Appendix A

National Type Evaluation Technical Committee
Grain Analyzer Sector

August 22 - 23, 2007 – Kansas City, Missouri
Meeting Summary

Agenda Items

1. Report on the 2007 NCWM Interim and Annual Meetings

The Interim Meeting of the 92nd National Conference on Weights and Measures (NCWM) was held January 21 - 24, 2007, in Jacksonville, Florida. At that meeting the NTEP Committee accepted the Sector's recommended amendments and changes to the 2006 Edition of NCWM Publication 14. These changes appear in the 2007 Edition. For additional background, refer to *Committee Reports for the 92nd Annual Meeting*, NCWM Publication 16 – April 2007.

Amendments/Changes to the Grain Moisture Meters Chapter in the 2006 Edition of NCWM Publication 14			
Section Number	**Amendment/Change**	**Page**	**Source**
VII. Additional Type Evaluation Test Procedures and Tolerances for Grain Moisture Meters Incorporating an Automatic Test Weight per Bushel Measuring Feature	Add paragraph C. Tolerances For Test Weight per Bushel Calibration Performance.	GMM-16	08/06 Grain Analyzer Sector – Item 4

Amendments/Changes to the Near Infrared Grain Analyzers Chapter in the 2006 Edition of NCWM Publication 14			
Section Number	**Amendment/Change**	**Page**	**Source**
III. Accuracy, Precision, and Reproducibility Requirements	Amend to add criteria applicable to "multi-class" calibrations.	NIR-3 thru NIR-6	08/06 Grain Analyzer Sector – Item 6(b)

Two items of interest to the Grain Analyzer Sector were reviewed by the Specifications and Tolerances Committee (S&T) at the NCWM Interim Meeting and were forwarded as voting items for consideration at the NCWM Annual Meeting scheduled for July 8 - 12, 2007, in Salt Lake City, Utah.

Conference Item Number	Handbook 44 Section Number	Recommendation	Source
356-1.1	5.56.(a) Grain Moisture Meters	Modify Paragraph S.1.2. and Table S.1.2. to include minimum acceptable abbreviations for multi-class grain moisture calibrations.	Grain Analyzer Sector
357-1	5.57. Near Infrared Grain Analyzers	Modify Paragraph S.1.2. and Table S.1.2. to add criteria applicable to "multi-class" calibrations.	Grain Analyzer Sector

Diane Lee, NIST/OWM, reported that both items were approved by the Conference and will appear in the 2008 issue of Handbook 44, *Specifications, Tolerances and Other Technical Requirements for Measuring Devices.*

Steve Patoray, NTEP Director, reported that the NCWM Board of Directors adopted a more detailed policy on the use of the NTEP logo which is a registered trademark of NCWM. All users of the NTEP logo will now be required to sign a license agreement regarding its use. Additional information regarding changes to the NCWM Publication 14 Administrative Policy, the License Agreement, and guidelines on the use of the NTEP logo will be placed on the NCWM website.

Steve Patoray noted that conformity assessment does not affect Grain Analyzers at present. Conformity assessment remains an issue mostly of interest to the Weighing Sector.

2. Report on NTEP Type Evaluations and OCP (Phase II) Testing

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. In addition to regular grain moisture meter (GMM) calibration updates, evaluation of the Perten AM5100 GMM was completed and a certificate of conformance (CC) was issued in December 2006. She reported that the following device types are enrolled in the OCP (Phase II) for the 2007 harvest:

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

DICKEY-john Corporation	GAC2000, GAC2100, GAC2100a, GAC2100b
DICKEY-john Corporation	OmegAnalyzer G
Foss North America	Infratec 1241
Foss North America	Infratec 1227, Infratec 1229
Perten Instruments	AM5100
The Steinlite Corporation	SL95

Ms. Brenner explained that although the CC for Seedburo Equipment Company's 1299A does not expire until July 1, 2008, Seedburo has elected not to enroll in Phase II for the 2007 harvest. Because there are still six devices in the program, the same as in 2006, the cost to manufacturers for Phase II will remain $7,730 per meter type.

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

At their August 2005 meeting, the Sector agreed that comparative 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, Cathy 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 (2004 - 2006) using calibrations updated for use during the 2007 harvest season.

Ms. Brenner pointed out that data on the DICKEY-john OmegAnalyzer G was not included in the comparisons because it had only been in the program for one year. Next year data on Perten's AM5100 will not be included for the same reason. Comparisons of GMMs with less than three years of data against GMMs with the full three years of data are not meaningful as they may be unduly influenced by a single unusual crop year.

She noted that no Durum samples in the 16 % to 18 % Moisture Range had been received since the 2002 harvest season. Dr. Richard Pierce, GIPSA, observed that Medium Grain Rough Rice data showed very few samples in the 14 % to 16 % Moisture Range while the adjacent ranges, both above and below, show nearly four to five times that number. No one was able to offer an explanation.

Cassie Eigenmann, DICKEY-john, offered the general comment that performance data appears to be getting much better; meters are closer to each other and closer to the air oven.

4. Proposed Change to the GMM Chapter of Publication 14 to Avoid Reducing a Previously Evaluated Approved/Pending Moisture Range Due to Lack of Data

Background: This is a carryover item from the Sector's August 2006 meeting. This issue was first raised at the Sector's 2005 meeting when Dr. Richard Pierce, GIPSA (the NTEP Laboratory) mentioned that the NTEP Laboratory was having problems increasing and decreasing "Approved" or "Pending" ranges of grain moisture meters depending on the data available in the most recent 3-year period. Most Sector members agreed that it didn't seem logical to reduce a range solely because data previously used to justify the range classification had to be dropped from the most recent 3-year period.

At their 2006 meeting, the Sector discussed guidelines for possible revisions to the GMM chapter of Publication 14 to address this problem. Two of the most significant guidelines considered for revision were:

1. Redefine "Pending" to be simply: "A new calibration that has not been validated by ongoing calibration data collected as part of the national calibration program."

2. The maximum upper moisture interval and the minimum lower moisture interval that can be given "Approved" status will be defined for each grain. These upper and lower limits are to be fixed values that do not change from year to year.

Most Sector members were generally in favor of either redefining or eliminating the "Pending" classification; however, this approach implied that another method had to be found to determine operating ranges, because "Pending" Moisture Ranges have traditionally been used to set the upper and lower moisture limits (operating range) for each calibration. Manufacturers objected to using a single fixed range for all types of devices, noting that some technologies were more accurate than others at high moistures. They preferred an option that would allow them to competitively extend the operating range and objected to being restricted by limitations in the Phase II sample collection system. Subsequent discussion led to the suggestion that the manufacturer should specify the operating Moisture Range for each grain. This range would NOT be listed on the Certificate of Conformance (CC), but would be used to determine when warnings would be displayed and printed to indicate that the displayed/printed moisture content of a sample being measured was beyond the operating range of the device. (See NIST Handbook 44, Section 5.56.(a)., paragraphs S.1.1.(f) and S.1.3.(c).)

The Sector decided that additional study was needed before a final recommendation could be made on this issue. The following points summarize the Sector's thinking at the close of their August 2006 meeting:

1. The "Pending Approval" classification will be eliminated. Operating ranges (upper and lower moisture limits) will be specified by the manufacturer. Operating ranges will NOT be listed on CCs.

2. The three most recent years of Phase II data will continue to be used to evaluate calibration performance.

3. Certificates will list a single "standard" Moisture Range for each grain calibration. These ranges will not vary from year-to-year. They will be the same for all instruments (see exception for new instruments). The "standard" ranges have to be wide enough to encompass the Moisture Ranges most commonly used in the market (to be determined) but narrow enough to assure that sufficient Phase II data will be available (over a three-year period) to:

   a. permit a new meter's calibrations to be "verified" over those ranges by the end of its third year in Phase II; and

   b. permit existing NTEP certified meters' calibrations to be "verified" over those ranges using the most recent 3 years of Phase II data when the new rules are first adopted.

4. Once a calibration has been "verified" a recalibration will not be forced due to lack of samples.

5. New instruments will be "evaluated" over the basic 6 % Moisture Ranges for corn, soybeans, and hard red winter wheat. Certificates for new instruments will continue to list the 6 % Moisture Ranges as the "evaluated" or "verified" ranges until sufficient Phase II data has been collected to allow the new instrument to achieve "verified" status for the full Moisture Range.

6. Outside the basic 6 % Moisture Range, tolerances that used to require a change in calibrations will continue to include the application of a 95 % confidence interval to the maximum tolerance for each 2 % moisture interval.

[For additional background, see the Grain Analyzer Sector's August 23 - 24, 2006, Meeting Summary, Agenda Item 7.]

Discussion: To determine suitable "standard" Moisture Ranges, the NTEP laboratory reviewed historical OCP data for the crop years 2000 through 2006, noting the total number of samples in each 2 % moisture interval and each running 3-year period. Additionally, for each 2 % interval, they compared the basic approval tolerance (one-half the HB 44 acceptance tolerance) to the 95 % confidence interval tolerance that is based on the number of samples. For an example of the data reviewed, see Table 4.1 and Figure 4.1.

Table 4.1 Number of Phase II Corn Samples					
Moisture Interval	**3 Year Totals**				
	2000 - 2002	**2001 - 2003**	**2002 - 2004**	**2003 - 2005**	**2004 - 2006**
8 - 10	13	4	7	7	12
10 - 12	23	13	17	19	16
12 - 14	81	67	80	95	117
14 - 16	113	113	125	128	161
16 - 18	109	106	107	98	87
18 - 20	89	99	101	94	88
20 - 22	53	59	60	48	55
22 - 24	40	45	41	35	41
24 - 26	41	41	60	46	46
26 - 28	39	33	26	18	14
28 - 30	29	27	29	23	19
30 - 32	12	17	22	26	27
32 - 34	7	12	25	24	24
34 - 36	1	4	15	17	19
36 - 38	1	3	8	9	11
38 - 40	0	3	6	6	3
40 - 42	0	6	7	9	3
42 - 44	0	2	3	4	2
44 - 46	0	1	2	3	2
46 - 48	0	1	1	1	0

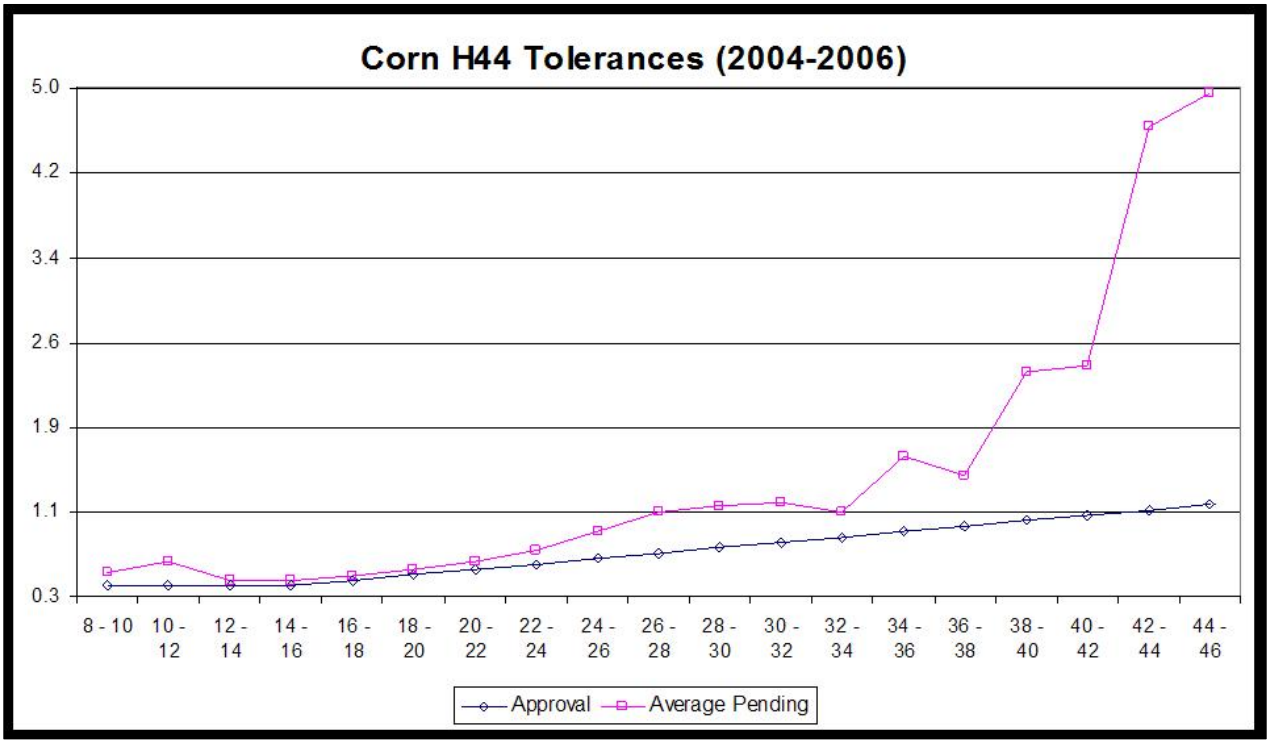

Figure 4.1 – Corn Moisture Tolerances

Recommendation (1): Based on the review of historical data, the NTEP laboratory proposed grain specific recommendations for the following Moisture Ranges and limits:

- **Basic 6 % Interval** – the Moisture Range used for Phase I Type Evaluation.
- **Standard Moisture Range** – the Moisture Range used for OCP Phase II calibration review.
- **Maximum Moisture Limit** – the upper moisture limit for calculating overall moisture bias in Phase II calibration review.

Grain-specific "standard" Moisture Ranges were selected to encompass the 2 % intervals where the majority of samples have been available and where the basic approval tolerance (one-half the HB 44 acceptance tolerance) was not significantly different from the tolerance that includes the application of a 95 % confidence interval.

These ranges and the percent of samples represented in each proposed Standard Moisture Range are listed in Table 4.2 along with the corresponding GIPSA sample collection Moisture Range.

While reviewing the historical data, a trend was noticed in the data for Oats. The bulk of the Oats data is from the 8 % to 14 % moisture interval instead of the 10 % to 16 % moisture interval presently specified in Publication 14. The NTEP lab proposes that the basic 6 % Interval for Oats be changed to 8 % to 14 % moisture for both moisture and test weight per bushel evaluation.

Table 4.2 Proposed Standard Moisture Ranges and Maximum Moisture Limits

Grain	GIPSA Moisture Handbook Range	Basic 6 % Interval	Proposed Standard Moisture Range	Proposed Maximum Moisture Limit	% N
Corn	8 % - 30 %	12 % - 18 %	10 % - 26 %	36 %	84
Grain Sorghum	8 % - 25 %	10 % - 16 %	10 % - 18 %	20 %	89
Durum Wheat	7 % - 20 %	10 % - 16 %	8 % - 16 %	16 %	89
Hard Red Spring Wheat	7 % - 20 %	10 % - 16 %	8 % - 18 %	20 %	91
Hard Red Winter Wheat	8 % - 20 %	10 % - 16 %	8 % - 18 %	20 %	95
Hard White Wheat	7 % - 20 %	8 % - 14 %	8 % - 14 %	16 %	95
Soft Red Winter Wheat	7 % - 20 %	10 % - 16 %	10 % - 18 %	20 %	91
Soft White Wheat	8 % - 20 %	10 % - 16 %	8 % - 16 %	18 %	95
"All Class" Wheat	7 % - 20 %	10 % - 16 %	8 % - 18 %	20 %	93
Wheat Excluding Durum	7 % - 20 %	10 % - 16 %	8 % - 18 %	20 %	94
Long Grain Rough Rice	7 % - 25 %	10 % - 16 %	10 % - 20 %	24 %	81
Medium Grain Rough Rice	7 % - 25 %	10 % - 16 %	10 % - 20 %	24 %	80
"All Class" Rough Rice	7 % - 25 %	10 % - 16 %	10 % - 20 %	24 %	85
Proposed change to Oats	8 % - 20 %	8 % - 14 %	8 % - 14 %	14 %	89
Soybeans	8 % - 20 %	10 % - 16 %	8 % - 18 %	22 %	95
Sunflower Seed	5 % - 25 %	6 % - 12 %	6 % - 16 %	20 %	86
Six-Row Barley	8 % - 20 %	10 % - 16 %	8 % - 16 %	18 %	90
Two-Row Barley	8 % - 20 %	10 % - 16 %	8 % - 16 %	18 %	94
"All Class" Barley	8 % - 20 %	10 % - 16 %	8 % - 16 %	18 %	91

Conclusion (1): The Sector accepted Recommendation (1) by consensus after the proposed Standard Moisture Ranges for both Medium Grain Rough Rice and "All Class" Rough Rice were changed from 10 % to 24 % to 10 % to 20 % to agree with the Standard Moisture Range for Long Grain Rough Rice. [Note: Table 4.2, above, incorporates these changes.]

Recommendation (2): Ongoing Calibration Program (OCP) Calibration Review

The NTEP Laboratory proposed the following guidelines for OCP calibration review:

1. The most recent 3 years of data will still be used to determine if the calibration performance is acceptable.

2. For each of their device types, manufacturers will be provided with a report listing all available data in 2 % moisture intervals. The report will indicate whether the calibration meets or exceeds the appropriate NTEP tolerances for each 2 % interval within the standard range and whether it meets or exceeds the overall moisture bias of ± .20 % moisture for all available data up to the Maximum Moisture Limit. (*Note: The current report indicates whether a calibration is "Approved," "Pending," or does not meet either tolerance for all available 2 % moisture intervals. The overall moisture bias in the current report is calculated using all available data.*)

3. The status of "Approved," "Pending," and "Not Available" would be removed from both the Certificate of Conformance (CC) and Publication 14. Instead, only grain moisture calibrations that have passed Phase I or meet the tolerances for Phase II data will be listed on the CC. All other NTEP grains will be listed on the CC as "calibration not available."

4. Manufacturer(s) will still be provided with all valid data collected during the OCP, even for samples exceeding the maximum limits.

Table 4.3 Current Long Grain Rough Rice Report Example

Moisture Level	No. of Samples	Average Bias	Standard	Approval Tolerance	Pending Tolerance	Status
8 - 10	42	0.04	0.31	0.40	0.48	*
10 - 12	90	0.04	0.17	0.40	0.43	*
12 - 14	50	0.11	0.20	0.40	0.45	*
14 - 16	70	0.12	0.34	0.40	0.47	*
16 - 18	190	0.07	0.31	0.45	0.49	*
18 - 20	140	0.11	0.37	0.50	0.55	*
20 - 22	68	0.03	0.39	0.55	0.63	*
22 - 24	44	0.15	0.56	0.60	0.74	*
24 - 26	8	0.24	0.54	0.65	1.01	*
26 - 28	5	0.87	0.97	0.70	1.62	**
ALL	707	0.09	0.35			

STATUS column:
* meets the NTEP approval tolerance
** does not meet NTEP approval tolerance, but meets Pending tolerance
*** does not meet either tolerance

Table 4.4 Proposed Long Grain Rough Rice Report

Moisture Level	No. of Samples	Average Bias	Standard	One-half HB 44 Acceptance Tolerance	Adjustment for 95 % Confidence Interval	NTEP Phase II Tolerance	Status
8 - 10	42	0.04					
10 - 12	90	0.04	0.17	0.40	NA	0.40	*
12 - 14	50	0.11	0.20	0.40	NA	0.40	*
14 - 16	70	0.12	0.34	0.40	NA	0.40	*
16 - 18	190	0.07	0.31	0.45	.04	0.49	*
18 - 20	140	0.11	0.37	0.50	.05	0.55	*
20 - 22	68	0.03					
22 - 24	44	0.15					
To Max Limit	694	0.08	0.34			0.20	*
24 - 26	8	0.24					
26 - 28	5	0.87					

STATUS column:
* meets the NTEP tolerance
** does not meet NTEP tolerance

Conclusion (2): Recommendation (2) was accepted by consensus.

Recommendation (3): Certificate of Conformance

The NTEP Laboratory has proposed the following guidelines for preparing the Certificate of Conformance (CC):

The body of the CC will still report the moisture intervals used during the Phase I evaluation. It will no longer list either the "Approved Moisture Range" or the "Pending" Moisture Range. A grain will be listed only if it meets either of the criteria listed below:

Phase I – Passes either the Accuracy Test (corn, soybeans, hard red winter wheat) or the Moisture Bias Check (the "Other 12" NTEP grains) as currently specified in Publication 14.

Phase II – Meets both the NTEP Phase II tolerances applied to each 2 % moisture interval within the Standard Moisture Range and the NTEP Phase II tolerance for overall moisture bias for all available data up to the maximum moisture limits.

A comparison of the way a grain calibration appears on the current CC with the way it will appear on the proposed CC is shown in Table 4.5.

Table 4.5 Certificate Calibration Table Comparisons

Current Table Example	Proposed Table Example
Corn Designation: Corn Calibration Version: 200705 Moisture Range – Approved: 8 % - 28 % Moisture Range – Pending: 8 % - 28 % Calibration Constants: K1 = 0001 K2 = 0020 K3 = 0300	Corn Designation: Corn Moisture Calibration Version: 200705 Calibration Constants: K1 = 0001 K2 = 0020 K3 = 0300

Discussion (3): Most of the discussion on the NTEP Lab's recommendations centered on the following questions:

1. Should the manufacturer be required to submit data to support the operating ranges (upper and lower moisture limits) claimed by the manufacturer?

2. Should the operating ranges (upper and lower moisture limits) claimed by the manufacturer be listed on the CC?

3. How should the "standard" Moisture Ranges be specified on the CC?

4. If a meter fails a single 2 % moisture interval outside the "basic" interval does the entire calibration fail or does the approval fall back to the "basic" interval?

Regarding question (1), some Sector members strongly favored requiring the manufacturer to submit some kind of data supporting the claimed upper and lower moisture limits for each grain, suggesting that big problems could result if data were not required to be submitted. There was concern that a manufacturer might use tempered grain to support an operating range. Others were opposed to requiring manufacturer data believing that it served no real purpose in that the Standard Moisture Ranges encompass the moistures over which the vast majority of grain is traded commercially. Furthermore, there would be no way that manufacturer data could be verified in the field (or in the lab without expensive testing) and that mandating its submission (and implied review by the NTEP lab) would require more NTEP lab effort than it was worth. Also, if the manufacturer decided to change a limit, modification of the CC would be required even if no changes had been made in the calibration. (Note: Manufacturers will still be required to submit data with their initial application for Type Evaluation.)

As for question (2), the suggestion that CCs carry the notation, "Evaluated over the Moisture Range of ___ % to ___ %, and certified for use over the range of ___ % to ___ %," was previously rejected by the Sector on the grounds that an NTEP certificate was not intended to be a marketing tool. It was pointed out that the functionality of displaying or printing a suitable warning message whenever a moisture limit is exceeded is verified by the NTEP lab in Phase I testing. Also, in practice when an elevator receives grain at harvest with an indicated "exceeds upper moisture limit" warning it typically ignores the warning message and receives the grain, accepting the indicated moisture value.

Regarding question (3), there was general agreement that the verified Moisture Ranges, whether "basic" or "standard" should be specified explicitly somewhere on the CC. The NTEP laboratory representative indicated that they were not overly opposed to including Standard Moisture Ranges in the body of the CC. However, they were opposed to including <u>any</u> Moisture Ranges on the calibrations page. The central argument was that the "basic" range would apply uniformly in year one and the "standard" range thereafter, and that the table of these ranges would be identical for all manufacturer certificates and would not need to be changed or updated other than including a statement indicating which verified range applies, i.e., "basic" or "standard."

Question (4) was answered quite simply. The entire calibration fails. The manufacturer is obliged to revise the calibration and re-predict moistures using the most recent three years of available Phase II raw data. Concern that calibrations might be failed unjustly or might not be able to be revised to "fit" available data were addressed by pointing out that Publication 14 changes would be proposed to disregard any 2 % interval containing less than five samples. Additionally, outside the "basic" Moisture Range a 95 % confidence interval will be added to the maximum tolerance.

Conclusion (3): With the understanding that manufacturer-supplied calibration operating ranges would not be specified in the certificate, but that verified ranges would be included in the body of the certificate rather than in the calibration table, the Sector agreed to Recommendation (3) by consensus.

Final Conclusion/Recommendation: Having agreed to accept the recommendations/guidelines of the NTEP Laboratory, subject to the changes noted in the above three conclusions, the Sector agreed by a vote of 11 to 1 to accept the amendments/changes to Part IV of the Grain Moisture Meter Chapter of *NCWM Publication 14* as originally proposed. The deletion from Part V of "Special Cases Dealing with Inadequately Represented Moisture Intervals" (except for a portion of "Special Considerations for Multi-Class Calibrations"), was accepted by

consensus. Details of the recommended amendments/changes, designed to avoid reducing a previously evaluated Approved/Pending Moisture Range due to lack of data in the On-going Calibration Program (Phase II), and the related changes to the 6 % moisture interval for Oats in Part VII and Appendix D are shown below.

IV. Tolerances for Calibration Performance

Calibration performance must be tested against established criteria at the following stages of the type evaluation process:

1. Evaluation of the calibration data supplied by the manufacturer with the application for type evaluation.

2. Evaluating instrument and calibration performance over the 6 % Moisture Range for corn, HRW wheat and soybeans (accuracy test discussed earlier).

3. Initial calibration approval for grains other than corn, HRW wheat, and soybeans.

4. Review of ongoing calibration data collected as part of the national calibration program (Phase II).

Calibrations for corn, HRW wheat and soybeans will be approved initially based upon type evaluation testing over a 6 % Moisture Range. The bias of all samples in a 2 % moisture interval may not exceed one-half of the Handbook 44 acceptance tolerance.

Calibrations for other grains will be approved initially based upon a bias check using a set of 10 to 12 samples referenced to the FGIS air oven laboratory and the FGIS official meter. "Multi-class" calibrations will be bias checked using 10 to 12 samples of each individual grain class included in the calibration. The maximum allowable overall bias between the meter under test and air oven is ± 0.4 for this bias check. An overall bias will be applied to the calibration in making approval decisions.

In order for a calibration to remain on the CC, the calibration must continue to meet tolerances for all 2 % moisture intervals in the Standard Moisture Range. This requirement is waived if a 2 % moisture interval contains fewer than five samples. For 2 % moisture intervals outside the basic 6 % Moisture Range, tolerances used to require a change in calibrations will include the application of a 95 % confidence interval to the maximum tolerance for each 2 % moisture interval. The intent of applying the confidence interval is to avoid forcing a calibration change based upon insufficient data. After only one year of data collection, the number of samples in some intervals will be small, and the confidence interval may be as large as the tolerance limit. In this instance, the calibration would have to be extremely poor before a calibration change would be mandated. After the instrument has been in the calibration program for several years, the confidence interval should be reduced to approximately 0.05 and recommendations can be made with greater certainty. The latest three years of data will be used to make decisions regarding the need to make a calibration update.

Whenever a calibration update is made, the manufacturer shall re-predict moisture values using the three most recent years of available raw data collected by the Type Evaluation Laboratory.

Updated calibrations will be approved based upon the re-predicted moisture values. Tolerances will be one-half of the Handbook 44 acceptance tolerance and will be applied in 2 % intervals over the Standard Moisture Range. Tolerances will include the application of a 95 % confidence interval to the maximum tolerance for each 2 % moisture interval outside the basic 6 % moisture interval.

Additionally, all calibrations must meet the following requirements for up to three years of available data:

a. The difference between the average bias to air oven for all samples up to the maximum moisture limit in a given year and the average bias to air oven for any other year shall not exceed: 0.90 for corn; 0.80 for rice, oats, sunflowers and sorghum; and 0.70 for wheat, soybeans, and barley.

b. The range of year-to-year differences in bias to air oven shall not exceed the HB 44 tolerances for three or more consecutive 2 % moisture intervals. Only moisture intervals consisting of five or more samples per year will be considered for this comparison.

c. The average calibration bias with respect to air oven shall not exceed 0.20 % moisture, calculated using the most recent calibration and all available raw data collected within the last three years through the maximum moisture limit.

Failure to meet the requirements in item a., b., or c. above will cause a "No Longer Approved for Use" status to be assigned to the affected grain type(s) on the NTEP Certificate of Conformance (CC) for that instrument. Calibration coefficients will not be listed for any calibration failing these requirements.

Until calibrations for NTEP grains have been evaluated successfully, they shall not be used on NTEP instruments. Calibrations for any of the NTEP grain types that have not been evaluated (or that a manufacturer chooses not to provide) will be listed on the CC as "Not Available."

V. Criteria for NTEP Moisture Calibration Review

By grain, the basic 6 % Moisture Interval, Standard Moisture Range, and Maximum Upper Limit for moisture calibration review are:

Grain Type or Class	Basic 6 % Moisture Interval	Standard Moisture Range	Maximum Upper Limit
Corn	12 % - 18 %	10 % - 26 %	36 %
Durum Wheat	10 % - 16 %	8 % - 16 %	16 %
Hard Red Spring Wheat	10 % - 16 %	8 % - 18 %	20 %
Hard Red Winter Wheat	10 % - 16 %	8 % - 18 %	20 %
Hard White Wheat	8 % - 14 %	8 % - 14 %	16 %
Soft Red Winter Wheat	10 % - 16 %	10 % - 18 %	20 %
Soft White Wheat	10 % - 16 %	8 % - 16 %	18 %
All-class Wheat	10 % - 16 %	8 % - 18 %	20 %
Wheat Excluding Durum	10 % - 16 %	8 % - 18 %	20 %
Grain Sorghum	10 % - 16 %	10 % - 18 %	20 %
Long Grain Rough Rice	10 % - 16 %	10 % - 20 %	24 %
Medium Grain Rough Rice	10 % - 16 %	10 % - 20 %	24 %
All-class Rough Rice	10 % - 16 %	10 % - 20 %	24 %
Oats	8 % - 14 %	8 % - 14 %	14 %
Six-Row Barley	10 % - 16 %	8 % - 16 %	18 %
Two-Row Barley	10 % - 16 %	8 % - 16 %	18 %
All-class Barley	10 % - 16 %	8 % - 16 %	18 %
Soybean	10 % - 16 %	8 % - 18 %	22 %
Sunflower Seed (Oil)	6 % - 12 %	6 % - 16 %	20 %

The following criteria are to be applied along with criteria listed in Part IV above to verify calibration performance.

Special Considerations for "Multi-Class Calibrations

For Phase II, data for each individual grain class included in a "multi-class" calibration will be reviewed to determine what adjustments, if any, are needed.

Data for each individual grain class and the combined data for all grain classes included in the "multi-class" calibration will be reviewed to verify calibration performance for each individual grain class and the combined data.

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VII. Additional Type Evaluation Test Procedures and Tolerances for Grain Moisture Meters Incorporating an Automatic Test Weight per Bushel Measuring Feature

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B. Accuracy, Precision, and Reproducibility:

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Type of Grain	Moisture Range	Minimum Test Weight per Bushel Range	Criteria for Sample Selection
Corn	12 % - 18 %	54 - 58	a) No less than 8 samples should come from the lowest two-thirds of the 6 % Moisture Range. b) No less than 2 samples should come from the highest one-third of the 6 % Moisture Range. c) Samples should represent a distribution of Test Weights per Bushel (TW) that minimizes the correlation between TW and moisture.
Soybeans	10 % - 16 %	55 - 59	
Hard Red Winter Wheat	10 % - 16 %	59 - 63	
Durum Wheat	10 % - 16 %	59 - 63	
Soft White Wheat (except White Club)	10 % - 16 %	58 - 62	
Hard Red Spring Wheat (and White Club)	10 % - 16 %	58 - 61	
Soft Red Winter Wheat	10 % - 16 %	56 - 60	
Hard White Wheat	8 % - 14 %	60 - 64	
Two-Row Barley	10 % - 16 %	47 - 51	
Six-Row Barley	10 % - 16 %	43 - 47	
Oats	8 % - 14 %	33 - 39	
Sunflower Seed (Oil Type)	6 % - 12 %	28 - 31	
Long Grain Rough Rice	10 % - 16 %	43 - 47	
Medium Grain Rough Rice	10 % - 16 %	44 - 48	
Grain Sorghum or Milo	10 % - 16 %	58 - 62	

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Appendix D

Sample Temperature Sensitivity

(For grains/oil seeds other than corn, soybeans, & hard red winter wheat)

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Moisture Ranges and Tolerance for Sample Temperature Sensitivity (for the "Other 12" NTEP grains)		
Grain Type	**Moisture Range for Test**	**Tolerance Limit (Bias at Temperature Extremes)**
Durum Wheat	10 % - 16 %	0.35
Soft White Wheat	10 % - 16 %	0.35
Hard Red Spring Wheat	10 % - 16 %	0.35
Soft Red Winter Wheat	10 % - 16 %	0.35
Hard White Wheat	8 % - 14 %	0.35
Sunflower seed (Oil)	6 % - 12 %	0.45
Grain Sorghum	10 % - 16 %	0.45
Two-rowed Barley	10 % - 16 %	0.35
Six-rowed Barley	10 % - 16 %	0.45
Oats	8 % - 14 %	0.45
Long Grain Rough Rice	10 % - 16 %	0.45
Medium Grain Rough Rice	10 % - 16 %	0.45

5. Editorial Change to NIST HB 44, Section 5.56. (a) Table S.1.2. and Section 5.57. Table S.1.2. Column Headings to Add a Column for "Grain Class"

Background: At its August 2006 meeting, the Sector recommended changes to both the Grain Moisture Meter (GMM) and Near Infrared Grain Analyzer (NIR) sections of NIST HB 44 to include criteria applicable to "multi-class" calibrations. These recommendations were subsequently adopted by the NCWM for inclusion in the 2008 version of NIST HB 44.

Overlooked in the original recommendations were changes to column headings to more specifically indicate that the items listed in those columns include grain "types" or "classes." Following the NCWM Annual Meeting NIST conducted a review of the Specifications and Tolerances Committee's (S&T) Grain issues. At this review Diane Lee, NIST-WMD, mentioned the additional changes to Table S.1.2. to add "Class" to the headings. These changes were judged to be editorial changes not requiring Sector approval. Steve Cook of NIST, new NCWM S&T Technical Advisor, and Ms. Lee further modified the tables to improve their appearance and to clarify the relationship between "Type" and "Class" by adding columns for "Grain Type" and "Grain Class." Additional changes were made to the titles in tolerance tables to include "Class." The modified tables are shown below as they will appear in the 2008 version of NIST HB 44:

Accepted:

a. In Table S.1.2. of Section 5.56.(a) add a column for "Grain Class" as shown below.

Section 5.56.(a) GRAIN MOISTURE METERS

S.1.2. Grain or Seed Kind and Class Selection and Recording

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Table S.1.2. Grain Types and Multi-Class Groups Considered for Type Evaluation and Calibration and Their Minimum Acceptable Abbreviations		
Grain Type	***Grain Class***	***Minimum Acceptable Abbreviation***
Barley	*Two-Rowed Barley*	*TRB*
	Six-Rowed Barley	*SRB*
	*All-Class Barley**	*BARLEY*
Corn	---	*CORN*
Grain Sorghum	---	*SORG or MILO*
Oats	---	*OATS*
Rice	*Long Grain Rough Rice*	*LGRR*
	Medium Grain Rough Rice	*MGRR*
	*All-Class Rough Rice**	*RGHRICE*
Small Oil Seeds (under consideration)	---	---
Soybeans	---	*SOYB*
Sunflower seed (Oil)	---	*SUNF*
Wheat	*Durum Wheat*	*DURW*
	Soft White Wheat	*SWW*
	Hard Red Spring Wheat	*HRSW*
	Hard Red Winter Wheat	*HRWW*
	Soft Red Winter Wheat	*SRWW*
	Hard White Wheat	*HDWW*
	*All-Class Wheat**	*WHEAT*
	*Wheat Excluding Durum**	*WHTEXDUR*

[Note: Grain Types marked with an asterisk (*) are "Multi-Class Calibrations"]
[Nonretroactive as of January 1, 1998]
(Table Added 1993) (Amended 1995, 1998, and 2007)

b. In Table S.1.2. of Section 5.57. add a column for "Grain Class" as shown below.

Section 5.57. NEAR-INFRARED GRAIN ANALYZERS

S.1.2. Selecting and Recording Grain Class and Constituent

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Table S.1.2. Grain Types and Multi-Class Groups Considered for Type Evaluation and Calibration and Their Minimum Acceptable Abbreviations

Grain Type	***Grain Class***	***Minimum Acceptable Abbreviation***
Barley	*Two-Rowed Barley*	*TRB*
	Six-Rowed Barley	*SRB*
	*All-Class Barley**	*BARLEY*
Corn	---	*CORN*
Soybeans	---	*SOYB*
Wheat	*Durum Wheat*	*DURW*
	Soft White Wheat	*SWW*
	Hard Red Spring Wheat	*HRSW*
	Hard Red Winter Wheat	*HRWW*
	Soft Red Winter Wheat	*SRWW*
	Hard White Wheat	*HDWW*
	*All-Class Wheat**	*WHEAT*
	*Wheat Excluding Durum**	*WHTEXDUR*

[Note: Grain Types marked with an asterisk (*) are "Multi-Class Calibrations"]
[Nonretroactive as of January 1, 1998]
(Table Added 1993) (Amended 1995, 1998, and 2007)

6. State Responses to Questions in Don Onwiler's Letter to Enhance State Participation in the Grain Analyzer Sector

Background: In mid-February 2007, Don Onwiler, NTEP Committee Chairman, sent a letter to key weights and measures (W&M) officials seeking their responses to the following questions:

1. Does your jurisdiction inspect devices for accuracy in test weight determination? How is that working out? Are the test procedures and tolerances appropriate?
2. Has your jurisdiction performed inspections of grain analyzers for protein content of grain? How has that worked out? If you have not done these inspections, is there a reason why? Are there still hurdles to clear in NIST Handbook 44?
3. How are you getting along with the tolerances and test procedures for grain moisture?

This was done in an attempt to identify issues of immediate interest to state W&M personnel; reasoning that an agenda featuring issues that are of high concern to them would encourage participation by state W&M personnel. Also, a direct written request from NCWM for assistance on topics of high concern to them may be helpful when they approach administrators for travel funds.

Responses to Don's questions were received from six states: Colorado, Illinois, Maryland, Nebraska, North Carolina, and South Carolina. They are summarized below:

1. Four of the six states have been inspecting grain moisture meters (GMMs) for Test Weight per Bushel (TW) for several years. An additional state will begin this year. The sixth state has been unable to collect

samples that will test within the tolerances. (There may be a misunderstanding regarding samples used for testing.) Among the states presently inspecting GMMs with TW capability, one reported using a single SRWW sample for this test. Another reported that rejection rates for TW dropped from 47.7 % in 2004 to 12.27 % in 2006, with tests thus far in 2007 at 2.83 %. Cheryl Tew, North Carolina Department of Agriculture, suggested that it would be helpful if there were procedures for the preparation/selection of field test samples. All respondents presently inspecting GMMs for TW were of the opinion that test procedures and tolerances were appropriate.

2. None of the six states reported that they were performing inspections of NIR grain analyzers measuring protein in grain. Four of the six indicated that to the best of their knowledge their jurisdictions did not have any commercial meters performing protein tests. The fifth gave no reason, but said that they have "no plans at this time to conduct inspections on the protein content in grain." The remaining state, Colorado, gave several reasons why they were not inspecting NIR grain analyzers at present:

    a) **Statutory authority:** The Colorado Measurement Standards Act provides for the licensing of grain moisture meters but not for NIR grain analyzers.
    b) **Resources:** To implement a grain analyzer for protein (NIR) program, we would require more test samples, metrologist and field staff training, and additional inspection time. To date we have not researched the number of eligible devices in our state.
    c) **Industry input:** We have not yet contacted our industry partners for input.
    d) **Handbook 44, Section 5.57. paragraph N.1.2.:** Colorado interprets this paragraph to mean that constituent values be assigned to NIR test samples by GIPSA. We suspect that purchasing enough samples from GIPSA to test all the commercially used devices in Colorado would be cost prohibitive.

3. All six states had no problems with current test procedures and tolerances for grain moisture; however, several areas of concern were mentioned:

    a) **Testing with high moisture corn** – difficult to determine if a "failed" inspection is due to the meter or the sample.
    b) **Sample preparation** – some makes of meters agree well with air oven on a sample while other makes do not. Is the problem with the air oven or is this a normal difference between meter types?
    c) **Testing meter to unlike meter** – consistent problems approving one specific type and a large percentage of rejects of another type.

4. One state suggested that it might be helpful to do a round robin air oven comparison among laboratories.

Discussion: The Sector was surprised to learn that field inspections of NIR grain analyzers were not being performed. When the NIR Sector was founded, over 15 years ago, there was an indication that there was an urgent need to develop Handbook 44 Code covering near infrared protein analyzers. The scope of the Code was later expanded to include near infrared devices measuring additional grains/oil seeds and additional constituents. The Near Infrared Grain Analyzer Code was elevated to permanent status effective January 1, 2003.

Diane Wise, Colorado Department of Agriculture, estimated that there are 100 to 150 NIR instruments in Colorado, mostly used in grain elevators for determining wheat protein. She reported that letters have been sent out to survey industry needs and to seek participants in a pilot program for testing NIR units in the field.

A question was raised regarding how the standard reference samples needed for field-testing would be provided to the states. It was pointed out that, at present, states must provide the samples. Paragraph N.1.2. of the NIR Grain Analyzer Code of NIST Handbook 44 stipulates:

> **N.1.2. Standard Reference Samples. –** Reference samples used for field inspection purposes shall be clean and selected to reasonably represent the constituent range. These samples shall be selected such that the difference between constituent values obtained using the GIPSA standard reference method and an official GIPSA NIR grain analyzer does not exceed one-half of the acceptance tolerance shown in Table T.2. for individual test samples or 0.375 times the acceptance tolerance shown for the average of five samples.
> (Amended 2001and 2003)

Dr. Richard Pierce, GIPSA, did not immediately recall the origin of the traceability numbers, but suspected they came from the original Tentative Code that covered only wheat protein. He noted that they would not apply to soybeans.

The estimated cost of the NIR protein, Combustion Nitrogen Analyzer (CAN) as-is protein, and air oven moisture tests (based on the fees/charges listed in USDA/GIPSA/FGIS Directive 9180.74, dated February 12, 2007) are listed below:

GIPSA NIR Wheat Protein (at 12 % M.B.)	$10.00
GIPSA Lab Fees/test:	
CNA "as is protein"	$16.00
Air Oven Moisture*	$13.00
Total per sample	$39.00

(*required for reporting protein on a specified moisture basis.)

A minimum of five samples are required for field inspection of devices measuring protein in wheat. More than five samples might have to be submitted for testing to assure that at least five samples will meet the criteria specified in N.1.2.

Because of time constraints, further discussion on this issue was postponed to a future Sector meeting.

7. Report on OIML TC 17/SC 1 IR59 "Moisture Meters for Cereal Grains and Oilseeds"

Background and Discussion: This item was included on the Sector's agenda to provide a summary of the activities of OIML TC 17/SC 1. The Secretariat (China) is working closely with the United States and a small international work group (IWG) to revise OIML R 59 "Moisture Meters for Cereal Grains and Oilseeds." All committee drafts (CD) have been distributed to the United States National Working Group (USNWG), which for the most part is a subset of the NTEP Grain Analyzer Sector.

TC 17/SC 1 last met in September 2004 in Paris, France to review comments to the April 2004 2 CD of OIML R 59. Since that time, revisions and comments have been handled by mail. A 4 CD dated July 2006 was received from the Secretariat and circulated to the USNWG in August 2006. U.S. comments were returned to the Secretariat in November 2006. To assist in identifying and locating changes that had been made to the 3 CD for inclusion in the 4 CD, a copy of the collated comments to the 3 CD from all participating countries was forwarded to the USNWG in May of 2007.

The United States will host the next meeting of TC 17/SC 1 at NIST September 24 and 25, at which time comments on the 4 CD will be reviewed. Diane Lee, NIST/WMD, briefed the Sector on the status of comments to the 4 CD of IR 59 and brought the Sector up to date on plans for the TC 17/SC 1 meeting to be held at NIST.

Many of the 172 comments on the 4 CD of IR 59 dealt with formatting or editorial issues. Major issues brought up in the comments are summarized below:

Japan	Change scope from "fully automated digitally indicating" to "direct indicating" grain moisture meters.
	Remove "The minimum allowable sample size used in analysis shall be 100 g or 400 kernels or seeds, whichever is smaller" (or remove resistance type meters from the scope).
	Remove requirement that Meters must be equipped with a communications interface.
BIML	In order to have a complete harmonization of the measurements, it would be appropriate to define an International Reference Method based on ISO Standards. In 4 CD, the reference method for moisture content is defined by the national responsible body. Reference Methods should be those defined in International Standards (e.g., ISO 711, ISO 712, ISO 665…).
	Disturbance tests should include at least: • Radiated radiofrequency electromagnetic fields (OIML D 11 - 12.1.1), • Conducted radiofrequency fields (OIML D 11 - 12.1.2), • Electrostatic discharges (OIML D 11 - 12.2), • Bursts on supply lines (OIML D 11 - 13.5), • Surges on supply lines (OIML D 11 - 13.8), • Bursts on signal, data and control lines (OIML D 11 - 12.4), • Surges on signal, data and control lines (OIML D 11 - 12.5), • AC mains voltage dips short interruptions and voltage variation (OIML D 11 - 13.4), • Mechanical shocks (OIML D 11 - 11.2), • Damp heat cyclic (OIML D 11 - 10.2.2), • Low voltage of internal battery (OIML D 11 - 14.1)
BIML (continued)	Testing procedures should specify the number of instruments to be tested. Only one could be used for all the tests except reproducibility test which could specify that at least two samples of moisture meters shall be provided by the manufacturer for type approval testing. (Note: Many countries have objected to requiring that two instruments be submitted for all tests.)
	Requirements related to software should be included on the basis of OIML TC 5/SC 2 work. Please refer to the draft Recommendation R 76-1 (clause 5.5 for requirements and annex G for evaluation and testing procedures).
	Proposal: Manufacturers shall provide the technical documentation, a user manual and the description of the adjustment procedure. Other information may be provided such as information on performance tests, on calibrations that support a determination whether the design of the moisture meter meets the requirements of this Recommendation. The technical documentation shall include: • a list of the electronic sub-assemblies with their essential characteristics; • a description of the electronic devices with drawings, diagrams; • a description of the software and its characteristics (including identification numbers) and operation including a list of the data variables and the circumstances when they may be changed; • mechanical drawings; and • a plan for marking and sealing.

Ms. Lee asked Sector members (most of whom are also members of the USNWG) to review the country comments and provide any reply or concerns they may have with these comments by September 15, 2007. She will arrange a conference call with those who plan to attend the TC 17/SC 1 meeting to discuss some of the more important concerns with the standard.

[Editor's Update: During the September 24 - 25, 2007, TC 17/SC 1 meeting, the subcommittee members agreed to a number of changes to the OIML grain moisture Recommendation and addressed a number of the issues that were reviewed during the Sector meeting. The subcommittee agreed that:

- the scope would state that "This Recommendation applies to digitally indicating grain moisture meters that directly display moisture content,"
- ISO Standards were recommended but the reference method will still be determined by the national responsible body,
- the sample size of 100 g or 400 Kernels remains in the standard but the national authorities may determine otherwise,
- at least two instruments must be submitted for type approval.

Efforts were made at the meeting to harmonize the OIML grain moisture Recommendation and the protein Recommendation. The updated grain moisture Recommendation will be forwarded to the USNWG when updates to the Recommendation have been completed].

8. Report on OIML TC 17/SC 8 Draft International Recommendation "Protein Measuring Instruments for Cereal Grain"

Background: This item was included on the Sector's agenda to provide a summary of the activities of OIML TC 17/SC 8. The first meeting of OIML TC 17/SC 8, charged with developing an International Recommendation (IR) for "Protein Measuring Instruments for Cereal Grain," was held in Sydney, Australia May 31 - June 1, 2004, to review comments received on an outline draft that had been developed earlier by Australia, the Secretariat of TC 17/SC 8. At that meeting, the scope of the recommendation was expanded to include wheat, barley, corn, soybeans, and rice, and changes were made to allow the national measurement authority to determine moisture basis, reference method, instrument monitoring process, and whether or not to test non-direct measuring devices.

The United States received a 2nd working draft (WD) of this document in August 2004, and a 3rd draft was received in May 2005. The USNWG members provided comments to these drafts relating mostly to parts of the document that appeared to be in conflict with U.S. metrological practice and procedures. In June 2005, a work group meeting was held in Berlin to address comments on the 3rd draft. Subsequently, a 1st Committee Draft (CD) of "Protein Measuring Instruments for Cereal Grain and Oil Seeds" dated May 2006 was forwarded to the USNWG with a request for comments by July 1, 2006. A second meeting of the work group was held in Ottawa, Canada in September 2006 to review comments received on the 1 CD. The main points of contention were: 1) Maximum permissible errors (MPEs), and 2) the standard reference method (Kjeldahl method vs. Dumas method). A small working group (WG) was established to consider appropriate MPEs for protein measuring instruments. A table of proposed MPEs (see table following) has been distributed to USNWG members for review and comment by June 25, 2007.

The United States will host the next meeting of the TC 17/SC 8 work group at NIST September 20 and 21, 2007, to attempt to resolve issues related to MPEs and the standard reference method.

Grain type	MPE (type approval) %	MPE (repeatability) %	MPE (in-field, verification, re-verification) %	MPE (reproducibility) %
Wheat	± 0.3	± 0.2	± 0.4	± 0.3
Barley	± 0.4	± 0.3	± 0.5	± 0.4
Rice	± 0.5	± 0.25	± 0.5	± 0.5
Corn	± 0.5	± 0.25	± 0.8	± 0.5
Soybean	± 0.55	± 0.5	± 0.8	± 0.55

Discussion: Diane Lee, NIST/WMD, reported that U.S. comments had been forwarded to Australia. The United States response included a table of the tolerances that are applied in the U.S. type evaluation program for protein measuring instruments and also field evaluation tolerances and an explanation of how the tolerances are applied. As of the August 2007 Grain Analyzer Sector meeting, no response had been received from Australia.

[Editor's Update: Australia's reply to comments on the Table of Proposed MPEs was received in the United States approximately one week after the Grain Analyzer Sector meeting. The reply was distributed to members of the USNWG requesting comments or feedback by September 15, 2007. In summary, Australia's reply indicated that they were firmly opposed to separate MPEs for repeatability and reproducibility and to the further separation of MPEs for particular instrument characteristics. However, they would support the inclusion of tight MPEs for repeatability, but they are yet to be convinced that there is any need for MPEs for reproducibility.]

[Additional Editor's update: During the September 20 - 21, 2007, TC 17/SC 8 meeting, Australia and other members of the subcommittee agreed to add additional tests and separate MPEs for these tests to the OIML Protein Recommendation. An updated OIML Protein Recommendation with changes from the September 20 - 21, 2007, TC 17/SC 8 meeting will be circulated to the USNWG when the United States receives the updates from the Secretariat.]

9. Report on OIML TC 5/SC 2 Draft "General Requirements for Software Controlled Measuring Devices" and NTETC Software Sector Activities

Background: This item was included on the Sector's agenda to provide a summary of the activities of OIML TC 5/SC 2 and the NTETC Software Sector. In 2004, all OIML TCs and SCs that were revising an OIML Recommendation were contacted to ensure that software aspects would be considered in revised Recommendations. All OIML Documents and Recommendations published since 1990 have been reviewed for terms and requirements related to software. A pre-draft of the document "Software in Legal Metrology" was circulated in October 2004 by the Co-Secretariats (Germany and France). When complete, this document will serve as guidance for OIML technical committees addressing software requirements in Recommendations for software-controlled instruments. NIST submitted U.S. comments on an early draft in February 2005. The 1st working draft (WD) of this document, titled "General Requirements for Software Controlled Measuring Instruments" was received in February 2006. U.S. comments to this WD were sent to the Secretariat in June 2006. A 1st Committee Draft (CD), addressing comments received on 1 WD, was recently distributed by the Secretariat. Copies (in pdf format) are available at http://www.oiml.org/download/cds.html.

The NTETC Software Sector held its first meeting in April 2006. At that time, several subcommittee work groups were formed to focus on various aspects relating to the use of software in today's weighing and measuring instruments. A second meeting was held in October 2006.

Discussion: Diane Lee, NIST/WMD, reported that Ambler Thompson of NIST-WMD has requested that any U.S. comments on 1 CD should be sent to him no later than September 7, 2007. The next meeting of TC 5/SC 2 is scheduled to be held at the PTB in Berlin, Germany during the week of December 3 - 7, 2007. Comments to 1 CD will be addressed at that time.

The NTETC Software Sector held its third meeting May 7 - 8, 2007, in Sacramento, California. Their next meeting is tentatively scheduled for the spring of 2008, either immediately preceding or following the meeting of NTEP laboratory representatives held at that time. Steve Patoray, NTEP Director, reported that the WELMEC document for Type P (built-for-purpose) and Type U (using a universal general-purpose computer) instruments is being used as a model for much of the Software Sector's proposed Code.

[Editor's Note: A history and overview of WELMEC activities towards the development of software requirements and software examination for measuring instruments under legal control can be downloaded from http://www.oiml.org/bulletin/2000/07/welmec.pdf. The complete WELMEC software document is available from http://www.welmec.org/publications/7-2en.pdf.]

10. Enhanced Trait Soybeans – Calibration Issues

Source: United Soybean Board (USB)

Background: Near infrared analyzers are becoming increasingly necessary for measuring soybean composition factors. In some cases, the factors are those covered by NTEP (protein and oil) and in others the factors are outside NTEP (individual fatty acids, sugar profiles, and others). Successful development of new traits requires uniform measurements across the entire developmental chain, from seed breeder to end user, a broader scope than covered by NIST Handbook 44. Additional instruments beyond those actually submitted for NTEP are used; collectively all instruments across the development chain need to agree, both on average, and, to the extent possible, from sample to sample.

Two United Soybean Board projects, Soybean Quality Traits (SQT) and Analytical Measurements and Marketing Standards Initiative (AMMS) have been developing a program that would generate a common soybean sample pool (with reference chemistry) that could be used to:

1. Modify existing instrument calibrations of all manufacturers (whether NTEP participants or not) such that differences among them are minimized.
2. Allow new manufacturers/technologies to enter the market efficiently.
3. Form the basis for a voluntary-participation proficiency program open to any user at any point in the development chain, many of which would not be subject to Handbook 44.
4. Allow rapid evaluation and introduction of tests for new traits, such as amino acids, phytate, fatty acid profiles. This would include the measurement of general market factors (protein and oil) on specialty grains that likely were not in the calibration pool of the NTEP calibrations.

The overall goal is to facilitate the introduction of new technologies and new traits in an organized way that supports the more direct supply chain markets developing from bioprocessing and biotechnology. Activities of the two USB projects could provide both support and sample materials for the NTEP program.

Discussion: Participants in the SQT and AMMS projects will share results and future concepts for cooperation with the Grain Analyzer Sector. Some of the topics include:

1. Should we bring new traits more quickly into the NTEP system, and if so, how can the USB programs assist?

2. Can we harmonize sample pools?
3. Is there a way to collaborate to gain participation in NTEP of instruments not necessarily designed/marketed for trade use, but that still are integral parts of the value chain (i.e., those designed for breeder use).
4. How to harmonize contractual trades as well as those subject to open market regulation - especially when NTEP factors may be measured along with others, but on specialty rather than general market grains.
5. How to update NTEP calibrations to measure the general market factors on new genetics not likely to be found in open market channels.

Amy Lopez, AOCS, manager of the USB SQT Analytical Standards Program, summarized efforts underway on the development and evaluation of analytical tools for the analysis of soybean quality traits. These efforts involve both wet chemistry and NIR analyzers. Work is being done with mulitple NIR companies to improve calibrations not only for protein and oil, but also for fatty acids and amino acids. Toward this end, a sample library, representative of many of the new genotypes, is being maintained. Assistance is offered to NIR manufacturers by supplying samples for calibration development. Calibration files developed in the SQT Analytical Standards Program (with yearly calibration updates) are offered to NIR device users. Also included is the opportunity to take advantage of a QC program in which the same prepared sample is sent to all participating laboratories to obtain specific analytical results. After performing the required analyses a participaing laboratory returns the results to AOCS which provides a statistical evaluation of the analytical results that compare, on a confidential basis, that laboratory's data with those of the other participating laboratories. A submitting laboratory's identity is known only to the submitter.

Dr. Nick Bajjalieh, Integrative Nutritition, Inc., outlined the approach the USB AMMS program was taking to develop marketing initiatives especially in the animal feed area.

Following the presentations, it was pointed out that most of the suggested topics were outside of the Sector's scope. However, several Sector members agreed that all NIR instruments in commercial use should be capable of providing in-tolerance results for protein, oil, and moisture when tested using the same soybean sample, whether that sample is a commodity-type soybean variety or a so-called "enhanced trait" variety. In other words, protein, oil, and moisture measurements using a "specialty soybean calibration" should agree with protein, oil, and moisture measurements using an NTEP soybean calibration. As more "enhanced trait" varieties are introduced, it is inevitable that some will find their way into commodity soybean channels, so harmonization of soybean protein, oil, and moisture calibrations between NTEP calibrations and "Enhanced Trait" calibrations should be a goal.

Dr. Pierce noted that GIPSA is expanding their NIR calibration database to include some specialty trait grains.

11. Prevention of Potential GMM Fraud – Expected Integrity among Moisture Meter Manufacturers

Source: DICKEY-john Corporation

Background: This item is intended to call attention to the potentially fraudulent practice of "calibrating" field instruments to read differently (higher) than like-type NTEP meters in the grain moisture meter (GMM) Ongoing Calibration Program (OCP) at GIPSA in Kansas City, thereby encouraging elevator owner-operators to purchase meters reading higher than the Federal Standard moisture meter. This issue has recently surfaced again due to seasonal grain movement in commercial corn markets.

For years, certain manufacturers or service agencies have been suspected of performing fraudulent electronic calibration adjustments to grain moisture meters before returning them to the field after repair or periodic routine maintenance. In fact, many like-type commercial moisture meters in field use have been noted to read (consistently) at the high end of the maintenance tolerance for moisture, thus allowing them to read several tenths to full percentage points higher in moisture, during commercial grain trade, than the GAC2100 Federal Standard meter. Grain purchased using a meter reading higher, inaccurate moisture values costs producers money in terms of inflated drying charges and excess shrinkage, thus benefiting the buyer. This same grain can then be sold by the buyer using a different meter (one that reads lower moisture) without incurring excess shrinkage or inflated drying cost, affording the buyer (now seller) an unfair profit at the cost of the producer.

This alleged fraudulent practice has been noted due to the fact that comparative OCP data for Corn identifying the Official Meter and listing the average bias for each NTEP meter type published by the NTEP Participating Laboratory for Grain Analyzers in 2005 and 2006 clearly show the Official Meter (the DICKEY-john GAC2100) to agree within 0.2 % moisture with any other NTEP meter up to 20 % moisture. Above 20 % moisture, the GAC2100 moisture indication increases to over 0.4 % moisture above other NTEP meters and peaks to 1.3 % moisture above most other meters at 27 % moisture. These data would indicate that most *field* meters should consistently read the same as the Federal Standard meter below 20 % moisture and below the Federal Standard meter at moistures higher than 20 %. However, state regulatory field test results for Corn (crop years 2005 and 2006) appear to indicate that the opposite may be true.

There are several NIST HB 44 requirements that speak to the maintenance and use of devices that are intended to prevent the user from taking advantage of the tolerance of any device. The general code in HB 44 includes the following pertinent paragraphs:

G-UR.4.1 Maintenance of Equipment
This paragraph states that, *"...Equipment in service at a place of business found to be in error predominately in a direction favorable to the device user shall not be considered maintained in a proper operating condition."* Although this does not speak directly to moisture meters, its intent is to ensure that when devices are calibrated, the calibration is set as close to zero as possible and is not set to one side of the tolerance in favor of the device owner.

G-UR.4.3 Use of Adjustments
This paragraph states that "*…Whenever equipment is adjusted, the adjustment shall be so made as to bring performance as close as practicable to zero value*."

Fundamental Considerations, NIST HB 44, paragraph 2.3. Tolerance and Adjustments
"*…Equipment owners should not take advantage of the tolerances by deliberately adjusting their equipment to have a value or to give performance at or close to the tolerance limit..."*

There are also provisions for avoidance of perpetration of fraud found in NIST Handbook 130 Uniform Laws and Regulations:

Section 15, Misrepresentation of Quantity
"*No person shall: sell, offer, or expose for sale a quantity less than the quantity represented, nor take more than the represented quantity when, as buyer, he/she furnished the weight or measure by means of which the quantity is determined, nor represent the quantity in any manner calculated or tending to mislead or in any way deceive another person."*

Section 22, Prohibited Acts
"No person shall use or have in possession for use any incorrect weight or measure..."

The above information is not intended in any way to accuse or insinuate that any particular meter manufacturer is knowingly participating in fraudulent practices, but is intended to provide information regarding the regulations designed to prevent such potential occurrences. Reviewing these regulations is intended to remind manufacturers and their service agencies that intentionally adjusting meters *to be in error predominately in a direction favorable to the device user* is considered a fraudulent practice, and also to remind weights and measures officials that meters adjusted in this manner *shall not be considered maintained in a proper operating condition.*

Discussion: Questions were raised about the validity of the 2002 study in Illinois, especially with regard to the use of high-moisture corn samples (above 22 % moisture), many of which were so wet that they had to be hand-shelled. Responding to the question, "How do you prove that production does or does not meet type?" Dr. Richard Pierce, GIPSA, noted that because different meter types react differently to the same sample, the only way to show conformance to type is by a meter-to-like-meter comparison where the "standard" meter is traceable to the meters in the NTEP Phase II program at GIPSA. Steve Patoray, NTEP Director, suggested that this may be an enforcement issue, not a conformity issue. As such, this type of issue should be discussed at a regional meeting. Co-Technical Advisor, Jack Barber, offered the opinion that it is a standardization or normalization issue. If a difference does

exist between the NTEP "standard" meters and a device in the field, it could be due to improper adjustment either by the manufacturer or by a service agency. It was suggested that states may need to ensure that there is a Registered Service Agent program in the state and that service personnel receive the proper training to ensure that adjustments made to the meter are appropriate.

The Sector took no action on this issue.

12. Time and Place for Next Meeting

The next meeting is tentatively planned for Wednesday, August 20 and Thursday, August 21, 2008, in the Kansas City, Missouri area. Meetings will be held in either the meeting hotel or the National Weather Service Training Center. 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 May 2008.

If you would like to submit an agenda item for the 2008 meeting, please contact Steve Patoray, NTEP Director, at spatoray@mgmtsol.com; G. Diane Lee, NIST Technical Advisor, at diane.lee@nist.gov; or Jack Barber, Technical Advisor, at jwbarber@insightbb.com by April 15, 2008.

Change Summary

Recommended Amendments/Changes to the Grain Moisture Meters Chapter in the 2007 Edition of NCWM Publication 14			
Section Number	**Amendment/Change**	**Page**	**Source**
IV. Tolerances for Calibration Performance	Delete all text relating to "approved" and "Pending" categories. Amend/modify to show the revised criteria for calibration approval.	GMM-5 thru GMM-7	08/07 Grain Moisture Meter Sector Agenda Item 4
V. Criteria for NTEP Moisture Calibration Review	Add Table specifying "Basic 6 % Moisture Interval," "Standard Moisture Range," and "Maximum Upper Limit" for each grain type or class. Delete Cases I through VII dealing with inadequately represented moisture intervals. Modify "Special Considerations for 'Multi-Class' Calibrations."	GMM-7 thru GMM-10	08/07 Grain Moisture Meter Sector Agenda Item 4
VII.B. Accuracy, Precision, and Reproducibility	Change Oats Moisture Range from 10 % to 16 % to 8 % to 14 % in table.	GMM-13	08/07 Grain Moisture Meter Sector Agenda Item 4
Appendix D – Sample Temperature Sensitivity (For grains/oil seeds other than corn, soybeans, and hard red winter wheat)	Change Oats Moisture Range from 10 % to 6 % to 8 % to14 % in table titled "Moisture Ranges and Tolerance for Sample Temperature Sensitivity."	GMM-44	08/07 Grain Moisture Meter Sector Agenda Item 4

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