



Test Monitoring Center

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MEMORANDUM: 20-007

DATE: February 14, 2020

TO: D02.B0.07 D5800 Mailing List

FROM: Tom Schofield

SUBJECT: D5800 Volatility Technical Update – LTMS Transformed Targets Adjustments

The D5800 LTMS changes effective February 7, 2020, required a change of the reference oil targets to natural log transform, as approved by the surveillance panel. However, to include past oils (52, 55 and 58) in EWMA calculations for current instruments, and to include all past oils in historic monitoring of precision and severity in transformed units, ALL past reference oil targets needed to be transformed to natural log in some manner. These changes were not discussed by the panel, but needed to be made when implementing the new LTMS transforms. As such, the TMC made assumptions on transforming historic targets. This memo simply discloses and documents those changes.

Using the same dataset as the most recent targets for obsolete oils 52, 55, and 58 (targets effective date range 20030721 – 20131011), individual test results were converted from original units (mass % volatized) to natural log. The new target means (in natural log) were calculated from that resulting dataset. However, rather than apply standard deviations similarly, the industry approved standard deviation (0.0465, implemented on 20200207) was applied. Only five currently calibrated rigs have calibration history going back to these oils, and the effects of these target changes on EWMA calculations were confirmed to be negligible.

For reference oil targets that pre-date 20030721, targets also needed to be transformed, but the data sets used to set those targets cannot be definitively reproduced. Therefore, the target mean values were transformed from original units to natural log and industry approved standard deviation (0.0465) was applied. These approximations have no effect whatsoever on EWMA calculations on currently calibrated rigs, as none have a calibration history going back that far. Historic severity trends are preserved with these changes, but the industry severity plots appear slightly smoother, as could be expected by using an appropriate natural log transform. Historic precision estimates will also change slightly.

Attached is a table of the original targets in original units (mass % volatized), and the adjustments to natural log transform effective February 7, 2020.

TMS/tms

Attachment

c: <http://www.astmtmc.cmu.edu/ftp/docs/bench/d5800/memos/mem20-007.pdf>

Distribution: Email

D5800 Reference Oil Target Changes to Natural Log Effective February 7, 2020
Per TMC Memo 20-007

| Oil ID | Target Start Date | Target End Date | n Size | Old Target Mean Original Units | Old Target Standard Deviation Original Units | Old Acceptance Bands | New Natural Log Transformed Mean | New Natural Log Transformed Standard Deviation | COMMENT |
|--------|-------------------|-----------------|--------|--------------------------------|--|----------------------|----------------------------------|--|---|
| 51 | 19960418 | 20000925 | | 18.13 | 0.42 | 17.3 - 19.0 | 2.8976 | 0.0465 | Obsolete Oil; log transform of original target mean |
| 52 | 19960418 | 20000925 | | 13.39 | 0.40 | 12.6 - 14.2 | 2.5945 | 0.0465 | Obsolete Oil; log transform of original target mean |
| 53 | 19960419 | 20000925 | | 22.30 | 0.55 | 21.2 - 23.4 | 3.0146 | 0.0465 | Obsolete Oil; log transform of original target mean |
| 54 | 19960419 | 20000925 | | 23.54 | 0.67 | 22.2 - 24.9 | 3.1857 | 0.0465 | Obsolete Oil; log transform of original target mean |
| 55 | 19960419 | 20000925 | | 16.21 | 0.48 | 15.3 - 17.2 | 2.7856 | 0.0465 | Obsolete Oil; log transform of original target mean |
| 52 | 20000926 | 20030720 | 59 | 13.61 | 0.49 | 12.6 - 14.6 | 2.6108 | 0.0465 | Obsolete Oil; log transform of original target mean |
| 55 | 20000926 | 20030720 | 60 | 16.39 | 0.66 | 15.1 - 17.7 | 2.7967 | 0.0465 | Obsolete Oil; log transform of original target mean |
| 58 | 20000926 | 20030720 | 59 | 14.46 | 0.52 | 13.4 - 15.5 | 2.6714 | 0.0465 | Obsolete Oil; log transform of original target mean |
| 52 | 20030721 | 20131011 | 33 | 13.75 | 0.61 | 12.6 - 14.9 | 2.6204 | 0.0465 | Obsolete Oil; log transform recalculated from original target dataset |
| 55 | 20030721 | 20131011 | 32 | 17.09 | 0.76 | 15.6 - 18.6 | 2.8374 | 0.0465 | Obsolete Oil; log transform recalculated from original target dataset |
| 58 | 20030721 | 20131011 | 37 | 15.20 | 0.72 | 13.8 - 16.6 | 2.7200 | 0.0465 | Obsolete Oil; log transform recalculated from original target dataset |
| VOLC12 | 20130917 | 99999999 | 24 | | | | 2.6523 | 0.0465 | Conversion to LN, minutes 20191105; LTMS update 20200207 |
| VOLD12 | 20130917 | 99999999 | 27 | | | | 2.5264 | 0.0465 | Conversion to LN, minutes 20191105; LTMS update 20200207 |
| VOLE12 | 20130917 | 99999999 | 27 | | | | 2.8175 | 0.0465 | Conversion to LN, minutes 20191105; LTMS update 20200207 |