Appendix B

National Type Evaluation Technical Committee
Measuring Sector

October 18 - 19, 2007 – Little Rock, Arkansas
Meeting Summary

Agenda Items

National Type Evaluation Technical Committee

1. Recommendations to Update NCWM Publication 14 to Reflect Changes to NIST Handbook 44

Source: NIST/WMD

Background: The 92nd National Conference on Weights and Measures (NCWM) adopted the following items that will be reflected in the 2008 Edition of NIST Handbook 44 (HB 44) and NCWM Publication 14. These items are part of the agenda to inform the Measuring Sector (MS) of the NCWM actions and recommend changes to NCWM Publication 14.

Recommendation: The Sector reviewed following changes to Publication 14 based on changes to NIST HB 44:

A. Checklist and Test Procedures (LMD – 28)

Code Reference: S.1.2.3. Value of Smallest Unit		
7.24.	The value of the quantity division shall not exceed the equivalent of one ~~pint~~ **0.5 L (0.1 gal) on retail devices with a flow rate of 750 L/min (200 gal/min) or less**.	**Yes □ No □ N/A □**

B. Checklist and Test Procedures (LMD – 30)

Code Reference: S.1.6.5.6., Display of Quantity and Total Price, Aviation Refueling Applications		
7.41.	**S.1.6.5.6. Display of Quantity and Total Price, Aviation Refueling Applications.** **(a) The quantity shall be displayed throughout the transaction.** **(b) The total price shall also be displayed under one of the following conditions:** **i. The total price can appear on the face of the dispenser or through a controller adjacent to the device.** **ii. If a device is designed to continuously calculate and display the total price, it shall be displayed for the quantity delivered throughout the transaction.** **(c) The total price and quantity shall be displayed for at least 5 min or until the next transaction is initiated by using controls on the device or other customer-activated controls.** **(d) A printed receipt shall be available and shall include, at a minimum, the total price, quantity, and unit price.**	**Yes □ No □ N/A □**

C. Checklist and Test Procedures (LMD – 32)

Code Reference: S.2.2.1. Multiple Measuring Devices with a Single Provision for Sealing		
9.6	A change to the adjustment of any measuring element shall be individually identified.	**Yes □ No □ N/A □**

Note: Examples of acceptable identification of a change to the adjustment of a measuring element include, but are not limited to:			
	(a)	a broken, missing, or replaced physical seal on an individual measuring element,	
	(b)	a change in a calibration factor for each measuring element,	
	(c)	display of the date of or the number of days since the last calibration event for each measuring element <u>or</u>,	
	(d)	a counter indicating the number of calibration events per measuring element.	
<u>Note (2): S.2.2.1. will be removed in the 2010 edition of Handbook 44 when General Code paragraph G-S.8.1. Multiple Weighing or Measuring Elements with a Single Provision for Sealing becomes effective.</u>			

D. Checklist and Test Procedures (LMD – 33, 34)

10. Discharge Lines and Discharge Line Valves			
Code Reference: S.3.1. Diversion of Measured Liquid			
This paragraph does not apply to devices that comply with Paragraph S.3.2.			
To prevent fraudulent practices, no means for which any measured liquid can be diverted from the measuring chamber or the discharge line of a device shall be available.			
A device may have two or more delivery outlets if there are automatic means to insure that:			**Yes ☐ No ☐ N/A ☐**
	(a)	liquid can flow from only one outlet at a time, and	
	(b)	the direction of liquid flow is definitely and conspicuously indicated.	
10.1.		Except as identified above, it shall not be possible to divert measured liquid from the measuring chamber or the discharge line of the device.	**Yes ☐ No ☐ N/A ☐**
10.2.		Two or more delivery outlets may be installed if there are automatic means to ensure that liquid can flow from only one outlet at a time, and the direction of flow for which the mechanism may be set at any time is definitely and conspicuously indicated.	**Yes ☐ No ☐ N/A ☐**
10.3.		Except as identified above, a**<u>n</u>** ~~**manually controlled**~~ outlet that may be opened for purging or draining the measuring system or for recirculating**<u>, if recirculation is required in order to maintain the</u>** product in **<u>a deliverable state,</u>** ~~**suspension**~~ shall be permitted **only when the system is measuring food products,** ~~**or**~~ **agri-chemicals<u>, biodiesel, or biodiesel blends</u>.** Effective **<u>automatic</u>** means shall be provided to prevent passage of liquid through any such outlet during normal operation of the measuring system and to inhibit meter indications (or advancement of indications) and recorded representations while the outlet is in operation.	**Yes ☐ No ☐ N/A ☐**

E. Checklist and Test Procedures for Specific Criteria for Vehicle Tank Meters (LMD – 44)

Checklist and Test Procedures for Specific Criteria for Vehicle Tank Meters
Code Reference S.2.5. Automatic Temperature Compensation for Refined Petroleum Products

24.	**Primary Elements**	
24.12.	**A device may be equipped with an automatic means for adjusting the indication and registration of the measured volume of product to the volume at 15 °C for liters or the volume at ~~(~~60 °F~~)~~ for gallons and decimal subdivisions or fractional equivalents thereof where not prohibited by state law.**	
24.13	**On a device equipped with an automatic temperature-compensating mechanism that will indicate or record only in terms of liters (gallons) compensated to 15 °C (60 °F), provision shall be made for deactivating the automatic temperature-compensating mechanism so the meter can indicate and record, if it is equipped to record, in terms of the uncompensated volume.**	**Yes ☐ No ☐ N/A ☐**
24.14	**A device equipped with automatic temperature compensation shall indicate or record, if equipped to record, both the gross (uncompensated) and net (compensated) volume for testing purposes. It is not necessary that both net and gross volume be displayed simultaneously.**	**Yes ☐ No ☐ N/A ☐**

26 Measuring Element		
Code Reference: S.2.2. Provision for Sealing		
26.3.	The adjusting mechanism shall be readily accessible to affix a security seal.	**Yes ☐ No ☐ N/A ☐**
Code Reference: S.2.5.4. Provision for Sealing Automatic Temperature-Compensating Systems		
26.4	**Adequate provision shall be made for an approved means of security (e.g., data change audit trail) or physically applying security seals in such a manner that an automatic temperature-compensating system cannot be disconnected and no adjustment may be made to the system.**	**Yes ☐ No ☐ N/A ☐**
Code Reference: S.2.4. Zero Set-Back Interlock, Vehicle-Tank Meters, Electronic		
26.4**5**	Except for vehicle-mounted metering systems used solely for the delivery of aviation fuel, a device shall be so constructed that after individual or multiple deliveries at one location have been completed, an automatic interlock system shall engage to prevent a subsequent delivery until the indicating and, if equipped, recording elements have been returned to their zero position. For individual deliveries, if there is no product flow for 3 minutes, the transaction must be completed before additional product flow is allowed. The 3-minute timeout shall be a sealable feature on an indicator.	**Yes ☐ No ☐ N/A ☐**

Code Reference S.2.5.5. Temperature Determination with Automatic Temperature Compensation		
26.6	**For test purposes, means shall be provided (e.g., thermometer well) to determine the temperature of the liquid either:** **(a) in the liquid chamber of the meter, or** **(b) immediately adjacent to the meter in the meter inlet or discharge line.**	**Yes ☐ No ☐ N/A ☐**

28 Marking Requirements		
Code Reference: S.5.6. Temperature Compensation for Refined Petroleum Products.		
28.4.	**If a device is equipped with an automatic temperature compensator, the primary indicating elements, recording elements, and recorded representations shall be clearly and conspicuously marked to show that the volume delivered has been adjusted to the volume at 15 °C for liters or the volume at 60 °F for gallons and decimal subdivisions or fractional equivalents thereof.**	**Yes □ No □ N/A □**

Field Evaluation and Permanence Tests for Metering Systems

(Section C. below is part of agenda item E.)

C. Field Evaluation and Permanence Test for Vehicle-Tank Meters, Except LPG, Cryogenic, and CO_2

The following tests are considered to be appropriate for vehicle-tank metering systems:

- Four test drafts at each of five flow rates.
- One vapor or air eliminator (product depletion) test.

Note: The normal test of a measuring system shall be made at the maximum discharge rate that may be anticipated under the conditions of the installation. Any additional tests conducted at flow rates down to and including one-half of the sum of the maximum discharge flow rate and the rated minimum discharge flow rate shall be considered normal tests. (Code reference N.4.1.)

Only one meter is required for the initial test, and after the test, the meter will be placed into service for the permanence test. The minimum throughput criterion for these meters is the maximum rated flow in units per minute x 2000.

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 must be within the applicable tolerances. Extended flow range testing performed at the manufacturer's discretion may be included on the certificate of conformance provided the results are within the acceptable tolerances.

Tests of Automatic Temperature Compensating Systems (Code Reference T.2.1.)

The difference between the meter error (expressed as a percentage) for results determined with and without the automatic temperature-compensating system activated shall not exceed:

(a) 0.4 % for mechanical automatic temperature-compensating systems; and

(b) 0.2 % for electronic automatic temperature-compensating systems.

The delivered quantities for each test shall be approximately the same size. The results of each test shall be within the applicable acceptance or maintenance tolerance.

Repeatability on Vehicle-Tank Meters (Code Reference T. 3.)

When multiple tests are conducted at approximately the same flow rate, the range of the test results for the flow rate shall not exceed 40 % of the absolute value of the maintenance tolerance, and 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.

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.

Conclusion: The Sector agreed to forward Items 1A through E to the NTEP Committee for addition to Publication 14.

Carryover Items

2. Table of Key Characteristics of Products in Family Products Table for Meters

Source: NTEP Director

Background: Prior to the 2006 Sector Meeting the NTEP director, Steve Patoray, submitted the following comments for Sector consideration:

This is a developing item. Probably all of you reading this know more about this topic than I ever will. I have had discussions with several different people on this topic over the past several months. The Product Family Table in NCWM Publication 14 has been improved over the past several years. Currently, Mass Flow Meters have a key characteristic of specific gravity. PD meters have a key characteristic of viscosity. We list in the table numbers. However, these numbers are without reference. These are normally tied to some temperature. None is listed. Also, there is no cross reference for anyone to identify what products might fall within those ranges. I had a very difficult time finding specific information on even some very basic products that we normally use in evaluations. Several of the folks on the Sector helped locate various tables and charts to help ID these values. The information in these charts varies for the "same" product.

As an example of the potential confusion, there are both dynamic (absolute) and kinematic viscosity. The values for these are not the same for the same product, the unit for these, respectively, is CentiPoises and CentiStokes.

Quoting from the Engineering Tool Box: The viscosity of a fluid is highly temperature-dependent and for either dynamic or kinematic viscosity to be meaningful, the reference temperature must be quoted.

In the table on page LMD-3 there are numbers for both Viscosity and Specific Gravity but no temperatures. While S.G. may not be as temperature-dependent, some reference should still be cited.

To expand on this in the table in Pub 14 on page LMD-3, we have Test C which just states viscosity, while Test E states specifically kinematic viscosity. This may be very important for the device that uses these tests, but I would suggest that it be clarified and consistent. The use of just the term "viscosity" could be misinterpreted.

What I am proposing is that this group consider listing specific values for each of the typical products listed in this table. It may need to be a separate table. With this information, the NTEP evaluator would then be able to look to the chart and find the correct value for the critical characteristic. This could be listed on the CC and the range could clearly be identified. Additional products could be added as necessary when used for an evaluation. The main point is that the same values will be used.

Also, there are four different product groups for crop chemicals. Without further information, this can lead to confusion.

Trying to follow all of the special notes is very difficult.

There still seem to be product families that are based on some other factor that is not specified, not just viscosity or specific gravity (first page of table). Many of the different products' values overlap.

This should be enough to get the discussion started. I hope that I have been clear in the fact that I would like to see this table continue to be revised and if possible condensed.

At the 2006 meeting, the Sector discussed the NTEP director's concerns and explored the concept of having a table of additional product characteristics beyond what is currently in the Product Family Table. The Sector considered appointing a separate work group to develop this item for presentation and discussion at the next meeting. The Sector ultimately agreed that further development of key characteristics should be included in the tasks of the work group formed to develop a new Product Family Table approach, as discussed in the 2006 agenda Item 5.

Work Group (WG) Recommendation: The Product Family Table from Pub 14 has been reviewed and reorganized by the work group as shown below. The new table removes the named liquids and focuses on the influence factors for the mass, magnetic, positive displacement, and turbine flowmeters.

There remains a need to list the liquids describing the viscosity, specific gravity, and conductance.

Product Family	**Flowmeter Test Requirements**
Normal Liquids	**Magnetic Flowmeters – Use Test F** **Mass Flowmeters – Use Test B** **Positive Displacement Flowmeters – Use Test C** **Turbine Flowmeters – Use Test E** **Other Flowmeter Types – Use Test A**
Heated Products (above 50 °C)	**Mass Flowmeters – Use Test D** **Positive Displacement Flowmeters – Use Test D** **Other Flowmeter Types – Use Test A**
Compressed Liquids	**Mass Flowmeters – Use Test D** **Positive Displacement Flowmeters – Use Test D** **Turbine flowmeters – Use Test E** **Other Flowmeter Types – Use Test A**
Cryogenic Liquids and Liquefied Natural Gas	**Mass Flowmeters – Use Test D** **Positive Displacement Flowmeters – Use Test A** **Turbine flowmeters – Use Test D** **Other Flowmeter Types – Use Test A**
Compressed Gases	**Mass Flowmeters – Use Test D** **Not applicable to Positive Displacement Flowmeters** **Other Flowmeter Types – Use Test A** **Note: CNG is only included in Section 3.37 Mass Flow Meters of Handbook 44**

Tests to be Conducted

Test A – Products must be individually tested and noted on the Certificate of Conformance.

Test B – To obtain coverage for a range of products within a family: Test with one product having a low specific gravity; test with a second product having a high specific gravity. The Certificate of Conformance will cover all products in the family within the specific gravity range tested.

Test C – To obtain coverage for a range of products within a family: Test with one product having a low viscosity; test with a second product having a high viscosity. The Certificate of Conformance will cover all products in the family within the viscosity range tested.

Test D – To obtain coverage for a product family: Test with one product in the product family.

Test E – To obtain coverage for a range of products within a family: Test with one product having a low kinematic viscosity; test with a second product having a high kinematic viscosity. The Certificate of Conformance will note coverage for all products in the family within the kinematic viscosity range tested.

Test F – To obtain coverage for a range of products within a family: Test with one product having a specified conductivity. The Certificate of Conformance will note coverage for all products in the family with conductivity equal to or above the conductivity of the tested liquid.

Product Family	Typical Products[1]	Viscosity[5] (Centipoise) (Centistokes)	Specific Gravity[2]
Normal Liquids	Diesel Fuel[3], Distillate, Gasoline[4], Fuel Oil, Kerosene, Light Oil, Spindle Oil, Lubricating Oils, SAE Grades, Bunker Oil, 6 Oil, Crude Oil, Asphalt, Vegetable Oil, Biodiesel above B20, Avgas, Jet A, Jet A-1, Jet B, JP4, JP5, JP7, JP8, Cooking Oils, Sunflower Oil, Soy Oil, Peanut Oil, Olive Oil, etc. Acetates, Acetone, Esters, Ethylacetate, Hexane, MEK, Naphtha, Toluene, Xylene, etc. Carbon Tetra-Chloride, Methylene-Chloride, Perchloro-Ethylene, Trichloro-Ethylene, etc. Ethanol, Methanol, Butanol, Isopropyl, Isobutyl, Ethylene glycol, Propylene glycol, etc. Tap, Deionized, Demineralized, Potable, Nonpotable Water Nitrogen Solution; 28 %, 30 % or 32 %; 20 % Aqua-Ammonia; Urea; Ammonia Nitrate; N-P-K solutions; 10-34-0; 4-10-10; 9-18-9; etc. Herbicides: Round-up, Touchdown, Banvel, Treflan, Paraquat, Prowl, etc. Fungicides, Insecticides, Adjuvants, Fumigants Dual, Bicep, Marksman, Broadstrike, Doubleplay, Topnotch, Guardsman, Harness, etc. Fungicides Micronutrients 3-10-30; 4-4-27, etc. Liquid Molasses; Molasses plus Phos Acid and/or Urea; etc. Sulfuric Acid, Hydrochloric Acid, Phosphoric Acid, etc.	0.3 to 2500 0.44 to 2270	0.6 to 1.85
Heated Products (above 50 °C)	Bunker C, Asphalt, etc.		0.8 to 1.2

Product Family	Typical Products[1]	Viscosity[5] (Centipoise) (Centistokes)	Specific Gravity[2]
Compressed Liquids	LPG, Propane, Butane, Ethane, Freon 11, Freon 12, Freon 22, etc. Anhydrous Ammonia Note: If a meter is certified for anhydrous ammonia the same meter type may also be certified for LPG without further testing		0.1 to 0.77
Cryogenic Liquids and Liquefied Natural Gas	Liquefied Oxygen, Nitrogen, etc.		0.07 to 1.4
Compressed Gases	Compressed Natural Gas		0.6 to 0.8

Discussion/Conclusion: The WG presented their work to date and received comments and recommendations. One member stated his belief that the statement in the table that the Compressed Liquids Family was not applicable to positive displacement meters should be removed. If a manufacturer is able to produce a positive displacement meter that will measure compressed liquids appropriately, they should not be restricted from doing so. The WG will continue to develop the item for presentation and discussion at the next meeting. The WG will also look at identifying the units of measure and reference temperatures as appropriate for various products in the table.

3. NTEP Checklist for Water Meters in Submetering Applications

Source: NTEP Director

Background/Discussion: The NTEP Committee asked the MS to consider and develop a checklist for residential water meters. These devices will most likely be used for submetering. Several states have recently contacted NTEP regarding these devices. California already has evaluation and certification of these devices in their state. It is recommended that the Sector review the procedures used by California and rework them into a format acceptable to NCWM Publication 14.

Comments from the California NTEP laboratory:

I have found a Word version of the water meter checklist and test procedure and copied the specific section. This is used as an EPO for field enforcement, but the same guidelines are followed in type approval. Three tests at three flow rates are performed and repeatability is verified. The basic form can be printed and used for water meter tests. This follows HB 44 sections 1.10. and 3.36.

In type evaluation California uses a procedure (not a checklist) for the evaluator, which starts with an application review and other directives not pertinent to actual testing. An electronic form is available which is specific for the California provers. California follows the testing criteria of the EPO. The electronic form could probably be formatted to the Pub 14 format.

The California type evaluation checklist for Domestic Cold Water Meters was included as Appendix C of the 2006 meeting agenda.

At its 2006 meeting, the Sector agreed that the best approach for developing a Publication 14 checklist for water meters would be the utilization of a WG made up of technical experts and other interested parties. The members present at the meeting who volunteered to serve on the WG were: Dan Reiswig, California NTEP Laboratory; Jim Welch, Measurement Canada; and Rodney Cooper, Actaris Neptune. The Sector Chairman, Mike Keilty will also invite participation by water meter manufacturers AMR, Badger Meter, and Neptune water meter division.

At the time of development of the 2007 meeting agenda no information had been received from the WG. Following distribution of the initial agenda the California NTEP Laboratory submitted a draft checklist based on Handbook 44 that is used in their lab. The Sector reviewed the draft checklist to determine if it should be submitted to the NTEP Committee for inclusion in Publication 14 with or without modification as shown in Appendix D.

Conclusion: The Sector reviewed the checklist submitted by the California NTEP laboratory. The NTEP director stated that the draft checklist needs to be formatted for inclusion in Publication 14. The NTEP director and the California laboratory will convert the checklist into the proper format and submit it to the members with a ballot for approval prior to forwarding to the NTEP Committee for inclusion in Publication 14.

4. NTEP Checklist for LPG Vapor Meters in Submetering Applications

Source: NTEP Director

Background/Discussion: The NTEP Committee asked the MS to consider and develop a checklist for residential water meters. These devices will most likely be used for submetering. Several states have recently contacted NTEP regarding these devices. California already has evaluation and certification of these devices in their state. It is recommended the Sector review the procedures used by California and rework them into a format acceptable for NCWM Publication 14.

The California type evaluation checklist for LPG vapor meters was included as the Appendix D of the 2006 meeting agenda.

At its 2006 meeting, Sector agreed the best approach for developing a Publication 14 checklist for LPG vapor meters would be the utilization of a WG made up of technical experts and other interested parties. Dan Reiswig, California NTEP Laboratory, will provide a list of vapor meter manufacturers to be contacted for participation in the WG.

At the time of development of the 2007 meeting agenda no information had been received from the WG. At the meeting, the Sector reviewed a recommendation and considered changes to Publication 14 deemed appropriate.

Conclusion: After reviewing a draft presented by the California NTEP laboratory, the Sector agreed that "LPG" in the title should be changed to "Hydrocarbon Gas" so that the measurement of natural gas would be included. The California NTEP laboratory and the NTEP director will continue to develop this checklist for presentation and discussion at the next Sector meeting.

5. Testing Meters Made of Different Metals

Source: California NTEP Laboratory

Discussion/Background: The California NTEP Laboratory is conducting an NTEP evaluation of a family of meters using multiple products in different product families. The meter family includes meters made of aluminum and stainless steel. Because Publication 14 does not specifically address this scenario, the laboratory is asking for input from the Sector before testing starts.

At the 2006 meeting the Sector discussed the scenario described above. The following proposal was offered as a possible solution. The Sector reviewed the proposal for possible forwarding to the NTEP Committee for inclusion in Publication 14.

Proposal: Add a new Section F. to the Publication 14 Technical Policy as follows and renumber subsequent sections:

U. Meters Made of Different Materials within the Same Family

When multiple meters made of different materials within a meter family are submitted for evaluation all meters will be tested with at least one product from each product family to be included on the CC and at least one meter will be tested with the range of products required in the Product Family Table for the meter type (e.g., positive displacement, turbine, mass meter, etc.) submitted for evaluation.

The MMA provided the following white paper for Sector consideration during the discussion:

Meter Manufacturers Association

Speaking as experienced manufacturers of PD Meters, Turbine Meters, and Mass Meters, it is our experience that the materials of construction do not affect the quality of measurement over the specified operating range of a particular metering technology, as these have been considered and accounted for during the design phase of the meter.

It is the manufacturer's responsibility to ensure that the meter meets type; additionally, material selection is the manufacturer's responsibility and is typically driven by the requirements of chemical compatibility with the liquid products that are being measured or by industry regulations (e.g., non-ferrous meters for aircraft refueling).

Materials are not selected or modified for reasons of accuracy. The market does identify and eliminate the inferior products through the normal surveillance process as well as the manufacturer's warranty process.

It is normal industry practice to include material varieties such as stainless steel, aluminum, cast iron, plastic, etc., into one meter; for example, some of our PD meters have cast steel outer housings, stainless steel bearings, cast iron rotors, anodized aluminum blades or cast iron blades or plastic blades. Non-ferrous aircraft meters will utilize aluminum cast components and SS bearings. We manufacturer turbine meters with stainless steel housings and aluminum rotors. The point being the measurement accuracy is a function of the manufacturing process, not the materials used.

It is not the intent of HB 44 to differentiate between measurement technologies, only the intended application.

Doesn't material selection fall under measurement technology?

Where do you draw the line on NTEP lab decisions on the materials of construction?

The manufacturers believe that the answer to the question is in the **LONG** history of meters themselves. There are hundreds of thousands of meters in service in the United States used for direct sales (e.g., home heating oil delivery, loading rack wholesale deliveries, aircraft refueling, agriculture chemical deliveries, etc.). These meters are verified routinely by the local W&M agencies, and if problems are detected (accuracy out of range) then they are taken out of service.

Summary: The meter manufacturers make determination of materials of construction. Meter manufacturers make the determination of what particular attributes of a meter enable it to be considered as part of a family.

Questions that need to be answered in order to make an informed decision:

1) Is there a real world problem that requires a solution by the inclusion of a new section specifically aimed at materials in Pub 14?

2) Is there an inequity in the market, facilitation of fraud?

One of the NTEP laboratories stated that during an evaluation of a mass flow meter the performance was different for two meters with different "tube" materials. Two mass flow meter manufacturers stated that if both meters were calibrated for the product being measured there should be no difference in performance due to "tube" material. Another laboratory stated that the permanence test of a meter conducted after 30 days is not a true indicator of long-term permanence. Another member stated that NTEP should be interested in testing key characteristics and metrologically significant components.

After further discussion at the 2006 meeting, the Sector agreed that the best approach for resolving the issue of what components are "metrologically significant" and require additional evaluation was to include the discussion and development of a proposal for Sector consideration in the tasks of the WG formed to develop a new Family Product Table approach, as discussed in agenda Item 5.

Recommendation/Discussion: At the time of development of the 2007 meeting agenda no information had been received from the WG, nor was any formal update presented at the meeting. One industry member suggested the item be withdrawn. The Sector technical advisor cautioned the group that withdrawing the item would not resolve the question as to whether or not a change in material used in the construction of a meter would require that the model be resubmitted for NTEP evaluation in order to maintain a valid CC. The manufacturers present at the meeting met following the conclusion of the first day's agenda and came back with some suggestions for resolving the problem. One suggestion was for the manufacturer to submit a drawing listing material used, similar to what is done with Underwriters Laboratories, Inc. (UL), who evaluates or tests what they consider to be the worst case. Another suggestion was to include ASTM specifications for the original material and any replacement material. Some of the NTEP laboratories believed that changing material constitutes a change of design and, therefore, requires a new model designation.

Conclusion: The Sector was not able to reach a consensus on this item, and it will be carried over for further development and consideration at the next Sector meeting.

New Items

6. Revise NTEP Policy F "New Product Applications for Meters"

Source: Endress and Hauser

Background/Discussion: Publication 14 Policy F addresses "New Product Applications for Meters". Criteria 1 and Criteria 2 apply to an initial evaluation of a device where a new product family is added. However, when a device has been repeatedly evaluated, the entire range of meter sizes should be covered—not just one size larger and one size smaller.

Researching past NTETC Sector reports, Endress and Hauser found little information regarding Policy F. One year there was a little discussion from an unidentified lab reporting that Policy F was a necessity for initially submitted devices. Criteria 2, which requires the new product fall within a less strict NIST Handbook 44 accuracy class than the most strict accuracy class covered by the existing CC, places a restriction upon devices previously tested and held to a high level of performance. Endress and Hauser recommended that Criteria 2 be deleted from Policy F.

The Sector was asked to consider the request to delete Criteria 2 from Policy F and develop a recommendation to the NTEP Committee.

The NTEP laboratories discussed this item thoroughly. The California lab submitted a proposal to reverse requirements 1 and 2 of Section F in Publication 14. The laboratories were concerned that accuracy class should not be the only consideration for adding a new product to a CC. The family products subgroups and a product's physical characteristics should also be considered when determining what products can be added to an existing CC based on the testing of one additional product.

At the Sector meeting, Endress and Hauser explained they recently experienced a problem with an NTEP laboratory's interpretation of Section F during an evaluation. The Sector discussed the issue at length and developed the chart shown below as a replacement to the current text in Section F.

F. New Product Applications for Meters

~~**If a manufacturer wants to add a new product to an existing family of meters, the following criteria will be applied:**~~

~~**1. If the accuracy class in NIST Handbook 44 for the new product falls within the same NIST Handbook 44 accuracy class or a more strict accuracy class than the most strict accuracy class covered on the Certificate of Conformance, the entire range of meter sizes will be covered for the product tested.**~~

~~**2. If the accuracy class in NIST Handbook 44 for the new product falls within a less strict NIST Handbook 44 accuracy class than the most strict accuracy class covered by the Certificate, the new product will only be covered for the meters meeting the requirements of paragraph E, Meter Sizes to be Included on a Certificate of Conformance.**~~

Meter Sizes Covered when Adding a New Product					
Certificate Covers	**Test**	**Tolerance Class HB 44**	**Product Family Pub 14**	**New Certificate Covers**	**Example** (to be added)
Application for new CC	**1 meter**	**Any Accuracy Class (Tolerance)**	**Any Product Family**	**Policy E.**	
Range of Sizes	**1 meter**	**Same or New Accuracy Class with greater tolerance**	**Same Product Family**	**Current Range of Sizes + Policy E.**	
Range of Sizes	**1 meter**	**New Accuracy Class with smaller tolerance**	**Same Product Family**	**Policy E.**	
Range of Sizes	**1 meter**	**Any Accuracy Class**	**New Product Family**	**Policy E.**	
Range of Sizes with 2 or more Accuracy Classes and[1] 2 or more Product Families	**1 meter**	**Any Accuracy Class**	**Any Product Family**	**Current Range of Sizes + Policy E.**	

If the product being added is from a family of products that has been previously subjected to the permanence test, then the requirement for a permanence test may be waived provided the initial test of the product being added meets following conditions:

a) the results of the initial test were not questionable; and
b) multi-point calibration may not be used to add the new product.

Conclusion: The Sector agreed to forward the proposed changes to the NTEP Committee for approval and inclusion in Publication 14.

7. Add Testing Criteria to NTEP Policy U "Evaluating electronic indicators submitted separate from a measuring element"

Source: California NTEP Lab

Background/Discussion: Section U allows for testing an indicator separate from a measuring element. Specific test criteria has not been developed for this section.

Recommendation: Develop and add specific criteria for testing an indicator separate from a measuring element for this section. California recommended using Canada's test criteria as a guideline to develop the tests as outlined in Appendices A, B, and C.

Conclusion: The Sector agreed the California NTEP laboratory should lead a WG to develop a specific test procedure for review at the next Sector meeting. Members of the WG are Dave Rajala (Veeder Root Company), Rich Miller (FMC Measurement Solutions), Maurice Forkert (Tuthill Transfer Systems), Dmitri Karimov (Liquid Controls), Rodney Cooper (Actaris Neptune), and Ralph Richter (NIST).

8. Next Meeting

Background/Discussion: The Sector discussed the date and location for its next meeting.

Conclusion: The Sector agreed that the 2008 meeting should be held immediately prior to the Southern Weights and Measures Association Annual Meeting that is tentatively scheduled for October 12 - 16, 2008, at the Doubletree Hotel in Atlanta, Georgia.

Additional Items as Time Allows

9. Temperature Compensation for Liquid-Measuring Devices Code

Source: NCWM S&T Committee

Background/Discussion: The NCWM S&T Committee is considering a proposal to modify Section 3.30. Liquid-Measuring Devices (LMD) Code by modifying paragraphs S.2.6., S.2.7.1., S.2.7.3., N.4.1.1.(a) and (b), N.5., UR.3.6.1.1., and UR.3.6.1.2., to add new paragraphs S.1.6.8., S.2.7.2., S.4.3., UR.3.6.1.3., and UR.3.6.4., and to renumber other existing paragraphs as appropriate to recognize temperature compensation for retail devices as shown in Item 330-4 of the Final Report of the 2007 S&T Committee:

Prior to the 2007 NCWM Interim Meeting, the Committee recognized via reports from the regional L&R committees and other sources that there was increasing support within the weights and measures community to address temperature compensation features for the retail sale of petroleum products in the Liquid-Measuring Devices Code. In response to these concerns and to encourage uniformity in applications where temperature compensation is being used, the Committee developed this proposal to provide design and performance requirements and testing criteria for retail metering systems that incorporate temperature compensation capability. The Committee was also concerned that if the current L&R Committee's proposed language for the Method of Sale of Commodities in NIST HB 130 was adopted, retail motor-fuel devices could be placed in service with no guidelines in NIST HB 44 for type approval and field testing. The L&R proposed language would permit the temperature-compensated sale of petroleum products at all levels of distribution.

At the Interim Meeting, the L&R Committee moved forward with a Method of Sale proposal containing permissive language for retail sales of petroleum products using automatic temperature compensation (see L&R Item 232-1). Although the Committee recognized that this S&T item was still not fully developed, it felt it could resolve the remaining issues in time for the NCWM Annual Meeting in July 2007; therefore, the Committee unanimously voted to make this item a "priority" Voting item as described in Section H of the Introduction of HB 44. The Committee

felt strongly that if the L&R item passed it was very important there be a corresponding S&T item that provided HB 44 guidance as described above. Following the Committee vote, the Committee chairman went before the NCWM Board of Directors (BOD) for their input. The BOD instructed the Committee to make this an Information item. Irrespective of the concerns about the timing of adoption of language in HB 130, after further deliberation the Committee concurred with the BOD and added the proposal to its agenda as an Information item. The BOD further informed the Committee of its plan to form a steering committee to provide guidance and give support to both the S&T and L&R Committees on temperature compensation issues. The Committee looks forward to working with the steering committee on this important issue.

This item is still in development. Below are some of the issues the Committee is currently working on.

Recorded Representations (S.1.6.7.): What, if any, abbreviations are acceptable for devices equipped with ATC (e.g., gal at 60 ºF)?

API Gravity: How should the API gravity be entered in the device and what API gravity should the inspector use during test? Should an average API gravity be used (national or state)? The Committee will work on gathering API data in order to resolve this issue.

Difference between Net and Gross (T.4.): Is the current tolerance of 0.1 % (electronic) appropriate for field-testing of retail devices with ATC? Will maintaining our current tolerances mean taking extra drafts to obtain a stable temperature? The Committee will gather data concerning temperature measurement.

The Committee will continue work on this item and will seek input from the regions and other interested parties in the weights and measures community.

Background/Discussion: The Sector was asked, if time allowed, to review the proposed changes to the LMD code and provide comments and recommend changes to the NCWM S&T Committee.

Conclusion: The Sector did not have time to review this item during the meeting.

List of Appendices

Appendix A – Measurement Canada Approval Procedure for Electronic Registers and Printers

Appendix B – Measurement Canada Approval Procedure for Linearization Functions Incorporated in Measuring Instruments

Appendix C – Measurement Canada Approval Procedure for Automatic Temperature Compensator Electronic Type

Appendix D – Checklist and Test Procedures for Water Meters

(Note: The appendices were distributed as separate documents with the 2007 Sector Agenda. Copies are available from NIST/WMD.)

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