



Test Monitoring Center

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

MEMORANDUM: 04-009

DATE: February 18, 2004

TO: Sequence III Surveillance Panel

FROM: Michael T. Kasimirsky *Michael T. Kasimirsky*

SUBJECT: Sequence IIIF Reference Oil 433-1 Final Test Targets

The TMC has received 31 data points on reference oil 433-1 and as such has sufficient data to update the test targets for the final time. The current test targets for this oil, based on 22 data points, are shown below for comparison purposes:

<i>Current Reference Oil 433-1 Test Targets</i>		
<i>Parameter</i>	<i>Mean</i>	<i>Standard Deviation</i>
PVIS	0.1643104	0.0321605
APV	9.30	0.306
WPD	4.57	0.760
PV60	3.59344	0.227054

The final test targets, based on the 31 available data points, are shown below:

<i>Final Reference Oil 433-1 Test Targets</i>		
<i>Parameter</i>	<i>Mean</i>	<i>Standard Deviation</i>
PVIS	0.1635099	0.0302263
APV	9.30	0.300
WPD	4.59	0.697
PV60	3.55500	0.229905

Any applicable severity adjustments were applied to the data prior to target generation. On the following pages are two tables showing the individual reference oil test results used in generation of these targets. Table 1 is the raw, unadjusted data as reported to the TMC and Table 2 is the severity-adjusted data used to calculate the test targets, with severity-adjusted parameters shown in *red*.

The new test targets, along with targets based on the raw data, the two previous sets of test targets on this oil, and the individual data points are displayed graphically in the six attached plots. The first two plots show Percent Viscosity Increase at 80 hours, in transformed and reported units respectively. The third shows Weighted Piston Deposits in reported units and the fourth shows Average Piston Varnish in reported units. The fifth and sixth plots show Percent Viscosity Increase at 60 hours (the IIIF-HD parameter) in transformed and reported units, respectively.

These new targets are effective for all tests completed on or after February 24, 2004.

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Attachments

c: John L. Zalar, TMC

<ftp://www.astmtmc.cmu.edu/docs/gas/sequenceiii/memos/mem04-009.pdf>

Distribution: Electronic Mail

Table 1 – Unadjusted Reference Oil 433-I Data

TESTKEY	LTM	SLAB	LTM	SAPP	IND	VAL	LTM	DATE	LTM	TIME	PVIS	PVISTI	APV	WPD	PV60	ACLW	SACLW	OILCON
40378	A	7	433-1	OC	8/16/2001	18:42	32.4	0.175682	9.09	3.86	31.56	58	46.9	2.91				
42144	A	7	433-1	OC	8/28/2001	21:06	39.4	0.159313	8.99	4.39	31.52	36.5	19	3.15				
42146	A	5	433-1	AC	12/9/2001	1:08	38.9	0.160334	9.56	3.75	33.16	8.1	8	3.06				
42147	A	6	433-1	AC	12/10/2001	0:06	36.1	0.166436	9.02	3.62	29.27	16.6	16.5	3.3				
42148	A	4	433-1	OC	3/8/2002	19:50	47.5	0.145095	9.55	5.8	40	153.4	123.6	3.19				
43567	A	4	433-1	AC	3/19/2002	10:24	40.9	0.156365	9.08	3.65	33.46	16.4	16.3	2.72				
45911	A	7	433-1	OC	6/16/2003	13:33	45.8	0.147764	9.5	4.97	35.11	276.8	270	3.28				
46566	A	7	433-1	OC	6/24/2003	7:07	43.3	0.151969	8.93	3.97	32.7	185.3	194.3	2.93				
47076	A	4	433-1	OC	7/31/2003	4:39	43.9	0.150927	9.22	4.69	32.71	62.1	22.4	3.22				
47085	A	5	433-1	AC	20031226	1:57	59.3	0.129859	9.11	4.67	50.62	29.8	15.6	2.99				
40366	B	2	433-1	AC	8/19/2001	1:48	36.9	0.164622	9.32	4.4	34.1	14.9	15.1	3.51				
40367	B	1	433-1	OC	6/15/2002	9:11	25	0.2	9.41	5.81	33.1	12.7	12.5	3.52				
40369	B	1	433-1	OC	6/29/2002	10:12	27.3	0.19139	9.41	5.69	37.6	13.6	13.4	3.7				
46856	B1	3A	433-1	AC	2/2/2003	14:15	45.7	0.147925	9.77	5.08	39.7	6	5.9	3.68				
47155	B1	2A	433-1	OC	3/30/2003	10:41	30.6	0.180775	8.8	4.42	25.9	233.7	218.6	3.11				
47157	B1	2A	433-1	AC	4/15/2003	12:29	25.3	0.198811	9.21	4.1	26.1	15.6	15.7	2.97				
47158	B1	2A	433-1	AC	5/11/2003	10:27	37.2	0.163956	9.2	5.09	28.9	27.8	14.6	2.98				
48530	B1	2A	433-1	OC	1/20/2004	6:40	26.5	0.194257	9.42	4.3	25.09	138.6	121.5	2.72				
40351	E	1	433-1	AC	8/17/2001	3:57	34.7	0.16976	9.1	4.08	28.93	17.1	17	2.29				
40354	G	1	433-1	OC	8/18/2001	6:10	84.2	0.108979	9.38	3.44	71.48	23.3	14.2	4.48				
42873	G	1	433-1	AC	12/31/2001	11:26	51.5	0.139347	8.89	3.62	40.71	24.6	9.5	3.35				
42874	G	4	433-1	AC	1/28/2002	6:10	59	0.130189	9.61	3.54	48.5	48.6	7.2	4.09				
42876	G	3	433-1	AC	4/14/2002	4:55	52.2	0.138409	9.2	4.84	40.24	14.9	10.7	3.56				
44394	G	4	433-1	AC	5/3/2002	15:42	60.2	0.128885	9.7	4.54	46.18	9.5	9.5	3.82				
45915	G	1	433-1	AC	12/6/2002	6:50	52.3	0.138277	9.02	3.86	41.87	13.1	13.3	3.23				
45916	G	5	433-1	OC	1/20/2003	21:31	42.2	0.153937	8.95	4.88	35.4	123.9	121.9	3.26				
47310	G	1	433-1	AC	3/25/2003	11:37	47.7	0.144791	9.45	4.43	36.13	26	8.4	3.8				
47312	G	5	433-1	AC	1/10/2004	11:55	35.2	0.16855	9.84	5.9	40.87	3.8	3.6	3.15				
40364	M	2	433-1	AC	8/17/2001	6:01	18.7	0.231249	9.68	5.62	30.09	8	7.6	4.16				
40365	M	1	433-1	AC	2/18/2002	5:07	16.4	0.246932	9.52	4.76	24.26	11.9	11.9	3.46				
44188	M	2	433-1	AC	12/1/2002	3:41	38.5	0.161165	9.3	4.78	29.55	16.3	16.7	2.53				

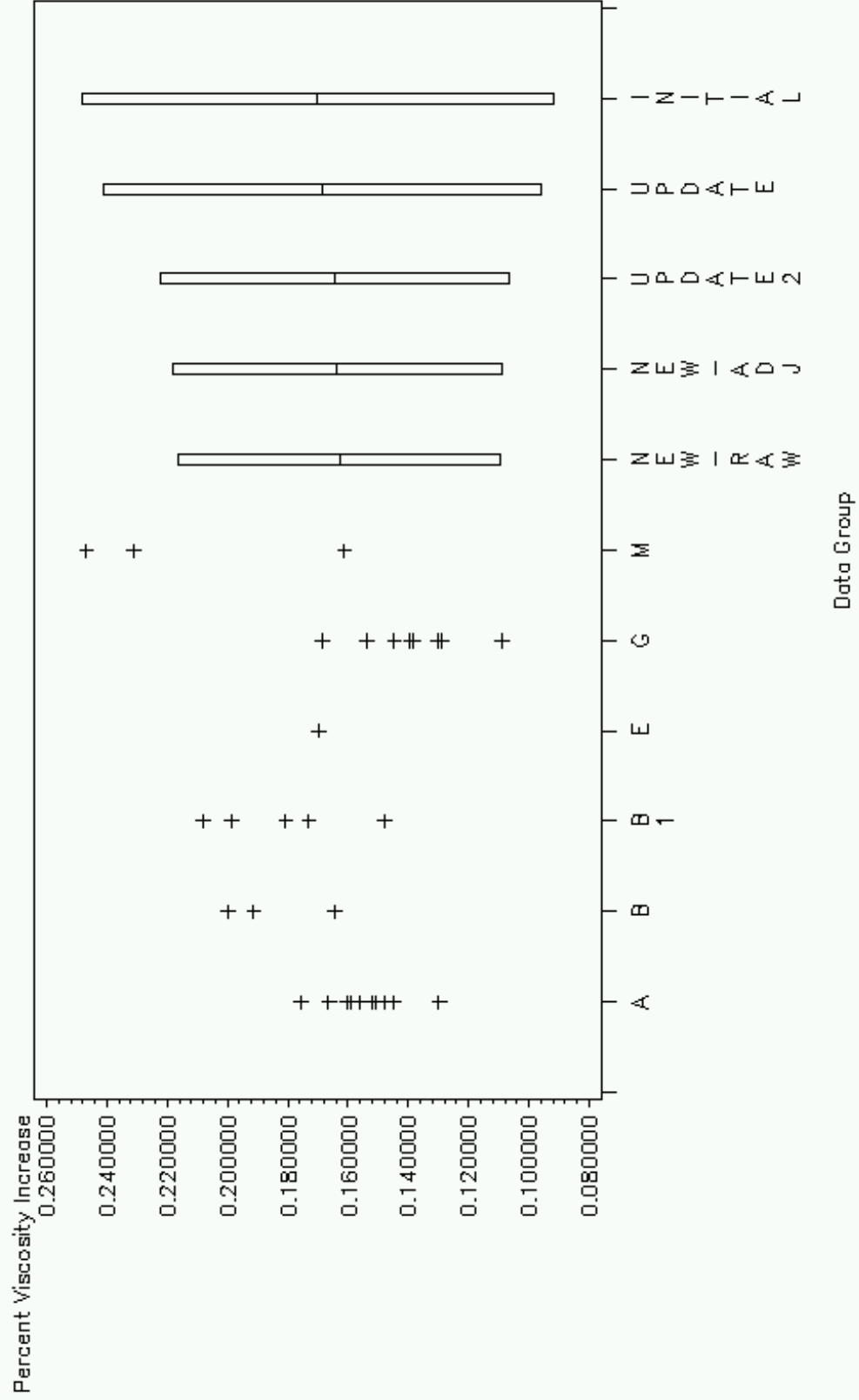
Table 2 – Severity Adjusted Reference Oil 433-1 Data

TESTKEY	LTM	SLAB	LTM	SAPP	IND	VAL	LTM	SDATE	LTM	TIME	PVIS	PVISTI	APV	WPD	PV60	ACLW	SACLW	OILCON
40378	A	7	433-1	OC	8/16/2001	18:42	32.4	0.175682	9.09	3.86	31.56	58	46.9	2.91				
42144	A	7	433-1	OC	8/28/2001	21:06	39.4	0.159313	8.99	4.39	31.52	36.5	19	3.15				
42146	A	5	433-1	AC	12/9/2001	1:08	38.9	0.160334	9.56	4.19	33.16	8.1	8	3.06				
42147	A	6	433-1	AC	12/10/2001	0:06	36.1	0.166436	9.02	4.06	29.27	16.6	16.5	3.3				
42148	A	4	433-1	OC	3/8/2002	19:50	47.5	0.145095	9.55	6.36	40	153.4	123.6	3.19				
43567	A	4	433-1	AC	3/19/2002	10:24	40.9	0.156365	9.08	3.65	33.46	16.4	16.3	2.72				
45911	A	7	433-1	OC	6/16/2003	13:33	45.8	0.147764	9.5	4.97	35.11	276.8	270	3.28				
46566	A	7	433-1	OC	6/24/2003	7:07	43.3	0.151969	8.93	3.97	32.7	185.3	194.3	2.93				
47076	A	4	433-1	OC	7/31/2003	4:39	43.9	0.150927	9.22	4.69	32.71	62.1	22.4	3.22				
47085	A	5	433-1	AC	2003/1226	1:57	59.3	0.129859	9.11	4.67	50.62	29.8	15.6	2.99				
40366	B	2	433-1	AC	8/19/2001	1:48	36.9	0.164622	9.32	4.4	34.1	14.9	15.1	3.51				
40367	B	1	433-1	OC	6/15/2002	9:11	25	0.2	9.41	5.81	33.1	12.7	12.5	3.52				
40369	B	1	433-1	OC	6/29/2002	10:12	27.3	0.19139	9.41	5.69	37.6	13.6	13.4	3.7				
46856	B1	3A	433-1	AC	2/2/2003	14:15	45.7	0.147925	9.77	4.44	39.7	6	5.9	3.68				
47155	B1	2A	433-1	OC	3/30/2003	10:41	30.6	0.180775	8.8	4.42	25.9	233.7	218.6	3.11				
47157	B1	2A	433-1	AC	4/15/2003	12:29	25.3	0.198811	9.21	4.1	26.1	15.6	15.7	2.97				
47158	B1	2A	433-1	AC	5/11/2003	10:27	33.4	0.173055	9.2	5.09	28.9	27.8	14.6	2.98				
48530	B1	2A	433-1	OC	1/20/2004	6:40	23.1	0.208017	9.42	4.3	25.09	138.6	121.5	2.72				
40351	E	1	433-1	AC	8/17/2001	3:57	34.7	0.16976	9.1	4.08	28.93	17.1	17	2.29				
40354	G	1	433-1	OC	8/18/2001	6:10	84.2	0.108979	9.18	3.44	71.48	23.3	14.2	4.48				
42873	G	1	433-1	AC	12/31/2001	11:26	51.5	0.139347	8.89	4.05	40.71	24.6	9.5	3.35				
42874	G	4	433-1	AC	1/28/2002	6:10	59	0.130189	9.61	4.12	48.5	48.6	7.2	4.09				
42876	G	3	433-1	AC	4/14/2002	4:55	52.2	0.138409	9.2	4.84	40.24	14.9	10.7	3.56				
44394	G	4	433-1	AC	5/3/2002	15:42	60.2	0.128885	9.7	4.54	46.18	9.5	9.5	3.82				
45915	G	1	433-1	AC	12/6/2002	6:50	52.3	0.138277	9.02	3.86	41.87	13.1	13.3	3.23				
45916	G	5	433-1	OC	1/20/2003	21:31	42.2	0.153937	8.95	4.88	35.4	123.9	121.9	3.26				
47310	G	1	433-1	AC	3/25/2003	11:37	47.7	0.144791	9.7	4.43	36.13	26	8.4	3.8				
47312	G	5	433-1	AC	1/10/2004	11:55	35.2	0.16855	10.00*	5.9	40.87	3.8	3.6	3.15				
40364	M	2	433-1	AC	8/17/2001	6:01	18.7	0.231249	9.68	5.62	30.09	8	7.6	4.16				
40365	M	1	433-1	AC	2/18/2002	5:07	16.4	0.246932	9.52	4.76	24.26	11.9	11.9	3.46				
44188	M	2	433-1	AC	12/1/2002	3:41	38.5	0.161165	9.15	4.78	29.55	16.3	16.7	2.53				

* Actual Severity-Adjusted result was 10.04, but 10.00 was used because the merit rating scale is a 0 to 10 scale.

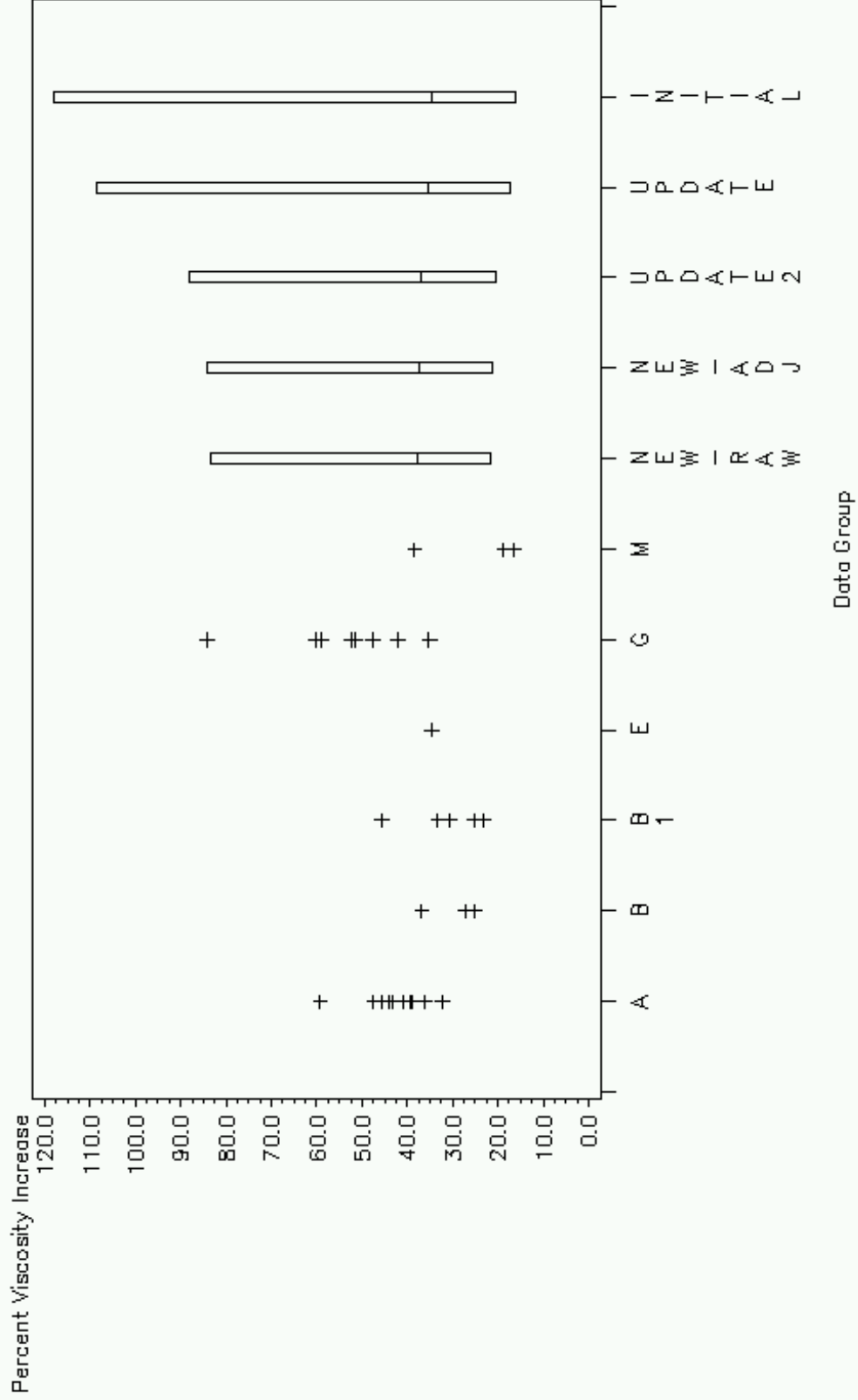
Sequence IIF Reference Oil 433-1 Test Target Data Set and Shewhart Bands

Percent Viscosity Increase, in transformed units



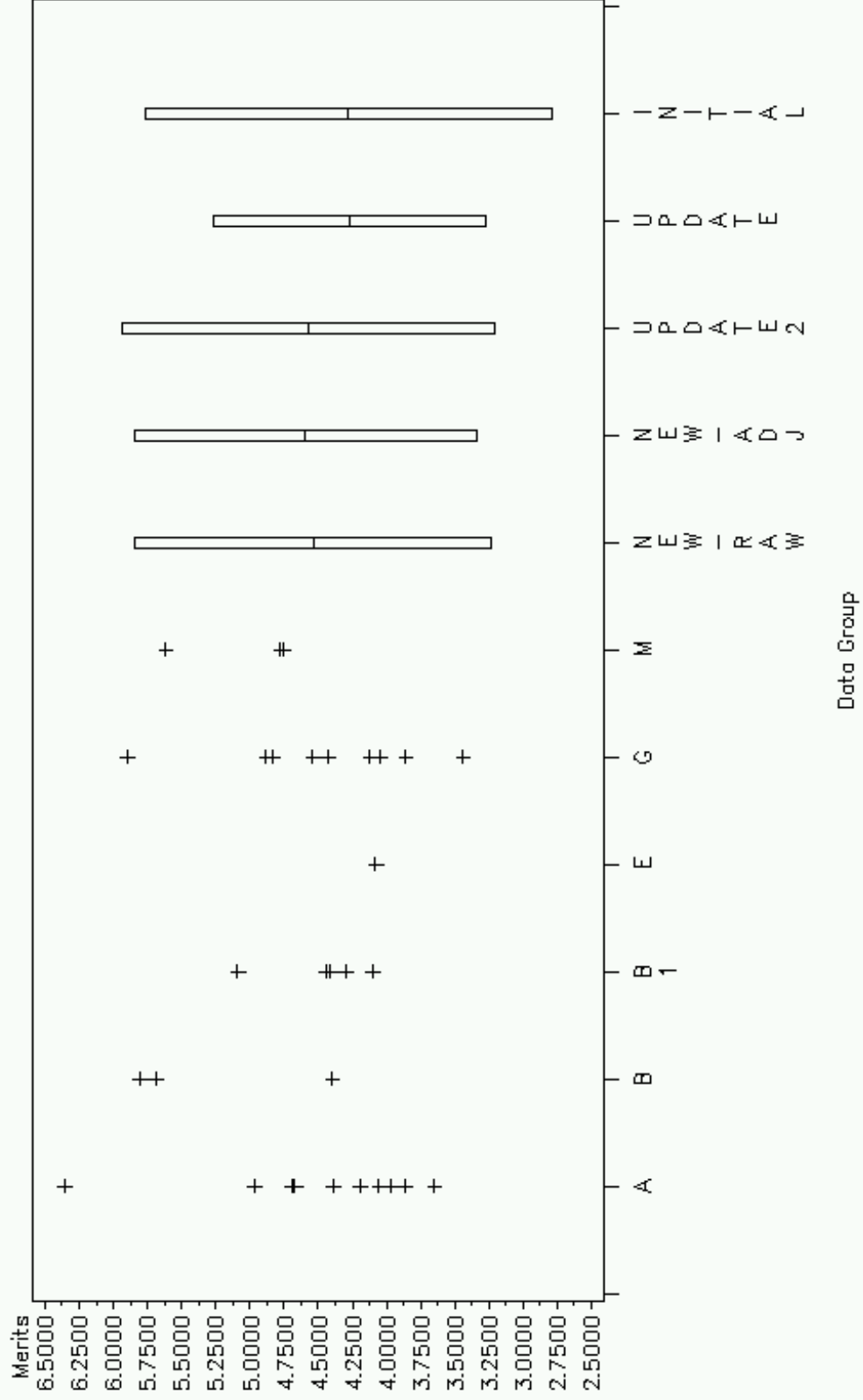
Sequence IIF Reference Oil 433-1 Test Target Data Set and Shewhart Bands

Percent Viscosity Increase, in original units



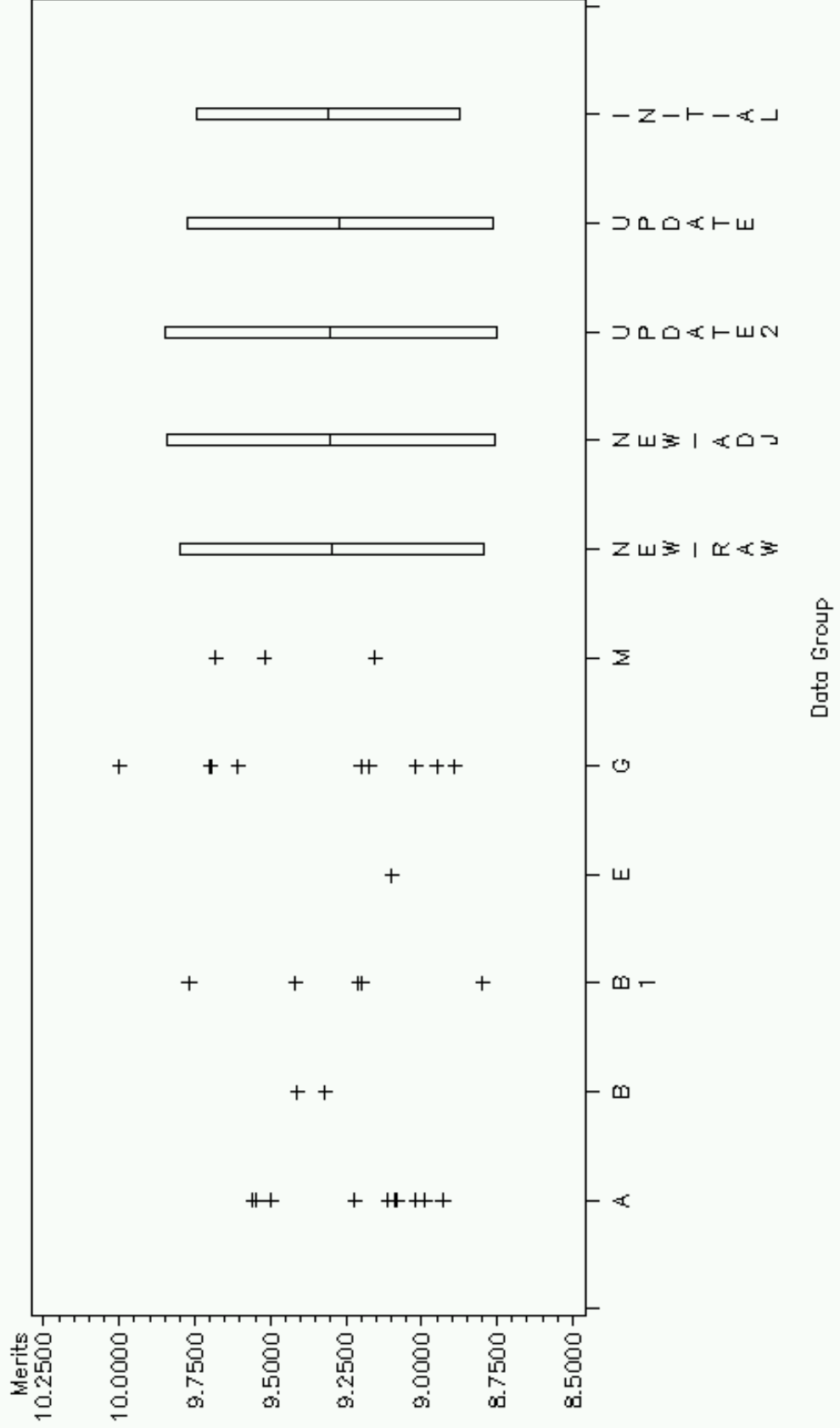
Sequence IIF Reference Oil 433-1 Test Target Data Set and Shewhart Bands

Weighted Piston Deposits, in reported units



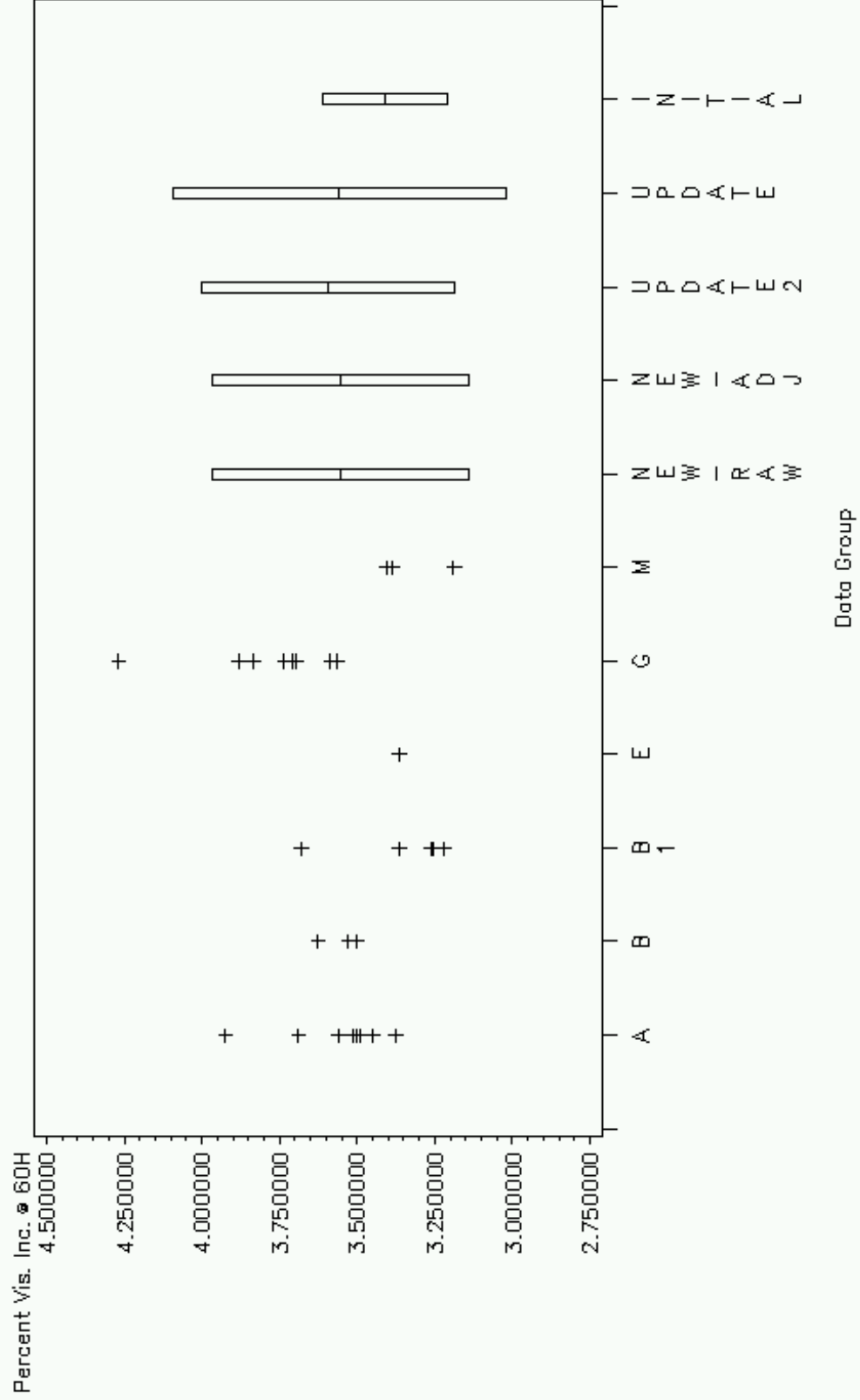
Sequence IIF Reference Oil 433-1 Test Target Data Set and Shewhart Bands

Average Piston Varnish, in reported units



Sequence IIF Reference Oil 433-1 Test Target Data Set and Shewhart Bands

Percent Viscosity Increase @ 60H, in transformed units



Sequence IIF Reference Oil 433-1 Test Target Data Set and Shewhart Bands

Percent Viscosity Increase @ 60H, in original units

