



# Test Monitoring Center

6555 Penn Avenue  
Pittsburgh, PA 15206-4489  
(412) 365-1000

MEMORANDUM: 03-103

DATE: October 17, 2003

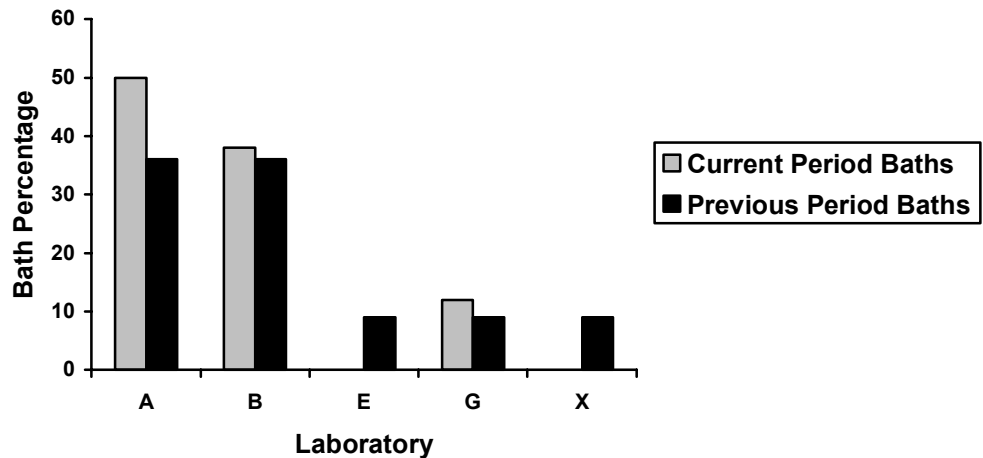
TO: Joe Franklin, Chairman, CBT Surveillance Panel

FROM: Jeff Clark

SUBJECT: High Temperature Corrosion Bench Test Status from April 1, 2003 through September 30, 2003

A total of 114 High Temperature Corrosion Bench Test results from eight baths in three labs were reported to the TMC during the period from April 1, 2003 through September 30, 2003. The following chart shows the distribution by laboratory.

**Laboratory/Bath Distribution**



The following summarizes the status of the reference oil tests reported to the TMC:

	TMC Validity Codes	No. of Tests
Operationally and Statistically Acceptable	AC	108
Failed Acceptance Criteria	OC	3
Operationally Invalid, Lab Judgement	LC	1
Aborted	XC	2
Total		114

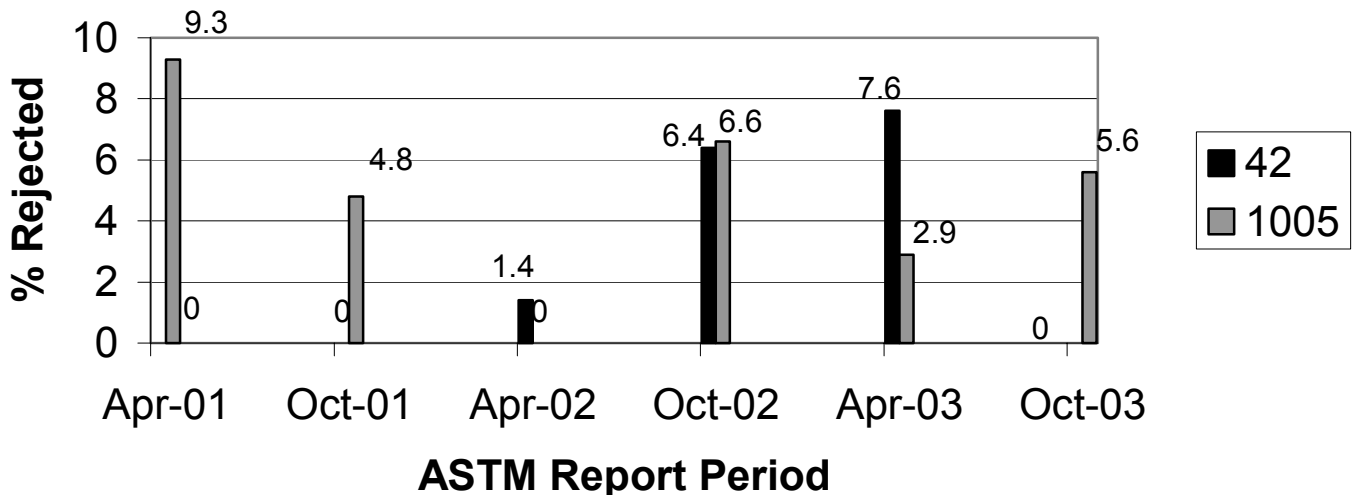
One test was operationally invalid due to running the wrong coupons. One test was aborted due to a power failure and one test was aborted due to technical error.

The following tabulates the statistically unacceptable tests:

Reason	Number of Tests
Mild Copper (Reference oil 1005)	2
Mild Copper, Severe Lead (Reference oil 1005)	1

A total of 57 operationally valid results were run on reference oil 42 of which 0 failed (0.0% fail rate). A total of 54 operationally valid results were run on reference oil 1005 of which 3 failed (5.6% fail rate). The following presents the fail rate for this period with the fail rates of previous periods, by reference oil:

### Comparison of Rejection Rates, by Oil, for This Period Versus Previous Periods



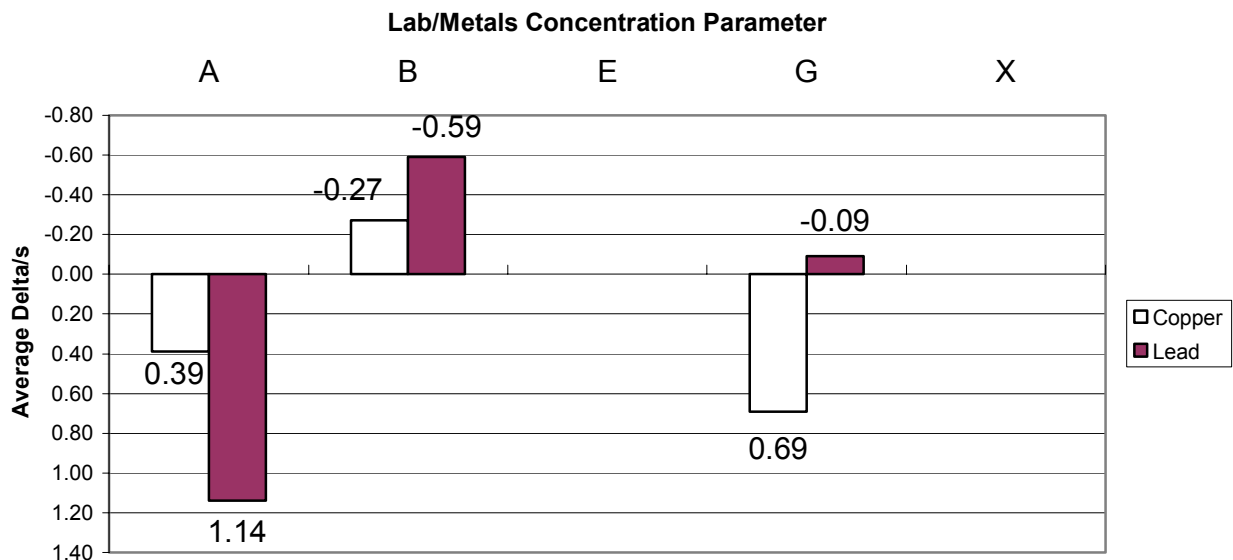
Industry Severity and Precision

The current severity for the change in metals concentration parameters on all operationally valid tests, for the current and previous periods, is tabulated below.

Period	n	$\Delta$ Cu	$\Delta$ Pb
		Mean $\Delta/s$	Mean $\Delta/s$
4/1/03 through 9/30/03	111	0.01	0.07
10/1/02 through 3/31/03	134	0.01	-0.26
4/1/02 through 9/30/02	124	0.30	0.22
10/1/01 through 3/31/02	137	0.02	-0.05
4/1/01 through 10/1/01	116	0.28	-0.26

Figures 1 and 2 plot the Summation delta/s from target for both change in copper and change in lead, respectively. Figure 1 shows copper change to be on target for the period. Figure 2 shows lead change to be on target for the period. Laboratory severity for both reference oils 1005 and 42 is depicted below.

**Average Delta/s By Lab, TMC Oils 42 & 1005**



Industry Severity by Reference Oil

The industry performance (severity and precision) for reference oil 42, comparing the current period with the previous ASTM report periods, is tabulated below. Values in parentheses are in transformed (natural log) units.

Period	n	$\Delta$ Cu mean	$\Delta$ Cu S	$\Delta$ Cu Mean $\Delta/s$	$\Delta$ Pb mean	$\Delta$ Pb s	$\Delta$ Pb Mean $\Delta/s$
4/1/03 to 9/30/03	57	26.5 (3.277)	(0.394)	0.09	107.9	13.60	0.00
10/1/02 to 3/31/03	66	26.8 (3.289)	(0.478)	0.11	100.1	19.53	-0.32
4/1/02 to 9/30/02	63	34.7 (3.546)	(0.492)	0.55	114.0	15.69	0.26
10/1/01 to 3/31/02	71	26.4 (3.274)	(0.376)	0.09	108.9	16.75	0.05
4/1/01 to 9/30/01	54	38.0 (3.638)	(0.293)	0.24	102.0	15.56	-0.25

The industry performance (severity and precision) for reference oil 1005, comparing the current period with the previous ASTM report periods, is tabulated below. Values in parentheses are in transformed (natural log) units.

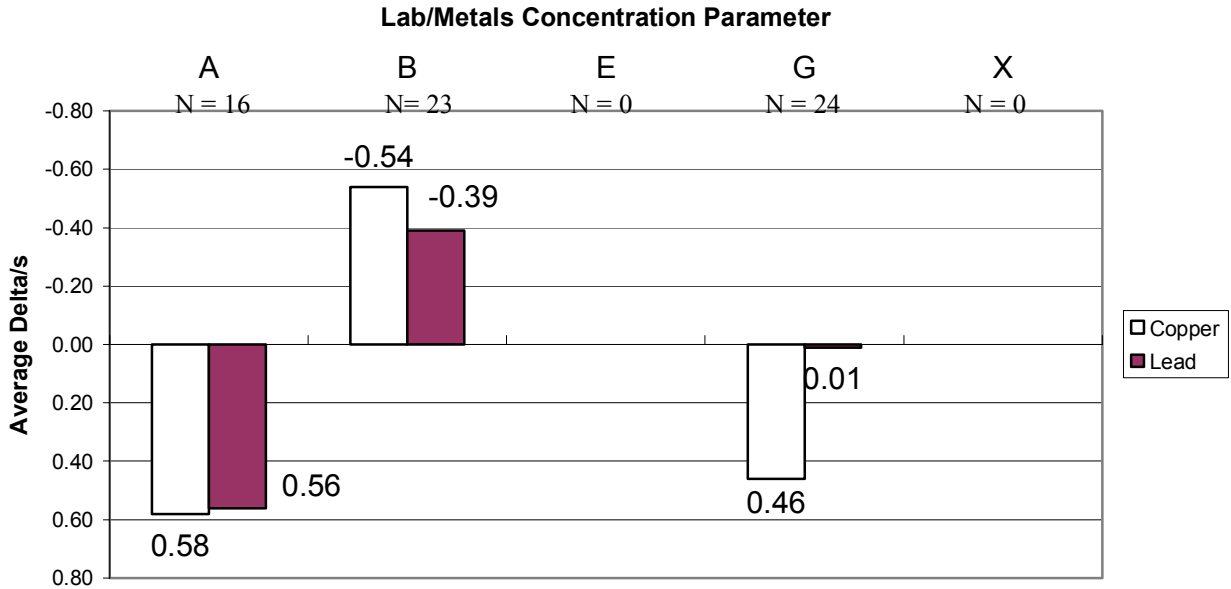
Period	n	$\Delta$ Cu mean	$\Delta$ Cu S	$\Delta$ Cu Mean $\Delta/s$	$\Delta$ Pb mean	$\Delta$ Pb s	$\Delta$ Pb Mean $\Delta/s$
4/1/03 to 9/30/03	54	9.4 (2.246)	(0.166)	-0.07	34.1	47.1	0.14
10/1/02 to 3/31/03	68	9.4 (2.243)	(0.497)	-0.09	29.6	11.3	-0.20
4/1/02 to 9/30/02	61	9.6 (2.262)	(0.164)	0.04	34.4	15.0	0.17
10/1/01 to 3/31/02	66	9.5 (2.248)	(0.154)	-0.05	30.3	9.3	-0.15
4/1/01 to 9/30/01	62	10.0 (2.300)	(0.151)	0.31	28.8	10.1	-0.27

Precision for copper on both oils shows some improvement compared to the previous period. Precision for lead shows some improvement for oil 42 and significant degradation for oil 1005. However, this is likely due to a single test result of 370 ppm and in all likelihood is not a true indication of precision for lead on oil 1005. For this period, copper was on target for both oils. Lead was on target for oil 42 and severe for oil 1005 (again, due to the one extreme result).

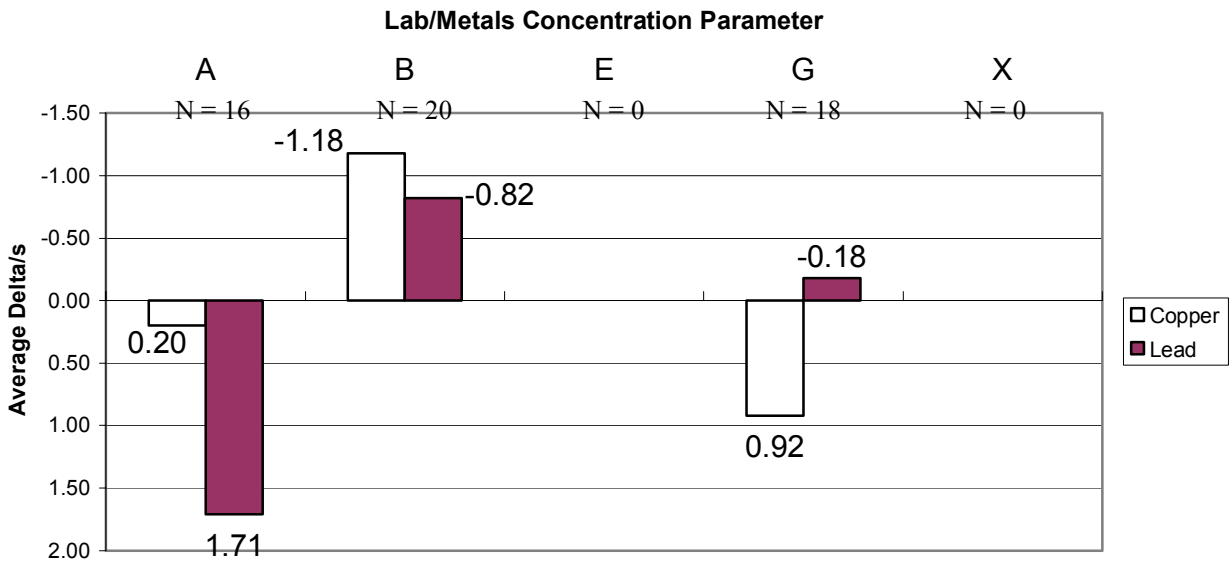
Laboratory Severity by Oil

Severity, for each oil, is plotted by laboratory on the following page.

### Average Delta/s By Lab, TMC Oil 42



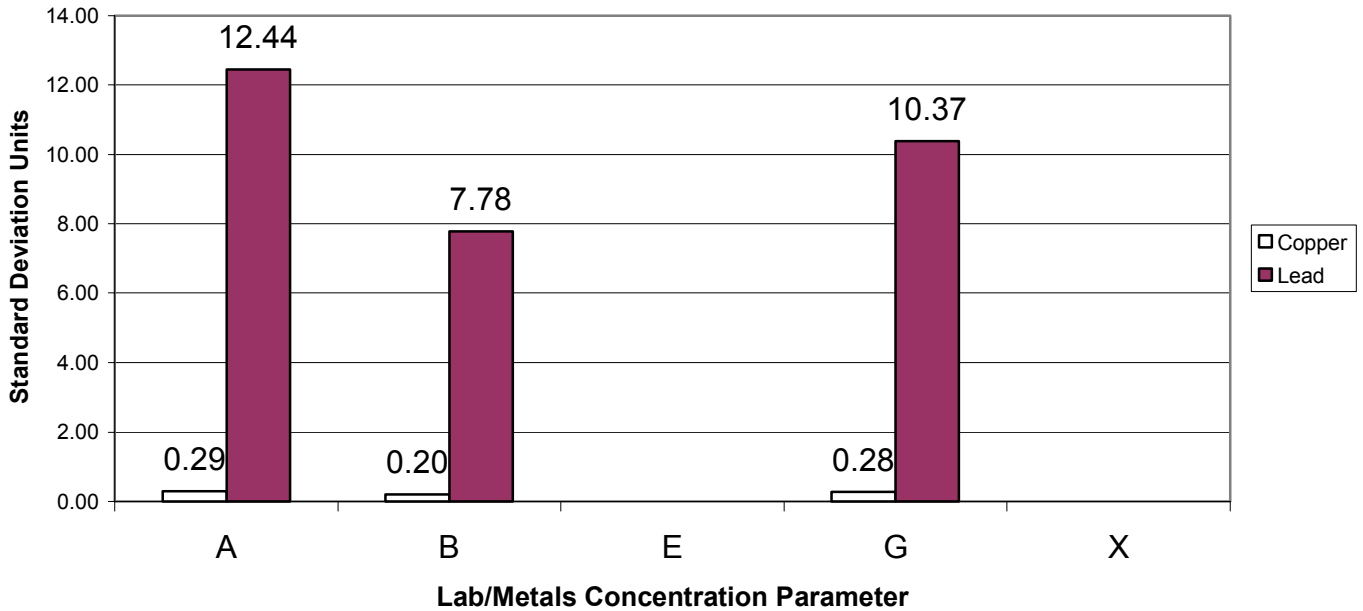
### Average Delta/s By Lab, TMC Oil 1005



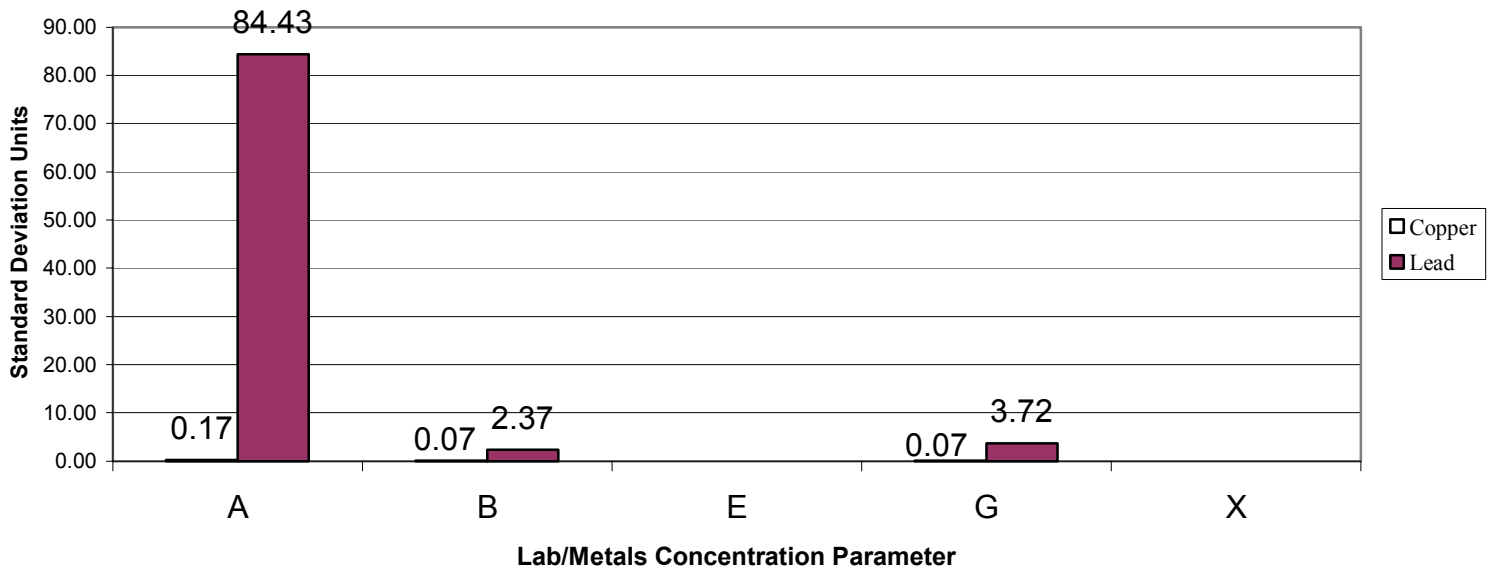
The charts show that lab B is mild for both parameters, on both oils. Lab A is severe for both parameters, on both oils. Lab G is severe for copper (both oils) and is mild for lead on oil 1005.

The following plots show the precision for this period, by lab and oil.

### Precision (s) By Lab, TMC Oil 42



### Precision Estimates (s) By Lab, TMC Oil 1005



Copper standard deviations were calculated in transformed (natural log, ln) units. For oil 42, lead variability was highest at lab A and lowest at lab B. Copper variability shows good agreement between labs. For oil 1005, lead variability was significantly higher at lab A, due to a single extreme result. For copper, variability was highest at lab A.

Reference Oil Supply

Reference oil quantities available at the laboratories and TMC, as well as estimated life of these oils, are tabulated below.

Oil	TMC Inventory, in gallons	TMC Inventory, in tests	Laboratory Inventory, in tests	Estimated life
42	0	0	31	3.5 months
1005	67.2	~2180	31	19+ years

The TMC supply of oil 42 has been exhausted. The TMC is in the process of obtaining a 20-gallon re-blend of that oil.

Information Letters

Information Letter 03-1 was issued on September 22, 2003. Topics covered were air source, specimen immersion depth, and the report forms and data dictionary.

Additional Information

The HTCBT database is available from the TMC's website. If you are uncertain how to access this data, contact the TMC.

JAC/jac/mem03-103.jac.doc

c: HTCBT Surveillance Panel  
J. L. Zalar  
F. M. Farber

<ftp://ftp.astmtmc.cmu.edu/docs/bench/htcbt/semiannualreports/htcbt-10-2003.pdf>

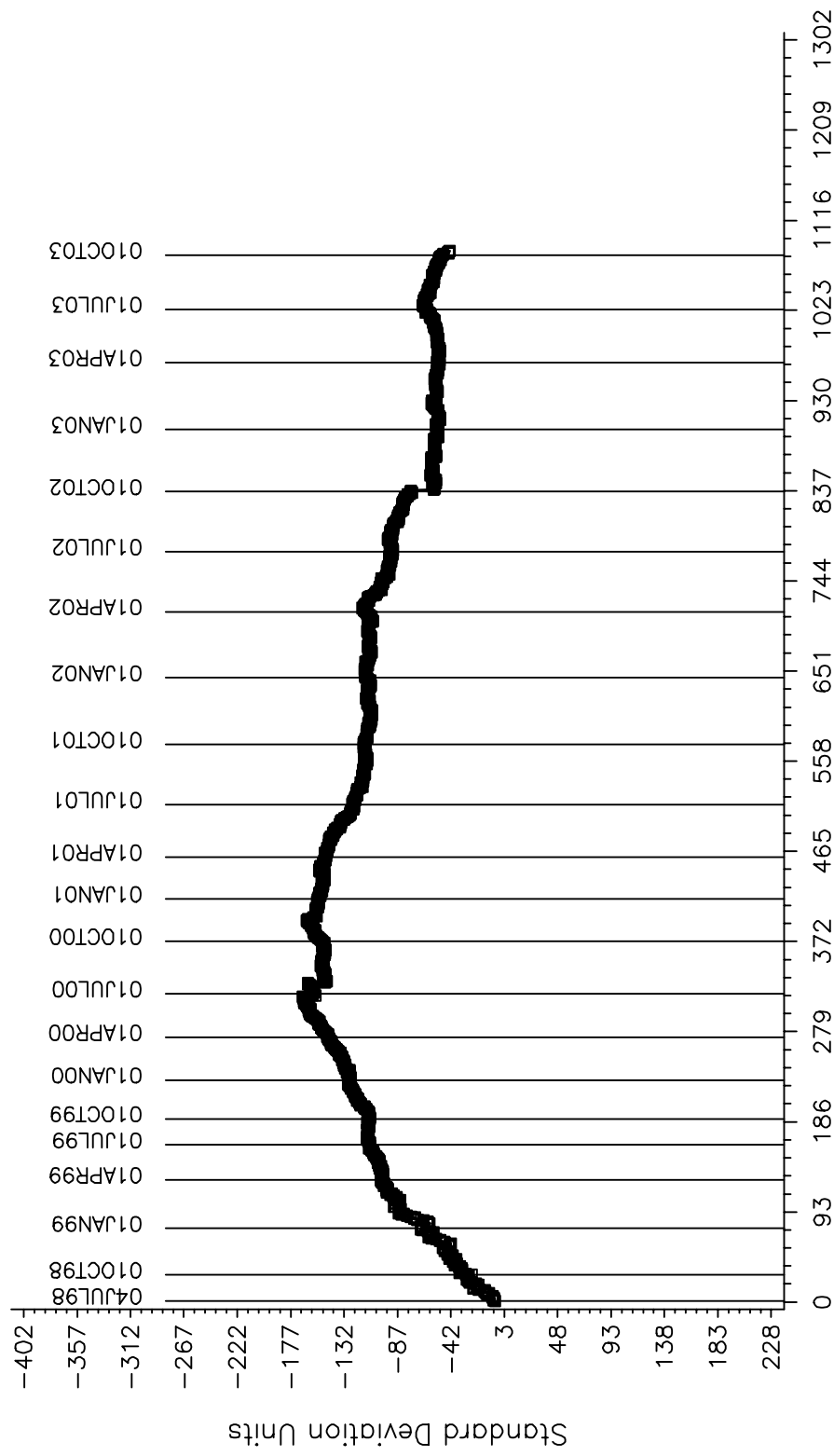
Distribution: Email

**Figure 1**

HIGH TEMP CBT INDUSTRY OPERATIONALLY VALID DATA

COPPER CHANGE (ppm)

CUSUM Severity Analysis



COUNT IN COMPLETION DATE ORDER

TMC 16OCT03:10:15

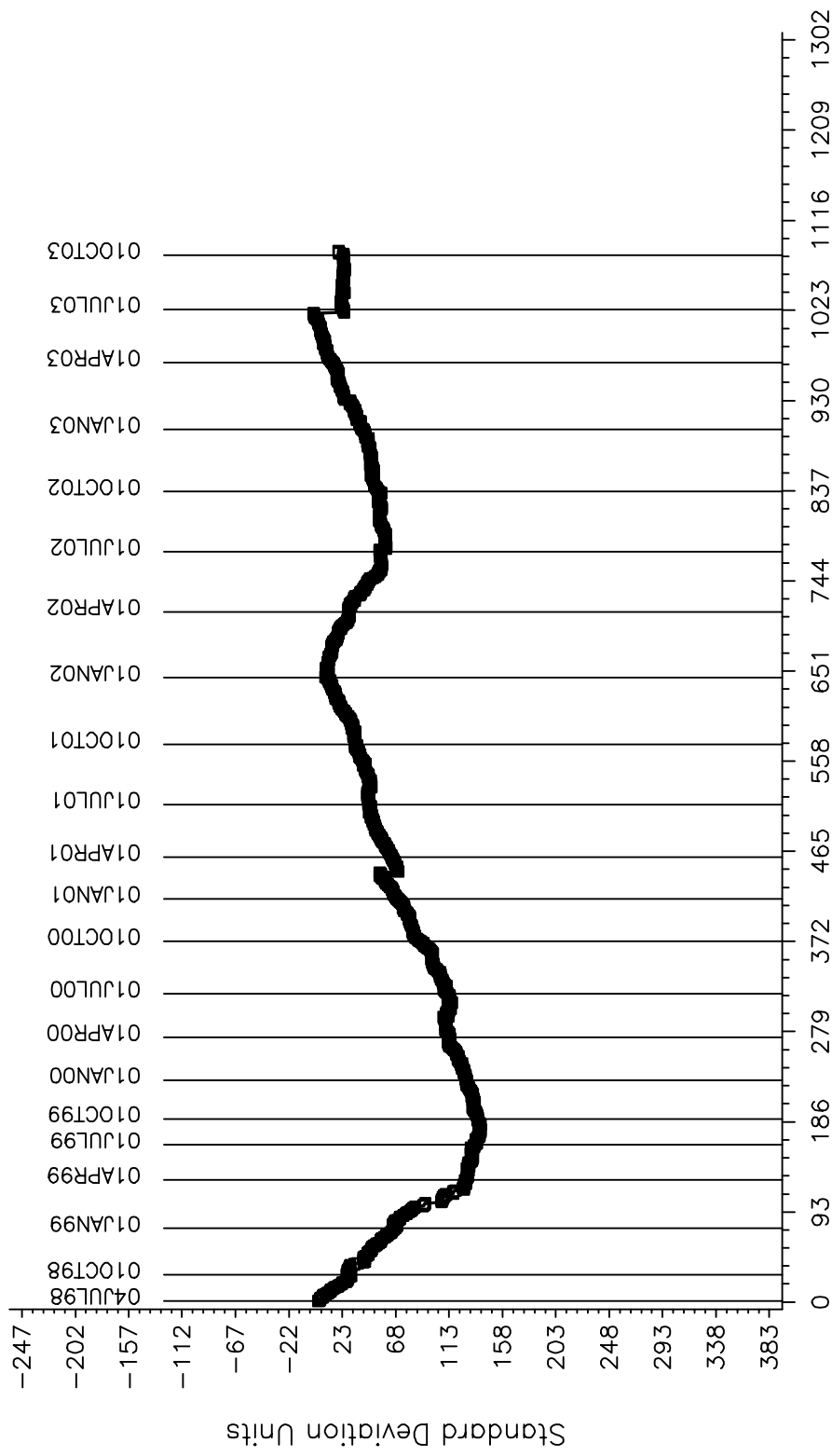


**Figure 2**

HIGH TEMP CBT INDUSTRY OPERATIONALLY VALID DATA

LEAD CHANGE (ppm)

CUSUM Severity Analysis



COUNT IN COMPLETION DATE ORDER

TMC 16OCT03:10:15