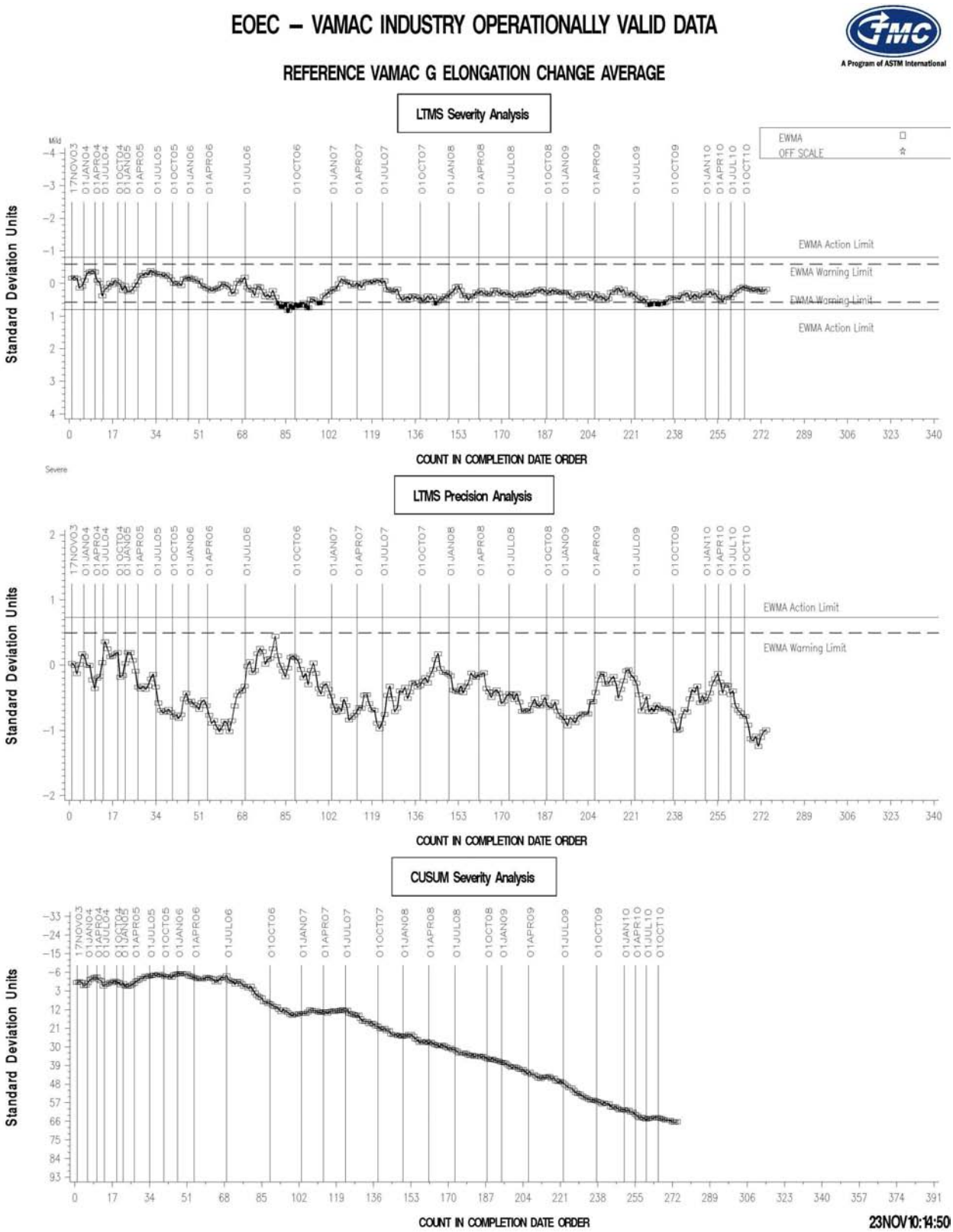
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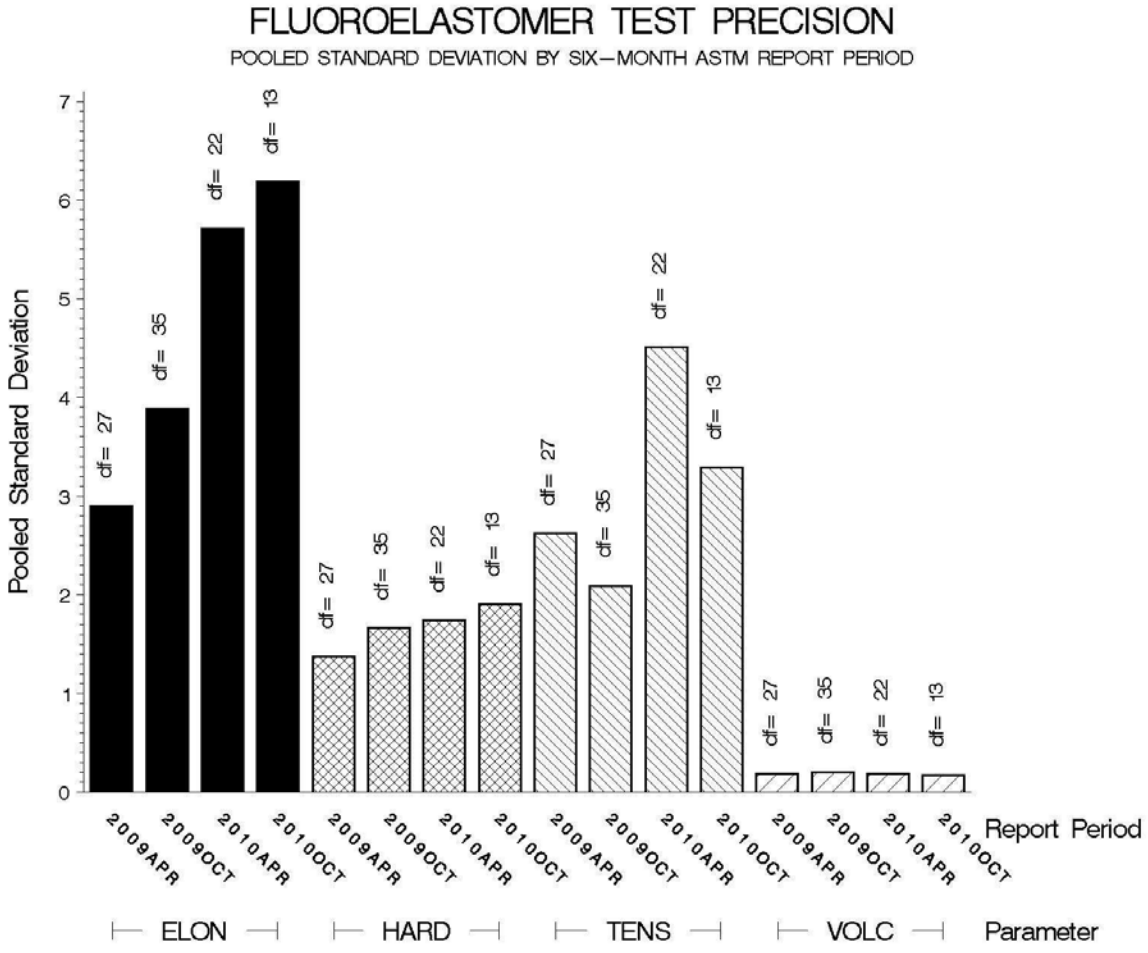
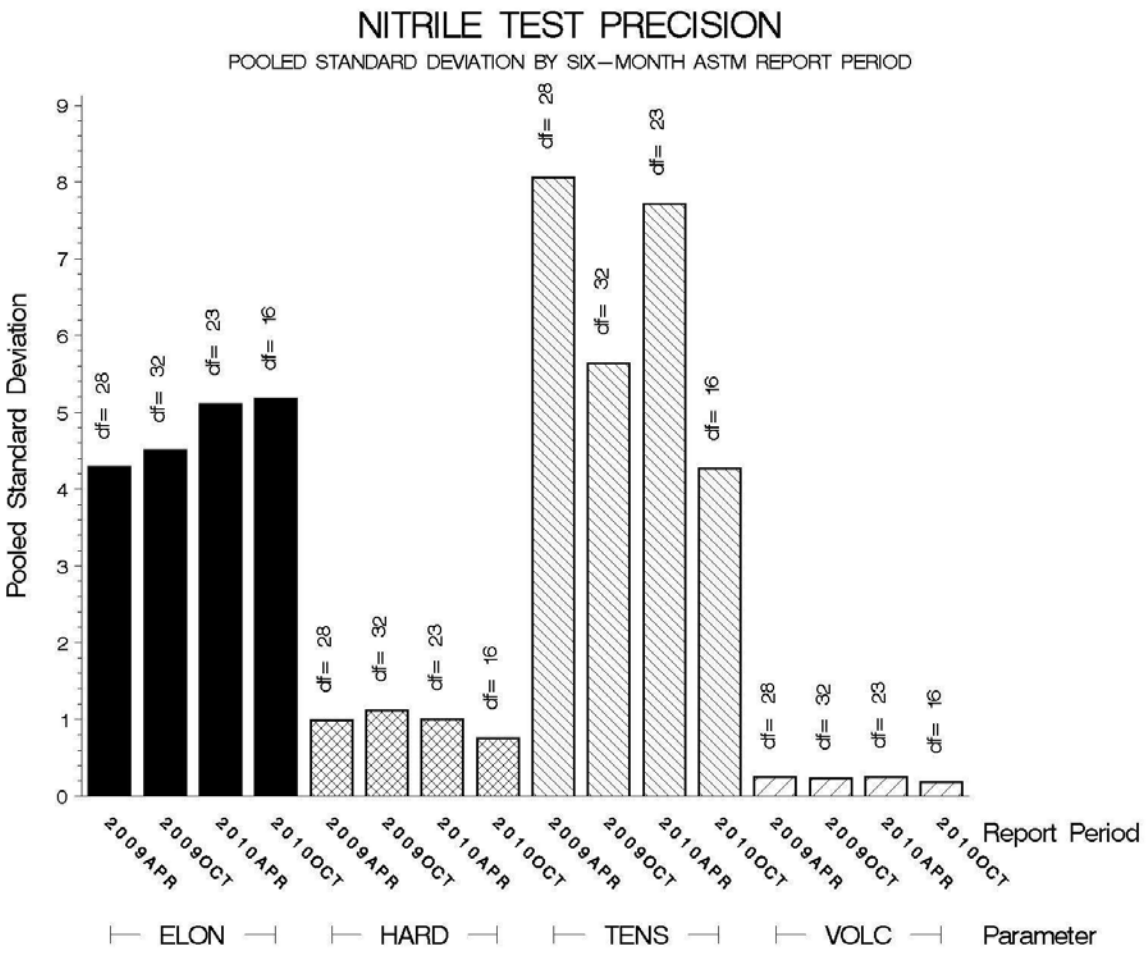
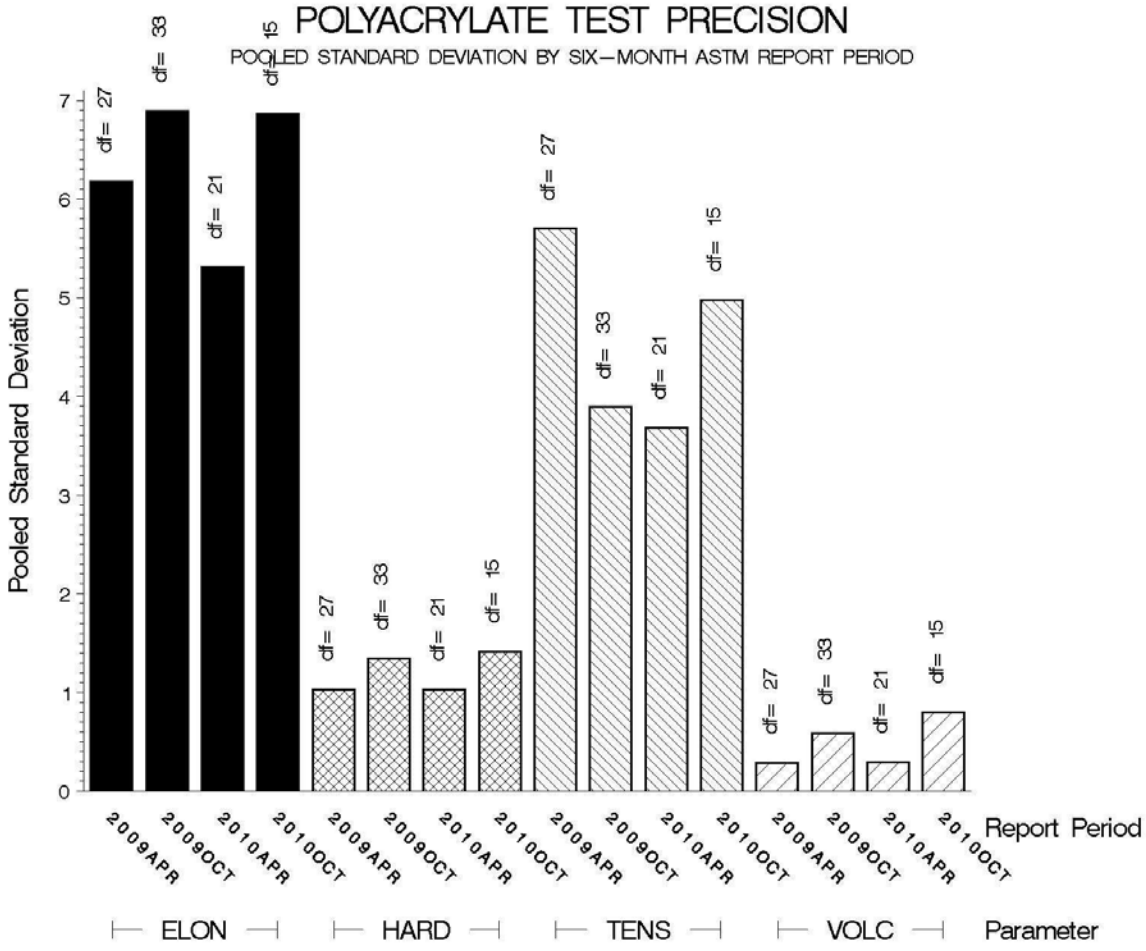
COUNT IN COMPLETION DATE ORDER
LTMS Precision Analysis
EWMA Action Limit
EWMA Warning Limit
Standard Deviation Units
COUNT IN COMPLETION DATE ORDER
CUSUM Severity Analysis
Standard Deviation Units
COUNT IN COMPLETION DATE ORDER
23NOV10:14:50

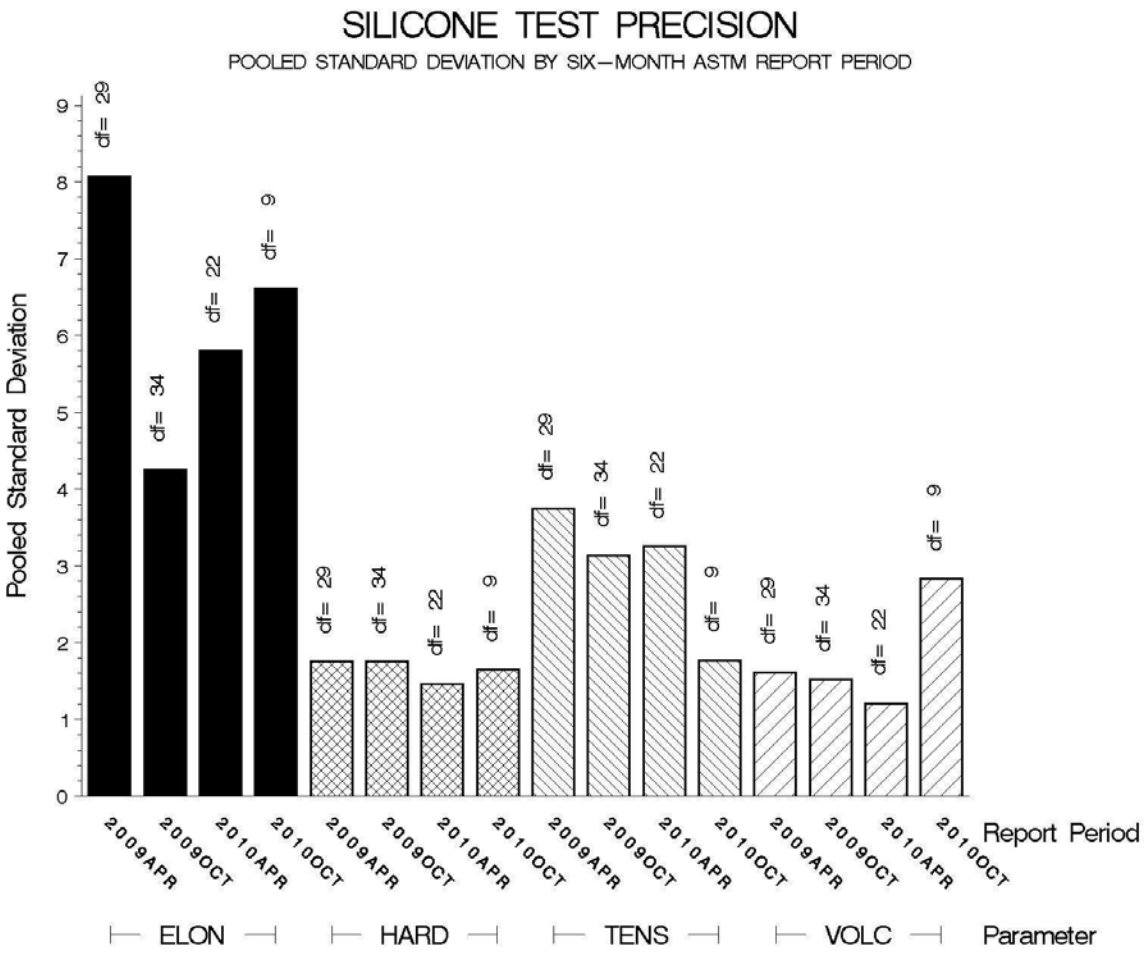
POOLED S:

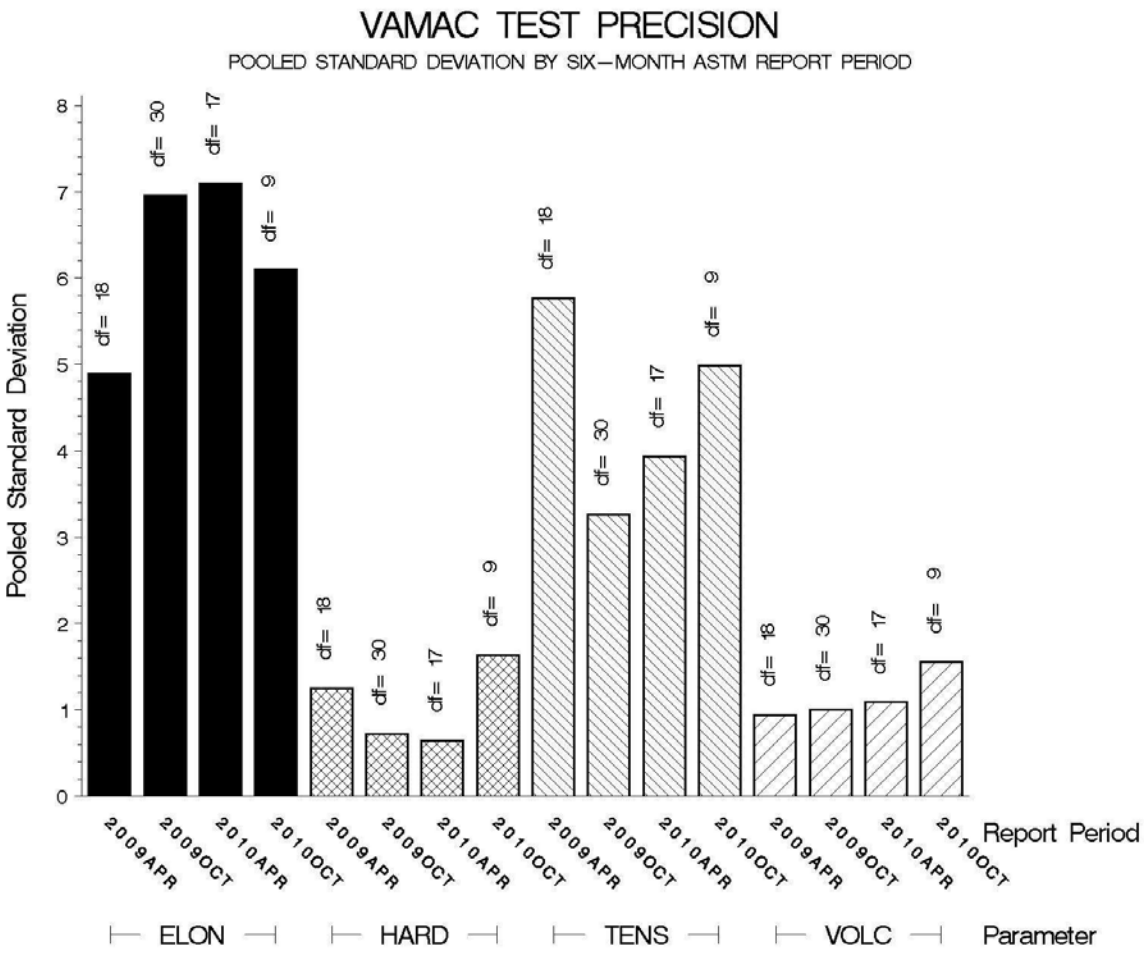
Shown below are bar charts comparing the pooled s values for the EOEC test parameters over the last four report periods.




NITRILE TEST PRECISION
POOLED STANDARD DEVIATION BY SIX–MONTH ASTM REPORT PERIOD
Pooled Standard Deviation
0
1
2
3
4
5
6
7
8
9
df= 28
df= 32
df= 23
df= 16
df= 28
df= 32
df= 23
df= 16
df= 28
df= 32
df= 23
df= 16
df= 28
df= 32
df= 23
df= 16
2009APR
2009OCT
2010APR
2010OCT
2009APR
2009OCT
2010APR
2010OCT
2009APR
2009OCT
2010APR
2010OCT
2009APR
2009OCT
2010APR
2010OCT
Report Period
ELON
HARD
TENS
VOLC
Parameter


POLYACRYLATE TEST PRECISION
POOLED STANDARD DEVIATION BY SIX-MONTH ASTM REPORT PERIOD
Pooled Standard Deviation
0
1
2
3
4
5
6
7
df= 27
df= 33
df= 21
df= 15
df= 27
df= 33
df= 21
df= 15
df= 27
df= 33
df= 21
df= 15
df= 27
df= 33
df= 21
df= 15
2009APR
2009OCT
2010APR
2010OCT
Report Period
ELON
HARD
TENS
VOLC
Parameter


SILICONE TEST PRECISION
POOLED STANDARD DEVIATION BY SIX–MONTH ASTM REPORT PERIOD
Pooled Standard Deviation
0
1
2
3
4
5
6
7
8
9
df= 29
df= 34
df= 22
df= 9
df= 29
df= 34
df= 22
df= 9
df= 29
df= 34
df= 22
df= 9
df= 29
df= 34
df= 22
df= 9
2009APR
2009OCT
2010APR
2010OCT
Report Period
ELON
HARD
TENS
VOLC
Parameter


VAMAC TEST PRECISION
POOLED STANDARD DEVIATION BY SIX–MONTH ASTM REPORT PERIOD
Pooled Standard Deviation
0
1
2
3
4
5
6
7
8
df= 18
df= 30
df= 17
df= 9
df= 18
df= 30
df= 17
df= 9
df= 18
df= 30
df= 17
df= 9
df= 18
df= 30
df= 17
df= 9
2009APR
2009OCT
2010APR
2010OCT
Report Period
ELON
HARD
TENS
VOLC
Parameter

STATUS OF REFERENCE OIL SUPPLY:
At the end of this report period, the testing oil supply stood as outlined in the following table:

		@ TMC	
Oil	Cans @ Labs	Cans	Gallons
1006-1	331	9891	1960
Total	331	9891	1960

Be aware that this table presumes that all of each of these oils is dedicated to the EOEC test area. This is not the case, as oil 1006-1 is also used in several other test areas.

INFORMATION LETTERS:

- EOEC Information Letter No. 09-1, Sequence No. 3, dated June 11, 2009 was issued during the period and contained the addition of Passenger Car Elastomer test precision estimates.
- EOEC Information Letter No. 09-2, Sequence No. 4, dated September 1, 2009 was issued during the period and contained the revision of Passenger Car Elastomer test precision estimates.

SUMMARY

Summary of Severity
as Measured by LTMS Control Charting

Elastomer	VOLC	HARD	TENS	ELON
Fluoroelastomer	Within limits	Within limits	Within limits	**Mild**
Nitrile	**Severe**	Within limits	**Mild**	Within limits
Polyacrylate	**Severe**	Within limits	**Severe**	Within limits
Silicone	Within limits	Within limits	**Mild**	Within limits
VAMAC	**Severe**	**Mild**	**Severe**	Within limits

Summary of Precision
as Measured by LTMS Control Charting

Elastomer	VOLC	HARD	TENS	ELON
Fluoroelastomer	Within limits	Within limits	Within limits	Within limits
Nitrile	Within limits	Within limits	Within limits	Within limits
Polyacrylate	Within limits	Within limits	Within limits	Within limits
Silicone	Within limits	Within limits	Within limits	Within limits
VAMAC	Within limits	Within limits	Within limits	Within limits

MTK/mtk/astm1010.doc/mem10-062.mtk.doc

c: F. M. Farber
J. A. Clark
EOEC Surveillance Panel
ftp://ftp.astmtmc.cmu.edu/docs/bench/eoec/semiannualreports/eoec-10-2010.pdf

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