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Committee D02 on PETROLEUM PRODUCTS AND LUBRICANTS

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June 04, 2015

Reply to:

Larry Hamilton

The Lubrizol Corporation

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ASTM D02.B0.03 L-60-1 Surveillance Panel

Members and Guests:

Attached for your review and comments are the unconfirmed minutes of the May 13, 2015

L-60-1 Surveillance Panel meeting held at Automation Alley, Troy, Michigan

Please direct any corrections or comments to my attention.

Sincerely,

Larry Hamilton; Chairman

L-60-1 Surveillance Panel

ASTM L-60-1 (D5704) Surveillance Panel Meeting Minutes

May 13, 2015

Automation Alley, Troy Michigan

Meeting was called to order at AM 10:09

Attendees: voting member in **BOLD**

| | |
|------------|--|
| AAM | No Rep |
| Afton | M. Keisler ; J. Chalkley; B. Mathews |
| AMSTA-TAR | B. Dwornick (Voting for A. Comfort) |
| BASF | No Rep |
| Eaton | No Rep |
| ExxonMobil | R. Banas ; P. Kanga |
| G. M. | No Rep |
| Intertek | A. Trader (Voting for D. Smith) N. Aguirre |
| Lubrizol | L. Hamilton (Chairman) ; J. Gropp; M. Umerley |
| Meritor | B. McGlone ; T. Muransky |
| SwRI | R. Warden |
| TMC | S. Parke |
| Volvo | No Rep |

15 members in attendance; 8 voting members present

Sign-in and review of membership

The sign-in sheets, identifying attendance and voting membership, is included; see attachment # 1

Attendance was taken and voting membership reviewed.

- A. Trader will vote for Intertek; D. Smith
- B. Dwornick will vote for AMSTRD-TAR; A. Comfort
- A. Athey resigned from L-60-1 membership

Review of Agenda

The Agenda was reviewed and is included; see attachment # 2

Approval of meeting minutes

Chairman called for a vote to accept the February 2015 Surveillance Panel Meeting Minutes.

M. Keisler requested corrections be made to the February minutes, One correction for accuracy of a statement and two mis-spellings. The February 2015 Minutes were not approved. The corrections will be made and the February minutes will be sent out with the May minutes for review.

Continuation of the February discussion on the donated RO 155-1 test results

Chairman gave brief re-cap of the 2 hour discussion from February Surveillance Panel Meeting.

J. Gropp presented data concerning the current severity issue and the problems of introducing a new reference oil during a severe trend. He also talked about the importance of historic tie-back of the

tests performance. **See attachment #3** (Note: there is one extra graph which shows how the first 30 tests on TMC 148 performed versus the target for Carbon / Varnish)

J. Gropp requested that we consider a correction factor that be applied to both Reference and Candidate tests.

Motion by J. Gropp to form a taskforce to meet with TMC to determine if it would be possible to create correction factors to account for severity shift in the test (main focus on Carbon/Varnish).

There was **no second**; the motion died.

This lead to lengthy discussions of the pros and cons of correction factors for the L-60-1 test and examples were given of how other ASTM tests have handled similar situations.

Some of the options discussed:

- Changing Targets
- Changing test conditions
- Apply correction factors
- Declare test out of control

No satisfactory answer for the group could be reached. Chairman will set up a meeting to discuss how to proceed.

Review wording of 9.2.2 in ASTM Procedure

L. Hamilton / S. Parke presented a TMC request for an additional comment for 9.2.2 about calibration expiration to conform to other L-Tests. **See attachment # 4**

Motion by R. Warden to approve wording as presented in attachment #4

2nd by M. Keisler Passed 8-0-0

New Business

There was no New Business.

Adjournment 12:17 PM

Motion by R. Warden to adjourn the meeting,

2nd by M. Keisler Passed 8-0-0

Respectfully Submitted;



Larry Hamilton

L-60-1 Surveillance Panel Chairman

ASTM L-60-1 Surveillance Panel Membership/Mailing List

Meeting Date: May 13, 2015

| Present / Initial * | Name | Voting Status | Company Name & Address | Phone & Fax & E-Mail |
|---------------------|--------------------------|-----------------------|---|---|
| NPA | Aguirre, Nancy | Non-voting | Intertek Automotive Research 5404 Bandera Rd San Antonio TX 78238 | Phone: 210-647-9428 Fax: E-Mail: Nancy.Aguirre@intertek.com |
| RB | Banas, Rob | Voting | ExxonMobil Fuels Lubricants & Specialties 114 Arcadia Park Drive Canton, GA 30114 | Phone: 678-493-3930 Fax: E-Mail: rob.banas@exxonmobil.com |
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| | Clark, Jeff | Non-voting | ASTM Test Monitoring Center 6555 Penn Avenue Pittsburgh, Pennsylvania 15206 | Phone: 412-365-1032 Fax: 412-365-1047 E-Mail: jmf@astmtmc.cmu.edu |
| | Comfort, Allen | Voting | AMSTA-TR-D/210 (Allen Comfort) U S Army Tank, Automotive, and Armament Command Warren, Michigan 48397-5000 | Phone: 586-282-4225 Fax: 586-282-4244 E-Mail: allen.s.comfort.civ@mail.mil |
| | Dharte, John | Voting | American Axle 1 Dauch Dr Detroit, MI 48212 | Phone: 313 758-4687 Fax: E-Mail: DharteJ@aam.com |
| BD | Dwornick, Bridget | Non-voting | AMSTRD-TAR-D/210 6501 E.11 Mile Rd Warren,MI 48397-5000 | Phone: 586-282-4221 Fax: 586-282-4244 E-Mail: bridget.dwornick@us.army.mil |

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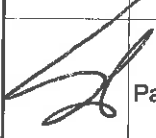
Meeting Date: May 13, 2015

| Present / Initial * | Name | Voting Status | Company Name & Address | Phone & Fax & E-Mail |
|----------------------------|-----------------|----------------------|--|--|
| | Dykhno, Olga | Voting | BASF Corporation 100 Pash Ave Florham Pash, NJ | Phone: Fax: E-Mail: olga.dykhno@basf.com |
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| <i>P.R. K</i> | Kanga, Percy R. | Non-Voting | Commercial Vehicle, Marine & Gas Engine Lubricants ExxonMobil Research & Engineering 600 Billingsport Road Paulsboro, NJ. 08066 | Phone: 856-224-2094 Fax: 856-224-3613 E-Mail: percy.r.kanga@exxonmobil.com |
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*Initials indicate that member was present

ASTM L-60-1 Surveillance Panel Membership/Mailing List

Meeting Date: May 13, 2015

| Present / Initial * | Name | Voting Status | Company Name & Address | Phone & Fax & E-Mail |
|--|------------------|------------------------------|---|--|
| | Mosher, Donna | Non-voting | Eaton Corporation 13100 E Michigan Ave Galesburg, Michigan 49053 | Phone: 269-342-3039 Fax: E-Mail: donnamosher@eaton.com |
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|----------------------------|--------------------|---------------------------------|---|--|
| ATT | Trader, Angela | proxy for Non-voting Dale | Intertek Automotive Research 5404 Bandera Rd San Antonio TX 78238 | Phone: 210-706-1533 Fax: E-Mail: angela.trader@intertek.com |
| MU | Umerley, Matt | Voting | The Lubrizol Corporation 29400 Lakeland Boulevard Wickliffe, Ohio 44092 | Phone: 440-347-4589 Fax: 440-347-2878 E-Mail: matthew.umerley@lubrizol.com |
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| GBM | MATTHEWS, BRAD | Non-voting | Afton Chemical 500 Spring Street Richmond, VA 23219 | Phone: Fax: E-Mail: Brad.Matthews@aftonchemical.ca |
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L-60-1 Surveillance Panel

May 13, 2015

Automation Alley, Troy Michigan

Agenda

For those not traveling, the call-in number will be 866-528-2256; Code 6859431

- I. Call to Order
- II. Membership and agenda review (Allison Athey withdrew Membership by e-mail)
- III. Approval of the February 18, 2015 SP meeting minutes.
- IV. Continued discussion of Targets for RO 155-1 – TMC / J. Gropp
- V. Candidate start vs Calibration period (see 9.2.2) - TMC
- VI. New Business
- VII. Adjournment

Voting Members

1. Rob Banas
2. Allen Comfort
3. John Dharte
4. Olga Dykhno
5. Larry Hamilton
6. Marc Keisler
7. Bruce McGlone
8. Scott Parke
9. Dale Smith
10. Rebecca Warden

L-60-1 Test Severity and New Reference Oil Acceptance Bands

J. L. Gropp
May, 2015

What Happened in 1995?

- **ASTM D5704 (L-60-1) test was released/approved for use**
 - Updated version of L-60 test
 - Primary purpose was to enable evaluation of thermal stability of automotive gear oils
 - In terms of Sludge and Carbon/Varnish deposits
- **MIL-PRF-2105E Specification was introduced to the industry**
 - Addressed need/desire for improved thermal stability
 - Measured via the L-60-1 test
 - Was subsequently rewritten as the SAE J2360 Standard
- **API Category MT-1 was introduced to the industry**
 - Addressed need/desire for improved thermal stability
 - Measured via the L-60-1 test

What's Important to Keep in Mind?

- SAE J2360 Standard and API Category MT-1 contain acceptance criteria for deposits (and other parameters) in the L-60-1 test
- Acceptance criteria are “locked-in”
 - Specifications do not have a process to compensate for changes in test severity
 - Assume that test severity will not change over time
- Critical for L-60-1 test to maintain its historic level of severity
 - Necessary to insure that oils which provided acceptable performance in the past continue to do so
 - Need to maintain a “level playing field” for new entrants into the market
 - L-60-1 Surveillance Panel is assigned this responsibility

What's the Current Situation?

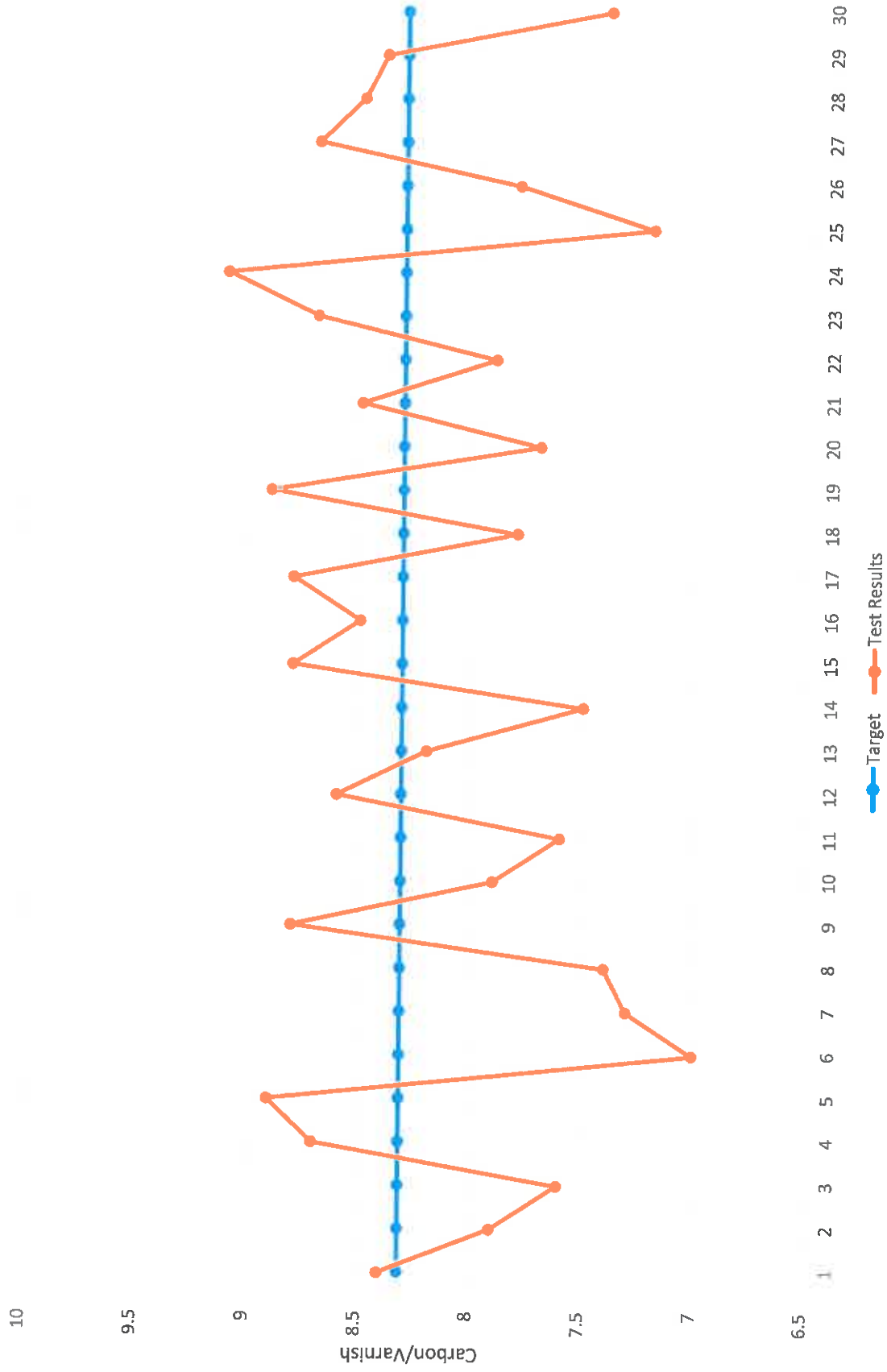
- Procedure has undergone numerous changes since initial introduction
 - Introduced new gear batches, made changes in gear preparation technique, adopted use of gear rating fixture, added second seal on shafts, allowed use of new alternator, introduced new cleaning solvent, etc.
- Test has been in a severe trend for several years
 - Most significant impact is upon Carbon/Varnish
 - See next slide for details
- Need to ask the question:
 - Have the above changes inadvertently affected test severity?

Recent Reference Oil Test Results versus Target for Carbon/Varnish

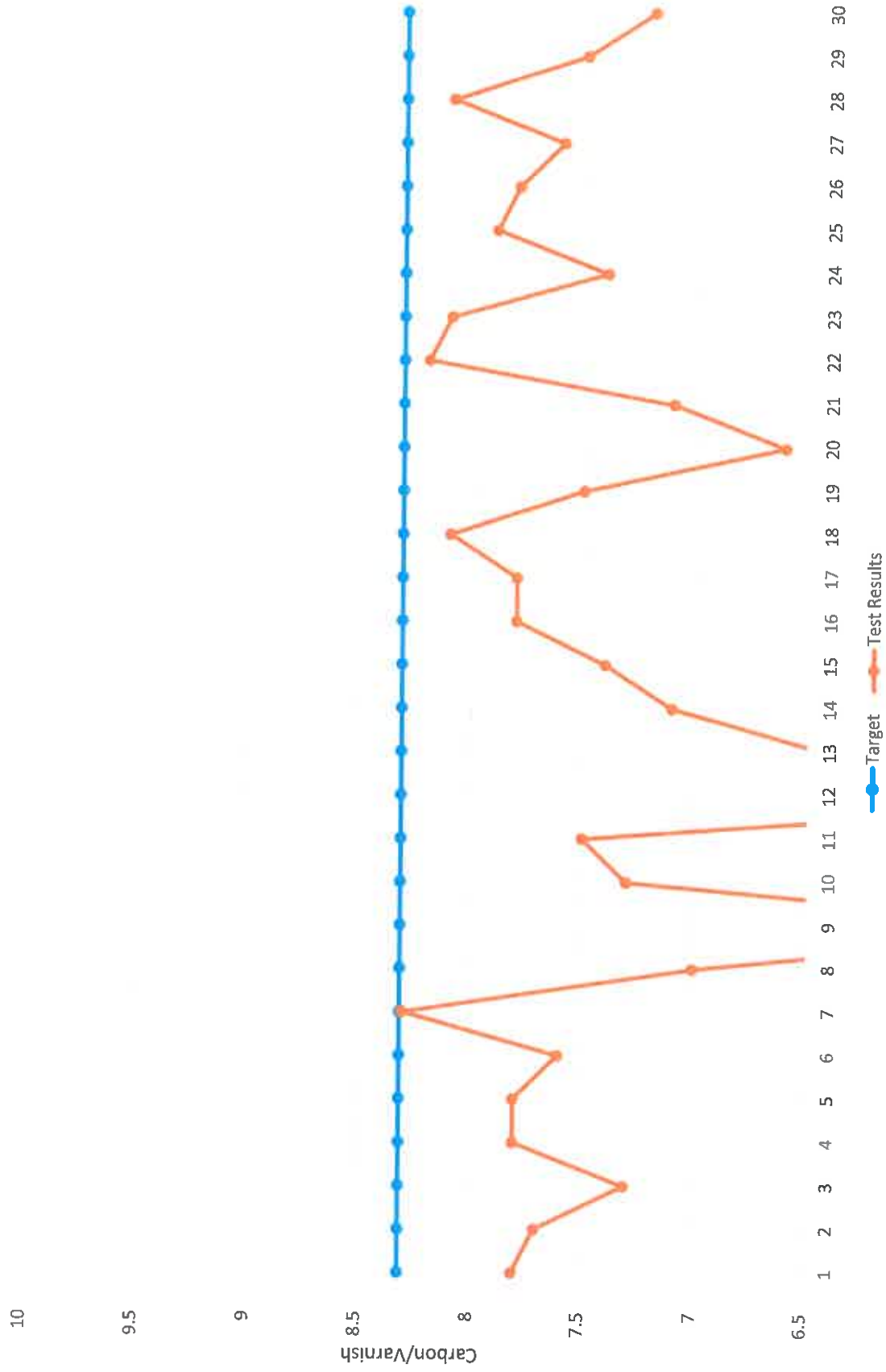
| Oil Code | Effective Date for Reference Oil Targets | | Carbon/Varnish Results * | | |
|---------------------|--|-----------------|--------------------------|-----------------|--|
| | Target | Last 10 Results | Last 20 Results | Last 30 Results | |
| TMC 148 / TMC 148-1 | 8.31 | 7.64 | 7.70 | 7.71 | |
| | Delta vs. Target | -0.67 | -0.61 | -0.60 | |
| TMC 151-2 | 8.59 | 8.01 | 8.05 | 7.96 | |
| | Delta vs. Target | -0.58 | -0.54 | -0.63 | |

* For tests with validity codes of AC and OC

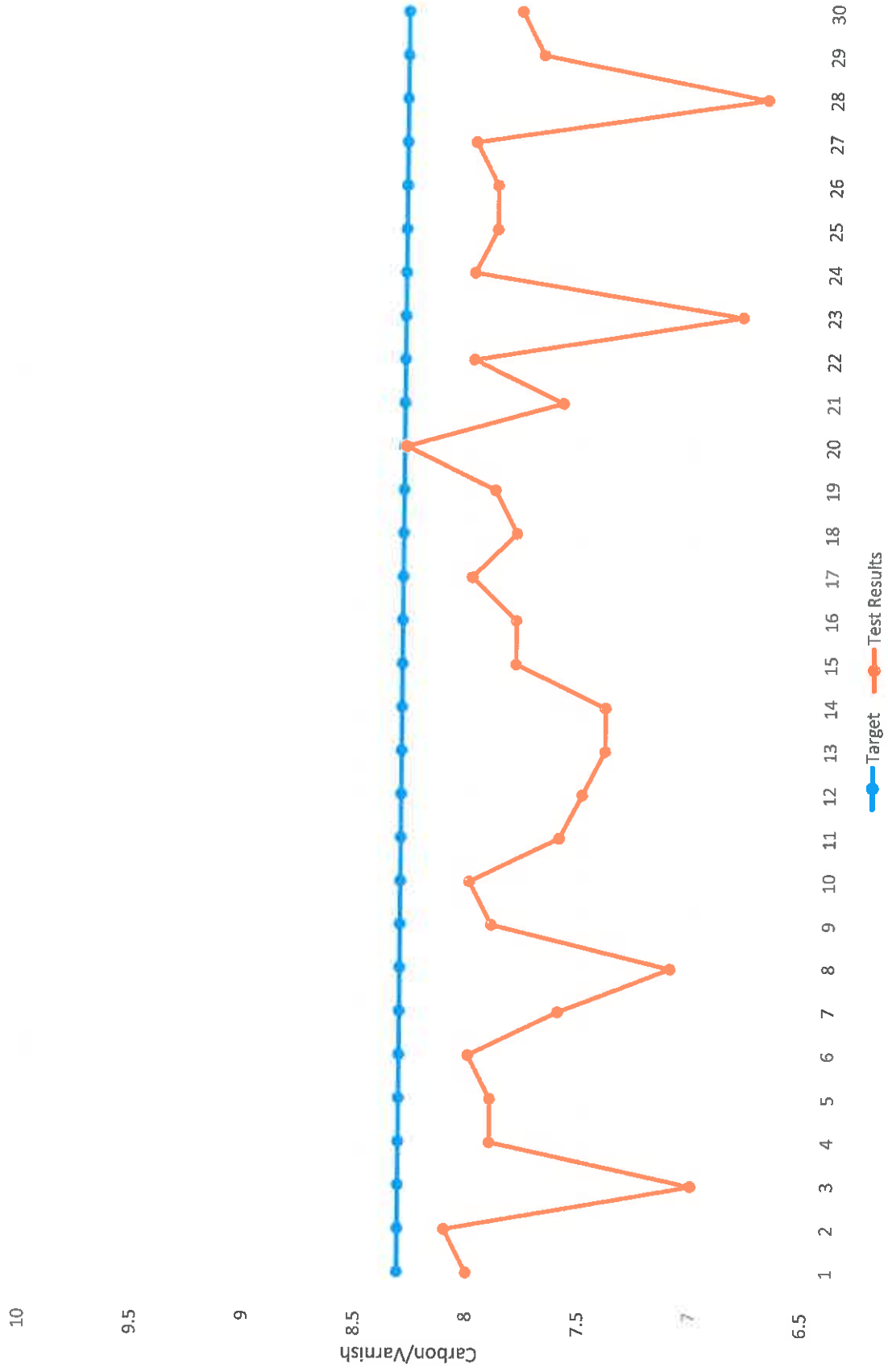
First 30 Results on TMC 148 versus Target for Carbon/Varnish



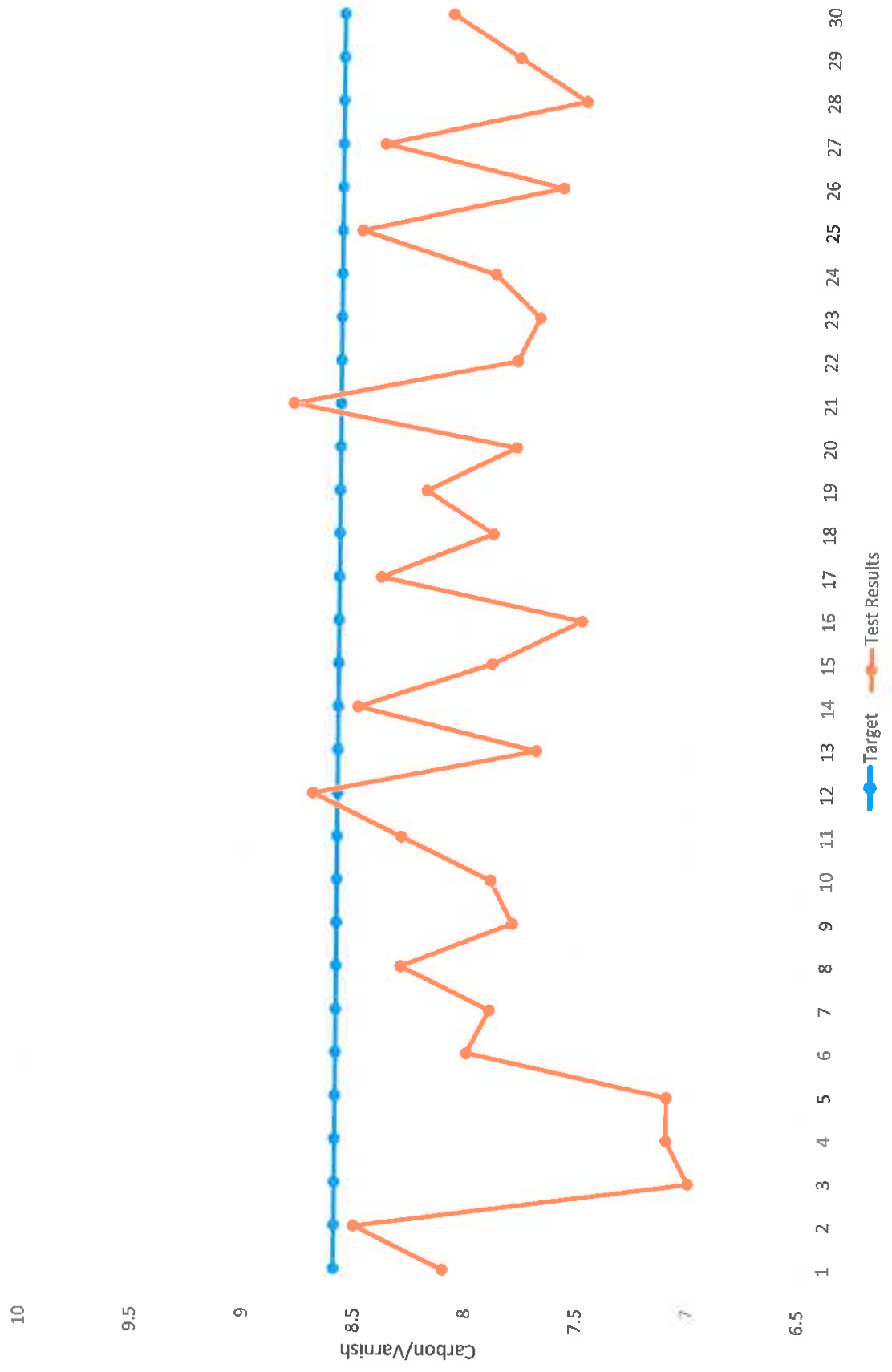
Last 30 Results on TMC 148 versus Target for Carbon/Varnish



Last 30 Results on TMC 148-1 versus Target for Carbon/Varnish



Last 30 Results on TMC 151-2 versus Target for Carbon/Varnish



What Issues Are We Facing?

- Carbon/Varnish ratings on reference oils are approximately 0.6 merit numbers lower today than when the test was released and acceptance criteria for SAE J2360 and MT-1 were established
- Some oils which passed the SAE J2360 and MT-1 acceptance criteria in the past will no longer do so
 - An oil which gave an 8.0 Carbon/Varnish rating in the past will now give a result below 7.5
 - An 8.0 is a solid pass, whereas a result below 7.5 is a fail
 - Need to recognize that the oil didn't change – The test did
- Introducing a new reference oil during a severity trend is not desirable
 - Results obtained don't reflect the true performance of the oil
 - Makes it difficult to identify the correct acceptance bands
 - May/will mask the existence of and/or magnitude of the severity trend
 - Comparing reference oil test results to incorrect (severe) acceptance bands will make it appear as though the test results are "on target"
 - Test is still severe, but doesn't appear to be
 - Severity bias adjustments will decrease and/or be eliminated over time

What Needs To Be Done?

- Implement a correction factor to compensate for this offset in Carbon/Varnish performance
 - Hold Surveillance Panel (or Task Force) meeting with the Test Monitoring Center to determine magnitude and process for implementation
- Postpone introduction of new reference oil (TMC 155-1) pending outcome of above activity
- Conduct in-depth review of test to identify cause(s) behind shift in test severity

Current 9.2 to 9.2.2

9.2 To ensure that uniform results are being obtained in the test, complete calibration of test stands by testing reference oil samples supplied by the TMC at the time calibration or recalibration is required.

9.2.1 *New Test Stand Calibration*—for a new test stand, reference tests as prescribed by the TMC shall be completed, giving results within the established limits for the reference oils. Inspection of the new test stand for compliance with this test method by the TMC is also required.

9.2.2 *In-Service Stand Calibration*—For a previously referenced test stand, reference tests giving results within the established limits for those oils shall be conducted at the frequency specified by the TMC (currently every ten tests or three months, whichever occurs first). Test oils for this purpose are distributed as blind coded samples by the TMC when request for calibration is received. All test starts and test data using reference oils shall be reported to the TMC. Calibration frequency is subject to change as required. Current calibration information is available from the TMC. **Any test started on or before the stand calibration expiration date is defined to have been run on a calibrated stand.**