

National Type Evaluation Program (NTEP) Measuring Sector

Annual Meeting
September 25-26, 2018 Baltimore, MD

Meeting Summary

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Glossary of Acronyms			
CC	Certificate of Conformance	NTETC	National Type Evaluation Technical Committee
DMS	Division of Measurement Standards	OIML	International Organization of Legal Metrology
ECR	Electronic Cash Register	OWM	Office of Weights and Measures (NIST)
EVFS	Electric Vehicle Fueling Systems	PD	Positive Displacement
HB 44	NIST Handbook 44 “Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices”	Pub 14	NCWM Publication 14
LMD	Liquid Measuring Devices	RMFD	Retail Motor-Fuel Dispenser
mA	milliamp	SI	International System of Units
MFM	Mass Flow Meters	S&T	Specifications and Tolerances
NCWM	National Conference on Weights and Measures	TG	Task Group
NIST	National Institute of Standards and Technology	VTM	Vehicle Tank Meter
NTEP	National Type Evaluation Program	W&M	Weights and Measures
This glossary is meant to assist the reader in the identification of acronyms used in this agenda and does not imply that these terms are used solely to identify these organizations or technical topics.			

NTEP Sector Chairman, Michael Keilty (Endress+Hauser Flowtec) opened the meeting, providing an overview of the purpose of the Sector; introducing the agenda; and identifying the voting members of the Sector according to NCWM records. A copy of the final attendance list is included in Appendix I to this summary.

Carry-over Items:

1. Laboratory and Field Evaluation – Clarification of Language

Source: NTEP Laboratories

Background Information: The NTEP evaluators have experienced confusion when interpreting the “Laboratory or Field Evaluation” section of the LMD checklist (see Page LMD-111). At its 2018 meeting, the Sector reviewed proposed changes from the NTEP laboratories to clarify the information in this section. The Sector agreed there are multiple points in this section that are confusing. Sector Technical Advisor, Tina Butcher noted that the original section was intended to cover multiple applications. Over time, permanence test criteria were changed or deleted for certain device types and there appears to be residual language that needs to be moved or deleted. NTEP Director, Jim

Truex noted that there have been arguments from manufacturers over the requirements for permanence testing and modifying the language as proposed is intended to help eliminate these instances.

After discussing the proposed changes at length, the Sector agreed that the proposed changes from the laboratories will help with some of the confusion, but more work is needed. The Sector agreed that additional clarifications to the first part of this section would be helpful; this will be a carryover item for next year. Tina Butcher agreed to rework the section based on the Sector's discussions and past decisions and circulate those proposed revisions to the labs, Rich Miller, and Dmitri Karimov and bring it back next year for the Sector to review.

Recommendation: The Sector will be asked to review proposed changes to the "Laboratory or Field Evaluation" section of the LMD checklist to be distributed prior to the Sector Meeting.

Discussion: Sector Chairman, Michael Keilty reviewed this issue, providing background information from last year's Sector discussion, noting that the Sector had sought to modify the "Laboratory or Field Evaluation" section of the Field Evaluation and Permanence Tests Portion of the Liquid-Measuring Devices Checklist as described in the "Background" above. Sector Technical Advisor, Tina Butcher, presented the following proposed revision of this section based on discussions amongst the NTEP Measuring Laboratories during their meeting just prior to the Sector meeting.

Laboratory or Field Evaluation

A. Use of Simulated Inputs:

As per NTEP Technical Policy U. Evaluating Electronic Indicators Submitted Separate from a Measuring Element, When evaluating electronic indicators submitted separate from a measuring element, simulated inputs (e.g. meter pulse, temperature, pressure, density, communications, etc.) may be used as follows:

- For the initial testing of the indicator for stationary applications.
- For software changes to a device with an existing CC.
- This provision does not apply to vehicle-tank metering systems.

B. Field and Permanence Testing for Components Subject to Evaluation:

Field Evaluation and Permanence Testing – General:

Measuring systems, devices, and elements whose performance may change with use over time are generally subject to field evaluation and permanence tests.

~~The following types of devices and elements are subject to initial field or laboratory evaluation:~~

- ~~• Electronic Indicating Elements~~
- ~~• Consoles~~
- ~~• Recording Elements~~
- ~~• Electronic Cash Registers~~
- ~~• Data Processing Units~~

Permanence testing consists of conducting an initial test followed by a subsequent test. The subsequent test will be conducted not sooner than 20 days following the initial test. During this period, the device must be used for at least 300 deliveries and achieve any required throughput.

~~Field examination is conducted between 20 and before 30 days of use in a normal installation. During this the permanence period interval, the device must perform and function correctly and not be serviced. Permanence tests are conducted on equipment such as a complete measuring system or only a measuring element (meter.)~~

Mobile Applications:

- A permanence test is required for all mobile devices.
- When updating a CC for a mobile device for changes in hardware, a permanence test is required.
- When updating a CC for mobile electronic devices for changes in software, a permanence test may be waived by NTEP.

Stationary Applications:

~~The~~ A permanence test is not required in either new evaluations or when updating a CC for the following *electronic* devices:

- Electronic Indicating Elements
- Consoles
- Recording Elements
- Electronic Cash Registers (e.g., Point-of-Sale Systems)
- Data Processing Units

~~listed above in stationary installations. The permanence test for mobile electronic devices may be waived by NTEP for updating a CC.~~

Key points raised during the Sector's discussion of this proposal were as follows.

- The proposed restriction for using simulated inputs only as described in proposed part A is inappropriate. It should be permissible to use simulated inputs to verify an indicator in a lab environment prior to other testing.
- There is no value to testing electronics over a period of time. They either work or they don't, and this will be evident during the initial evaluation.
- Focus needs to be on measurement capability. If electronics fail, this is a warranty issue.
- Permanence testing, including field testing, is necessary to verify appropriateness of systems and components used in mobile applications (e.g., vehicle-mounted).
- Durability testing to simulate "road use" might be considered; however, standards would need to be set. For example, the duration and strength of vibrations or other influences.
- A third-party laboratory might be considered for some testing if witnessed by an NTEP evaluator.
- The proposed minimum number of 300 deliveries was questioned. The labs proposed this threshold as a starting point based upon requirements used for NTEP evaluations of other devices. The labs viewed this as a starting point for discussion, noting that some limits need to be established to avoid a company placing a device in an installation that gets little or no use during the permanence period. Other device types such as scales have similar criteria for permanence testing and belt conveyor scales even requires a six-month permanence period.
- For meter testing, throughput quantity is often achieved at a manufacturer's facility in a compressed period of time. There was opposition to including any language that would eliminate this option for achieving throughput quantity.
- Defining "normal use" is a challenge. Specifying time and number of uses is a way to establish some minimum criteria for "normal use." More work and discussion are needed to establish an appropriate combination of time and degree of use.

The Sector reworked the proposed modifications from the laboratories several times without reaching agreement.

Decision: *The Sector concluded that additional work is needed to develop proposed revisions to the Laboratory or Field Evaluation section of the “Field and Permanence Tests for Metering Systems” found on page LMD-111 of the NCWM Publication 14 Liquid-Measuring Devices Checklist. The following individuals volunteered to work together to develop proposed revisions to be circulated to the Sector for review and decision, possibly resolving the proposal via email balloting. Sector Technical Advisor, Tina Butcher will lead the effort and ensure that the work is completed.*

- *Tina Butcher (NIST OWM, NTEP Measuring Sector Technical Advisor) – Lead*
- *Craig Cavanaugh (Tuthill Transfer Systems)*
- *Dmitri Karimov (IDEX Corporation, Liquid Controls)*
- *Rich Miller (Technip MC)*
- *Randy Ramsey/Hunter Hair (NC NTEP Lab)*
- *John Roach (CA NTEP Lab)*

2. Diesel Exhaust Fluid (DEF) - Testing Criteria to Include DEF on an NTEP CC

Source: NTEP Laboratories

Background Information: NTEP evaluators are routinely asked what testing is necessary to cover DEF on NTEP certificates. Another common question is what testing is necessary to get a family of meters certified for DEF and what other products will be included.

The current policy has been questioned at times by applicants. For example, a client stated that DEF is 67% water and 32% Urea. Mag Flow conductance for Urea is 5000 micro siemens/centimeter and that for water is 725 (see page LMD-7 in Pub 14 for both products). Plus, they are in different families.

NTEP tested the product with DEF. NTEP concluded that each family (water and fertilizer) should be tested to establish conductivity. Our thoughts were that we would simply give the product DEF (the product actually tested) on the CC since we are not really establishing conductivity for the family table for either water or fertilizer. In this case, after discussion, NTEP let the client know that they had a couple of choices.

1. Test only DEF and only get DEF with no conductance range
2. Test water and Urea which would establish conductivity for both water and fertilizer families.

Prior to the 2017 Sector Meeting, DEF was and had been considered fertilizer due to the Urea content. DEF is prevalent enough now to justify its own category listing. The Sector considered a recommendation to establish a separate product category for diesel exhaust fluid (DEF).

NTEP Director, Jim Truex introduced the item on behalf of the NTEP Laboratories, noting the proposal arose from discussions among the laboratories who need more specific criteria to address DEF. He clarified that the criteria are intended to apply to all meter types. Some Sector members asked if the proposed change, if adopted, would affect the status of current NTEP Certificates of Conformance (CCs) and Mr. Truex noted that NTEP would not require companies to resubmit CCs for evaluation. Some questioned whether not having the reference on a current CC might not create a disadvantage compared with companies getting new CCs with the listing on the CC.

Mr. Truex noted that DEF is becoming prevalent enough that people want this to be specifically listed on their CCs and giving DEF its own category might help answer some of the questions and clear up some current confusion. The Sector acknowledged that the Family of Products Table does not provide an exhaustive listing of specific products; these are just examples of products and their characteristics that might be measured with a given meter type and a classification of how they would be treated regarding NTEP testing.

There was some additional discussion about the nature of DEF and some commented on the fact that there can be different percentages of water used in the mixture. The Sector spent some time discussing possible ranges to list in the table. The Sector finally agreed that more research is needed and concluded that this task would be better completed outside of the meeting.

The group discussed this item at length, including proposed parameters for DEF and Urea. The proposed changes are more complex than can be resolved at the meeting and the Sector wants to see a final, marked-up draft of the changes to the Product Family Table before making a decision.

Michael Keilty agreed to lead a small group of volunteers consisting of the following to work on this item:

- Michael Keilty (Endress + Hauser)
- Rich Miller (FMC)
- Craig Cavanaugh (Tuthill Transfer System)
- Robin Parsons (Parafour Innovations)

The group was to develop and circulate a proposal to the remainder of the Sector in a ballot to add DEF as a separate line item for each meter type in the Product Family Table. In addition, the group was to further review the listings for Urea to ensure the references are accurate.

Recommendation: No action is asked of the Sector on this item. This item is included on the Sector’s agenda to report on the actions taken following the last Sector meeting.

The group assigned to this task completed its work. Sector Chairman, Michael Keilty, balloted the Sector initially in ballot 17-01 and in a subsequent ballot 17-02. Sector reached a consensus on the changes proposed and Mr. Keilty summarized the results of the ballot in an email to the Sector dated 11/21/17. The results are repeated below for reference. The changes adopted are shown in Appendix A to this Agenda.

Summary of Ballot Results	
Ballot 17-01	Ballot 17-02
(Prior to change recommended by D. Karimov)	
3 yes	9 yes
2 no	0 no
1 abstain	0 abstain
(After recommended change by D. Karimov)	
4 yes – with the changes and no others	
Summary Totals: 7 yes; 2 no; 1 abstain	Summary Totals: 9 yes; 0 no; 0 abstain
Public Members: 2 yes; 1 no	Public Members: 3 yes; 0 no
Private Members: 5 yes; 1 no; 1 abstain	Private Members: 6 yes; 0 no

Discussion: Sector Chairman, Michael Keilty reviewed this issue, providing background information from last year’s Sector meeting and noting the work by the small task group and the subsequent ballot and decision made by the Sector in fall 2017. Michael touched on the following in his review:

- There was some confusion during the balloting process regarding changes to the proposal under review. However, this was resolved after some communications by the Chairman.
- The small task group discussed: specifying a range of characteristics for DEF (as is done for other products in the current Families of Products Table); establishing conductivity values; and how to identify key characteristics.

- Members of the group widely researched DEF to determine its range of parameters. Data was difficult to find.
- Finding data on conductivity was particularly difficult. DEF is a water-based solution, with slightly varying proportions and different sources of water (which can have its own range of conductivity). This possibly contributes to the variability of conductance among different samples of DEF.
- A suggestion was made that companies submitting devices for type evaluation to demonstrate conductivity of the liquid to the NTEP labs.

There was a small amount of discussion on this item. Points raised included:

- Robin Parsons (Parafour Innovations) observed that standards are tightening as DEF use increases. This may lead to better data in the next few years.
- Some questioned whether the laboratories should ask for documentation from companies during type evaluation. Data would need to be corrected to a reference temperature since other values in the Families of Products Table are corrected to 60 degrees Fahrenheit.

Decision: No decision was asked of the Sector on this item. This item is included on the Sector's agenda to report on the actions taken following the last Sector meeting and to allow for any remaining questions about the issue and/or the Sector's decision. One NTEP lab reported listing the conductivity values stated in Pub 14 on the NTEP CC resulting from an evaluation. A suggestion was made for any NTEP Laboratory conducting an evaluation of DEF measuring system to request data on the conductivity of the specific DEF used in the evaluation; however, no decision was made in this regard. To the extent possible, the NTEP Laboratory should document as much information as is available about the product used in the evaluation in the "Test Conditions" on the NTEP CC.

New Items:

3. Recommendations to Update NCWM Pub 14 to Reflect Changes to NIST HB 44 and Other Proposed Changes.

Source: NCWM S&T Committee

Background:

At its 103rd Annual Meeting, the National Conference on Weights and Measures (NCWM) adopted the following items that will be reflected in the 2019 Edition of NIST Handbook 44. These items were included on the Sector's agenda to inform the Measuring Sector of the NCWM actions and to recommend corresponding changes to NCWM Publication 14. For additional details on these items, refer to the NCWM S&T Committee's 2018 Interim Report and its accompanying appendix along with the addendum sheets issued by the S&T Committee during the 2018 NCWM Annual Meeting, all of which can be found on the NCWM's web site at:

<http://www.ncwm.net/meetings/annual/publication-16>

A. Vehicle-Tank Meters Code - Manifold Flush Systems - Paragraph S.3.1. Diversion of Measured Liquid

Background: At the 2018 NCWM Annual Meeting, the NCWM adopted the following changes to the Vehicle-Tanks Meters Code to specify requirements for "manifold flush systems" used to flush product on

metering systems with multiple compartments delivering multiple products through a single discharge hose. For reference, see Block 1 on the 2018 S&T Committee's Agenda, which includes GEN-1 and VTM-1.

Modify paragraph S.3.1. as follows:

S.3.1. Diversion of Measured Liquid. – ~~Except on equipment used exclusively for fueling aircraft, n~~No means shall be provided by which any measured liquid can be diverted from the measuring chamber of the meter or the discharge line thereof. However, two or more delivery outlets may be installed if means are provided to ~~insure~~ **ensure** that:

- (a) liquid can flow from only one such outlet at one time; and
- (b) the direction of flow for which the mechanism may be set at any time is definitely and conspicuously indicated.

This paragraph does not apply to the following:

- 1) **Equipment used exclusively for fueling aircraft.**
- 2) **Multiple-product, single discharge hose metering systems that are equipped with systems designed to flush the discharge hose, provided the flushing system complies with the provisions of paragraph S.3.1.1.**

Add a new paragraph S.3.1.1. as follows:

S.3.1.1. Means for Clearing the Discharge Hose. Metering systems may be equipped with systems specifically designed to facilitate clearing of the discharge hose prior to delivery to avoid product contamination. In such systems, a valve to temporarily divert product from the measuring chamber of the meter to a storage tank, shall be installed only if:

- (a) **The discharge hose remains of the wet hose type; and**
- (b) **the valve and associated piping are approved by the weights and measures authority having jurisdiction over the device prior to commercial use; and**
- (c) **the valve is permanently marked with its purpose (e.g., flush valve); and**
- (d) **the valve is installed in a conspicuous manner and as far from the hose reel as practical; and**
- (e) **the system clearly and automatically indicates the direction of product flow during operation of the flush system; and**
- (f) **clear means, such as an indicator light or audible alarm, is used to identify when the valve is in use; and**
- (g) **no hoses or piping are connected to the inlet when it is not in use.**
(Added 20XX)

Add a new paragraph heading UR.2.6. and new paragraph UR.2.6.1. as follows:

UR.2.6. Clearing the Discharge Hose

UR.2.6.1. Records. Whenever, prior to delivery, a different product is pumped through the discharge hose to avoid contamination, a record including the date, time, original product, new product and gallons pumped shall be maintained. These records

shall be kept and available for inspection by weights and measures for a period of 12 months
(Added 20XX)

Recommendation: The Sector is asked to consider recommending modifications to NCWM Publication 14 to correspond with the changes to Handbook 44 relative to “manifold flush systems” that were adopted by the NCWM in July 2018. Proposed changes are outlined in Appendix B to this Agenda.

Discussion: Sector Chairman, Michael Keilty, reviewed this item, noting the content of the referenced requirements have already been adopted by the NCWM. There were no substantive comments on this item other than discussion about the purpose of the requirement.

Decision: *The Sector reviewed the changes made by the NCWM to specify requirements for “manifold flush systems” as shown in the “Background” section of this agenda item; the Sector also acknowledged a related item on the NCWM S&T Committee’s 2019 Agenda. The Sector reviewed the changes proposed to NCWM Publication 14 to reflect these Handbook changes as outlined in Appendix B to this summary and agreed to recommend these changes be adopted as shown.*

B. Vapor Elimination – Multiple Measuring Codes

Background: At the 2018 NCWM Annual Meeting, the NCWM adopted the following changes to the LPG & Anhydrous Ammonia Liquid-Measuring Devices Code; Cryogenic Liquid-Measuring Devices Code; and Carbon Dioxide Liquid-Measuring Devices Code to align requirements for air/vapor elimination. For reference, see the block of items under S&T Block 6, including LPG-1, CLM-3, and CDL-3.

LPG & Anhydrous Ammonia LMD Code:

S.2.1. Air/Vapor Elimination. - A **device measuring system** shall be equipped with an effective **air/vapor eliminator or other** automatic means to prevent the passage of **air/vapor** through the meter. Vent lines from the **air/vapor** eliminator shall be made of appropriate non-collapsible material.
(Amended 2016 **and 2018**)

Cryogenic Liquid-Measuring Devices Code:

S.2.1. Vapor Elimination. – A measuring system shall be equipped with an effective **air/vapor** eliminator or other **effective automatic** means to prevent the ~~measurement of vapor that will cause errors in excess of the applicable tolerances~~ **passage of air/vapor through the meter.** **Vent lines from the air/vapor eliminator shall be made of appropriate non-collapsible material.**
(Also see Section T. Tolerances.)
(Amended 2018)

Carbon Dioxide Liquid-Measuring Devices Code:

S.2.1. Air/Vapor Elimination.

(a) A **device measuring system** shall be equipped with an effective **air/vapor eliminator or other** automatic means to prevent the passage of **air/vapor** through the meter.

(b) Vent lines from the **air/vapor** eliminator shall be made of appropriate non-collapsible material.

(Amended 2016 **and 2018**)

Recommendation: The Sector is asked to recommending modifications to NCWM Publication 14 to reflect the changes to the three HB44 codes described in the “Background” section above. Proposed changes are outlined in Appendix C to this Agenda.

Discussion: Sector Chairman, Michael Keilty, reviewed this item, noting the content of the referenced requirements have already been adopted by the NCWM. There were no extensive comments on this item other than discussion about the purpose of the requirements, which were noted as changes made to align these requirements with other Handbook 44 measuring codes. There was an observation from one Sector member that there is no “air” in propane; the Technical Advisor noted the S&T Committee acknowledged this in discussions several years ago and chose to use the “air/vapor” term so that there could be consistency in language among the various H44 metering codes.

Decision: *The Sector reviewed the changes made by the NCWM to align requirements for air/vapor elimination among the various measuring devices codes as shown in the “Background” section of this agenda item. The Sector reviewed the changes proposed to NCWM Publication 14 to reflect these Handbook changes as outlined in Appendix C to this summary and agreed to recommend these changes be adopted as shown. The Technical Advisor notes a minor editorial change was made to page 3, item 8.3 of that appendix; the text should be underlined. This correction has been made in the version of Appendix C attached to this summary.*

C. Recorded Representations – 2018 S&T Item LMD-2: S.1.6.7. Recorded Representations; S.1.6.8. Recorded Representations for Transactions Where a Post-Delivery Discount(s) is Provided; and UR.3.4. Printed Ticket.

Background: At the 2018 NCWM Annual Meeting, the NCWM adopted the following changes to the Liquid-Measuring Devices Code to specify requirements for including information to identify the dispenser used in a transaction on recorded representations issued by retail motor-fuel dispensing systems. For reference, see Item LMD-2 on the S&T Committee’s Agenda.

<p>S.1.6.7. Recorded Representations. – Except for fleet sales and other price contract sales and for transactions where a post-delivery discount is provided, a printed receipt providing the following information shall be available through a built-in or separate recording element for all transactions conducted with point-of-sale systems or devices activated by debit cards, credit cards, and/or cash:</p> <ul style="list-style-type: none">(a) the total volume of the delivery;*(b) the unit price;*(c) the total computed price; and(d) the product identity by name, symbol, abbreviation, or code number. and(e) <u>the dispenser designation by either an alpha or numerical description.</u>** <p><u>*[Nonretroactive as of January 1, 1986]</u> <u>**[Nonretroactive as of January 1, 2021]</u> (Added 1985) (Amended 1997, 2012, and 2014 <u>and 2018</u>)</p> <p>S.1.6.8. Recorded Representations for Transactions Where a Post-Delivery Discount(s) is Provided. – Except for fleet sales and other price contract sales, a printed receipt providing the following information shall be available through a built-in or separate recording element that is part of the system for transactions involving a post-delivery discount:</p> <ul style="list-style-type: none">(a) the product identity by name, symbol, abbreviation, or code number;(b) transaction information as shown on the dispenser at the end of the delivery and prior to any post-delivery discount(s), including the:<ul style="list-style-type: none">(1) total volume of the delivery;(2) unit price; and(3) total computed price of the fuel sale.(c) an itemization of the post-delivery discounts to the unit price; and(d) the final total price of the fuel sale after all post-delivery discounts are applied, and
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(e) The dispenser designation by either an alpha or numeric description.

(Added 2012) (Amended 2014 ~~and 2018~~) [Nonretroactive as of January 1, 2021]

UR.3.4. Printed Ticket. - The total price, the total volume of the delivery, ~~and~~ the price per liter or gallon, **and a corresponding alpha or numeric dispenser designation*** shall be shown, either printed by the device or in clear hand script, on any printed ticket issued by a device and containing any one of these values.

(Amended 2001 ~~and 2019~~) ***(Nonretroactive as of January 1, 2021)**

Recommendation: The Sector is asked to recommending modifications to NCWM Publication 14 to reflect the changes to the Liquid-Measuring Devices Code in NIST Handbook 44 relative to including information to identify the dispenser used in a transaction on recorded representations issued by retail motor-fuel dispensers. Proposed changes are outlined in Appendix D to this Agenda.

Discussion: Sector Chairman, Michael Keilty, reviewed this item, noting the content of the referenced requirements have already been adopted by the NCWM. There was lengthy discussion regarding the fact that dispensers currently in use may or may not issue receipts with the identity information. Discussion points included the following:

- The Sector discussed the purpose of the requirements.
- The Sector also discussed a proposal under consideration for the 2019 NCWM cycle to add a nonretroactive exemption for establishments with a single dispenser having multiple meters or not more than one individual dispenser with a single meter for each product delivered. A question was raised about the purpose of the exception in paragraph UR.3.4. Printed Ticket as it applies to a single multi-product dispenser. Such a device often has two sides, which means that not including the dispenser designation on receipts issued by such a device will not clearly indicate the hose and meter used by a customer.
- It was suggested a better approach would have been to make the exception applicable only to single-hose, single-meter dispensers.
- The requirement should be related to the hose, not the meter.
- For retail motor-fuel dispensers (RMFDs) interfaced with point-of-sale (POS) systems, this information is controlled by the POS system software, not the RMFD. Thus, a specific model of RMFD at one station might print out the correct information, but the same model of RMFD may not print out the correct information at another station. It is dependent on the programming of the POS system, not the RMFD design or functionality. The NTEP Director clarified these requirements apply to card-activated RMFDs, not just those interfaced with POS systems.

Decision: *The Sector reviewed the changes made by the NCWM to include nonretroactive requirements for point-of-sale and card-activated retail motor-fuel systems as shown in the “Background” section of this agenda item. The Sector reviewed the changes proposed to NCWM Publication 14 to reflect these Handbook changes as outlined in Appendix D to this summary and agreed to recommend these changes be adopted as shown. During the meeting the Technical Advisor noted an error in the referenced page number of the “Checklist and Test Procedures for Card-Activated Retail Motor-Fuel Dispensers” on page 5 of the version of Appendix D that accompanied the agenda. The page number should be ECRD-6, not LMD-84. This has been corrected in the version of the Appendix D attached to this summary.*

D. WTR- Water Meters – Paragraph S.2.1. Provision for Sealing

Background: At the 2018 NCWM Annual Meeting, the NCWM adopted the following changes to the Water Meters Code to add specific criteria for sealing water meters and to align the sealing requirements with that of other measuring device codes in HB44. For reference, see S&T Item WTR-2.

<u><i>Table S.2.1.</i></u> <u><i>Categories of Device and Methods of Sealing</i></u>	
<u><i>Categories of Device</i></u>	<u><i>Methods of Sealing</i></u>
<u><i>Category 1: No remote configuration capability.</i></u>	<u><i>Seal by physical seal or two event counters: one for calibration parameters and one for configuration parameters.</i></u>
<u><i>Category 2: Remote configuration capability, but access is controlled by physical hardware.</i></u> <u><i>The device shall clearly indicate that it is in the remote configuration mode and record such message if capable of printing in this mode or shall not operate while in this mode.</i></u>	<u><i>The hardware enabling access for remote communication must be on-site. The hardware must be sealed using a physical seal or an event counter for calibration parameters and an event counter for configuration parameters. The event counters may be located either at the individual measuring device or at the system controller; however, an adequate number of counters must be provided to monitor the calibration and configuration parameters of the individual devices at a location. If the counters are located in the system controller rather than at the individual device, means must be provided to generate a hard copy of the information through an on-site device.</i></u>
<u><i>Category 3: Remote configuration capability access may be unlimited or controlled through a software switch (e.g., password).</i></u> <u><i>The device shall clearly indicate that it is in the remote configuration mode and record such message if capable of printing in this mode or shall not operate while in this mode.</i></u>	<u><i>An event logger is required in the device; it must include an event counter (000 to 999), the parameter ID, the date and time of the change, and the new value of the parameter. A printed copy of the information must be available on demand through the device or through another on-site device. The information may also be available electronically. The event logger shall have a capacity to retain records equal to 10 times the number of sealable parameters in the device, but not more than 1000 records are required. (Note: Does not require 1000 changes to be stored for each parameter.)</i></u>

[Nonretroactive as of January 1, 2019]
(Added 2018)

Recommendation: The Sector is asked to recommending modifications to NCWM Publication 14 to reflect the changes to the Water Meters Code described in the “Background” section above. Proposed changes are outlined in Appendix E to this Agenda.

Discussion: Sector Chairman, Michael Keilty, reviewed this item, noting the content of the referenced requirements have already been adopted by the NCWM. Discussion points included the following:

- This table will help align requirements for sealing water meters with those in other measuring codes.
- This table will provide water meter manufacturers with specific criteria that recognizes the use of audit trails.

- The Sector should consider proposing a modification to the statement under checklist item 4.3.1.2. to clarify that the audit trails should be tracking evidence of the changes, not preventing changes. Adding the phrase “without evidence of the change” or similar language should be considered and discussed as a future proposal for the Water Meters Code and other Measuring Codes; an example is shown as follows.
 - 43.1.2. An approved means of security (e.g., data change audit trail) so that no changes may be made to its adjustable components **without evidence of the change**.
- The Sector was reluctant to propose changes to this Publication 14 checklist item without a corresponding change (and the benefit of discussion that would take place in developing such a change) to HB44 requirements.
- Audit trails are not intended to prevent metrologically significant changes from being made; they are intended to track and provide evidence of these changes.

Decision: *The Sector reviewed the changes made by the NCWM to include specific requirements for “categories of devices” and “methods of sealing” for water meters as shown in the “Background” section of this agenda item. The Sector reviewed the changes proposed to NCWM Publication 14 to reflect these Handbook changes as outlined in Appendix E to this summary and agreed to recommend these changes be adopted as shown.*

The Sector agreed to include a future agenda and item and consider developing a proposal to recommend modifications to paragraph S.2.1. Provision for Sealing and corresponding paragraphs in other HB44 measuring device codes to clarify that audit trails are intended to track and provide evidence of metrologically significant changes as a way of deterring unauthorized changes, not prevent such changes from being made.

E. Power Loss on Retail Motor-Fuel Dispensing Systems – Alignment of Pub 14 with HB 44

Background: In the process of researching a technical question, the Technical Advisor, Tina Butcher, noted a discrepancy between language in NCWM Publication 14 and that of NIST Handbook 44 with regard to power loss requirements for retail motor-fuel dispensers.

NIST Handbook 44 paragraph S.1.6.2. Provisions for Power Loss requires that transaction information needed to complete a transaction in progress at the time of a power loss be retained in the system for at least 15 minutes as follows:

S.1.6.2. Provisions for Power Loss.

S.1.6.2.1. Transaction Information. – *In the event of a power loss, the information needed to complete any transaction in progress at the time of the power loss (such as the quantity and unit price, or sales price) shall be determinable for at least 15 minutes at the dispenser or at the console if the console is accessible to the customer.*
[Nonretroactive as of January 1, 1983]

S.1.6.2.2. User Information. – *The device memory shall retain information on the quantity of fuel dispensed and the sales price totals during power loss.*
[Nonretroactive as of January 1, 1983]

Paragraph S.1.6.2.1. Transaction Information gives examples of “quantity and unit price” or “quantity and sales price” as examples of the required information; however, the multiple corresponding code references to these paragraphs in Pub 14 specifies “quantity” and “total sale” values must be recallable.

Recommendation: The Sector is asked to consider recommending modifications to the power loss requirements in Pub 14 to align with HB44 (or suggest a change to HB44 to align with Pub 14). Proposed changes are outlined in Appendix F to this Agenda, which includes excerpts from the following portions of the LMD Checklist:

- **Retail Motor-Fuel Dispensers (RMFDs)** – Code References S.1.6.2.1. and S.1.6.2.2. Provisions for Power Loss – Page LMD-37
- **Cash-Activated RMFDs** - S.1.6.2. Provisions for Power Loss – Page LMD-47
- **Liquefied Petroleum Gas (LPG) Liquid Measuring Devices** – Code Reference S.1.5.6. - Page LMD-68
- **Mass Flow Meters** - Code References S.2.4.1. and S.2.4.2. on Page LMD-76
- **Hydrogen Gas Measuring Devices** - Code Reference S.2.3. on Page LMD-100 and LMD-106
- **Field Evaluation & Permanence Tests - CNG Devices** - Code References S.2.4.1. and S.2.4.2. on Page LMD-123

Discussion: Sector Technical Advisor, Tina Butcher (NIST OWM), reviewed this item, noting that, in the process of researching a technical inquiry, she had observed some differences between NCWM Publication 14 and NIST HB 44 with regard to the information that must be able to be recalled in the event of a power failure. She developed the proposed changes in Appendix F to help better align Pub 14 with HB 44. Discussion points included the following:

- The Sector debated what pieces of information would be needed as a minimum to reconstruct and finish a transaction conducted with an RMFD.
- Rich Miller (FMC) noted at least two pieces of information would enable a business to complete a transaction.
- NTEP and the NTEP laboratories have interpreted HB44 to require two specific pieces of information as being the minimum needed to complete a transaction.
- There was some debate, given the formatting of paragraph S.1.6.2.1., whether the paragraph intends to say that an example of minimum information would be “quantity and unit price” OR “quantity and total sales price” OR [only] “total sales price.”
- NCWM Pub 14 provides more specific guidance to manufacturers and laboratories of how to apply the paragraph and helps ensure consistency in interpreting the requirement.
- The Sector believes the references in Pub 14 are supported by HB 44.
- Many of today’s systems provide more than two pieces of information.

Decision: *The Sector agreed NOT to recommend the changes outlined in Appendix F to this summary. The Sector agreed that the current provisions in Pub 14 are a reasonable interpretation of HB 44 and are supported by HB 44. Sector members are asked to study the recommended changes (and the corresponding HB 44 paragraphs) in the coming year. Should any Sector member believe a change to either HB 44 or Pub 14 is warranted, an item should be proposed for the Sector’s 2019 agenda to revisit the issue (or the member is free to independently propose a change to HB 44).*

Additional Items as Time Allows:

If time permits, the NCWM S&T Committee and/or other groups and individuals would appreciate input from the Measuring Sector on the measuring-related issues that are outlined in the remaining agenda items below. A copy of any regional association modifications or positions will be provided to the Sector when these are made available by the regions. For each item in this section, the Sector is asked to review the item and consider providing input that might assist the S&T Committee and other groups and individuals in their deliberations. For items included on the S&T Agenda, the content in this agenda is limited to a brief synopsis along with the current proposal. Full background information on these items can be found in the NCWM S&T Committee's Interim Report and Carryover Agenda. The Interim Report is available at the following web address; the carryover agenda will be posted after September 1 when it is distributed to the Regional Weights and Measures Associations.

4. Limiting Flow Rate During Field Testing of LPG Retail Motor-Fuel Systems

Source: Robin Parsons, Parafour Innovations

Recommendation/Item Under Consideration: The Sector is asked to review and discuss the following proposal to modify NIST Handbook 44 LPG and Anhydrous Ammonia Liquid-Measuring Devices Code Paragraph N.4.1. Normal Tests and provide input to assist the submitter and the S&T Committee in considering this proposal.

Modify N.4.1. as follows to clarify the need to test the unit at the maximum discharge flow rate that the system is capable of in the application for which it was designed:

N.4.1. Normal Tests. – The “normal” test of a device shall be made at the maximum discharge flow rate developed under the conditions of the installation. Any additional tests conducted at flow rates down to and including one-half the sum of the maximum discharge flow rate and the rated minimum discharge flow rate shall be considered normal tests. **Adjustments of the inlet valve of the proving device to limit the maximum flow of the device, as designed for and capable of in normal use (and as marked on the data plate as indicated on the device COC), shall be permitted.**

(Amended 1998 **and 20XX**)

An alternative to changing the wording, and possibly warranted even IF changing the wording, would be to send a clarification statement to all state metrology enforcement divisions, explaining that the control of flow when testing a lower flow device with a high flow prover which could exceed the metrological rating of the device being tested, is both permitted and required.

Optionally, wording could be added to require the use of a proving device with a flow path diameter no greater than that of the device being tested, e.g., 3/4” metering device – uses 3/4” prover or 18 gpm max flow rate metering device uses an 18 gpm max flow rate prover.

Background: The current market for LPG powered vehicles uses a liquid injection system, which causes an elevated temperature in the vehicle storage tank. In order to fill these vehicles, the LPG station must use a “High Differential Pressure” pump. These pumps typically have flow rates in the range of 20 to 30 GPM. Most LPG Autogas vehicle fueling dispensers, have meters with a maximum flow rate of 12 to 18 gpm. In normal operation, there is NO commercial/retail dispensing application where the receiving tank will take flow greater than 15 gpm, due to the design of the tank fill valve circuit, which has a maximum nominal flow path equal to +/1 1/2”. However, most calibration inspectors use a 100-gallon volumetric prover, which has a 1-1/2” inlet valve. Thus, when performing a calibration verification draft, it is possible to exceed the maximum NTEP rated flow rate of the meter/dispenser due to the high capacity of the prover fill circuit (which is designed to be used for calibration of 3/4” to 2” size meters) which could never be seen in the actual applications for which the dispenser is designed. Many prover operators/inspectors interpret HB44 section N4 Testing Procedures, N4.1 Normal tests, to mean that they are forbidden to adjust or “throttle” the volumetric prover inlet valve to be within the range of the NTEP documented min/max flow rate, which is greater

than the possible in-use for application flow rate. Therefore, when they run the draft at the maximum flow the dispensing system is capable of when attached to a high flow prover, they are substantially exceeding the maximum design flow rate of the dispenser, and the actual maximum flow rate it can ever achieve in any typical metering activity. Sometimes they red-tag the unit and tell the customer they need a higher capacity meter, and sometimes they adjust the calibration to be within tolerance with the meter over-speeding, which of course results in the meter being out of tolerance when used in normal operations for which it is designed.

Discussion: Sector Chairman, Michael Keilty, introduced this item, after which the submitter, Robin Parsons (Parafour Innovations) provided an overview of the issues surrounding the proposal, including the following points:

- Many changes in technology have occurred in the LPG metering arena in recent years.
- A high differential pressure pump is needed to overcome the pressure of the system.
- An NFPA requirement for a stop-fill valve was imposed that automatically limits retail motor-fuel applications to 12 gpm.
- Many service companies and industry use a 100-gallon prover to test LPG RMFDs. Many of these provers have a 1-1/2" fill port ball valve on them. When this valve is hooked up to a large opening, this can result in over-speeding the meter.
- Most new stations can only exceed the rated maximum flow on the meter during testing.
- Prover operators need to throttle the flow rate down to avoid exceeding the marked maximum flow rate on the meter.
- If service companies calibrate at higher flow rates than are normally used, runs made at flow rates used for normal deliveries are then out of tolerance.
- The current language in paragraph N.4.1. results in the inspector conducting a test at the highest speed that can be achieved in the installation with the prover. This results in exceeding the meter's maximum rated flow.
- For systems that comply with applicable NFPA requirements, no retail applications will exceed 18 gpm and no vehicle fueling system will exceed 10 gpm.

Discussion by the Sector included the following points:

- A nozzle is capable of higher flows, but the flow rate will be restricted as a result of the pressure on the tank and the orifice size of the receiving tank.
- Throttling the ball valve manually is subject to introducing errors.
- Might a solution be to mark the limitation for the flow rate on the device.
- The purpose of the language in N.4.1. is to verify that the system would not enable flow rates in excess of the marked meter rating. Relying on the operator to consciously restrict the flow opens the possibility for using the system outside of its maximum ratings. Thus, the inspector tests the highest flow that can be achieved in the installation and is striving to ensure that the system can't be made to exceed the marked maximum during a delivery.
- The highest flow rate that can be achieved by the inspector during testing may not reflect the highest flow rate that can be achieved in normal use.

- Regulatory agencies typically carry a number of adaptors with their proving system to enable the proving system to be hooked up to a variety of different fueling valves. Might a valve for use in testing RMFDs that limits the flow rate to the NFPA specified rate be added to this list and its use specified in the test procedures?
- How would the inspector verify that “normal” deliveries won’t exceed the flow rate at which they have tested the system (and the marked maximum)? Observing and timing an actual delivery may not provide a reflection of the highest possible flow rate since flows can be dependent on the receiving tank. We need to consider that receiving vehicles are not owned by the device owner, so it is not possible to control the receiving valves.
- Measurement Canada requires a valve that automatically limits the flow rate to within the meter’s marked maximum flow rate.
- In order to automatically limit the flow rate into a prover, one would have to put a restriction on the nozzle to limit the flow to the largest anticipated being used in normal applications.
- The wording currently proposed may not have the intended effect since the phrase “shall be permitted” may be read as permissive rather than required. Modifications to the wording might need to be considered.

Decision: The Sector made no decisions on this issue; however, members shared their observations and thoughts to assist the submitter in the development of his proposal. At the point the submitter is ready to submit a proposal to the NCWM, he should complete the appropriate form (Form 15, found on the NCWM website at <http://www.ncwm.net/standards-development/propose-change>) and submit it as instructed on the form. The deadline (September 1, 2018) has passed for this cycle, but it could be submitted for a future cycle.

5. Development of Infrastructure to Validate the Use of “Master Meters”

Source: NIST OWM

Background Information: Over the past few years, weights and measures jurisdictions and industry have expressed an interest in using “master meters” to conduct testing of compressed natural gas metering systems and other types of measuring systems. OWM concurs that the use of master meters has merit and may offer a safer, more cost effective, and time efficient method of testing for some types of measuring systems than other test methods. The Measuring Sector has also worked to identify criteria to allow the use of “master meters” in type evaluation testing using criteria provided by NIST regarding “essential elements of traceability.”

As mentioned in its comments on this general subject on related issues before the NCWM S&T Committee over the past few years, OWM has pointed out that ensuring traceability of measurements and compliance with the Fundamental Considerations of NIST Handbook 44 is critical to ensuring credibility and support of any test method for use in official testing. OWM has been repeatedly asked by regulatory officials and industry for assistance and guidance in putting this infrastructure in place. In order to assist regulators and industry in this endeavor, OWM is devoting resources to working with industry and officials to assist in the development of a framework that will facilitate the validation of this test method.

OWM is in the process of purchasing six Coriolis meters for the purpose of collecting and analyzing data obtained from field testing using this method. NIST OWM will purchase the following Coriolis meters:

- Two ½ inch
- One 1-inch
- Two 1 ½ inch and
- One 3-inch, and
- ½ inch meter, specific for testing CNG.

Recommendation: This item is included on the Sector’s agenda to allow OWM to provide an update on this project if time allows. No action is asked of the Sector; however, input is welcome.

Discussion: Sector Chairman, Michael Keilty, introduced this item, after which the submitter, Tina Butcher (NIST OWM) provided an overview of the issue as outlined above. NIST OWM requested this item be included on the agenda to make the Sector aware of the project to research the use of mass flow meters used as master meters and to seek help from manufacturers and others who might assist in collecting data. She noted that NIST is particularly interested in collaborating with facilities where testing might be conducted over a range of temperatures and with different types of products.

Discussion by the Sector included the following points:

- Use of master meters in CNG metering system inspection and testing is of particular interest to regulators and industry. Industry and regulators are already using master meters in this application.
- Tulsa Gas Technologies has assembled a test unit that uses a mass flow meter as a master meter for using testing CNG metering systems. The Sector Chairman noted that he understands Tulsa has sold around 20 of these units globally, including to regulators in states such as Colorado and Florida.
- Rich Miller (FMC) suggested NIST might consider going through independent laboratories that are certified and work with them. FMC doesn’t deal much with smaller meters; most of their testing system is focused on large meters. There is a lot of data on large meters used as master meters.
- Marc Buttler (MicroMotion) raised the question of what proportion of testing of RMFDs is done using acceptance tolerance vs. maintenance tolerance. This should be considered in designing the test protocol.
- Measurement Canada can explore possible opportunities for collaboration with their testing laboratory since they do have the ability to test over a range of temperatures.
- The spring 2019 NTEP Laboratory Meeting will be held in Tulsa, OK with the goal of visiting Tulsa Gas Technology and allowing evaluators the opportunity to observe testing and learn about the use of Tulsa’s master meter test unit.

Decision: *The Sector made no decisions on this issue; however, members shared their observations and thoughts to assist the submitter in further progress with the project. There was general support for the concept of using master meters in routine field testing by service companies and regulators.*

6. S&T 2018 Carryover Item VTM-1B – S.3.1.1. Diversion of Measured Liquid and UR.2.6. Clearing the Discharge Hose

Source: New York and NIST OWM (2018)

Purpose: Provide specifications and user requirements for manifold flush systems to help ensure their design and use does not facilitate fraud. Recognize that there is a balance between a mechanism that provides an important safety benefit but also, if used incorrectly, facilitates fraud. Ensure that VTM owners understand their responsibilities when installing such a system and ensure uniformity in enforcement throughout the country.

Items Under Consideration: See Appendix G to this Agenda.

Background: At its 2018 Annual Meeting, the NCWM adopted modifications to Paragraph S.3.1. Diversion of Measured Liquid and added new Paragraphs S.3.1.1. Means for Clearing the Discharge Hose and UR.2.6. Clearing the Discharge Hose. Additional changes to these paragraphs were considered at that meeting, but they could not be

acted upon without delaying the original proposal. The S&T Committee agreed to carryover a portion of that item as outlined in the “Items Under Consideration” above to allow the submitter and OWM to propose additional changes to help ensure these flush systems are designed and used in such a way so as to minimize the facilitation of fraud.

For full details on this issue, including the submitter’s justification and recommendations and other background information, please see Appendix A, Page S&T – A5 in the S&T Committee’s 2018 Interim Report found at: http://www.ncwm.net/_resources/e30d:p74t7a-2qg/files/76035627zccf278df/_fn/4-ST-Web.pdf

Discussion: Sector Chairman, Michael Keilty, introduced this item, after which the submitter, Tina Butcher (NIST OWM) provided an overview of the issue as outlined above at in the S&T Committee’s Report. Discussion by the Sector included the following points:

- A flush system would have to be designed to communicate with different companies’ metering systems to comply with the proposed requirements.
- New firmware may be needed in the metering system.
- It isn’t clear what type and extent of electronics, if any, exist on the flushing systems.
- With electronic metering systems it may be possible to accomplish what is proposed, but not for mechanical systems. The requirements for flushing systems are directed toward electronic systems at present.
- Is the current 3-minute timeout limit too short to facilitate use with these systems?

Decision: *The Sector made no decisions on this issue; however, members shared their observations and thoughts to assist the submitter in further progress with the project. There was general acknowledgement of the need to provide safeguards to deter fraud with these systems, but there are questions which much be resolved regarding how these provisions can be accomplished.*

7. S&T 2018 Carryover Items in Block 4 – Terminology for Testing Standards

Source: NIST OWM (2018)

Purpose: To remove the current limited definition and use of the term “Transfer Standard” and eliminate terms “Testing Standards”, “Verification (Testing) Standards”, and instead use the term Field Standard, consistent with its reference in Handbook 44, Appendix A, Fundamental Considerations and its use in several sections of Handbook 44. To correct the broad use of the term Transfer Standard and instead replace its use with the term Field Standard. To update all use of the term “standard” to use the term “Field Standard.” To remove the current limited definition of Transfer Standard and instead use the term Field Standard.

Item Under Consideration: See Appendix F to this Agenda.

Background: A review of terminology used to describe standards used in field testing indicate a number of inconsistencies in both NIST Handbook 44 as well as in common usage. For example, the term “transfer standard” is used in the Cryogenic Liquid-Measuring Devices Code and defined in Appendix D of Handbook 44; however, the definition is limiting in scope and may be better termed simply a “field standard.” All instruments/devices used as a Field Standard in the testing of Weighing and Measuring Devices, regardless of nomenclature, must comply with the requirements of HB 44, Appendix A, Fundamental Considerations Associated with the Enforcement of Handbook 44 Codes, paragraph 3.2 Testing Apparatus, Adequacy. Using the term transfer standard as it is recently being applied in no way negates this requirement of adequacy and confuses the user as to the nature of the field standard being used. Likewise, the term “standard” to describe a field standard can also cause confusion since there are multiple meanings associated with the word “standard.”

There are also multiple definitions pertaining to various types of “standards” in NIST Handbook 130 that may be confusing relative to the terminology used in Handbook 44. OWM identified proposed changes in multiple areas of Handbook 44 (as shown in the Item Under Consideration in Appendix F to this Agenda) in an attempt to improve the consistency among the various references in Handbook 44. Although OWM heard support for the proposed changes to the Metering Codes from MMA, others recommended “Developing” status. Some of the comments received included whether or not current standards referred to as “transfer standards” should be considered “field standards” and if these standards were intended or can meet the fundamental considerations that state “when the standard is used without correction its combined error and uncertainty must be less than one-third of the applicable tolerance.” Based on comments received and those made at the 2018 Interim and Annual Meetings, it is clear this issue is more complex than originally envisioned and OWM concurs that additional development is needed.

During the S&T Committee’s work session at the 2018 NCWM Annual Meeting, the Committee agreed to recommend that the entire block of items move forward as “Developing.” The Committee also concluded that all of the block 5 items, as well as LPG-4, and MFM-2 are related to the Block 4 items due to terminology, and that the submitter of the Block 4 items (OWM) provide detail of their developing language to the submitter of the related items (Endress & Hauser Flowtec AG USA) to prevent conflicting terms as they are considered during future meetings.

For full details on this issue, including the submitter’s justification and recommendations and other background information, please see Appendix A, Page S&T – A17 in the S&T Committee’s 2018 Interim Report found at: <http://www.ncwm.net/resources/e30d:p74t7a-2qg/files/76035627zccf278df/fn/4-ST-Web.pdf>

Recommendation: This item is still under development. OWM has received a number of comments on this proposal and is continuing to work on revisions to the proposal in response to those comments. This item is included to keep the Sector apprised of the work and OWM continues to welcome comments to assist in further developing changes to various HB44 codes and sections that will improve understanding and consistency relative to references to test standards.

Discussion/Decision: Sector Chairman, Michael Keilty, introduced this item, after which the submitter, Tina Butcher (NIST OWM) provided an overview of the issue as outlined above at in the S&T Committee’s Report and made several points:

- This item turned out to be more complicated than originally thought.
- OWM has begun reviewing other sections of NIST HB 44 which use the terms in this agenda item as well as and other terms related to standards. OWM has also reviewed terminology used in NIST HB 130 (particularly the Model Weights and Measures Law), which includes a number of definitions for terms describing various types of standards.
- There appears to be confusion within the weights and measures community about various terms used to describe standards, including what they mean and how they are used; what criteria applies to them; and how they are verified. From comments shared on these issues before the S&T Committee, there also appears to be inconsistent use and understanding of terms associated with these standards.
- This item is related to other items on the S&T Committee agenda regarding the use and terminology of standards. This item is also related to Sector Agenda Item 5 on “master meters.”
- OWM believes this item still needs work.

The Sector did not discuss this item in great detail; however, a few comments were shared:

- The standards addressed in Sector Agenda Item 8 are intended to be used on a short-term basis for conducting a specific test.
- This agenda item broadly addresses different types of standards and terminology used to describe them.

- Measurement Canada has various terms such as “travelling standard” which are used to describe different types and applications of standards.
- Terminology used in the International Vocabulary of Measurement (VIM) should be considered and reviewed and an attempt made to align the terminology with the VIM.

Decision: *The Sector did not reach any conclusions on this item. There was general acknowledgement of the need to align terminology and recognize various types of standards used in field testing; more work and discussion by the weights and measures community will help ensure consistency of understanding and application. The item remains under development and is related to and/or has overlap with the work being done by NIST OWM in Sector Agenda Item 5 as well as the S&T proposal outlined in Sector Agenda Item 8.*

8. S&T 2018 Carryover Items in Block 5 – Define Field Reference Standard

Source: Endress+Hauser Flowtec AG (2018)

Purpose: Add definition for field reference standard meter to HB44. Delete transfer standard definition. Change terms in sections 3.34, 3.38, and 3.39.

Item under Consideration: Amend paragraphs in multiple codes as follows. See Appendix F to this agenda for the specific proposed changes.

B5: CLM-2	D	N.3.2. Transfer Standard Test and T.3. On Tests Using Transfer Standards
B5: CDL-2	D	N.3.2. Transfer Standard Test and T.3. On Tests Using Transfer Standards
B5: HGM-2	D	N.4.1. Master Meter (Transfer) Standard Test and T.4. Tolerance Application on Test Using Transfer Standard Test Method
B5: OTH-4	D	Appendix D – Definitions: field reference standard meter and transfer standard

Background: During S&T open hearings discussion in July 2017 it was pointed out that the term transfer standard which is used in the proposal to amend HB44 3.37 N.3 and 3.32 N.3 Test Drafts is incorrect. The statement made also suggested that the use of transfer standard is incorrectly used in HB44 code sections 3.34, 3.38 and 3.39. It was suggested that a more appropriate term to use is field reference standard or field reference standard meter. There is no definition in OIML G18 which supports the use of the term transfer standard. There is suggestive basis to support reference standard as it is used textually in OIML G18.

NIST has no procedural documents in place to justify the revision with a definition. The definition of transfer standard is used in code sections 3.34, 3.38 and 3.39 and that those sections do not need to change.

During the 2018 NCWM Interim Meeting, open hearings, the Committee heard comments from Mr. Michael Keilty (Endress & Hauser Flowtec AG USA), submitter of this block of items. Mr. Keilty reported he had developed this proposal with help from Mr. Henry Oppermann (Weights and Measures Consulting, LLC). In written comments to the Committee by Mr. Oppermann, on another item. Mr. Oppermann opposed the term “Transfer Standard” in that it is a temporary measurement reference. Mr. Keilty stated that he agrees with this interpretation and states that what he is proposing is for a “field reference standard meter” term and recommends that the items move forward (he did not specify to what status).

Mr. Henry Oppermann (Weights and Measures Consulting, LLC) provided comments for Stand Alone Items LPG-4 and MFM-2. Mr. Oppermann agrees with Mr. Keilty that these are field standards, however, the terminology “field reference standard meter” should just be “field standard”. Anything that meets the 1/3 requirement should be accepted, but currently, there is no data to prove that these can meet the 1/3 requirement. He stated that this proposal specifies that the size of the test draft be in two minutes but has no explanation for the size, and it conflicts with the previous proposal that said that larger test drafts were needed. He also stated that the definition for “field reference standard meter” is vague and insufficient, the requirements for accuracy and repeatability are not defined. He commented that a NIST 105 series handbook is not yet established for these and that there are currently no test procedures or parameters

for performance requirements to demonstrate these systems can meet the requirements. The definition would apply to all codes and more study and assessment is needed. He commented that more data is needed before this is moved forward, and that the items should be given a “Developing” status.

Mr. Constantine Cotsoradis (Flint Hills Resources) provided comments, at this time, intending to address item MFM-2 (see Item MFM-2 for comments).

Mr. Michael Keilty (Endress & Hauser Flowtec AG USA), asked the Committee that it be noted that the 2 previous commenters, Mr. Oppermann and Mr. Cotsoradis, were speaking to Stand Alone Items LPG-4 and MFM-2 and not only Block-5.

Mr. Dmitri Karimov (Liquid Controls), speaking on behalf of the MMA, reported that while the MMA supports Block 4, the terminology in Block 5 conflicts with those in Block 4 and therefore recommends that the items be “Developing.”

Mr. Ross Andersen (NY- retired) commented that all standards are a transfer standard, transferred from one measurement to another. He stated that what is needed is to make sure that the standard we use is accurate to 1/3 of the applied tolerance. In regard to the data that has been discussed, he asks where is the data for what we use now? There is none. It was just selected. He stated that what we need is one test method as the “referee standard” and that whatever test method is used, that it can agree with the reference.

During the Committee’s work session, the members considered the comments heard on this block of items. The Committee agreed to recommend that this block of items move forward as “Developing.” The Committee also agreed that all the Block 5 items, as well as LPG-4, and MFM-2 items are related to the Block 4 items due to terminology and that the submitter of Block 4 (OWM) provide detail of their developing language to the submitter of the related items (Endress & Hauser Flowtec AG USA) to prevent conflicting terms as they are considered during future meetings.

The Committee did not take comments during open hearings on Developing items at the 2018 NCWM Annual Meeting except to grant the submitter of a Developing item (or block of Developing items) an opportunity to provide an update on the progress made to further develop the item(s) since the 2018 NCWM Interim Meeting.

Mike Keilty (Endress+Hauser Flowtec AG), the developer of this item provided comments during the NCWM annual meeting open hearings. He mentioned that this item has been before the conference since 2015. He agreed that the definitions are confusing and agrees with the work that NIST is doing to clarify the terminology. Mr. Keilty recommended that any new information be presented at the January meeting and recommends that Block 5 items move forward as Voting items at the 2019 NCWM Annual Meeting.

The Committee received written comments from Seraphin Test Measure Company on all items in Block 4 regarding transfer standards raising several concerns and recommending the items remain developmental until such time those concerns have been resolved.

OWM provided the following written recommendations and comments to this block of items as feedback to the submitter and as part of its analysis of the S&T Committee’s 2018 agenda items

The Committee agreed to carryover this block of items on its 2019 agenda to allow for further discussion and development of these proposals.

For full details on this issue, including the submitter’s justification and recommendations and other background information, please see Appendix A, Page S&T – A20 in the S&T Committee’s 2018 Interim Report found at: http://www.ncwm.net/_resources/e30d:p74t7a-2qg/files/76035627zccf278df/_fn/4-ST-Web.pdf

Discussion: Sector Chairman, Michael Keilty, introduced this item, and provided comments as the submitter of the item:

- There are items on the S&T Committee agenda proposing to modify the test criteria for mass flow meters and cryogenic metering systems when tested using “transfer standards” which prompted this item.
- This item proposes changes to that term in multiple codes and in definitions in an attempt to align the terminology and make it consistent across codes and with language being considered in the related S&T Item on terminology for testing standards.
- These items were submitted in 2017 and were also discussed at NCWM meetings in 2018.
- The standards addressed in this item are intended to be used on a short-term basis for conducting a specific test.

Sector comments were limited, though included some comments regarding the use of metering devices as standards and the acknowledgement that the use of such equipment will be of benefit to regulators and industry.

Decision: *The Sector did not reach any conclusions on this item. There was general acknowledgement of the need to align terminology and recognize various types of standards used in field testing; more work and discussion by the weights and measures community will help ensure consistency of understanding and application.*

9. S&T 2018 Carryover Items in Block 7 – Address Devices and Systems Adjusted Using a Removable Digital Storage Device

Source: NIST OWM (2013)

Purpose: Expand the scope of definition to cover instances where the “other device,” as noted in the current definition, may be necessary to the operation of the weighing or measuring device or which may be considered a permanent part of that device.

Item under Consideration: The Sector is asked to review and provide input on the following items under this block. See Appendix F to this Agenda for proposed language under consideration for these items.

B7: GEN-2	D	G-S.8.2. Devices and Systems Adjusted Using Removable Digital Device Storage
B7: LMD-1	D	S.2.2. Provision for Sealing.
B7: VTM-2	D	S.2.2. Provision for Sealing.
B7: LPG-2	D	S.2.2. Provision for Sealing.
B7: HGV-1	D	S.2.2. Provision for Sealing.
B7: CLM-4	D	S.2.5. Provision for Sealing.
B7: MLK-1	D	S.2.3. Provision for Sealing.
B7: WTR-1	D	S.2.1. Provision for Sealing.
B7: MFM-1	D	S.3.5. Provision for Sealing.
B7: CDL-4	D	S.2.5. Provision for Sealing.
B7: HGM-3	D	S.3.3. Provision for Sealing.

Background: The proposal was originally intended to address the use of removable digital storage devices, such as USB flash drive, memory cards, etc. in grain moisture meters (GGMs). This proposal was later expanded to address all device types when it was recognized that other weighing and measuring systems may make use of the same type of media to make metrologically significant changes. The scenario originally identified in this item recognized that there are systems in which removable digital storage devices can be used as either data transfer devices that are not necessary to the operation of the device or as data storage devices which are necessary to the operation of the device. If removable data storage devices are necessary to the operation of the device, they are not covered by the current definition of remote configuration capability in HB 44.

Rather than propose requirements which could potentially impact weighing and measuring systems using other methods of making metrologically significant changes, OWM is proposing the addition of:

- (1) A General Code paragraph (G-S.8.2.) which specifies the method of sealing for those devices which can be adjusted using digital storage media; and
- (2) Changes to each specific HB44 code to reference this new General Code paragraph as the required method of sealing for those devices which can be adjusted using digital storage media.

The intent of proposed new paragraph G-S.8.2. is to address the sealing of devices and systems adjusted using a removable digital storage device that must remain in the device in order for the device to be operational. The intent of all the other items in this block is to provide an exemption to the existing sealing requirements in each of the device codes being applied when the calibration or configuration parameters are changed using a removable digital device and direct those performing the inspection to paragraph G-S.8.2.

OWM has developed multiple iterations of these proposed changes based on comments from the weights and measures community, including from the NTEP Measuring Sector. The most recent proposal (with changes to the General Code paragraph to address comments made at the 2018 Interim Meeting) are shown in the Item Under Consideration in Appendix F to the Sector's Agenda. With these changes, OWM believes these items are fully developed and ready for vote.

During its work session at the July 2018 NCWM Annual Meeting, members of the S&T Committee agreed that the amended version of paragraph G-S.8.2. offered by OWM to address the concern raised by a meter manufacturer improved clarification. Consequently, the Committee agreed to OWM's request to replace the existing proposed paragraph G-S.8.2. with the amended version made available by OWM and as shown in Item under Consideration for this item. No other changes were made to any other item in this block and members of the Committee agreed they believe the items in this block are fully developed and should be presented for vote in the 2019 NCWM Conference cycle. Refer to the Committee's 2018 Interim Report to view the version of paragraph G-S.8.2. that was replaced by the Committee at the 2018 NCWM Annual Meeting.

For full details on this issue, including the submitter's justification and recommendations and other background information, please see Appendix A, Page S&T – A23 in the S&T Committee's 2018 Interim Report found at: http://www.ncwm.net/_resources/e30d:p74t7a-2qg/files/76035627zccf278df/_fn/4-ST-Web.pdf

Discussion: Sector Chairman, Michael Keilty, introduced this item, after which the submitter, Tina Butcher (NIST OWM) provided an overview of the issue as outlined above at in the S&T Committee's Report. Mrs. Butcher noted:

- The item has been modified twice since it was last reviewed the Measuring Sector; once in response to a suggestion made at the last Sector meeting and once in response to comments made during the open hearings at the Interim Meeting and by the Scale Manufacturers Association.
- The proposed approach strives to minimize impact on device types which are not adjusted using removable digital storage devices and are adequately addressed by current sealing requirements.

Discussion by the Sector included the following points:

- Might an additional category of sealing be added to the existing sealing tables?
- The current provision for sealing tables are based on a definition of "remote configuration capability" which does not fit these devices which are adjusted using removable digital storage devices.
- The proposed approach allows devices with this capability to be addressed without impacting devices with other types of access.
- Including the reference in the General Code simplifies the requirements and helps improve consistency for controlling access to adjustments to metrologically significant parameters on electronic devices.

- The proposed requirement will need to be reviewed as new technologies and methods of access come into the marketplace.

Decision: *The Sector made no decisions on this issue; however, members acknowledged modifications to address past Sector concerns. Individual Sector members will continue to study the proposal can share any suggested changes directly with the S&T Committee.*

10. S&T 2018 Carryover Item GEN-3 – G-S.2. Facilitation of Fraud – “Skimmers”

Source: Arizona, Florida, Maine, Michigan, and Cambridge, MA (2018) and NCWM S&T Task Group on Skimmers

Purpose: To prevent access and tampering by unauthorized persons to any area of the device where electronic financial transactions occur, credit card information is obtained, and or personal information is stored or transmitted.

Item under Consideration: See Appendix F to this Agenda.

Background: The following background information appeared with this item when it was originally presented to the S&T Committee:

Given the potential financial impact to consumers and credit issuing companies Weights & Measures recognizes the need to offer more protection to both buyer and seller in these transactions. The current design of these devices offers little to no barrier to fraud through theft of credit information, as such it is our belief that the current design, in most cases, already violates G.S.2. by facilitating easy access to allow installation of these fraudulent card reading devices. Therefore, in our opinion stronger means must be implemented to decrease the potential for fraudulent activity with these devices.

The Florida Department of Agriculture and Consumer Services estimates that on average, each skimmer results in 100 counterfeit cards, each of which are used to make \$1,000 in fraudulent purchases. In other words, a single skimmer typically leads to \$100,000 in theft. This is a nationwide problem that causes millions of dollars in fraudulent charges to consumers, device owners and banking institutions each year. A solution can be achieved through upgraded security measures on the weighing and measuring devices that fall within the guidelines of this handbook.

One possible argument is that these preventative measures should be in User Requirements instead of in Specifications, but this is intended to be a long-term solution. The State of Florida has enacted legislation to require device users to add security measures. They have found that most owner/operators have chosen to use security seals or non-standard locks on the dispensers and that 85% of the skimming equipment being found is in devices with user applied security measures. User applied security measures are not as effective as electronic security and/or unique, tamper proof locks. The current design of these devices offers little to no barrier to fraud through theft of credit information, as such it is our belief that the current design, in most cases, already violates G.S.2. by facilitating easy access to allow installation of these fraudulent card reading devices.

Manufacturers of these devices may argue that the cost to make the necessary upgrades will be prohibitive. This item is not intended to be retroactive and the cost of the additional security measures will be universal and not place any manufacturer at a competitive disadvantage. Several manufacturers of electronic security systems designed for retail motor fuel dispensers have products available and at least three new manufacturers of low cost systems have recently come into the marketplace (at least one of them is working with OEM manufacturers and the security systems are being integrated into newly manufactured dispensers).

At the 2018 NCWM Interim Meeting, the S&T Committee heard comments both in favor or and in opposition to the proposal. The Committee agreed to recommend giving this item an “Assigned” status and requested the formation of a Task Group (TG). At the 2018 NCWM Annual Meeting, Mr. Hal Prince (FL), Chairman of the TG reported the following to the Committee, noting work is ongoing and the TG has been meeting bi-weekly since May 2018:

1. Is this a weights and measures issue that NCWM should take on?
2. If so, does weights and measures have the authority to require manufacturers and users of commercial weighing and measuring equipment to take whatever steps needed to ensure such equipment prevents unauthorized access to nonmetrological changes to the equipment?

Mr. Prince further reported members of the TG were recently surveyed and asked these questions, but results are not yet available. It is hoped more information will be available to report at the next (2019) NCWM Interim Meeting.

Mr. Prince also stated that more members and stakeholders are needed for the TG. Members of the TG believe that Weights and Measures needs an educational component, e.g., an outreach program set up for law enforcement and consumers and perhaps a “best practice guide” developed.

For full details on this issue, including the submitter’s justification and recommendations and other background information, please see Appendix A, Page S&T – A27 in the S&T Committee’s 2018 Interim Report found at: <http://www.ncwm.net/resources/e30d:p74t7a-2qg/files/76035627zccf278df/fn/4-ST-Web.pdf>

Discussion: Sector Chairman, Michael Keilty, introduced this item, pointing out that the S&T Committee has assigned a Task Group with the charge of reviewing the proposal initially presented to the S&T Committee along with comments received on the proposal thus far. Discussion by the Sector included the following points:

- While acknowledging that weights and measures officials and service personnel might play a role in helping to address the problem of skimmers in RMFDs, multiple Sector members observed that the authority to address skimmers seems to be outside of the scope of most weights and measures jurisdictions.
- Although a thief may use an RMFD to steal credit card information, the skimmer does not typically affect the measurement transaction itself.
- The use of skimmers to steal credit card information is a serious issue, one that affects more than retail motor-fuel dispensers and one which may require a broader solution.
- Implementing specifications to change the design of RMFDs to prevent/deter skimmer use is burdensome for manufacturers and costly to device owners and, in turn, consumers. Thieves quickly act to implement measures to circumvent such changes, resulting in increased costs to device owners with limited benefit.
- Guidelines for officials to assist law enforcement agencies that do have authority over this type of fraudulent activity might be of use in helping to address this problem.
- Measurement Canada’s legal metrology regulations do not go beyond the measurement process. They do not get involved in the payment process.

Decision: *The Sector made no decisions on this issue. The Sector acknowledges and appreciates the work being done by the Skimmers Task Group and will look forward to the opportunity to review any recommendations from that group.*

11. S&T 2018 Carryover Item LPG-3: S.2.5. Zero-Set-Back Interlock, Stationary and Vehicle-Mounted Meters, Electronic

Source: Maryland (2018)

Purpose: To align the LPG code with the VTM code for electronic registers/indicators used in stationary and mobile applications.

Item under Consideration: See Appendix F to this Agenda.

Background: This specification has been in place for VTMs for many years. Its purpose is to prevent a second party from being charged for product delivered to the first party. However, there is no requirement for interlocks in the LPG Code, other than the requirement added in 2016 for stationary retail motor fuel devices. Currently, the only protection is provided by two User Requirements paragraphs, UR.2.5. Ticket in Printing Device, which prohibits the “riding of tickets” (having a ticket in the printer while the vehicle is moving from one location to another) and UR.2.1. Return of Indication and Recording Element to Zero, which requires the indications to be set to zero before a delivery. Both requirements are extremely difficult, if not impossible to enforce where printers are frequently mounted in the cab of the vehicle and are not visible to an observer outside the vehicle. In addition, electronic registers used in stationary applications shall not be exempt from this requirement due to the possibility of a second party being charged for product delivered to the first party in this scenario as well.

This requirement for electronic indicators already exists in the VTM Code and being as the majority of electronic registers are used in both applications, I cannot see any objections as to why this requirement should be added to the LPG and Anhydrous Ammonia Liquid-Measuring Device Code.

During the 2018 NCWM Interim Meeting, the Committee received multiple comments in support of this item, including comments from NIST OWM suggesting some modifications adjustments to the proposed language. Based on comments received, the Committee felt nonretroactive date is needed before advancing the item to a “Voting” status and changed the status to “Developing” pending agreement on an effective date. The Committee did not invite comments from other than the submitter at the 2018 Annual Meeting. No updates were provided.

During the Committee’s work session, members of the Committee felt that the nonretroactive date needed to be included before the item could be advanced to a “Voting” status. The Committee elected to maintain the item on its agenda as “Developing” pending agreement of an effective date.

The Committee did not take comments during open hearings on Developing items at the 2018 NCWM Annual Meeting except to grant the submitter of a Developing item (or block of Developing items) an opportunity to provide an update on the progress made to further develop the item(s) since the 2018 NCWM Interim Meeting. There were no comments or updates provided on this item by the submitter at the Annual meeting.

For full details on this issue, including the submitter’s justification and recommendations and other background information, please see Appendix A, Page S&T – A51 in the S&T Committee’s 2018 Interim Report found at: http://www.ncwm.net/_resources/e30d:p74t7a-2qg/files/76035627zccf278df/_fn/4-ST-Web.pdf

Discussion/Decision: *The Sector only briefly discussed this item and made no decisions or recommendations. While this requirement has been in place for VTMs for some time, some Sector members questioned what the impact might be on LPG systems and whether or not they are able to readily comply at present. Should the item progress, the submitter should consider specifying a nonretroactive date.*

12. S&T 2018 Carryover Item LPG-5: N.4.1.2. Repeatability Tests and N.4.2.4. Repeatability Tests for Type Evaluation

Source: Ross Andersen, Retired (2017)

Purpose: To address differences between Handbook44 and Publication 14 practices for repeatability testing.

Item under Consideration: See Appendix F to this Agenda. This version of the Item Under Consideration reflects changes proposed by the submitter following the July 2018 NCWM Annual Meeting.

Background: The proposal is aimed to correct a number of areas of confusion. First, the inclusion of repeatability in the N.4.1. series indicates that repeatability is to be run at normal flow rates. There was some confusion if this was the actual intent when these sections were added to HB44 in multiple codes. Running the tests only at Normal flow rates is consistently how the test was typically performed in the field. The amendment to N.4.1.2. was to clarify this explicitly for field tests and type evaluation tests.

A new paragraph was proposed because NTEP has required repeatability on tests over the entire range of flow rates conducted under controlled conditions during type evaluation testing. This means anywhere between rated maximum and minimum flow rates. The proposed code addition would have formalized and legitimized what has been done for a long time.

Another question arose whether gross or net results could be used in repeatability tests? Obviously, you can't compare net to gross but you can compare three consecutive gross or three consecutive net results. The tolerance paragraph in the LPG Code specifies the tolerance does not apply to the test of the compensator. Also, the practice in HB44 is to test one variable at a time to the extent possible, the revision clarifies that repeatability is addressed to gross meter performance only. This can be through deactivating the ATC or just using gross values where both gross and net are available from the same test.

The submitter provided proposed changes with the goal of clarifying and maintaining the status quo as the code is presently written. Following the July 2018 Annual Meeting, the submitter submitted a revised version of the Item Under Consideration in response to comments received on the item. The proposal outlined in the Item Under Consideration reflects the updated version provided by the submitter. The submitter provided additional analysis and rationale for the updates made to the original proposal as outlined below.

In the original proposal (carried as developing item LPG-5 in 2018 L&R Report), the intent was to address only the LPG code and preserve the status quo based on what presently appears in the Handbook. It was understood that the decisions on this item would set precedents affecting all LMD codes that contained a repeatability test. After discussion at the 2018 Interim and Annual Meetings, with various Meter Manufacturers, with OWM, and with other interested parties, the original proposal is being amended. The questions being posed have been broadened to include all LMD codes. The issues in this revision can now be expressed through the following questions:

1. Should the repeatability test be conducted net (compensated) or gross (uncompensated)? Or possibly, are both allowed provided all test results are from the same mode of operation?

Response to Issue 1.

In developing this item, I heard comments agreeing with the original proposal to use only gross results and comments differing in that either gross or net should be accepted provided all results are from the same mode. The tolerance paragraph in the LPG/NH4 code indicates the test does not apply to the test of the ATC system. It can be argued that the ATC system already has a performance requirement in T.4., requiring agreement between net and gross, i.e. compensated and uncompensated results. This tolerance reads much like the T.3. paragraph. Also, Handbook 44 precedent tends to support performing the tests in gross mode only. That precedent implies that in testing one component or variable, you attempt to hold all other components or variables constant. The revised proposal retains the limitation of performing the test using gross results (uncompensated).

In those codes where different device applications are sometimes gross and sometimes net, it will be necessary to specify using gross results, if the device has ATC capability. It is proposed to add the following text in the note paragraph specifying the repeatability test. “For devices equipped with an automatic temperature compensator, the test results shall be based on uncompensated (gross) volume, i.e. with the temperature compensator deactivated.” (or equivalent wording) In the LPG/NH4 code this change renders the extra wording in T.3. unnecessary, i.e. that the tolerance does not apply to ATC.

2. Should the repeatability test be a normal test as presently presented in the Code? That is, is the test limited to flow rates within the range of normal tests? Note that the repeatability test now appears in the Normal Test section in every affected HB44 LMD Code, Sections 3.30, through 3.39. The table below shows the history of the related sections.

Code	Note Paragraph	Tolerance Paragraph
3.30. LMD	N.4.1.2. (Added 2001)	T.3. (Added 1992) (Amended 2001 and 2002)
3.31. VTM	N.4.1.2. (Added 2001)	T.3. (Added 1992) (Amended 2001 and 2002)
3.32. LPG/NH4	N.4.1.2. (Added 2001)	T.3. (Added 1992) (Amended 1997 and 2001)
3.33. Vapor	N.4.1.2. (Added 2002)	T.3. (Added 2002)
3.34. Cryogenic	N.5.1. (Added 2001)	T.4. (Added 2001)
3.35. Milk	N.4.1.1. (Added 2002)	T.3. (Added 2002)
3.36. Water	N.4.1.1. (Added 2002)	T.1.1. (Added 2002) (Amended 2010)
3.37. Mass Flow	N.6.1.1. (Added 2001)	T.3. (Amended 1992, 1994, and 2001)
3.38. CO ₂	N.4.1.1. (Added 2002)	T.2.1. (Added 2002)
3.39. Hydrogen	N.6.1.1. (Tentative Code 2010)	T.3. (Tentative Code 2010)

Response to Issue 2.

Overwhelming support has emerged for the proposition that repeatability tests may be performed at any flow rate within the legitimate operating range of the device. To accomplish this, the Note paragraph on repeatability tests must be removed from the Normal Test section of each Code and placed in its own section. In the proposed wording below, the repeatability Note was simply moved to the next available number under Testing Procedures in each Code. For example, in 3.30. LMD Code, note N.4.1.2. is proposed to be renumbered N.4.6. This results in the sequence N.4.1. Normal tests, N.4.2. Special Tests, N.4.3. Money-Value Computation Tests, N.4.4. Pour and Drain Times, N.4.5. Temperature Correction on Wholesale Meters, and N.4.6. Repeatability Tests. NIST OWM has suggested inserting it after Special Tests and renumbering N.4.3. to N.4.5. Either way accomplishes the same end. Adding at the end of the list may cause less disruption.

However, removing repeatability from the special tests now leaves the issue of flow rates for conducting the test unstated. I suggest we need to add a statement to each Note as follows: “When conducting the tests, the flow rates shall be within the minimum and maximum discharge rates as marked by the manufacturer.” However, some codes use different terminology and in some cases minimum and maximum discharge rates are not marked like RMFD’s. For these cases I propose to add an additional statement regarding minimum discharge rates and maximum discharge rates as appropriate to that code.

3. If the test may only be performed as a normal test in Issue 2, how do we legitimize the NTEP policy of applying the tolerance to repeatability tests at special test flow rates? Based on the response to Issue 2, this will be a moot issue and can be dropped moving forward.

For full details on this issue, including the submitter's justification and recommendations and other background information, please see Appendix A, Page S&T – A59 in the S&T Committee's 2018 Interim Report found at: http://www.ncwm.net/_resources/e30d:p74t7a-2qg/files/76035627zccf278df/fn/4-ST-Web.pdf

Discussion: Sector Chairman, Michael Keilty, introduced this item, after which Tina Butcher (NIST OWM) provided an overview of the issue as outlined above at in the S&T Committee's Report. She also noted the following points:

- The General Code specifies that a device must be capable of repeating its indications within applicable tolerances under any condition of normal use.
- Most HB 44 measuring codes were modified to include a tighter tolerance for repeatability after inspectors reported finding metering systems that used the full range of the tolerance for multiple tests run under the same conditions. These metering systems were likely in need of repairs, but met the tolerance.
- Repeatability tolerances are based on 40% of the absolute value of the maintenance tolerance. Thus, testing is always based on the relative tolerance for the rate of flow at which the device is being tested. For example, for tests run at slower flow rates, most (though not all) metering systems are allowed a larger tolerance and the repeatability tolerance is based on that.
- There was no evidence in reviews of past NCWM S&T Committee reports that the current repeatability requirements were intended to be limited on only normal tests nor that the requirement was intentionally located under the "Normal Tests" section.
- Past Measuring Sector summaries in which the HB 44 requirements were discussed also do not reflect any intention to limit repeatability testing to only normal tests.

Discussion by the Sector included the following points:

- The tolerances currently specified in HB 44 apply across all flow rates.
- A meter must meet accuracy requirements at any flow rate within the limitations marked on the meter.
- The proposed changes will not affect what is being done in NTEP. NTEP has been verifying meters across their entire rated range of flow since the program began.
- A meter needs to be capable of repeating its indications at any condition of normal use, provided it is within the marked flow range of the meter.
- For a device equipped with an automatic temperature compensating system (ATCS), the ATCS needs to be deactivated when conducting a repeatability test.

Decision: *The Sector made no decisions on this issue; however, the Sector confirmed that the current NTEP policy of conducting repeatability testing at all flow rates across the rated range of the meter is appropriate and a meter must be capable of meeting repeatability tolerances for repeated, consecutive tests at a given flow rate. Comments expressed general support of the proposed changes and indicated the recommendations are reasonable.*

13. S&T 2019 - New Proposal – Section 3.30 LMD Code - Airport Refueling Systems

Source: G. Diane Lee and Tina Butcher (NIST OWM)

Purpose: Modify the Liquid Measuring Devices Code to address self-service airport fueling dispensing systems equipped with a primary analog indicator and a separate card activated console with a printer that are used to fuel multiple tanks on aircrafts.

Item Under Consideration/Background: See corresponding NCWM Form 15 in Appendix H to this Agenda.

Discussion: Sector Chairman, Michael Keilty, introduced this item and Tina Butcher (NIST OWM, submitter of the item to the S&T Agenda) explained its background and origin. Mrs. Butcher noted that a number of airport refueling systems which were installed as part of a program to enhance air safety by providing additional fueling points. Unfortunately, weights and measures jurisdictions were not consulted prior to installation and, because installers were apparently unfamiliar with legal metrology requirements, these systems fail to meet requirements for agreement of indications. The Sector had limited discussion of this issue. Comments included the following:

Other retail motor-fuel systems are required to meet agreement of indications requirements. Exempting these systems is not fair and puts companies whose products meet the requirements at a competitive disadvantage.

Weights and measures agencies with such systems in their jurisdiction might consider low-/no-cost options to help ensure agreement requirements are met while preventing the installation of future systems that do not meet requirements.

Decision: *The Sector discussed the proposed item to address airport refuelers and agreed to offer the following suggestions/observations to assist the S&T Committee in its deliberations on this item.*

- *The Sector acknowledges this is proposed as a Developing Item; however, the Sector does not believe modifications to provide an exemption for requirements on agreement of indications to these systems are appropriate and this item should be withdrawn from the S&T Committee's agenda. The Sector views this as an enforcement issue.*
- *Numerous other retail motor-fuel applications have been required to comply and have complied for many years with requirements for agreement of indications. To allow such exceptions would put manufacturers of retail motor-fuel systems which currently comply (and which compete with those used in airport refueling applications) at a competitive disadvantage. Additionally, the lack of agreement of indications could cause customer confusion (as has already been evidenced by the reported complaint) and possibly create a safety concern.*
- *The regulatory agency should work with the community to educate them and help ensure future systems meet all HB 44 requirements.*
- *There would seem to be some low-cost options which could be used by the regulatory jurisdiction for addressing these systems and ensure agreement requirements are met. For example, posting signage instructing the consumer/operator not to reset the indications during a delivery.*

14. S&T 2019 – New Proposal – Section 3.30 LMD Code - Recognition of Diesel Exhaust Fluid (DEF) and Other Products

Source: G. Diane Lee and Tina Butcher (NIST OWM)

Purpose: Modify the Liquid Measuring Devices Code to adequately address requirements for retail liquid measuring devices that measure DEF and other products.

Item Under Consideration/Background: See corresponding NCWM Form 15 in Appendix H to this Agenda.

Discussion: Sector Chairman, Michael Keilty, introduced this item and Tina Butcher (NIST OWM, submitter of the item to the S&T Agenda) explained its background and origin noting that it was called to OWM's attention that the LMD Code does not adequately address DEF and may not adequately address other liquids. Discussion by the Sector included the following points:

- If the proposed deletion of “including liquid fuels and lubricants” is struck from the Application Section A.1. General, as shown below it seems that part A.1.(b) (which spells out specific product types for wholesale meter applications) is unnecessary.

A.1. General. – This code applies to:

- (a) devices used for the measurement of liquids, ~~including liquid fuels and lubricants~~, and
 - (b) wholesale devices used for the measurement and delivery of agri-chemical liquids such as fertilizers, feeds, herbicides, pesticides, insecticides, fungicides, and defoliant.
(Added 1985)
- There are other liquid types such as systems that dispense windshield washer fluid that are covered by the LMD code.
 - The Sector agreed that the use of the term “including” in A.1.(a) makes it clear that the LMD Code is not limited to covering
 - Multiple Sector members expressed discomfort with modifying the code to change “retail motor-fuel dispensers” to “retail devices.”
 - In past discussions over the years, NCWM S&T Committee has attempted to avoid creating “laundry lists” of products or applications. In this instance, however, the Sector preferred specifying DEF, not knowing what implications the broader reference to “retail devices” might create.
 - No changes had been proposed to Paragraph S.1.2.1. Retail-Motor-Fuel Devices to address units for DEF systems. This may have been an oversight in the proposal.

Decision: *The Sector discussed the proposed changes to NIST HB 44 to address DEF and agreed to offer the following suggestions/observations to assist the S&T Committee in its deliberations on this item.*

- *The Sector acknowledged DEF measuring systems are covered under the Liquid-Measuring Devices Code as are other liquid-measuring systems such as those dispensing windshield washer fluid.*
- *The current wording of A.1.(a) is not currently limiting, though changes might be made to make that clear. If the phrase “including liquid fuels and lubricants” is struck from the Application Section A.1., then A.1.(b) may become unnecessary and the Committee may wish to consider striking it.*
- *The Sector acknowledged changes to HB 44 to better address DEF appear to be needed. Some Sector members recommend, rather than using the broad reference to “retail devices” (or a similar reference),*

that the modifications specifically reference “DEF” to avoid creating an unintentional conflict with other applications.

15. S&T 2019 – New Proposal – Section 3.37. Mass Flow Meters Code – Location of Marking Information, RMFDs

Source: Juana Williams (NIST OWM)

Purpose: Extend the NIST Handbook 44 Mass Flow Meters Code provision allowing the use of a key or tool for accessing internal required markings for liquid retail motor-fuel dispensers to include retail motor-fuel dispensers delivering compressed gases.

Item Under Consideration/Background: See corresponding NCWM Form 15 in Appendix H to this Agenda.

Discussion: Sector Chairman, Michael Keilty, and Technical Advisor, Tina Butcher, noted that Items 15, 16, and 17 on the Sector’s agenda address S&T Committee agenda items that are largely “housekeeping” in nature and briefly described the purpose of each. These items are intended to clean up inconsistencies and errors in H44 and/or align requirements among various measuring codes.

Decision: *The Sector made no decisions on this issue, acknowledging this is primarily a housekeeping item on the S&T Committee’s agenda intended to align requirements in the Mass Flow Meters (MFMs) Code with other measuring codes and afford MFMs with the same provisions for accessing G-S.1. Identification Information as other measuring systems.*

16. S&T 2019 – New Proposal – Block – Mass Flow Meters Code; Hydrogen Gas Measuring Devices Code; and Electric Vehicle Refueling Code – Addition of Timeout Requirements

Source: Juana Williams (NIST OWM)

Purpose: To prevent the facilitation of fraud on a vehicle fueling system equipped with the capability for authorization of a transaction by a credit card, debit card, or cash.

Item Under Consideration/Background: See corresponding NCWM Form 15 in Appendix H to this Agenda.

Discussion: Sector Chairman, Michael Keilty, and Technical Advisor, Tina Butcher, noted that Items 15, 16, and 17 on the Sector’s agenda address S&T Committee agenda items that are largely “housekeeping” in nature and briefly described the purpose of each. These items are intended to clean up inconsistencies and errors in H44 and/or align requirements among various measuring codes.

Decision: *The Sector made no decisions on this issue, acknowledging this is primarily a housekeeping item on the S&T Committee’s agenda intended to align requirements in the Mass Flow Meters (MFMs) Code; Hydrogen Gas-Measuring Devices; and Electric Vehicle Fueling Systems Code with other measuring codes and include consistent requirements for “timeout” of credit card authorizations.*

17. S&T 2019 – New Proposal – Section 3.37. Mass Flow Meters Code – Deletion of “GLE” and Addition of DGE Maximum Quantity Division

Source: Juana Williams (NIST OWM)

Purpose: Delete the reference to “gasoline liter equivalent (GLE)” since that term that was removed from all Mass Flow Meters Code requirements in 2016. Clarify and limit the maximum value of the quantity division for indicated and recorded deliveries in the diesel gallon equivalent (DGE) to an increment of 0.001.

Item Under Consideration/Background: See corresponding NCWM Form 15 in Appendix H to this Agenda.

Discussion: Sector Chairman, Michael Keilty, and Technical Advisor, Tina Butcher, noted that Items 15, 16, and 17 on the Sector’s agenda address S&T Committee agenda items that are largely “housekeeping” in nature and briefly described the purpose of each. These items are intended to clean up inconsistencies and errors in H44 and align requirements among various measuring codes.

Discussion: Sector Chairman, Michael Keilty, and Technical Advisor, Tina Butcher, noted that Items 15, 16, and 17 on the Sector’s agenda address S&T Committee agenda items that are largely “housekeeping” in nature and briefly described the purpose of each. These items are intended to clean up inconsistencies and errors in H44 and/or align requirements among various measuring codes.

Decision: *The Sector made no decisions on this issue, acknowledging this is primarily a housekeeping item on the S&T Committee’s agenda intended address points that were overlooked when the new unit of “DGE” was added in 2016. The proposal referenced in this agenda item, Item 17, is intended to eliminate a reference to “GLE” (which was inadvertently omitted when the term was deleted from HB44 in 2016) and to specify maximum quantity divisions for DGE consistent with those for other equivalent units (the addition of which was overlooked when this new term was added).*

18. S&T 2019 – New Proposal – Section 3.40 Electric Vehicle Fueling Systems Code - Definition - Power Factor

Source: Tina Butcher (NIST OWM)

Purpose: To simplify the definition for “Power Factor” currently included in NIST Handbook 44 (HB44) Section 3.40. Electric Vehicle Fueling Systems – Tentative Code. To align the current HB 44 definition with a definition included in a proposal to adopt a “Method of Sale” requirement for electric watt hour meters that is currently under consideration by the NCWM Laws & Regulations Committee.

Item Under Consideration/Background: See corresponding NCWM Form 15 in Appendix H to this Agenda.

Discussion/Decision: *Sector Chairman, Michael Keilty, and Technical Advisor, Tina Butcher, pointed out this item is intended to align the definition for “power factor” in HB 44 for Electric Vehicle Fueling Systems with one being proposed for inclusion in NIST HB 130 for sales of electricity through electric watt-hour meter. Given the definition in the L&R proposal was developed by the NIST USNWG on Electric Vehicle Fueling and Submetering, the proposal on the S&T Committee’s agenda is viewed as largely “housekeeping.” The Sector did not discuss this proposal beyond acknowledging its purpose and made no decision on this item.*

19. Meeting Location and Date of 2019 Measuring Sector Meeting

Background: This Item is included on the Sector’s agenda to apprise Sector members of arrangements for the 2019 Sector meeting.

At its 2017 meeting, the Sector concluded most Sector members prefer not to hold the meeting in conjunction with a regional association meeting and, in particular, want to avoid holding it over a weekend. The Sector identified the following possible destinations for future meetings to recommend to the NCWM BOD:

- Atlanta, GA
- Baltimore/Annapolis, MD
- Columbus, OH
- Denver, CO (different hotel than before)
- Fort Wayne, IN

- Indianapolis, IN
- Jacksonville, FL
- Orlando, FL

In June 2018, NTEP Director, Jim Truex polled the Sector on potential locations and dates for the 2019 Sector Meeting. Based upon the results of that poll, the meeting will be held September 24 – 26, 2019 in Denver, CO as follows:

Meeting Location:

Holiday Inn & Suites
6900 Tower Road
Denver, CO 80249
(303) 574-1300

Dates:

Tuesday, 9/24/19: 8 am – 5 pm
Wednesday, 9/25/19: 8 am – 5 pm
Thursday, 9/26/19: 8 am – 5 pm

Final meeting and lodging details will be provided closer to the 2019 meeting.

Discussion: NTEP Director, Jim Truex, reviewed the date and location selected for the 2019 NTEP Measuring Sector Meeting and noted the following:

- The 2019 meeting will be held jointly with the Software Sector.
- The dates and location for the meeting were selected based on results of a poll of Measuring Sector members.
- As of the current time, there will NOT be a separate NTEP Measuring Laboratories meeting held in conjunction with the Sector meeting. The NTEP Laboratories are holding a special meeting in the spring to review and receive hands-on training regarding the use of master meters in CNG testing.
- There is a possibility that the Measuring Sector will NOT meet with the Software Sector on Thursday, 9/26/18.
- The Software Sector will be proposing they assume responsibilities for all areas of NCWM Pub 14 that address software. This includes relevant sections of the Liquid-Measuring Devices Checklist and other measuring-related checklists. The timeline and scope of this proposal has not yet been identified.
- The Measuring Sector has not accepted a lot of what the Software Sector has proposed for inclusion in Pub 14. The BOD/NTEP may take over certain sections and assign responsibility to the Software Sector.

Decision: *The Sector was not asked to make any decisions on this item. The item was included as an information item on the Sector's agenda to apprise members of the dates and location of the 2019 Sector meeting and share information regarding a proposal being considered by the NCWM BOD for the Software Sector to assume responsibility for all portions of NCWM Pub 14 addressing software related requirements and issues.*

Agenda Items Added During the Sector Meeting

The following items were added to the agenda and discussed by the Sector after the Sector had completed its review of previously planned agenda items.

20. Magnetic Flow Meters

Source: NTEP Measuring Laboratories

Item Under Consideration/Background: This item was added to the Sector's agenda during the meeting after the Sector completed its review of scheduled agenda items. The purpose of this item was to provide guidance to the NTEP laboratories and manufacturers regarding procedures and policies to apply during testing of magnetic flow meters.

During the NTEP Evaluating Laboratories meeting just prior to the 2018 NTEP Measuring Sector Meeting, one of the laboratories reported receiving an assignment for a magnetic flow meter for measuring milk. The NTEP Evaluating Laboratories discussed the need for guidance on test procedures and permanence criteria for these meters. The laboratories suggest adding to the existing NTEP criteria for positive displacement meter. The laboratories would have preferred to use the criteria for mass flow meters since that criteria seems more broadly applicable; however, the criteria for MFMs reference a 10:1 turndown ratio for the minimum to maximum rated flow.

Discussion: To address magnetic flow meters, the NTEP Evaluation Laboratories propose modifications to NCWM Publication 14, Part D Initial Evaluation and Permanence Tests for Wholesale Positive Displacement (PD) Meters found on Page LMD-115 in the Field Evaluation and Permanence Tests for Metering Systems portion of the Liquid-Measuring Devices Checklist. The Sector reviewed a marked-up copy of Part D with the laboratories' recommendations. Discussion points included the following:

- NTEP might consider that OIML R117 does not specify endurance tests for these meters.
- One of the evaluating laboratories reported having tested mass flow meters and sonic meters and finding failures after the permanence period. Without additional experience to demonstrate otherwise, this lab and others are not in favor of eliminating the permanence tests.
- For meters measuring water, there is a deviation between American Water Works Association standards and NIST Handbook 44.
- One laboratory reported having observed some water meters passing the permanence tests, but others failing, particularly some of the ultrasonic meters.
- Starting with the criteria in Section D seems a reasonable approach for developing criteria for magnetic flow meters.
- The Sector reviewed the NTEP Laboratories' proposed changes to Part D Initial Evaluation and Permanence Tests for Wholesale Positive Displacement (PD) Meters found on Page LMD-115 in the Field Evaluation and Permanence Tests for Metering Systems portion of the Liquid-Measuring Devices Checklist.
- The Sector agreed it is better to create a new section in this portion of the checklist to address magnetic flow meters and ultrasonic meters.

Decision: *The Sector recommends the following new section be added to the Field Evaluation and Permanence Tests for Metering Systems portion of the Liquid-Measuring Devices Checklist to address magnetic flow meters and ultrasonic meters. The Sector recommends this section be lettered "M;" however, leaves it to the discretion of the NTEP Director regarding the most appropriate order in which to place this section in the checklist.*

M. Initial Evaluation and Permanence Tests for Magnetic Flow Meters and Ultrasonic Meters (Other Than Vehicle-Mounted and Retail-Motor-Fuel Applications)

The following tests are considered to be appropriate for magnetic flow meters and ultrasonic metering systems:

1. For wholesale devices, four test drafts at each of five flow rates.
 - 1.1. "Special" tests shall include a test at or slightly above the slower of the following rates:
 - 1.1.1. 20% of the marked maximum discharge rate; or,
 - 1.1.2. The minimum discharge rate marked on the device.
2. For retail devices:
 - 2.1 The minimum number of tests for the meter will include the following:
 - Five tests at the fast flow rate
 - Three tests at a midrange flow rate
 - Five tests at the slow flow rate
3. The meters must perform within acceptance tolerance.
4. Repeatability - Tests for repeatability shall include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors, such as temperature, pressure, and flow rate, are reduced to the extent that they will not affect the results obtained.

The range of the test results for the flow rate shall not exceed 40% of the absolute value of the maintenance tolerance. The results of each test shall be within the applicable tolerance. This tolerance does not apply to the test of the automatic temperature compensating system.
5. In no case shall testing be performed at a flow rate less than the minimum discharge rate marked on the device.
6. Only one meter is required for the initial test, after which the meter will be reevaluated for permanence. The minimum throughput criterion for these meters is the maximum rated flow in units per minute x 2000.
7. Following the period of use, the tests listed above are to be repeated. All results within the range of flow rates to be included on the Certificate of Conformance (CC) must be within the applicable tolerances. Extended flow range testing performed at the manufacturer's discretion may be included on the CC provided the results are within the acceptable tolerances.

21. Vapor Elimination on LPG Retail Motor-Fuel Dispensers

Source: Robin Parsons (Parafour Innovations)

Item Under Consideration/Background: This item was added to the Sector's agenda during the meeting after the Sector completed its review of scheduled agenda items. There are retail motor-fuel dispensers dispensing LPG which utilize mass flow meters. Since they use MFMs, these devices are covered under the MFM Code rather than the LPG & Anhydrous Ammonia Liquid-Measuring Devices Code. The submitter is encountering systems in which a vapor eliminator is not being included in these systems. He questioned whether or not a physical vapor eliminator needs to be included; if there are other means that are actually effective; and how does a service company or regulator evaluate the effectiveness of a system (either with a vapor eliminator or with "other effective means") to eliminate vapor.

Discussion: Discussion points included the following:

- There is a difference between requirements for air/vapor elimination in Section 3.32. LPG & NH₃ LMD Code and Section 3.37. MFM Code. The LPG Code specifies provisions must be made to prevent the

“passage” of air/vapor through the meter; the MFM code specifies that provision must be made to prevent “measurement” of air/vapor.

- Most measuring codes recognize that “other effective means” can be provided than a conventional air/vapor eliminator. Examples of these other means are documented in past NCWM S&T Committee reports. In such cases the task of verifying that either option is “effective” falls to the regulator.
- There is a test procedure to verify the effectiveness of an air eliminator or “other effective means” for some types of devices, such as that used when testing a vehicle-tank meter and conducting a product depletion test.
- There isn’t always a practical way to verify the effectiveness of an air eliminator or “other effective means” (particularly for products such as LPG which are under pressure) and/or there are no clear guidelines for officials to follow in validating these alternatives.
- Parafour Innovations conducts a test of an air eliminator during type evaluations.
- Current NTEP test procedures and procedures recommended in NIST Examination Procedure Outlines do not include a recommended test.
- NIST is open to incorporating such a test into the EPOs if the procedure is vetted through groups such as the Measuring Sector, NTEP Evaluating Laboratories, and/or others who can provide input and expertise and the community can agree upon the method.

Decision: The Sector reached no decisions on this issue. The NTEP Director noted that, if this issue involves a concern about a competitor’s product complying/not complying with the requirements, this should be submitted to the NTEP Director to investigate.

22. Inclusion of Items on the Sector’s Agenda

Source: Sector Chairman, Michael Keilty (Endress+Hauser Flowtec) and Sector Technical Advisor, Tina Butcher (NIST OWM)

Item Under Consideration/Background: This item was added to the Sector’s agenda during the meeting after the Sector completed its review of scheduled agenda items. Sector Chairman, Michael Keilty, introduced the item, noting the intent is to clarify the process for submitting items to the Sector’s Agenda and noted the following:

- Items are typically submitted through the regional weights and measures associations by submitted a “Form 15” to the NCWM.
- Items are designated with a status of Developing, Information, Assigned, Voting, or Withdrawn by the NCWM S&T Committee at the January NCWM Interim Meeting.
- For items designated with a “D,” the Committee will generally not take comments on the item from other than the submitter. Some have expressed concerns about not being able to provide input on Developing items while they are under development.
- The protocol for taking comments may be reviewed by the NCWM BOD at an upcoming meeting.
- Submitters can select the region(s) to which the item is to be submitted.
- Submitters may not want an item to be reviewed by a Sector prior to having it viewed by one or more regional associations.

- A submitter owns the item and should have the right to make its first presentation to the community. The submitter needs to identify where they want to present the item and how to move it forward.
- A submitter may want to limit where an item is first discussed, particularly if the submitter wants to be present to provide history on the issue and respond to questions.
- The form for submitting items to the Sector's agenda is a bit different from the Form 15 and doesn't include any reference to regions.

Discussion: Discussion points and comments included the following:

- Prior to including a new item submitted via a Form 15 on the Sector's agenda, the submitter should be specifically asked if it is desirable to do so.
- The Sector's agenda has historically included items which are on the current S&T Committee Agenda that may be of relevance to Sector members or for which Sector members' expertise may be of assistance to the S&T Committee. These items were relegated to an "As Time Permits" section of the agenda in recognition that the charge of the Sector is to address NTEP-related issues, not develop HB 44 issues. Segregating the agenda in this way allowed for the Sector to address its business and, should time permit, address additional items; Sector members who did not want to spend time reviewing these items could choose to leave the meeting at the conclusion of the Sector's business. This practice also alerted Sector members to items with possible impact to their organizations.
- Does the Sector still want an "As Time Permits" section of the agenda?
- Rather than including all S&T items that are possibly relevant to the Sector on the Sector Agenda, only items for which the S&T Committee specifically asks for assistance should be included.
- Some Sector members expressed appreciation of hearing about relevant S&T items and discussing them. The process is valuable in helping members understand an item and makes them more aware of issues that might impact their organizations.
- Sector members acknowledged that the S&T Committee values the input from the Sector and this also provides a service to the submitter in helping to fully vet a proposal.
- Reviewing a proposal as early as possible is helpful and will provide input to the submitter that can assist in the item's development. Early review may also prevent delays which might occur if the S&T Committee asks for Sector review upon receiving the item for the first time.
- The expectation in terms of confidentiality is unclear. At some point, the submitter should have an expectation that an item is a "public" item.
- Some believe it's no longer confidential once it's submitted to the NCWM.

Decision: The Sector agreed to continue including an "As Time Permits" section on its agenda. The Sector agreed that having the opportunity to review relevant items on the S&T Agenda is beneficial when time permits. Items from the S&T Committee Agenda which are "carryover items" are to be included on the Sector's Agenda only if the S&T Committee specifically requests the Sector's input on the item. For newly submitted items that have not yet been reviewed by the S&T Committee at the national level, the submitter must be asked whether to include the item on the Sector's agenda or makes a specific request to do so.