Appendix A

National Type Evaluation Technical Committee (NTETC) Grain Analyzer Sector

August 25 - 26, 2010
Kansas City, Missouri

Meeting Summary

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1. Report on the 2010 NCWM Interim and Annual Meetings

The 95th Annual Meeting of the National Conference on Weights and Measures (NCWM) was held July 11 - 15, 2010, in St. Paul, Minnesota. No Grain Moisture Meter (GMM) or Near Infrared (NIR) Grain Analyzer items appeared in the Specifications and Tolerances (S&T) Committee Interim Report for consideration by the NCWM at the 2010 Annual Meeting.

Mr. Jim Truex, National Type Evaluation Program (NTEP) Administrator, reported that Annual Meeting attendance this year was down to approximately 250 registrants with only 35 - 36 states participating. There was some speculation that the attendance drop was partly due to the economy. Conference membership for 2010 is down approximately 200 from 2009. A similar drop in membership occurred the previous year. NCWM is running smoothly; in spite of the drop in membership, the Conference is in sound financial shape.

Other General Code items of interest to the Sector were non-voting items related to software and provisions for sealing electronic adjustable components. [See Grain Analyzer Sector Agenda Items 5, 6, and 7.]

2. Report on NTEP Type Evaluations and On-going Calibration Program (OCP) (Phase II) Testing

Ms. Cathy Brenner of the Grain Inspection, Packers and Stockyards Administration (GIPSA), the NTEP Participating Laboratory for Grain Analyzers, briefed the Sector on NTEP Type Evaluation activity. A Phase I evaluation is currently underway for one new grain moisture meter. Annual GMM calibration reviews were completed on schedule and updated Certificates of Conformance (CCs) were issued for six device types. Six device types are enrolled in the OCP (Phase II) for the 2010 harvest:

Bruins Instruments	**OmegAnalyzerG**
DICKEY-john Corporation	GAC2000 NTEP, GAC2100, GAC2100a, GAC2100b
DICKEY-john Corporation	GAC2500 (first year for this instrument)
Foss North America	Infratec 1241
Perten Instruments	AM5100
The Steinlite Corporation	SL95

[**Note:** Models listed on a single line are considered to be of the same "type."]

Ms. Brenner pointed out that plans to resume work on an addition to and the remodeling of the Federal Grain Inspection Service (FGIS) Technical Services Division Building can have an impact on NTEP testing. Of major concern is the loss the walk-in environmental chamber. The chamber will be completely disassembled and removed to make way for utility hook-ups. It is likely to be the last item to be restored to operating condition. If started in September, the new addition is tentatively scheduled to be completed in March. Some of the labs will then be moved to the new building. The labs remaining in the old building will be rearranged to allow renovations to be made to the empty portion of the old building. Those labs will then be moved into the renovated portion so the renovation can be completed. The air-oven lab, NTEP lab, the moisture meter lab, among others, would each have to be relocated twice in the remodeling process. At least two years of renovations and disruptions are anticipated.

Other facilities are being looked into as possible interim sites where Phase I environmental testing might be performed. One possibility for manufacturers with suitable walk-in environmental chambers would be for GIPSA to perform the tests on site. There is also the possibility that facilities might be available for GIPSA to use on a short term rental basis. Alternatively, testing could be subcontracted to other NTEP laboratories. There are questions of how the added cost of on-site, rental, or subcontracting can be handled and what additional training other NTEP laboratories might require for conducting tests unique to grain moisture meters (GMMs). If these details cannot be resolved satisfactorily, testing might have to be deferred until the new facility is fully operational.

Some of the facilities suggested include: Kansas State University, Ohio Department of Agriculture, and Iowa Department of Agriculture. Additional sites are being investigated.

3. Review of Ongoing Calibration Program (Phase II) Performance Data

At the Sector's August 2005 meeting, it was agreed that comparative Ongoing Calibration Program (OCP) data identifying the Official Meter and listing the average bias for each NTEP meter type should be available for annual review by the Sector. Accordingly, Ms. Brenner, representing GIPSA, the NTEP Participating Laboratory for Grain Analyzers, presented data showing the performance of NTEP meters compared to the air oven. These data are based on the last three crop years (2007 - 2009) using calibrations updated for use during the 2010 harvest season.

Four meter types were included in the comparison graphs: DICKEY-john's GAC2100, Foss's Infratec 1241, Perten's AM5100, and Steinlite's SL95. Only the GAC2100 has been identified on the comparisons. It is identified as "Official Meter". The remaining three instruments were randomly assigned numbers 1, 2 and 3, or, in the case of sunflowers, A and B.

[**Note:** The 2007 - 2009 GMM Phase II comparison graphs were distributed with the August 2010 Grain Analyzer Sector Agenda. Until completion of the NCWM Interim Meeting, held in January 2011, they can be downloaded from the NCWM web site using the following link:

http://www.ncwm.net/sites/default/files/meetings/grain_analyzer/2010/10_GMM_Bias.pdf
After that time, all Grain Analyzer Sector Meeting documents will be moved to the NCWM web site Meetings Archive Folder.]

Ms**.** Brenner pointed out that sunflower results were included this year. They had been eliminated last year to preserve confidentiality, because only two meters were approved for sunflowers and one of them was the Official Meter. This year there are now two meters in addition to the Official Meter with sunflower results.

The 2009 crop year was atypical especially for Corn and Rough Rice. Many of the samples received were of low test weight per bushel (TW) or of low quality. Two of the meters showed abnormal results especially in the 14 % to 16 % moisture range. When performance was reviewed before calibrations were adjusted (using the calibrations from the 2009 harvest), out of five meters in the program two meters passed, and three just barely failed if 2009 data was included. When 2009 data was ignored, all meter passed.

Dr. Richard Pierce, GIPSA, expanded on Ms. Brenner's comments, explaining that they had received many more low TW samples than in previous years. Under usual circumstances GIPSA might have decided that this is not the kind of data that they wanted to use for the calibration program, and they could have deleted those samples. This wasn't done because the effects of low TW differ radically from one meter type to the next. Some read low if TW is low, others may read high, and some are not affected. As a result, GIPSA didn't believe there was a valid reason for deleting those samples. As one of the lower frequency meters, the Official Meter seems to be more sensitive to unusual grain conditions. This has shown up on the rice samples, and there have been issues in the 14 % to 16 % moisture range with corn.

At the last Grain Inspection Advisory Committee meeting, GIPSA was asked if there was anything they could do to improve the moisture calibrations for rice and corn. Dr. David Funk, GIPSA, told the Committee that the meter is doing as well as it can for the technology that is used. He suggested that if this is a serious problem for the Committee, then GIPSA may need to look at selecting a new meter technology that performs better on these atypical crops. The Advisory Committee responded by suggesting that GIPSA move forward and explore that. Although there is presently no agency decision and no firm timeline regarding selecting a replacement for the current Official Meter, Dr. Pierce was of the belief that we are now at the point where manufacturers and agencies within GIPSA need to be made aware that this could be coming and it could be coming fairly quickly.

Dr. Funk indicated his willingness to make the same Power Point presentation to the Sector that he had given to the Grain Inspection Advisory Committee if the Sector was interested in hearing more on this subject. The Sector agreed to amend the Agenda to include Dr. Funk's presentation. [Note: See Agenda Item **14. Future Direction of Moisture Measurement Technology**.]

4. Report on New GIPSA/NIST Interagency Agreement for 2010 – 2014

The five-year Interagency Agreement that provides funding and defines the fee schedule for the NTEP Phase II GMM OCP expired September 30, 2009 (the end of the Federal Government's Fiscal Year 2009). At the time of the Sector's August 2009 meeting, a new Interagency Agreement was being reviewed by the National Institute of Standards and Technology's (NIST's) legal office. The new agreement was finally approved in the spring of 2010.

Dr. Pierce, GIPSA, explained the fee table showing how fees are calculated based on the number of meter types in the program. With six device types presently enrolled in Phase II for the 2010 harvest the cost to manufacturers will be $8750 per device type. If a seventh meter enters the program, the cost per device type per year increases to $10,715. Dr. Pierce noted that over the last 15 years the number of meters in the program each year has varied from 5 to 7.

The fee schedule for the new agreement is shown below:

NTEP On-going Calibration Program Fee Schedule For Year 2010 to 2014							
(1) Total Meters (including official meter)	(2) Meters In NTEP Pool	(3) Cost Per Pool Meter	(4) Total Program Cost	Funding Contribution From Participants			
				(5) NIST	(6) GIPSA	(7) Mfg's (total funding from mfg's)	(8) Cost Per Meter Type
2	1	22,500	22,500	7,500	7,500	7,500	3,750
3	2	22,500	45,000	15,000	15,000	15,000	5,000
4	3	22,500	67,500	22,500	22,500	22,500	5,625
5	4	22,500	90,000	30,000	30,000	30,000	6,000
6	5	22,500	112,500	30,000	30,000	52,500	8,750
7	6	22,500	135,000	30,000	30,000	75,000	10,715
8	7	22,500	157,500	30,000	30,000	97,500	12,185
9	8	22,500	180,000	30,000	30,000	120,000	13,335

Column	Explanation (or formula for calculating)
(1) Total Meters	The number of meter types (including the Official GIPSA meter) that will share in the NTEP calibration costs.
(2) Total Meters in NTEP Pool	The number of meter types other than the Official meter that will share in the NTEP calibration costs.
(3) Cost per Pool Meter	The cost associated with each pool meter in the program.
(4) Total Program Cost	A per meter type cost of $22,500 times the number of NTEP "pool" meters.
(5) NIST Contribution	One-third the total program cost up to a maximum of $30,000.
(6) GIPSA Contribution	One-third the total program cost up to a maximum of $30,000.
(7) Manufacturers Contributions (total funding from manufacturers)	Total Program Cost minus NIST Contribution minus GIPSA Contribution.
(8) Cost per Meter Type	Manufacturers' Contributions divided by Total Meters (including the Official meter).

5. Item 310-1 G-S.8. Provision for Sealing Electronic Adjustable Components, G-S.8.1., Adjustment Mode Indication, and Definitions for Adjustment and Adjustment Mode

Background: This item originated from the Southern Weights and Measures Association (SWMA) and first appeared on the S&T Committee's 2008 agenda. The proposal added requirements to G-S.8. to assure that a device could not be sealed in the configuration mode and continue to operate normally. Such a condition could facilitate fraud. The proposal as submitted required that a device continuously indicate when access to the set-up mode was not disabled.

At the 2008 Interim Meeting, the S&T Committee reviewed comments received during the open hearing and discussed alternate proposals provided by NIST Weights and Measures Division (WMD) and the Scale Manufactures Association (SMA). At the 2008 Annual Meeting, the WMD suggested that the S&T Committee amend the recommendation to address some of the concerns noted by the CWMA, NTEP participating laboratories, and WMD since the 2008 Interim Meeting. The item remained Informational for the 2008 Annual Meeting

During the open hearings at the 2009 Interim Meeting, WMD stated that it had received comments questioning how the application of a physical seal (as recommended by the manufacturer and listed on the Certificate of Conformance [CC]) ensures that the calibration and configuration modes are disabled. What does that presence of the physical seal (pressure sensitive or lock and wire) do to the device that disables the calibration and configuration modes? The S&T Committee agreed with the comments that the proposal ***was not ready*** to become a Voting item and recommended that the item remain Informational for 2009.

At the 2010 NCWM Interim Meeting, WMD stated that it remained concerned about devices which could be sealed while allowing access to calibration or configuration changes without breaking that seal. WMD agreed with the position of the NCWM S&T Committee that the current language in paragraph G-S.8. requires that a security seal be broken before a metrological change can be made to a device (or other approved means of security such as an audit trail provided). Thus, once a security seal is applied, it should not be possible to make a metrological change to the device without breaking that seal. Since this philosophy addresses provisions for protecting access to any metrological adjustment, the philosophy should be applied consistently to all device types. WMD encouraged the S&T Committee to reiterate in its Interim and Final Reports the correct interpretation of G-S.8. as the Committee and the Measuring Sector have done in the past, and as demonstrated in more recent actions by the Weighing Sector.

The S&T Committee agreed that a device must be equipped with an approved audit trail or that a physical seal is required to be broken before any metrological adjustments to comply with paragraph G-S.8. The Committee also believed that an indication that the adjustment mode is in operation is only necessary for devices with approved electronic methods of sealing. Additionally, the adjustment mode indicator should not be operable during normal weighing or measuring operations. The Committee agreed that if a device designed for commercial applications is capable of being sealed and still allows external or remote access to the calibration or configuration mode, then that device is clearly in violation of the current provisions in G-S.8. Provision for Sealing Electronic Adjustable Components and G-S.2. Facilitation of Fraud and, therefore, no change to the existing language in paragraph G-S.8. would be needed. The S&T Committee believed that type evaluation procedures have been amended in applicable sections of NCWM Pub 14 to address the issues of incorrectly applying the requirements in G-S.8. The Committee also noted that there was some confusion regarding the meaning of the terms “adjustment” and “adjustment mode” in the CWMA Annual Meeting reports.

The S&T Committee received no comments addressing potential inconsistent interpretations of the requirements by field officials, requirements for adjustment mode indications, and limitations on metrological indications while in the adjustment mode in any proposals. Consequently, the Committee developed a revised proposal that:

- does not change the existing text in G-S.8.;
- adds language that restates the intent of G-S.8.;
- adds language to address metrological (legal for trade) measurements while in an adjustment mode;
- adds a new paragraph G-S.8.1. that requires an indication and, recorded representations while in the adjustment mode (if equipped with a printer); and
- adds new definitions for “adjustment” and “adjustment mode” from the white paper on the “Metrological Requirements for Audit Trails” adopted by NCWM in July 1993 to facilitate a common understanding of the terms.

The S&T Committee also recommended that the amended proposal be given Informational status to allow interested parties sufficient time to analyze and comment on the most recent language that appears in the “Item Under Consideration” below:

[See the 2008 NCWM Annual and 2009 Interim and Annual Reports for additional background information.]

Item Under Consideration:

Amend General Code paragraph G-S.8. and subsequent subparagraphs.

G-S.8. Provision for Sealing Electronic Adjustable Components. *- A device shall be designed with provision(s) for applying a security seal that must be broken, or for using other approved means of providing security (e.g., data change audit trail available at the time of inspection), before any change that detrimentally affects the metrological integrity of the device can be made to any electronic mechanism.* ***That is:***

(a) It shall not be possible to apply a physical security seal to the device while it is in the calibration and/or configuration mode nor to access the calibration and/or configuration (adjustment) mode when sealed; or

(b) The calibration and/or configuration adjustments are protected by an approved method for providing security (e.g., data change audit trail).

A device may be fitted with an automatic or a semi-automatic calibration mechanism. This mechanism shall be incorporated inside the device. After sealing, neither the mechanism nor the calibration process shall facilitate fraud.

During any mode of operation in which adjustments can be made, devices shall not provide indications that can be interpreted, transmitted into memory, or printed as a usable (legal) measurement value.*
[Nonretroactive as of January 1, 1990]
[Nonretroactive as of January 1, 201X]
(Added 1985) (Amended 1989**, ~~and~~** 1993**, and 201X**)

G-S.8.1. Adjustment Mode Indication. For electronic devices protected by an approved means for providing security (e.g. data change audit trail), the device shall clearly and continuously indicate and print, if equipped with a printer, that the calibration and configuration adjustment modes are enabled. [Nonretroactive as of January 1, 201X]

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G-S.8.~~1~~2. Multiple Weighing or Measuring Elements that Share a Common Provision for Sealing. *– A change to any metrological parameter (calibration or configuration) of any weighing or measuring element shall be individually identified.*
[Nonretroactive as of January 1, 2010]

Note: For devices that utilize an electronic form of sealing, in addition to the requirements in G-S.8.~~1~~2., any appropriate audit trail requirements in an applicable specific device code also apply. Examples of identification of a change to the metrological parameters of a weighing or measuring element include, but are not limited to:

(1) a broken, missing, or replaced physical seal on an individual weighing, measuring, or indicating element or active junction box;

(2) a change in a calibration factor or configuration setting for each weighing or measuring element;

(3) a display of the date of calibration or configuration event for each weighing or measuring element; or

(4) counters indicating the number of calibration and/or configuration events for each weighing or measuring element.

(Added 2007)

Add applicable definitions to Appendix D from a white paper on the "Metrological Requirements for Audit Trails" adopted by NCWM in July 1993.

Adjustment mode. An operational mode of a device which enables the user to make adjustments to sealable parameters, including changes to configuration parameters.

Adjustment. A change in the value of any of a device's sealable calibration parameters or sealable configuration parameters.

Discussion: This item is a carryover from the Grain Analyzer Sector's August 2009 meeting (Agenda Item 9). At that time, the changes did not appear to affect the provisions for sealing GMMs and NIR Grain Analyzers. However, if the most recent language proposed for **G-S.8.** and its sub-paragraphs, see **"Item Under Consideration"** above, is the version that will ultimately be accepted, changes will have to be made in both the GMM Code in HB 44 and the GMM checklist in Pub 14.

The necessary changes could be addressed as follows:

1) Incorporate the essence of the proposed changes to G-S.8. and applicable subparagraphs; retain the simple device categories of the existing GMM Code; broaden the scope of Category 3 by removing "remotely"; and add a note to **Table S.2.5.** to explain the meaning and scope of "Remote configuration capability." This is accomplished by amending paragraph **S.2.5. Provision for Sealing** and **Table S.2.5. Categories of Device and Methods for Sealing** of HB 44 **Section 5.56.(a) Grain Moisture Meters,** and amending all the GMM Pub 14 checklist items under the heading **Code Reference: S.2.5. Provision for Sealing** to include the proposed additions/amendments to **G-S.8.**

The suggested GMM HB 44 changes are as follows:

S.2.5. Provision for Sealing. – Provision shall be made for applying a security seal in a manner that requires the security seal to be broken, or for using other approved means of providing security (e.g., audit trail available at the time of inspection as defined in Table S.2.5. Categories of Device and Methods of Sealing) before any change that affects the metrological integrity of the device can be made to any ***electronic*** mechanism. ***That is:***

(a) It shall not be possible to apply a physical security seal to the device while it is in the calibration and/or configuration mode nor to access the calibration and/or configuration (adjustment) mode when sealed; or

(b) The calibration and/or configuration adjustments are protected by an approved method for providing security (e.g., data change audit trail).

During any mode of operation in which adjustments can be made, devices shall not provide indications that can be interpreted, transmitted into memory, or printed as a usable (legal) measurement value.

[Nonretroactive as of January 1, 201X]

(Amended **201X**)

Table S.2.5.
Categories of Device and Methods of Sealing

Categories of Device	***Methods of Sealing***
Category 1: *No remote configuration capability.*	*Seal by physical seal or two event counters: one for calibration parameters (000 to 999) and one for configuration parameters (000 to 999). If equipped with event counters, the device must be capable of displaying, or printing through the device or through another on-site device, the contents of the counters.*
Category 2: *Remote configuration capability, but access is controlled by physical hardware.* *A device shall clearly indicate that it is in the remote configuration mode and shall not be capable of operating in the measure mode while enabled for remote configuration.*	*The hardware enabling access for remote communication must be at the device and sealed using a physical seal or two event counters: one for calibration parameters (000 to 999) and one for configuration parameters (000 to 999). If equipped with event counters, the device must be capable of displaying, or printing through the device or through another on-site device, the contents of the counters.*
Category 3: *Remote configuration capability access may be unlimited or controlled through a software switch (e.g., password).* *When accessed* ~~***remotely***~~ *for the purpose of modifying sealable parameters, the device shall clearly* ~~***and continuously***~~ *indicate that it is in the configuration mode and shall not be capable of operating in the measuring mode.*	*An event logger (**e.g., a data change audit trail)** 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 (for calibration changes consisting of multiple constants, the calibration version number may be used rather than the calibration constants). A printed copy of the information must be available through the device or through another on-site device. The event logger shall have a capacity to retain records equal to twenty-five (25) 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.)*
Category 3a: *No remote capability, but operator is able to make changes that affect the metrological integrity of the device (e.g., slope, bias, etc.) in normal operation.*	*Same as Category 3*
Category 3b: *No remote capability, but access to metrological parameters is controlled through a software switch (e.g., password).*	*Same as Category 3*
Note: Remote configuration capability is defined in HB 44 as the ability to adjust a weighing or measuring device or change its sealable parameters from or through some other device that is not itself necessary to the operation of the weighing or measuring device or is not a permanent part of that device. As used in this table, "remote configuration capability" also includes the ability of the measuring device to accept new or revised sealable parameters from a memory chip, external computer, network, or other device plugged into a mating port (e.g., USB port) on the measuring device or connected wirelessly to the measuring device. (Added 201X)	

[*Nonretroactive as of January 1, 1999* ***and January 1, 201X***]
(Amended 1998)

Note: Zero-setting and test point adjustments are considered to affect metrological characteristics and must be sealed.
(Added 1993) (Amended 1995 and 1997)

Any additions/changes to the GMM section of HB 44 will also need to be made to the corresponding Sections to Pub 14.

Comments/Conclusions: Several Sector members questioned the need for adding "and continuously" to the second paragraph of Category 3 in Table S.2.5. reasoning that menu-driven devices typically allow access to a configuration

mode only by password. Once in a configuration mode, it is not possible to make measurements without first leaving the configuration mode. The Sector agreed that "and continuously" should be deleted.

Please note that this proposal is in response to an informational item on the NCWM S&T agenda. Consideration of the suggested changes and additions depends on further discussion of this item and on the final action taken by the S&T Committee on **Item 310-1**. This will remain a carryover item for the next Grain Analyzer Sector meeting.

6. Item 310-3 G-S.1. Identification. – (Software)

Purpose: This proposal is intended to amend the identification marking requirements for all electronic devices manufactured after a specified date by requiring that metrological software version or revision information be identified. Additionally, the proposal will list methods, other than "permanently marked," for providing the required information.

Background: Starting at the October 2007 meeting, the Software Sector has discussed the value and merits of required markings for software. After several iterations, the Software Sector developed a table to reflect their positions. This table was submitted to NCWM S&T Committee and was assigned Developing status in 2008. However, the Software Sector did not include a recommendation on how to incorporate the proposal into existing G-S.1. and G-S.1.1. language. In particular, WMD was concerned about properly addressing the various existing requirements and multiple non-retroactive dates.

Prior to the NCWM 2009 Interim Meeting, NIST WMD commented on S&T Item 310-3, and presented an alternate proposal with significant modifications, which were included in the Interim Meeting Agenda background for the item. There was much additional comment and various proposed versions of the table from NIST WMD, et al.

[Note: For the complete background on Item 310-3 refer to the Specifications and Tolerances Committee Interim Agenda for the 2010 NCWM Interim Meeting as it appeared in Pub 15, 2010. This is available on line at: http://ts.nist.gov/WeightsAndMeasures/Publications/upload/08-ST-10-Pub15-FINAL.pdf.]

At the 2009 Software Sector Meeting, it was agreed that the proposed table had not accomplished the intended purpose of clarifying the requirements. To remove some of the confusion the Software Sector revisited this item from the beginning modifying the text of G-S.1. to match the Software Sector's original intent.

At its March 2010 meeting, the Software Sector, in response to comments heard during the 2010 Interim meeting, revised the proposed language changes described in the S&T Committee Interim Agenda **Item 310-3**. These revisions removed existing mention of "not-built-for purpose" and the differentiation between Type P and Type U software types. The first sentence of G-S.1. was restored to the current HB 44 wording.

The Software Sector also initiated discussion on two new concepts, which may eventually result in additional recommendations to amend G-S.1. First, the Software Sector sees merit to requiring some "connection" between the software identifier (i.e., version/revision) and the software itself. The proposal was as follows (with the expectation that examples of acceptable means of implementing such a link would be included in Pub 14).

Add a new sub-subparagraph **G-S.1.(d)(3)**:

> ***"The version or revision identifier shall be directly and inseparably linked to the software itself. The version or revision identifier may consist of more than one part, but at least one part shall be dedicated to the metrologically significant software."***

Second, it seems that at each meeting of the Software Sector, the states reiterate the problems they have in the field locating the basic information required when the CC number is marked via the rather general current **HB 44** requirement of 'accessible through an easily recognizable menu, and if necessary a sub-menu' [**G-S.1.1.(b)(3)**]. The states have indicated that this is too vague and field inspectors often cannot find the certificate number on unfamiliar devices.

The Software Sector would like feedback on the proposal to specify a limited number of menu items/icons for accessing the CC number (if is not hard-marked or continuously displayed) in subparagraph (c) as follows:

(b) The CC Number shall be:

(3 accessible through ***one or, at most, two levels of access.***

(i) For menu-based systems, "Metrology", "System Identification", or "Help".

(ii) For systems using icons, a metrology symbol ("M" or "SI"), or a help symbol ("?," "I," or an "i" within a magnifying glass).

To facilitate a review of the suggested amendments, additions, and changes to G-S.1. and its sub-paragraphs, the current HB 44 language has been marked up below to show all of the suggested modifications.

G-S.1. Identification. – All equipment, except weights and separate parts necessary to the measurement process but not having any metrological effect, shall be clearly and permanently marked for the purposes of identification with the following information:

(a) the name, initials, or trademark of the manufacturer or distributor;

(b) a model identifier that positively identifies the pattern or design of the device;

(1) The model identifier shall be prefaced by the word "Model," "Type," or "Pattern." These terms may be followed by the word "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.). The abbreviation for the word "Model" shall be "Mod" or "Mod." Prefix lettering may be initial capitals, all capitals, or all lowercase.
[Nonretroactive as of January 1, 2003]
(Added 2000) (Amended 2001)

(c) a nonrepetitive serial number, except for equipment with no moving or electronic component parts ***~~and not built for purpose, software-based devices;~~***
[Nonretroactive as of January 1, 1968]
(Amended 2003 **and 201X**)

(1) The serial number shall be prefaced by words, an abbreviation, or a symbol, that clearly identifies the number as the required serial number.
[Nonretroactive as of January 1, 1986]

(2) Abbreviations for the word "Serial" shall, as a minimum, begin with the letter "S," and abbreviations for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., S/N, SN, Ser. No., and S. No.).
[Nonretroactive as of January 1, 2001]

(d) the current software version or revision identifier for ***~~not built for purpose~~*** ***software-based electronic*** *devices;*
[Nonretroactive as of January 1, 2004]
(Added 2003) **(Amended 201X)**

(1) The version or revision identifier shall be prefaced by words, an abbreviation, or a symbol, that clearly identifies the number as the required version or revision.
[Nonretroactive as of January 1, 2007]

(Added 2006)

(2) Abbreviations for the word "Version" shall, as a minimum, begin with the letter "V" and may be followed by the word "Number." Abbreviations for the word "Revision" shall, as a minimum, begin with the letter "R" and may be followed by the word "Number." The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.).
[Nonretroactive as of January 1, 2007]

(Added 2006)

(3) The version or revision identifier shall be directly and inseparably linked to the software itself. The version or revision identifier may consist of more than one part, but at least one part shall be dedicated to the metrologically significant software.

(Added 201X)

(e) an NTEP CC number or a corresponding CC Addendum Number for devices that have a CC. The CC Number or a corresponding CC Addendum Number shall be prefaced by the terms "NTEP CC," "CC," or "Approval." These terms may be followed by the word "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.)
[Nonretroactive as of January 1, 2003]

The required information shall be so located that it is readily observable without the necessity of the disassembly of a part requiring the use of any means separate from the device.

(Amended 1985, 1991, 1999, 2000, 2001, 2003~~, and,~~ 2006 **and 201X**)

G-S.1.1. Location of Marking Information for ~~Not Built For Purpose~~ Software-Based Electronic Devices. – *For ~~not built for purpose,~~ software-based devices either:*

(a) The required information in G-S.1. Identification. ~~(a), (b), (d), and (e)~~ shall be permanently marked or continuously displayed on the device; or

(b) The Certificate of Conformance (CC) Number shall be:

(1) permanently marked on the device;

(2) continuously displayed; or

(3) accessible through ~~an easily recognized menu and, if necessary, a submenu. Examples of menu and submenu identification include, but are not limited to, "Help," "System Identification," "G-S.1. Identification," or "Weights and Measures Identification."~~ ***one or, at most, two levels of access.***

(i) For menu-based systems, "Metrology", "System Identification", or "Help".

(ii) For systems using icons, a metrology symbol ("M" or "SI"), or a help symbol ("?," "I," or an "i" within a magnifying glass).

Note: *For (b), clear instructions for accessing the information required in G-S.1.(a), (b),* ***(c),*** *and (d) shall be listed on the CC, including information necessary to identify that the software in the device is the same type that was evaluated.*

[Nonretroactive as of January 1, 2004 ***and 201X****]*

(Added 2003) (Amended 2006 **and 201X**)

Discussion: It should be noted that these new ideas are in the developmental stage, and are included here at the request of the Software Sector, which is seeking comments from interested parties. The Grain Analyzer (GA) Sector is asked to comment on the proposed changes to G-S.1. and G-S.1.1. shown above, specifically those that will most affect Grain Analyzers.

1. G-S.1.(d) and its sub paragraphs will require a software version or revision identifier that is directly and inseparably linked to the software itself; and

2. G-S.1.1. and its sub paragraphs will allow the identifiers required in G-S.1. to be either permanently marked or continuously displayed for software-based electronic devices. This includes the software version or revision identifier. It also allows display of the CC number to be accessible by menu or icon (as opposed to continuously displayed.)

3. If not either permanently marked or continuously displayed, the CC Number will have to be accessible through one or two levels of access identified by the labels, "Metrology", "System Identification", or "Help" in menu based systems, or for systems using icons, a metrology symbol ("**M**" or "**SI**"), or a help symbol ("**?**," "**I**," or an "**i**" within a magnifying glass). Note that this is not suggested to be the final list of valid options; the Software Sector would like to have feedback specifically on additional menu text/icon images that should be considered acceptable. The Software Sector feels that the number of acceptable options is less of an issue (within reason) than the fact that the list is finite.

Comments/Recommendations: The GA Sector found the wording of G-S.1.1. confusing. It seemed to say that the markings spelled out in G-S.1. were to be ***EITHER*** *permanently marked or continuously displayed on the device* ***OR*** *the Certificate of Conformance (CC) Number shall be either: permanently marked or continuously displayed, or accessible through menu or icon.* To some, this implied that the software version identifier did NOT have to be displayed. Others believed that the "***OR***" phrase meant that only the CC had three options for marking (permanent, continuously displayed, or accessible via menu or icon), and that the software/firmware version/revision number must be either permanently marked or continuously displayed.

Regardless of how the wording is interpreted, the GA Sector agreed that it was not practical to permanently mark or continuously display the software/firmware version/revision identifier for GMMs. The GA Sector recommends that G-S.1.1.(b) be amended to include accessing the software version or revision identifier by menu or icon. At present all NTEP GMMs are built-for-purpose. They all have permanently marked CC numbers. Software version/revision identifiers, however, are accessible by menu or icon. GMM displays are of limited size. Some existing devices don't have room to display the software version/revision identifier on every "screen". Hard marking of that identifier is not practical, because it precludes updating software without also replacing the hard-marked label.

7. Other Software Requirements That May Impact Grain Analyzers

The items under this heading are mostly excerpts from the Software Sector's March 2010 meeting summary intended to keep Grain Analyzer Sector Members informed of developmental software requirements that may impact grain analyzers. For more detailed information, see the complete Software Sector meeting summary at: http://www.ncwm.net/sites/default/files/meetings/software/2010/10_Software_Summary.pdf

a. Identification of Certified Software

[**Note:** This item is now partially covered by the provisional proposal to make G-S.1.(d) applicable to software-based electronic devices and by adding the following new sub-subparagraph **G-S.1.(d)(3)**:]

"The version or revision identifier shall be directly and inseparably linked to the software itself. The version or revision identifier may consist of more than one part, but at least one part shall be dedicated to the metrologically significant software."

Also the Software Sector recommends the following information be added to Pub 14 as explanation/examples:

- *Unique identifier must be displayable/printable on command or during operation, etc.*
- *At a minimum, a version/revision indication (1.02.09, rev 3.0 a, etc.). Could also consist of/contain checksum, etc. (crc32, for example).*

Software Sector Conclusions: The item needs additional discussion and development by the Software Sector. Outstanding questions: If we allow hard-marking of the software identifier (the Sector has wavered on this in the past), does the above wording then imply that some mechanical means is required (i.e., physical seal) to 'inseparably link' the identifier to the software? Do we still have to be able to display/print the identifier if it is hard-marked?

b. Software Protection / Security

Background: The Software Sector derived a trial Pub 14 checklist based on the International Organization of Legal Metrology (OIML) checklist to verify that the software adequately protected against fraudulent modification as well as accidental or unintentional changes. The checklist has been distributed to current NTEP labs for use on a trial basis for new type approval applications.

Devices with embedded software TYPE P (aka built-for-purpose)			
	Declaration of the manufacturer that the software is used in a fixed hardware and software environment, and		Yes☐ No ☐ N/A ☐
	cannot be modified or uploaded by any means after securing/verification		Yes☐ No ☐ N/A ☐
	Note: *It is acceptable to break the "seal" and load new software, audit trail is also a sufficient seal.*		
	The software documentation contains:		
		description of all ~~**the metrologically significant**~~ functions, **designating those that are considered metrologically significant** ~~***OIML states that there shall be no undocumented functions***~~	Yes☐ No ☐ N/A ☐
		description of the securing means (evidence of an intervention)	Yes☐ No ☐ N/A ☐
		software identification	Yes☐ No ☐ N/A ☐
		description how to check the actual software identification	Yes☐ No ☐ N/A ☐
	The software identification is:		
		clearly assigned to the metrologically significant software and functions	Yes☐ No ☐ N/A ☐
		provided by the device as documented	Yes☐ No ☐ N/A ☐
Personal computers, instruments with PC components, and other instruments, devices, modules, and elements with programmable or loadable metrologically significant software TYPE U (aka not built-for-purpose)			
	The *metrologically significant* software is:		
		documented with all relevant (see below for list of documents) information	Yes☐ No ☐ N/A ☐
		protected against accidental or intentional changes	Yes☐ No ☐ N/A ☐
	Evidence of intervention (such as, changes, uploads, circumvention) is available until the next verification / inspection (e.g. physical seal, Checksum, CRC, audit trail, etc. means of security)		Yes☐ No ☐ N/A ☐

Software with closed shell (no access to the operating system and/or programs possible for the user)			
	Check whether there is a complete set of commands (e.g. function keys or commands via external interfaces) supplied and accompanied by short descriptions		Yes☐ No ☐ N/A ☐
	Check whether the manufacturer has submitted a written declaration of the completeness of the set of commands		Yes☐ No ☐ N/A ☐
Operating system and / or program(s) accessible for the user:			
	Check whether a checksum or equivalent signature is generated over the machine code of the metrologically significant software (program module(s) subject to legal control W&M jurisdiction and type-specific parameters)		Yes☐ No ☐ N/A ☐
	Check whether the metrologically significant software will detect and act upon any unauthorized alteration of the metrologically significant software using simple software tools e.g. text editor.		Yes☐ No ☐ N/A ☐
Software interface(s)			
	Verify the manufacturer has documented:		
		the program modules of the metrologically significant software are defined and separated	Yes☐ No ☐ N/A ☐
		the protective software interface itself is part of the metrologically significant software	Yes☐ No ☐ N/A ☐
		the *functions* of the metrologically significant software that can be accessed via the protective software interface	Yes☐ No ☐ N/A ☐
		the *parameters* that may be exchanged via the protective software interface are defined	Yes☐ No ☐ N/A ☐
		the description of the functions and parameters are conclusive and complete	Yes☐ No ☐ N/A ☐
		there are software interface instructions for the third party (external) application programmer.	Yes☐ No ☐ N/A ☐

Software Sector Discussion: The labs again indicated they had not had a chance to utilize the checklist. The list was reviewed and some minor modifications to the checklist text were incorporated as shown above.

Software Sector Conclusion: Work is ongoing on this item with the intent that it eventually be incorporated as a checklist in Pub 14; again the labs are requested to try utilizing this checklist for any evaluations on software-based electronic devices.

c. Software Maintenance and Reconfiguration

Background: The Software Sector agreed that the two definitions below for update and Traced update were acceptable.

Verified Update: A verified update is the process of installing new software where the security is broken and the device must be re-verified. Checking for authenticity and integrity is the responsibility of the owner/user.

Traced Update: A traced update is the process of installing new software where the software is automatically checked for authenticity and integrity, and the update is recorded in a software update log or audit trail.

The Software Sector also worked towards language proposed for defining the requirements for a Traced Update (currently considered as relevant for Pub 14):

For a Traced Update, an event logger is required. The logger shall be capable of storing a minimum of the 10 most recent updates. An entry shall be generated for each software update.

Use of a Category 3 audit trail is required for the Traced Update. If software update is the only loggable event, then the Category 3 audit trail can be limited to only 10 entries. A log entry representing a software update shall include the software identification of the newly installed version.

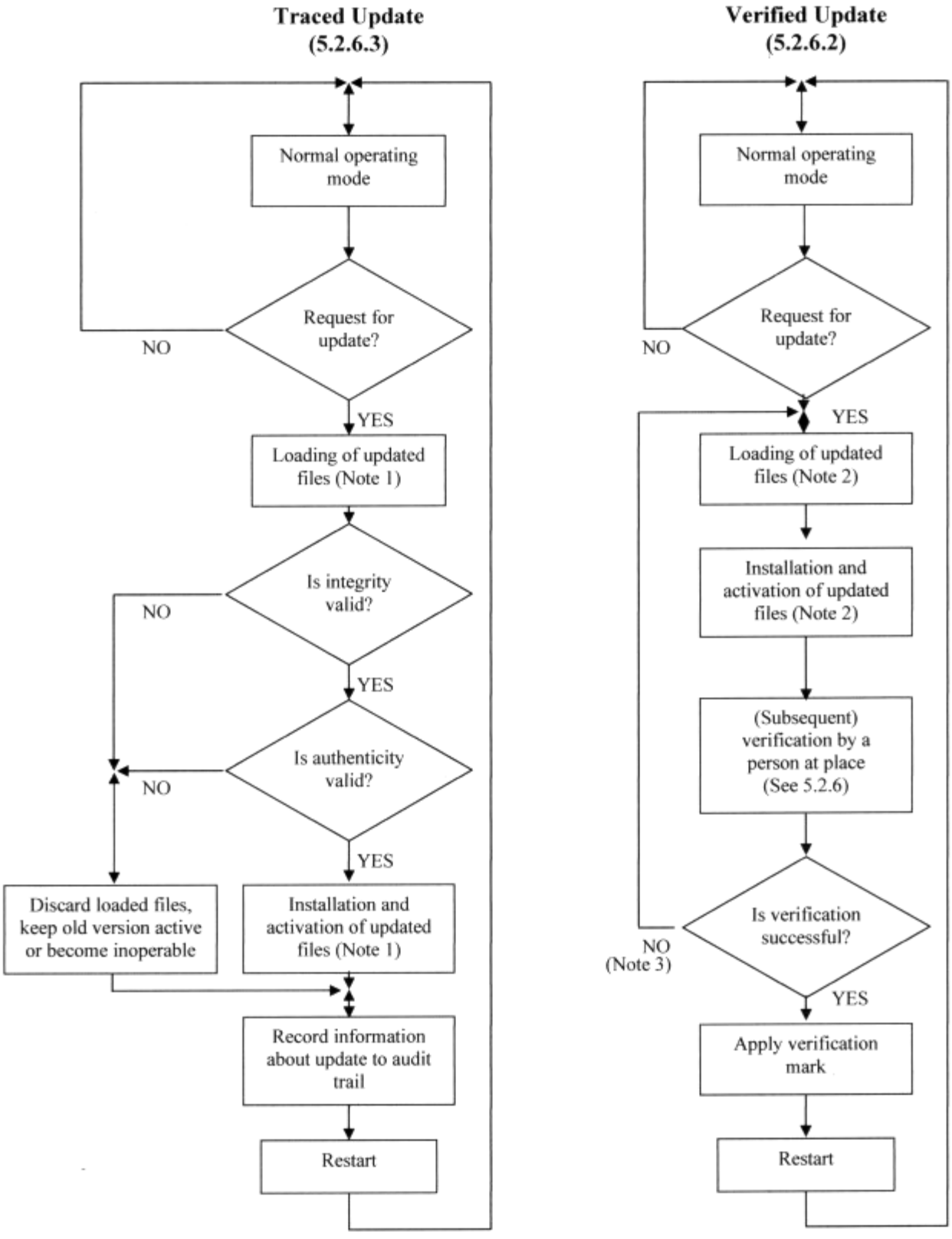
Software Sector Conclusions: The general consensus of the group after considering feedback from external interested parties is that a new G-S.9. with explicit requirements [for Metrologically Significant Software] is not necessary (nor likely to be adopted by the Conference) and that this requirement belongs in the Pub 14 lists of sealable parameters rather than in Handbook 44:

The updating of metrologically significant software shall be considered a sealable event.

Additional work is to be done to further develop the proposed text toward inclusion in Pub 14.

Grain Analyzer Sector Discussion: At its August 2009 meeting the GA Sector questioned the need for a definition of "Traced Update". The traced update was initially intended to cover cases in Europe where the National Body controls a network of devices and wants to update all the devices simultaneously from a central location. Denmark and France do this with NIR Grain Analyzers. Even though individual states may still require that a device updated via a "Traced Update" must be "returned to service" by a registered serviceperson before it can be used, the Sector may want to consider adopting "Traced Update" requirements for all Category 3 Grain Analyzers. The device is still subject to later inspection by state Weights and Measures personnel. By designing to the requirements for "traced update", states might be encouraged to allow devices updated to those requirements to be returned to service without requiring a visit by a registered serviceperson.

Logic flow charts illustrating "traced update" and "verified" update are shown on the following page.



Software Update Procedure – from OIML D 31:2008 (E)

Notes:

(1) In the case of a Traced Update updating is separated into two steps: "loading" and installing/activating". This implies that the software is temporarily stored after loading without being activated because it must be possible to discard the loaded software and revert to the old version, if the checks fail.

(2) In the case of a Verified Update, the software may also be loaded and temporarily stored before installation but depending on the technical solution loading and installation may also be accomplished in one step.

(3) Here, only failure of the verification due to the software update is considered. Failure due to other reasons does not require re-loading and re-installing of the software, symbolized by the NO-branch.

Note: GA Agenda Item 7 was for information only. No action was taken. No comments or recommendations were made

8. Report on OIML TC17/SC1 R59 "Moisture Meters for Cereal Grains and Oilseeds"

Background: This item was included on the Sector's agenda to provide a summary of the activities of OIML TC 17/SC 1. In October 2008, the Secretariat of TC 17/SC 1 was jointly allocated to China and the United States. The Co-Secretariats (China and the United States) are working closely with an international work group (IWG) to revise OIML R 59 "Moisture meters for cereal grains and oilseeds." The 5 CD of **OIML R 59**, revised to comply with OIML's Guide ***Format for OIML Recommendations*** and to incorporate tests for the recommended disturbances of **OIML D 11** ***General Requirements for Electronic Measuring Instruments***, was distributed to the Subcommittee in February 2009.

Comments: Ms. Diane Lee, NIST/WMD, reported that comments on the 5 CD of **OIML R 59** have been received by 10 countries, including the United States. Ms. Lee is working on a draft 6 CD based on those comments. It will reflect the U.S. recommendation to remove the Sand & Dust test (one of the disturbance tests of OIML D 11) on the basis that the sand and dust concentration specified for that test far exceeds the concentrations encountered by GMMs in normal use. The equipment diagrams of 5 CD will be replaced by generic block diagrams and, at the request of Japan, a \block diagram will be added for a resistance type GMM.

A meeting of TC 17/SC 1 to review the draft 6 CD will be held in Orlando, Florida following the CIML meeting. Ms. Lee noted that, in addition to herself, TC 17/SC 1 meetings are usually attended by Dr. Pierce, Ms. Brenner, and Ms. Cassie Eigenmann. She will arrange a conference call to go over the draft 6 CD before the changes are made permanent for discussion at the meeting.

Mr. Richard Cantrill, AOCS, recommended that TC 17/SC 1 become aware of the work that ISO Food Group Technical Committees, TC 34/SC 2 – Oil Seeds, and TC 34/SC 4 – Cereals and Pulses, have done that relates to the use of moisture meters.

Editor's Note: The related Standards are:

ISO 7700-1:2008 -- Checking the performance of moisture meters in use
-- Part 1: Moisture meters for cereals
ISO/DIS 7700-2 -- Checking the performance of moisture meters in use
-- Part 2: Moisture meters for oilseeds
(ISO/DIS 7700-2 is a Draft International Standard. When approved, it will replace ISO 7700-2:1987.)

Editor's Note: At the September 28 - 29, 2010, TC 17/SC 1 meeting in Orlando, Florida, the participants reviewed a preliminary copy of OIML R 59 CD and comments to R 59 CD. Changes to R 59 6 CD will include the changes that were agreed to at the September 2010 meeting.

9. Report on OIML TC 17/SC 8 "Protein Measuring Instruments for Cereal Grain and Oil Seeds"

Background: This item was included on the Sector's agenda to provide a summary of the activities of OIML TC 17/SC 8. A new subcommittee was formed to study the issues and write a working draft document "Protein Measuring Instruments for Cereal Grain and Oil Seeds." Australia is the Secretariat for this new subcommittee. A TC 17/SC 8 meeting was hosted by NIST in September 2007 to discuss the 2 CD. Discussions on 2 CD dealt mostly with maximum permissible errors (MPEs) and harmonization of the TC 17/SC 8 Recommendation for protein with the TC 17/SC 1 Recommendation for moisture. The secretariat distributed a 2 CD N6 of the document in February 2010. Comments were due in May 2010.

Discussion/Comments: Ms. Lee, NIST/WMD, reported that 2 CD N6 reflects major changes to harmonize with R 59-5 CD. A meeting of TC 17/SC 8 will be held September 27 - 28, 2010, in Orlando, Florida to address the comments to 2 CD N6.

Dr. Pierce noted that there is still resistance to accepting the U.S. recommendation that two instruments be submitted for type evaluation. He asked those who had been with the Sector from the early days, to explain what had led the Sector to decide that type evaluation would require two instruments as opposed to one or three. At least two Sector members remembered the reasoning: It is easy to make one instrument. The problem is to make two that read alike. The Sector originally considered three instruments but that was too expensive. Three would have been ideal, because if one fails during testing, you usually have two that agree with each other, so you know immediately which one is wrong.

GIPSA has seen numerous instances in NTEP testing where one test instrument passes a test and the second instrument does not (for the NTEP Power Supply test, since 1994, in 24 % of the tests one instrument failed while the other passed; in 3 % of the tests both instruments failed). The failures appear not to be random events. They appear to identify legitimate deficiencies.

Editor's Note: At the September 27 - 28, 2010, TC 17/SC 8 meeting comments to the Recommendation on Protein Measuring Instruments for Cereal Grain and Oil Seeds 2 CD were reviewed. It was agreed at this meeting that two instruments will be submitted for OIML type approval. This agreed change and other changes from the September 2010 meeting will be included in 3 CD.

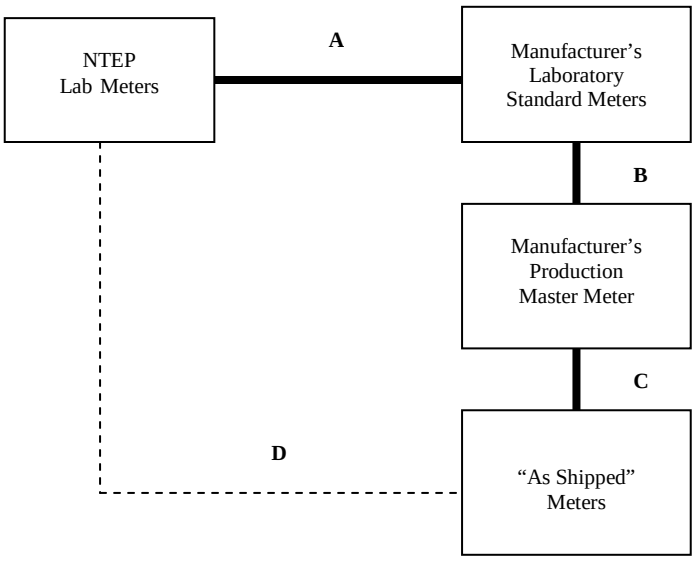
10. Standardization of Grain Moisture Meters – Traceability of GMMs used in Meter to Like-Meter testing.

Background: This item is a carry-over from the Sector's August 2009 meeting (Item 9.5). For NTEP meters HB 44 permits meter to like-meter testing using "Properly Standardized Reference Meters". Mr. Karl Cunningham, Illinois Department of Agriculture, Weights and Measures, asked for a definition of a "Properly Standardized Reference Meter". He also wanted to know what criteria these "Reference Meters" must meet.

He was referred to **Section VI. Standardization of Instruments** in the GMM chapter of Pub 14 that shows the relationship and maximum permissible errors between the NTEP Lab meters, Manufacturer's Laboratory Standard Meters, Manufacturer's Production Master Meter, and "As Shipped" meters. It was explained that a properly standardized reference meter for a Service Company should have the same traceability to the NTEP Lab Meters as the Manufacturer's Production Master Meter has.

Section VI. Standardization of Instruments in the GMM chapter of Pub 14 requires manufacturers to demonstrate that their methods for standardizing units in production result in as "shipped" units which agree with the corresponding NTEP Laboratory units (path D in the accompanying **Figure 1**) within ± 0.3 x the HB 44 acceptance tolerance. They are also required to show that the mean moisture difference between Manufacturer's Laboratory Standard Meters and the corresponding NTEP Laboratory Meters (path A in the accompanying **Figure 1**) does not exceed ± 0.2 x the HB 44 acceptance tolerance.

Figure 1



During a discussion of potential agenda items for the Sector's 2010 meeting, Dr. Pierce, FGIS/GIPSA, representing the NTEP Participating Laboratory for Grain Analyzers, suggested that the Sector may want to explore how the NTEP program (or lab) can assist manufacturers who are asked to demonstrate traceability of field instruments back to the air oven reference method. The NTEP Lab has manufacturers' instruments in the NTEP Phase II program that are directly traceable to the GIPSA air oven reference lab. There is, however, no documentation demonstrating alignment of NTEP instruments with manufacturers' master instruments or field instruments. The NTEP lab is not involved in this process. There are no criteria for the grain types, the number of analyses, or the number of samples that should be used in side-by-side testing.

The Sector co-Technical Advisor suggested that a first step in acquiring documentation demonstrating alignment of NTEP instruments with manufacturers' master instruments or field instruments would be adding language to the NTEP Application to require submission of the documentation required by §VI., and adding a check list of the Required Documentation to the existing GMM Checklist of Pub 14.

A related issue mentioned by Dr. Pierce was authorized repair facilities providing states with documentation that their "standard" instrument is traceable to the air oven reference. He was of the opinion that this was not directly an NTEP lab issue, but believed that manufacturers should be able to trace these standards back to NTEP Phase II instruments.

Proposed: Amend the Application Instructions Section of the Grain Analyzer NTEP Application as shown below:

- **Submit details of procedures and tests for maintaining reference meters and standardizing units in production to meet the requirements of §IV of the GMM Chapter of Pub 14.**

And insert the following Check List of Required Documentation just in front of the **General** section [but still under the "Checklist" Heading in the Table of Contents] of the GMM chapter of Pub 14:

Required Documentation (Refer to NCWM Publication 14, Grain Moisture Meter Chapter, §VI. Standardization of Instruments)			
Doc1.	**Manufacturer has submitted specific details of the proposed test procedures to be used for the comparison between their reference standard instruments and instruments of like type in the NTEP Participating Laboratory.**		**Yes☐ No☐ N/A☐**
	(a)	**Comparisons will be made "side-by-side**	**Yes☐ No☐ N/A☐**
	(b)	**Comparisons will be made by an exchange of grain samples**	**Yes☐ No☐ N/A☐**
Doc2.	**Manufacturer has shown that the mean moisture difference between Manufacturer's Laboratory Standard Meters and the corresponding NTEP Laboratory Meters (path A in figure below) does not exceed ± 0.2 x the Handbook 44 acceptance tolerance.**		**Yes☐ No☐ N/A☐**
Doc3.	**Manufacturer has demonstrated that its methods for standardizing units in production result in "as shipped" units which agree with the corresponding NTEP Laboratory units (path D in Figure 1 of §VI) within ± 0.3 x the Handbook 44 acceptance tolerance.**		**Yes☐ No☐ N/A☐**
Doc4.	**Manufacturer has also demonstrated that once units are standardized, moisture results between units of like type will not exceed these tolerances when a grain calibration change is made.**		**Yes☐ No☐ N/A☐**

Discussion: Dr. Pierce suggested that there are two issues being presented here:

1. For Phase I, a clarification of what information is being obtained at the time of initial type evaluation. At present, manufacturers are asked for a general description of the process (not all the details) they intend to use to standardize instruments.

2. For Phase II, whether there should be some kind of semi-official document signed by the NTEP laboratory attesting to the fact that a side-by-side test (or by grain sample exchange) demonstrated that manufacturer "A's" working masters line up with the two calibration instruments at the NTEP laboratory within 0.x % moisture. This might be issued each year (or every two years) as part of the Phase II program. If the laboratory provided this service, Dr. Pierce noted that they would have to specify the test procedure that had been used including the grain type(s), number and sequence of drops, etc.

When manufacturers were asked if this addition to Phase II was needed, Mr. Tim Kaeding, Perten Instruments, responded that, with the exception of an NTEP lab issued certificate, what Dr. Pierce described was very much like what they were already doing. Perten takes their working standard instruments to the NTEP lab, performs a side-by-side comparison with the NTEP instruments using corn, soybeans, and wheat, analyzes the data, determines that they match statistically, and prepares a report showing the traceability of their working standards to the corresponding NTEP instruments lab. This has apparently satisfied the Illinois Department of Agriculture's request for traceability.

Ms. Eigenmann outlined the procedures used by DICKEY-john. Twice a year the base parameters of three laboratory standard meters, which never leave DICKEY-john's temperature and humidity controlled laboratory, are measured to ensure that they are aligned. Records are kept of every test, adjustment, etc. performed on the lab standards. Three working standards, used on the production line, are taken to the laboratory once a month for a check against the three lab standards. In side-by-side comparisons of six drops of grain per unit, the average moistures must agree within 0.08. Similarly, three Product Service working standards are brought to the laboratory twice a year to be checked against the lab standards using the same criteria as the production line standards. Additionally, two transfer standards are checked against the lab standards. These are held to a tighter tolerance than 0.08. The transfer standards are hand carried to Kansas City, Missouri, and checked against all the like instruments at FGIS (including the two NTEP lab units). Anyone requiring a document showing comparative data between a GAC 2100 and the lab standards can bring their GAC 2100 to DICKEY-john's moisture lab for checking.

With no one from Steinlite to report, Dr. Pierce recalled that Steinlite typically picked up their two NTEP lab meters and took them back to Atchison, Kansas, for testing.

With manufacturers already running comparative tests and providing the requested documentation, it didn't appear that the NTEP laboratory needed to be involved. Manufacturers were not in agreement that the testing be standardized. Some questioned whether the testing could be standardized because it would be technology dependent. Others saw some merit in standardizing comparative tests using specified grains and procedures (number and sequence of drops, etc.) and of standardized reports. No action was taken on this issue.

Some Sector members objected to the proposed amendments to the Grain Analyzer NTEP Application and the GMM checklist. Manufacturers were of the opinion that they were already providing the information required in the Section VI of the GMM Chapter of NCWM Pub 14. Further, Section IV relates more to Phase II than to Phase I. No Phase I testing is required by Section IV, so the addition of check-list items was not required.

Decided: The Sector decided that the proposal to amend the Application Instructions Section of the Grain Analyzer NTEP Application and to insert a Checklist of Required Documentation in the Checklist of the GMM chapter of Pub 14 was a Phase II issue not a Phase I issue. The Proposal will be withdrawn.

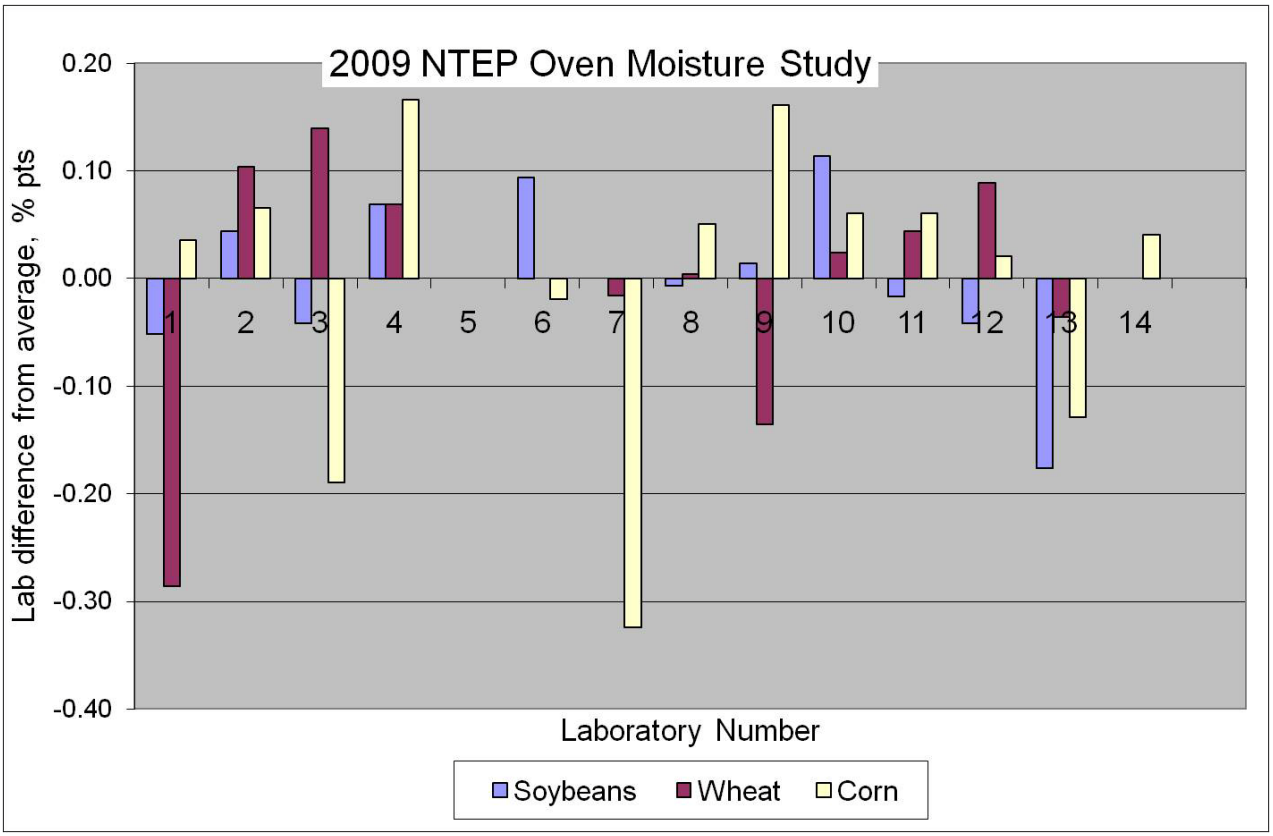
11. Air-Oven Collaborative Study – Analysis of results

Background: At its August 2008 meeting, the Sector agreed that a collaborative study was long overdue. It was also noted that such a study addresses the measurement traceability requirements of **ISO 17025** ***General requirements for the competence of testing and calibration laboratories***. Mr. Cunningham subsequently agreed that the State of Illinois Moisture Meter Laboratory would serve as the "pivot" laboratory. At the August 2009 meeting, he reported that 14 laboratories participated in this study. Participants included: USDA/GIPSA (as reference laboratory), Arkansas, Colorado, Illinois, Iowa, Maryland, Mississippi, Missouri, North Carolina, South Carolina, Wisconsin (corn only), Wyoming, and DICKEY-john. Perten was sent samples but didn't return results. With the exception of one or two outliers, results were fairly good. Histograms showing the distribution of Lab error (Participant Lab result minus Reference Lab result) for each of the grain samples were presented (see August 2009 Sector Meeting Summary).

Discussion: Dr. Charles Hurburgh, Iowa State University, was unable to attend the Sector meeting. He forwarded a statistical analysis of the results, and supplied the following comments:

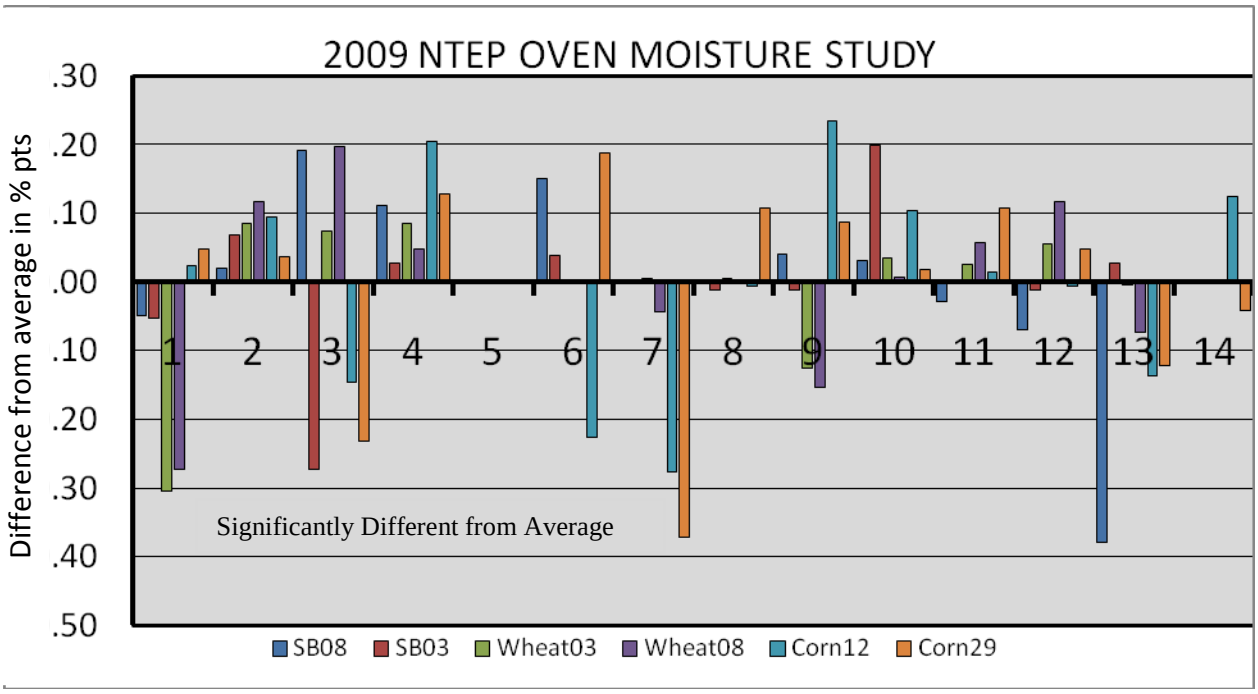
> The results were quite good. Two outliers were removed. Outliers are detected by calculating the SD with the questionable point removed. If the questionable point is 3 SDs out after being removed it is considered an outlier. When you don't have many data points this prevents a bad data point from making the SD very large and protecting itself, so to speak. Standard deviations across labs of less than 0.20 percentage points are good. The sample handling and prep were clearly done well.
>
> Overall, the individual Labs did well; there were only two cases where the lab average was significantly different from the average of the labs but none of the information values (temperatures, humidity, etc. seemed to correlate with errors. No attempt was made to analyze the information data; it would be helpful in the future to require all the temperatures in one type of units (C or F) and all the times in minutes and so on.

The chart below shows the deviation from the average. Most are within 0.2 % of the Average.



Discussion: Several Sector members asked why the lab difference from average was averaged across two samples of each grain type. They wondered what the chart would look like if results were shown for individual samples. The concern was that in some cases the averaging over two samples might lead to significantly understating errors.

Several weeks after the Sector's meeting, the Co-Technical Advisor prepared a chart showing the lab difference from average for each individual sample (see chart following). One of the most dramatic differences showed up in Lab 3's results for soybeans. Averaged over two samples, the difference was only −0.04, while individual differences from individual averages were 0.19 for SB08 and −0.27 for SB03. A similar phenomenon was observed in Lab 6's results for corn. Averaged over two samples, the difference was only −0.02 while the individual differences were −0.23 for Corn12 and 0.19 for Corn29.



12. Proficiency Testing

[Submitted by Ms. Amy L. Johnson, SQT Program Manager, American Oil Chemists Society (AOCS)]

Background: At the Sector's August 2009 Meeting Dr. Hurburgh, Iowa State University, urged the representatives from the American Oil Chemists Society (AOCS) to prepare a proposal so that the collaborative (air-oven) study could be conducted on an on-going basis rather than on an ad hoc basis. He cautioned that the proposal would have to include corn and wheat as well as soybeans.

Several years ago the AOCS in conjunction with the United Soybean Board (USB) established the AOCS-USB Soybean Quality Traits Analytical Standards Program (SQT), a system of verification of analytical measurements. This program provided the infrastructure for the generation of reliable analytical results at all levels of the soybean industry by establishing industry-wide acceptance of analytical methods and protocols and their implementation under internationally accepted quality management standards. The AOCS has proposed the addition of an air-oven/grain moisture meter proficency testing (PT) series to their Analytical Standards Program (ASP). Proficency testing is a continuous program, samples are sent out in regular intervals (e.g., 2 to 4 times/year). Participants are able to join on a continuous basis.

Discussion: Ms. Johnson, AOCS, proposed an air-oven/GMM proficiency testing series designed specifically to address the needs of GMM manufacturers and states maintaining a grain moisture laboratory. AOCS would administer the program, oversee distribution of samples, compile results, perform statistical analysis of results, and distribute a report to participants. AOCS does not collect the samples. This is subcontracted to suitable providers. AOCS does not have laboratories. Since GIPSA/FGIS is a certified laboratory already participating in the SQT program, GIPSA air-oven results could be reported for comparison if desired.

The Sector decided that a program that included distribution of two samples each of corn, wheat (preferably of one type), and soybeans per year would be adequate. A final report by mid July is desirable, so sample distribution would have to take place in early spring (March – April). The annual cost of such a program was estimated to be in the range of $80 to $100 per participant.

Sector chair, Ms. Eigenmann, asked Ms. Johnson to put together a formal proposal based on the above criteria. Ms. Johnson will contact all those on the GA Sector mailing list as well as those on the NIST/WMD list of state W&M officials interested in grain moisture with details of the proposed program.

13. Time and Place for Next Meeting

The next meeting is tentatively planned for Wednesday, August 24 and Thursday, August 25, 2011, at the Chase Suites by Woodfin at Kansas City International Airport in Kansas City, Missouri. Sector members are asked to hold these days open pending determination of agenda items, exact meeting times, and meeting duration. Final meeting details will be announced by early June 2010.

If you would like to submit an agenda item for the 2011 meeting, please contact any of the following persons by June 1, 2011:

Mr. Jim Truex, NTEP Administrator at jim.truex@ncwm.net
Ms. G. Diane Lee, NIST Technical Advisor, at diane.lee@nist.gov
Mr. Jack Barber, Co-Technical Advisor, at barber.jw@comcast.net

14. Future Direction of Moisture Measurement Technology

The Grain Inspection Advisory Committee (GIAC) meets twice annually to advise GIPSA on the programs and services it delivers under the U.S. Grain Standards Act. Recommendations by the committee help GIPSA to better meet the needs of its customers who operate in a dynamic and changing marketplace.

The committee is comprised of 15 members and 15 alternate members appointed by the Secretary of Agriculture. Committee members and alternates represent all segments of the grain industry. They include grain producers, processors, merchandisers, handlers, exporters, consumers, grain inspection agencies, and scientists. Committee members serve without compensation, but are reimbursed for travel expenses.

Meetings typically follow a format of a day of presentations followed by a morning during which committee members digest the material they have heard to produce resolutions addressing the significant issues. The resolutions are subjected to a vote by the committee. Those that are adopted are taken seriously by GIPSA's administer in considering how to respond to these resolutions.

On June 16, 2010, Dr. Funk, GIPSA/FGIS Associate Director for Methods Development, made a presentation to the GIAC entitled, "Future Direction of Moisture Measurement Technology." He repeated this presentation on August 26, 2010, at the NTETC Grain Analyzer Sector meeting in Kansas City, Missouri. Following is a digest of Dr. Funk's presentation.

In November of 2009 the GIAC approved the following resolution:

> The Advisory Committee recommends that GIPSA evaluate the current moisture calibration for high moisture rough rice for accuracy when compared to the air oven reference.

The FGIS Annual Calibration Study was already doing this. Each year approximately 1100 samples are collected to evaluate and enhance official moisture meter accuracy. For 15 major grains, all NTEP-certified models are tested with the same set of grain samples. Grain calibrations are optimized to the most recent three years of data with consideration of abnormal conditions. To minimize "hunting", calibrations are changed only if certain error thresholds are exceeded, but there are problems. The long gain rough rice accuracy for 2007 - 2009 crops shows a large scatter above 20 % moisture and for 2009 a very strange pocket of data between 14 % and 17 % moisture with significant negative bias. Similar problems appeared in corn. The crop year 2009 was a year of extremely low quality and low test weights. Many samples were well under 50 pounds per bushel.

The conclusions reached from the 2009 crop calibration study revealed:

- Year-to-year differences contribute significant instability to GMM calibrations.
- Rice is one of the more difficult grains for accurate moisture measurements.
- Growing conditions in 2009 resulted in some grain samples not being measured accurately by current official moisture meters.
- It is impossible to significantly improve the official meter's accuracy for the "problem" samples without degrading overall accuracy.

So GIPSA's response to the GIAC Resolution was that FGIS is continually evaluating and trying to improve moisture calibrations. FGIS has expert knowledge of moisture measurement technologies and the current official technology is doing the best that it can. If the market needs better performance, FGIS needs to select and implement different technology. If FGIS is going to implement different moisture technology, it needs to happen soon.

New technology offers improved accuracy, better stability over time and crop conditions, easier calibration development, reduced support cost, and provides competition (it can be duplicated by any manufacturer).

It needs to happen soon to avoid being caught in a technology "rut" for decades as with the older dielectric instruments which required look-up tables. It needs to happen soon to be able to utilize current FGIS expertise before it is depleted by retirements. It needs to happen soon to create and implement a sustainable official moisture measurement system based on up-to-date technology.

New technology will be selected using the following steps:

- Develop and prioritize criteria for the selection.
- Develop a procurement document.
- Solicit proposals.
- Evaluate proposals and submitted performance data.
- Conduct further testing of the proposed technologies.
- Announce selection and establish contract(s).
- Develop and validate official standardization processes.
- Procure new moisture measurement instruments.
- Conduct a pilot test to validate system readiness for the transition.
- Implement the switch to the new instrumentation.

The criteria used to select a new official meter will most likely include the following criteria used in 1997:

- Best value to the government
    - Procurement costs
    - Support costs
- NTEP certification

- Accuracy over moisture and temperature ranges
- Repeatability
- Suitability for all grain type officially tested
- Suitability for automation
- Consistency among units
    - Transferability of calibrations
    - Precision of standardization
    - Ease of standardization
    - Stability over time

Other possible criteria might include:

- Speed of test
- Multiple-factor capability
- Accuracy of tests on abnormal samples such as "green soybeans"
- Availability of multiple sources for equivalent technology
- Prior commercial acceptance of technology

Dr. Funk offered the following time line for fully implementing a new technology:

- October 2010 – Agency decision on whether to pursue new moisture technology
- June 2011 – Develop criteria and procurement documents and issue solicitation for proposals
- February 2012 – Announce decision
- May 2013 – Implement new technology for initial grains
- September 2013 and later – Implement new technology for other grains.

Following his presentation to the GIAC, the following resolution was adopted:

> The Advisory Committee recommends that GIPSA/FGIS move forward with expediency to determine the feasibility and selection of a new federal standard moisture measurement technology and/or instrument(s) for use in the official system.

Following Dr. Funk's presentation to the GA Sector, he conducted a question and answer session. Some of the questions and Dr. Funk's responses are shown below:

Question: Will the new technology require any changes to existing HB 44 or Pub 14 requirements or procedures?

Answer: Basically, no … and yes. We have choices of technology, but the technologies out there are already represented in the NTEP program. We're not going to select a technology that hasn't proven itself. If

it's not out there as a commercial technology that's proven itself in the marketplace, we're not going to consider it. In the NTEP program we have two technologies represented: dielectric RF methods and NIR methods. Right now we have two instruments that represent the technology I'm talking about that have been NTEP certified. That was the trigger point at which we could consider adopting a new technology. That is not to say that is the technology we are going to select, but until we had proven that we could have two instruments using that technology we were not ready to even consider adopting a new technology.

Question: You've answered the "Yes" half of the previous question. Could you please address the "No"?

Answer: The answer is, to the extent that industry migrates to this technology hopefully we will get to the point where we don't need a Phase II evaluation. When all USDA instruments are using the same calibrations, and they are not being yanked around year by year, we may be looking to a more technical evaluation of instruments where we just evaluate the ability of an instrument to accurately measure density corrected dielectric constants. If the new technology is widely accepted we may get to a point in 5 to 10 years where the NTEP looks significantly different from what it is now. The current five-year interagency agreement may be the last one.

[**Note:** Dr. Pierce commented that he believed they were committed to finishing the current five-year agreement.]

Question: Do you think this new technology will eliminate a lot of complaints we get about such things as the "rebound" effect in soybeans?

Answer: It will help. It's not going to eliminate green soybeans effect nor will it eliminate test weight sensitivity in corn, but it will reduce the effects. It has about half the effect as the current official meter. I'm not saying this is the best technology possible. The goal is not to come up with the best possible technology. The goal here is to come up with a simple, well documented, public technology that anybody can use successfully and get equivalent results. We do want it to be accurate, and it is accurate. We want it to be stable, and it is much more stable. Is it perfect? Absolutely not! There is a microwave technology out there that is probably very good, but it also requires an exclusive license. It is not open for anyone to use royalty free. The goal here is to have something that is royalty free by anybody that wants to make it.

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