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# Test Monitoring Center

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412-365-1000

MEMORANDUM: 17-004  
DATE: April 18, 2017  
TO: HTCBT Surveillance Panel  
FROM: Michael T. Kasimirsky *Michael T. Kasimirsky*  
SUBJECT: Reference Oil 44-4 Final Test Targets

As part of a July 8, 2016, motion for unanimous consent, the HTCBT Surveillance Panel approved the final update of Reference Oil 44-4 test targets based upon six months of calibration testing. The final targets are shown in Table 1, below:

Table 1: Reference Oil 44-4 Final Test Targets (N=177)			
Parameter	Mean	Standard Deviation	Acceptance Range
Copper Concentration	4.9961	0.1069	119.8 to 182.3
Lead Concentration	31.5	9.0	13.8 to 49.2

The individual test results used in generation of these test targets are shown in Table 2. One data point (shown in red in the table) was screened from the data set, for high copper concentration results, and not used in the test target calculation. Standard Practice E 178 for Dealing with Outlying Observations was used for the screening.

The individual test results, initial and final test target acceptance ranges, and the test target acceptance range for Reference Oils 44-1, 44-2, and 44-3 for *Copper Concentration* and *Lead Concentration* are plotted in Figures 1 and 2, respectively.

These targets are effective on April 30, 2017.

c: <ftp://ftp.astmtmc.cmu.edu/docs/bench/htcbt/memos/mem17-004.pdf>

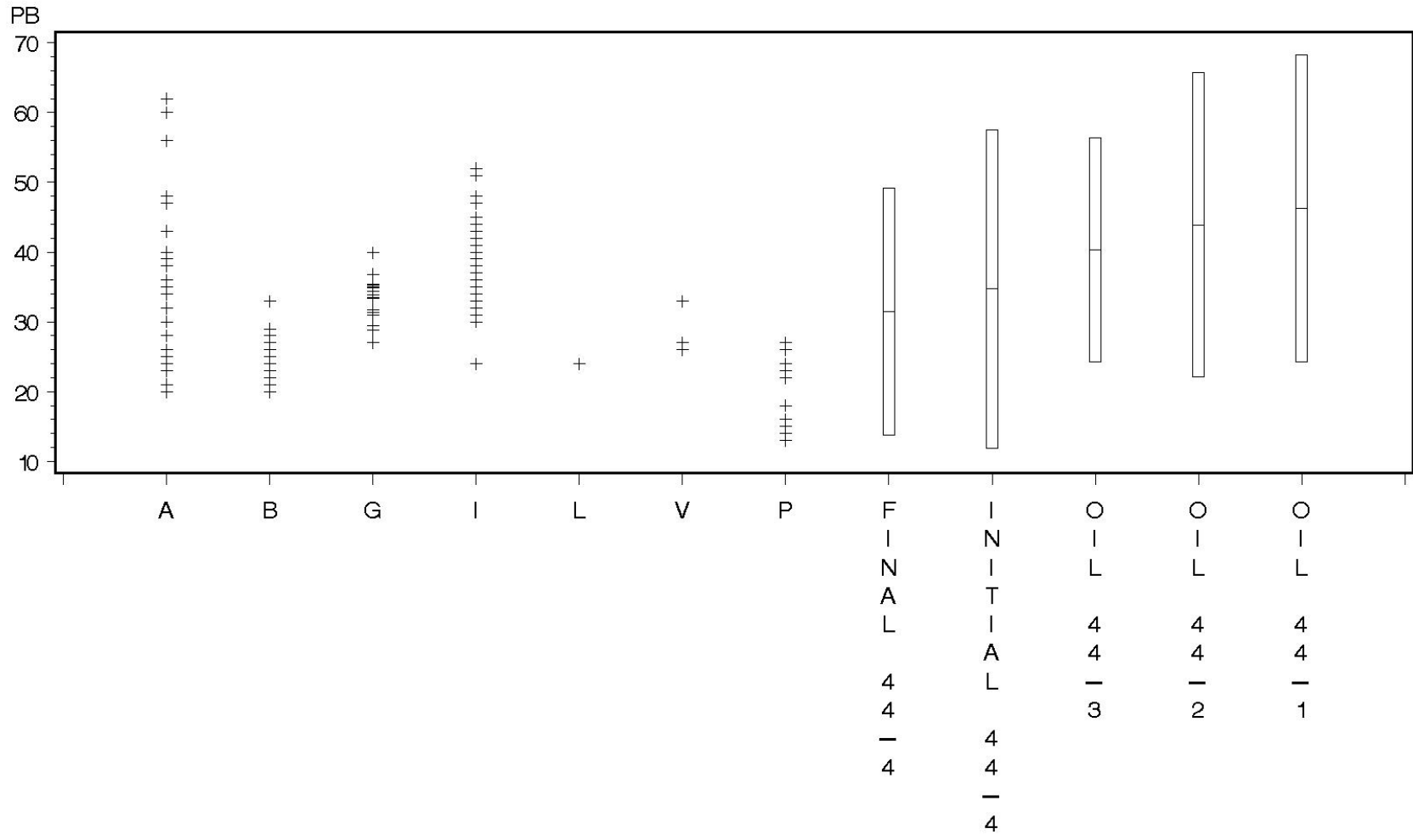
Distribution: electronic mail



## Figure 2: Change in Lead Concentration

### Test Target Data Set and Acceptance Bands

HTCBBT Reference Oil 44-4



TESTKEY	LAB	BATH	BATCH	DATE	TIME	CUC	CUCti	PBC
116328-HTCBT	B	2	L	20160429	09:40	140.0	4.941642423	22.0
116329-HTCBT	B	2	L	20160429	09:40	158.0	5.062595033	22.0
116425-HTCBT	G	2	L	20160429	22:30	142.6	4.960043508	35.0
116426-HTCBT	G	2	L	20160429	22:30	155.2	5.044714608	34.9
116330-HTCBT	B	10	L	20160502	11:40	149.0	5.003946306	24.0
116331-HTCBT	B	10	L	20160502	11:40	158.0	5.062595033	25.0
116290-HTCBT	A	7	L	20160504	13:14	168.0	5.123963979	39.0
116291-HTCBT	A	7	L	20160504	13:15	142.0	4.955827058	56.0
116288-HTCBT	A	6	L	20160505	12:58	138.0	4.927253685	62.0
116289-HTCBT	A	6	L	20160505	12:58	132.0	4.882801923	60.0
116358-HTCBT	I	3	L	20160510	11:00	158	5.062595033	39
116359-HTCBT	I	3	L	20160510	11:00	162	5.087596335	37
116360-HTCBT	I	3	L	20160510	11:00	170	5.135798437	36
116361-HTCBT	I	3	L	20160510	11:00	156	5.049856007	36
116427-HTCBT	G	1	L	20160510	23:00	136.9	4.919250732	31.0
116428-HTCBT	G	1	L	20160510	23:00	534.8	6.281892845	11.4
116429-HTCBT	G	2	L	20160519	19:00	139.6	4.938781119	29.4
116430-HTCBT	G	2	L	20160519	19:00	130.8	4.873669439	27.0
116343-HTCBT	V	3	K	20160614	16:30	131	4.875197323	27
116344-HTCBT	V	3	K	20160614	16:30	119	4.779123493	33
116345-HTCBT	V	3	K	20160614	16:30	140	4.941642423	27
116346-HTCBT	V	3	K	20160614	16:30	135	4.905274778	26
116332-HTCBT	B	1	L	20160811	10:30	173.0	5.153291594	27.0
116362-HTCBT	I	1	L	20160815	11:00	141	4.94875989	47
116363-HTCBT	I	2	L	20160816	11:00	147	4.990432587	42
116364-HTCBT	I	4	K	20160816	11:00	168	5.123963979	43
116292-HTCBT	A	6	L	20160816	13:06	186.0	5.225746674	40.0
116333-HTCBT	B	6	L	20160817	11:15	152.0	5.023880521	23.0
116293-HTCBT	A	3	L	20160817	14:44	173.0	5.153291594	30.0
116365-HTCBT	I	5	L	20160818	11:00	151	5.017279837	43
116294-HTCBT	A	5	L	20160818	15:39	173.0	5.153291594	43.0
116434-HTCBT	G	1	L	20160822	10:48	130.6	4.872139217	33.4
116295-HTCBT	A	7	L	20160822	15:14	168.0	5.123963979	40.0
116366-HTCBT	I	3	L	20160823	11:00	160	5.075173815	41
116296-HTCBT	A	6	L	20160824	13:34	163.0	5.093750201	47.0
116297-HTCBT	A	3	L	20160825	15:58	166.0	5.111987788	43.0
116298-HTCBT	A	5	L	20160826	15:57	198.0	5.288267031	48.0
116334-HTCBT	B	2	L	20160829	08:45	154.0	5.036952602	25.0
116435-HTCBT	G	2	L	20160829	22:30	123.1	4.812997033	31.4
110568-HTCBT	P	1	J	20160830	10:00	178	5.18178355	14
110569-HTCBT	P	1	J	20160830	10:00	204	5.318119994	15
110570-HTCBT	P	1	J	20160830	10:00	193	5.262690189	13
116299-HTCBT	A	7	L	20160830	15:15	171.0	5.141663557	39.0
116368-HTCBT	I	4	L	20160831	11:00	174	5.159055299	51
116367-HTCBT	I	5	L	20160901	11:00	165	5.105945474	52
116300-HTCBT	A	6	L	20160901	13:33	163.0	5.093750201	40.0
116301-HTCBT	A	3	L	20160902	15:15	170.0	5.135798437	38.0
116436-HTCBT	G	1	L	20160902	20:30	133.8	4.896346148	33.9
116369-HTCBT	I	2	L	20160906	11:00	146	4.983606622	38
116370-HTCBT	I	3	L	20160906	11:00	157	5.056245805	45

TESTKEY	LAB	BATH	BATCH	DATE	TIME	CUC	CUCti	PBC
116371-HTCBT	I	4	K	20160906	11:00	139	4.934473933	40
116335-HTCBT	B	11	L	20160906	11:20	146.0	4.983606622	25.0
116372-HTCBT	I	5	K	20160907	11:00	154	5.036952602	48
116302-HTCBT	A	5	L	20160907	13:45	130.0	4.86753445	48.0
116336-HTCBT	B	10	L	20160908	08:50	166.0	5.111987788	22.0
118075-HTCBT	A	7	L	20160908	15:35	162.0	5.087596335	47.0
116437-HTCBT	G	2	L	20160908	22:15	102.1	4.625952725	35.2
118077-HTCBT	A	6	L	20160909	15:42	149.0	5.003946306	40.0
116438-HTCBT	G	1	L	20160909	20:45	103.2	4.636668853	35.3
118076-HTCBT	A	3	L	20160913	15:00	164.0	5.099866428	32.0
116337-HTCBT	B	2	L	20160914	13:40	157.0	5.056245805	20.0
116338-HTCBT	B	6	L	20160915	09:20	149.0	5.003946306	27.0
118078-HTCBT	A	5	L	20160915	15:15	159.0	5.068904202	24.0
116439-HTCBT	G	2	L	20160915	20:30	122.6	4.808927024	35.4
117015-HTCBT	I	1	K	20160918	11:00	135	4.905274778	51
110571-HTCBT	P	1	J	20160919	10:00	146	4.983606622	13
117013-HTCBT	I	2	K	20160919	11:00	163	5.093750201	36
117014-HTCBT	I	3	K	20160919	11:00	165	5.105945474	44
118079-HTCBT	A	6	L	20160919	13:57	173.0	5.153291594	38.0
116339-HTCBT	B	1	L	20160921	10:20	151.0	5.017279837	21.0
117016-HTCBT	I	5	K	20160921	11:00	160	5.075173815	39
118771-HTCBT	G	1	L	20160921	23:15	126.5	4.840242308	33.5
110572-HTCBT	P	2	J	20160922	10:00	158	5.062595033	7.0
118772-HTCBT	G	2	L	20160923	00:30	155.0	5.043425117	39.9
117017-HTCBT	I	1	K	20160925	11:00	148	4.997212274	34
118081-HTCBT	A	7	L	20160927	14:06	172.0	5.147494477	34.0
118773-HTCBT	G	1	L	20160928	00:00	160.7	5.079539273	31.7
116340-HTCBT	B	11	L	20160928	10:15	150.0	5.010635294	23.0
118082-HTCBT	A	6	L	20160928	16:50	172.0	5.147494477	40.0
117018-HTCBT	I	1	L	20161003	11:00	144	4.9698133	34
117019-HTCBT	I	2	L	20161004	11:00	163	5.093750201	34
117020-HTCBT	I	4	L	20161005	11:00	122	4.804021045	33
116341-HTCBT	B	1	L	20161005	14:25	155.0	5.043425117	22.0
116342-HTCBT	B	6	L	20161011	13:23	159.0	5.068904202	21.0
118774-HTCBT	G	2	L	20161011	23:00	155.8	5.048573133	31.3
110573-HTCBT	P	1	J	20161012	10:00	142	4.955827058	13
117021-HTCBT	I	4	K	20161012	11:00	129	4.859812404	34
118627-HTCBT	B	11	L	20161014	10:45	150.0	5.010635294	21.0
117022-HTCBT	I	3	L	20161018	11:00	137	4.919980926	35
119770-HTCBT	P	1	J	20161019	10:00	129	4.859812404	16
118083-HTCBT	A	3	L	20161024	13:28	146.0	4.983606622	38.0
117023-HTCBT	I	2	L	20161025	11:00	138	4.927253685	32
117024-HTCBT	I	3	L	20161025	11:00	157	5.056245805	34
118629-HTCBT	B	11	L	20161026	10:15	160.0	5.075173815	24.0
117025-HTCBT	I	4	L	20161026	11:00	125	4.828313737	34
118630-HTCBT	B	10	L	20161027	11:25	155.0	5.043425117	24.0
118084-HTCBT	A	3	L	20161101	13:26	148.0	4.997212274	34.0
118631-HTCBT	B	11	L	20161107	08:50	148.0	4.997212274	27.0
120801-HTCBT	A	5	L	20161107	15:05	146.0	4.983606622	30.0
120800-HTCBT	A	12	L	20161108	10:57	149.0	5.003946306	32.0



TESTKEY	LAB	BATH	BATCH	DATE	TIME	CUC	CUCti	PBC
118080-HTCBT	A	6	L	20161109	13:41	144.0	4.9698133	28.0
118632-HTCBT	B	6	L	20161110	08:00	157.0	5.056245805	24.0
118633-HTCBT	B	2	L	20161110	09:50	167.0	5.117993812	27.0
118634-HTCBT	B	10	L	20161115	12:40	159.0	5.068904202	23.0
120802-HTCBT	A	5	L	20161117	13:51	144.0	4.9698133	26.0
117026-HTCBT	I	1	L	20161121	11:00	153	5.030437921	34
120803-HTCBT	A	7	L	20161122	14:10	142.0	4.955827058	23.0
118777-HTCBT	G	1	L	20161128	11:00	121.7	4.801559	28.8
120804-HTCBT	A	6	L	20161128	16:39	138.0	4.927253685	25.0
118635-HTCBT	B	6	L	20161129	08:40	171.0	5.141663557	29.0
118636-HTCBT	B	6	L	20161208	08:50	140.0	4.941642423	26.0
117027-HTCBT	I	5	L	20161208	11:00	158	5.062595033	31
121881-HTCBT	B	11	L	20161213	13:55	148.0	4.997212274	28.0
121882-HTCBT	B	10	L	20161214	09:35	143.0	4.96284463	21.0
118735-HTCBT	I	4	L	20161214	11:00	121	4.795790546	41
119771-HTCBT	P	2	J	20161215	10:00	140	4.941642423	24
120805-HTCBT	A	7	L	20161216	15:15	148.0	4.997212274	26.0
118737-HTCBT	I	3	K	20161219	11:00	143	4.96284463	35
121883-HTCBT	B	2	L	20161220	13:15	151.0	5.017279837	26.0
120806-HTCBT	A	3	L	20161220	16:46	142.0	4.955827058	25.0
118779-HTCBT	G	1	L	20161221	09:45	137.8	4.925803359	36.8
118736-HTCBT	I	5	K	20161221	11:00	152	5.023880521	33
118738-HTCBT	I	2	L	20161227	11:00	132	4.882801923	34
118739-HTCBT	I	3	L	20161227	11:00	121	4.795790546	34
118740-HTCBT	I	3	L	20170102	11:00	164	5.099866428	24
120807-HTCBT	A	7	L	20170103	16:11	138.0	4.927253685	26.0
119772-HTCBT	P	1	J	20170111	10:00	140	4.941642423	27
118741-HTCBT	I	4	L	20170111	11:00	141	4.94875989	35
119773-HTCBT	P	2	J	20170112	10:00	152	5.023880521	18
121884-HTCBT	B	10	L	20170112	11:20	166.0	5.111987788	26.0
118742-HTCBT	I	1	L	20170116	11:00	153	5.030437921	34
118743-HTCBT	I	4	L	20170118	11:00	144	4.9698133	31
121885-HTCBT	B	11	L	20170119	09:15	153.0	5.030437921	28.0
118744-HTCBT	I	5	L	20170119	11:00	148	4.997212274	30
120809-HTCBT	A	5	L	20170120	14:29	138.0	4.927253685	36.0
121886-HTCBT	B	10	L	20170124	13:00	156.0	5.049856007	24.0
122409-HTCBT	A	7	L	20170126	15:54	150.0	5.010635294	21.0
118745-HTCBT	I	1	L	20170130	11:00	156	5.049856007	33
118746-HTCBT	I	2	L	20170131	11:00	144	4.9698133	35
122410-HTCBT	A	6	L	20170131	15:02	144.0	4.9698133	24.0
121887-HTCBT	B	10	L	20170202	10:50	154.0	5.036952602	26.0
122411-HTCBT	A	3	L	20170202	15:04	146.0	4.983606622	24.0
122412-HTCBT	A	5	L	20170203	16:00	144.0	4.9698133	23.0
121888-HTCBT	B	6	L	20170207	08:55	144.0	4.9698133	24.0
118747-HTCBT	I	3	L	20170207	11:00	144	4.9698133	35
122413-HTCBT	A	6	L	20170209	16:20	158.0	5.062595033	20.0
122414-HTCBT	A	3	L	20170210	16:02	150.0	5.010635294	25.0
118748-HTCBT	I	3	L	20170214	11:00	151	5.017279837	33
119774-HTCBT	P	1	J	20170215	10:00	141	4.94875989	23
122415-HTCBT	A	6	L	20170217	15:37	146.0	4.983606622	26.0

TESTKEY	LAB	BATH	BATCH	DATE	TIME	CUC	CUCti	PBC
119775-HTCBT	P	2	J	20170222	10:00	150	5.010635294	22
118749-HTCBT	I	4	L	20170222	11:00	139	4.934473933	34
120446-HTCBT	L	1	L	20170224	11:10	150.0	5.010635294	24.0
119776-HTCBT	P	2	J	20170301	10:00	133	4.890349128	26
121097-HTCBT	G	1	L	20170301	21:00	122.6	4.808927024	33.5
122417-HTCBT	A	12	L	20170302	17:11	152.0	5.023880521	30.0
122416-HTCBT	A	5	L	20170303	15:21	134.0	4.8978398	26.0
121889-HTCBT	B	6	L	20170306	11:30	137.0	4.919980926	29.0
123541-HTCBT	B	2	L	20170310	08:45	172.0	5.147494477	33.0
121099-HTCBT	G	1	L	20170310	20:15	122.6	4.808927024	34.4
123601-HTCBT	I	1	L	20170313	11:00	138	4.927253685	32
125243-HTCBT	A	5	L	20170313	13:38	138.0	4.927253685	32.0
123542-HTCBT	B	11	L	20170314	14:05	147.0	4.990432587	26.0
122418-HTCBT	A	12	L	20170314	14:57	148.0	4.997212274	28.0
125244-HTCBT	A	7	L	20170315	15:54	145.0	4.976733742	30.0
123602-HTCBT	I	2	K	20170320	11:00	143	4.96284463	33
119777-HTCBT	P	1	J	20170321	10:00	125	4.828313737	15
123603-HTCBT	I	4	K	20170321	11:00	122	4.804021045	40
125245-HTCBT	A	6	L	20170321	15:05	142.0	4.955827058	20.0
123604-HTCBT	I	5	K	20170322	11:00	139	4.934473933	37
123543-HTCBT	B	2	L	20170323	09:30	146.0	4.983606622	27.0
123544-HTCBT	B	11	L	20170323	13:35	164.0	5.099866428	28.0
125246-HTCBT	A	3	L	20170324	15:54	136.0	4.912654886	36.0
125247-HTCBT	A	7	L	20170330	15:44	134.0	4.8978398	35.0
123545-HTCBT	B	2	L	20170331	08:25	155.0	5.043425117	29.0
123546-HTCBT	B	11	L	20170403	13:30	139.0	4.934473933	27.0
123605-HTCBT	I	2	L	20170404	11:00	131	4.875197323	39
123606-HTCBT	I	3	L	20170404	11:00	135	4.905274778	42