B. Acceptance Criteria

1. New Laboratory/Test Stand(s)

   a. A minimum of two (2) operationally valid calibration tests, with no Shewhart severity alarms (all parameters), are required to calibrate the laboratory.

   b. One (1) operationally valid calibration test, with no Shewhart severity alarms (all parameters), is required to calibrate a stand.

2. Existing Laboratory/Test Stand(s)

   a. On a stand rotational basis, a laboratory shall begin a reference oil test no later than 125 days following the completion of the laboratory's previous reference oil test or after no more than 25 test starts in the laboratory, whichever comes first. During periods following a failed stand calibration, invalid, or aborted test, a grace period of an additional 15 days or additional non-reference test starts equal to two (2) times the number of currently calibrated stands in the laboratory (as of EOT on failing stand), whichever comes first, shall be permitted from the completion date of the last acceptable calibration test. A laboratory has the option of moving to the next stand in the rotation to maintain lab calibration, independent of its action on the failing stand.

   b. The reference oil test interval listed in 2a shall be reduced if any stand calibration test exceeds certain limits of the Shewhart Chart for Severity (see below). During periods following a failed stand calibration test, the grace period described above in 2a shall apply.

   c. If a test stand fails two consecutive calibration tests on the same parameter but on different reference oils, the stand must generate two (2) operationally valid calibration tests, with no Shewhart severity alarms (all parameters).

   d. If not required to begin a reference oil test sooner, due to the above requirements, a stand shall begin a reference oil test no later than 365 days following the completion of the previous reference oil test on that stand.

3. Reference Oil Assignment:

   Of the two tests required to bring a new laboratory into the system, the first shall be conducted on reference oil 438 and the second on either reference oil 434 or 435. Once a test laboratory has been accepted into the system, 100% of the scheduled calibration tests should be conducted on reference oils 434, 435, and 438. If possible, the same oil should not be used for successive calibration tests in a stand.

4. Control Charts

   In Section 1, the construction of the control charts that constitute the Lubricant Test Monitoring System is outlined. The constants used for the construction of the control charts for the Sequence IIIG, and the response necessary in the case of control chart limit alarms, are depicted below. *Note that Sequence IIIG laboratory control charts are only updated following an acceptable stand calibration test.*

c. The first (3) tests must be conducted on reference oils 542 (GF5X), 541 (GF5D) and 1010, in that order for new engine reference acceptance.

2. Existing Test Stand/Engine

a. The stand/engine must have previously been accepted into the system by meeting the LTMS requirements

b. All operationally valid tests must be charted to determine if the stand/engine is in control as defined by the control charts in the Lubricant Test Monitoring System. If there are two (2) or more operationally invalid tests during the attempt to calibrate an existing stand/engine, then two (2) operationally valid calibration tests, with no Shewhart severity alarms (all parameters), are required to calibrate the stand/engine.

3. Reference Oil Assignment:

a. For new stand/engines, see Section 1.c above.

b. Once a stand/engine has been accepted into the system, 100% of the scheduled calibration tests should be conducted on reference oils 540, 542, and 1010 or subsequent approved reblends. If possible, the same oil should not be used for successive calibration tests in a stand.

4. Control Charts

In Section 1, the construction of the control charts that contribute to the Lubricant Test Monitoring System is outlined. The constants used for the construction of the control charts for the VID, and the response necessary in the case of control chart limit alarms, are depicted below. *Note that laboratory control charts are only updated following an acceptable stand/engine calibration test.*

LUBRICANT TEST MONITORING SYSTEM CONSTANTS

		EWMA Chart				Shewhart Chart	
		LAMBDA		K		K	
Chart Level	Limit Type	Precision	Severity	Precision	Severity	Precision	Severity
Stand/Engine	Special K	--	--	--	--	--	2.96
	Warning	--	--	--	--	1.645	
	Action	0.1	0.3	1.645	0.000	2.325	1.96
Industry	Warning	0.1	0.2	1.645	1.96	--	--
	Action	0.1	0.2	2.33	2.575	--	--

APPENDIX B

HISTORY OF INDUSTRY CORRECTION FACTORS
APPLICABLE TO LTMS DATA

Test Area	Effective	Description
IIIF	None	None
IIIG	None	None
IIIGA	None	None
IIIGB	July 24, 2009	Add 1.61 to PHOS
IVA	None	None
VG	July 1, 2005	For Fuel Batch TF2221LS20, Add 0.19 to AEV; Add 2.175 to AES and divide by 1.192 Add 0.54 to APV; Add 0.627 to RCS and divide by 1.041
VG	November 10, 2007	For Fuel Batch TF2221LS20, Add 0.12 to AEV; Add 0.42 to AES ; Add 0.39 to APV; Add 0.23 to RCS
VG	May 26, 2009	For Fuel Batch XC2721NX10, Add 3.011 to AEV and divide by 1.356; Add 1.325 to APV and divide by 1.207
VG	October 1, 2009	For Fuel Batch XC2721NX10, Subtract 0.24 from APV; subtract 0.12 from AEV.
VIB	None	None
VID	None	None
VIII	None	None
1M-PC	None	None
1K	None	None
1N	May 1, 2004	Add -1.135 to ln(TLHC+1)
1P	None	None
1R	None	None
C13	None	None
ISB	None	None
ISM	June 28, 2007	Add +1.7 to Crosshead Wear At 3.9% Soot Add +19.1 to Injector Adjusting Screw Wear At 3.9% Soot
T-8	None	None
T-8E	None	None
T-10A	None	None
T-11	September 14, 2005	Add -0.39% to Soot @ 12cSt Vis. Inc., Add 1274 cP to MRV Vis.
T-11	December 6, 2005	Add -0.36% to Soot @ 12cSt Vis. Inc., Add 713 cP to MRV Vis.
T-11	March 24, 2006	Add -0.35% to Soot @ 12cSt Vis. Inc., Add 956 cP to MRV Vis.
T-12	Batch R Piston Ring & Cylinder Liner Hardware	Multiply Average Cylinder Liner Wear by 0.58
	SWTN Hardware	Multiply Average Cylinder Liner Wear by 0.86
		$\Delta Lead_{Final}$ = exp[(ln(ΔLead) x 0.95)]
		$\Delta Lead\ (250\text{-}300)_{Final}$ = exp[(ln(ΔLead 250-300) x 1.03)]
		OC = exp[(ln($OC_{100\text{-}300}$) x 0.96)]
RFWT	None	None

HISTORY OF INDUSTRY CORRECTION FACTORS
APPLICABLE TO LTMS DATA (continued)

EOAT	None	None
L-33-1	None	None
L-37	None	None
L-42	None	None
L-60-1	None	None
HTCT	None	None
OSCT	None	None