**National Type Evaluation Technical Committee (NTETC)**
**Grain Analyzer Sector**
**August 22-23, 2007 - Kansas City, Missouri**
**Meeting Agenda**

**Agenda Items**



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## 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 – 25, 2007, in Jacksonville, FL. 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 - March 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 |

For additional background refer to *Committee Reports for the 92nd Annual Meeting*, NCWM Publication 16 - March 2007. Diane Lee, NIST/OWM, will report on actions taken by the Conference on these issues.

Steve Patoray, NTEP Director, will report on other issues from these meetings that might be of interest to the Sector.

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

Cathy Brenner of the Grain Inspection, Processors and Stockyards Administration (GIPSA), the NTEP Participating Laboratory for Grain Analyzers, will bring us up to date on the progress of NTEP Type Evaluations and the collection and analysis of Grain Moisture Meter OCP (Phase II) data on the 2006 crop. She will also identify, for the 2007 harvest, the models enrolled in Phase II.

**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, will present 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.

**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 to possible revisions to the GMM Chapter of Publication 14 to address this problem. Two of the most significant guidelines considered 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.

Although most Sector members were generally in favor of either redefining or eliminating the "Pending" classification, 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 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 three 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 used to require a change in calibrations will continue to include the application of a 95 percent confidence interval to the maximum tolerance for each 2-percent 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 percent moisture interval and each running 3 year period. Additionally, for each 2 percent interval, they compared the basic approval tolerance (one-half the HB44 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 |

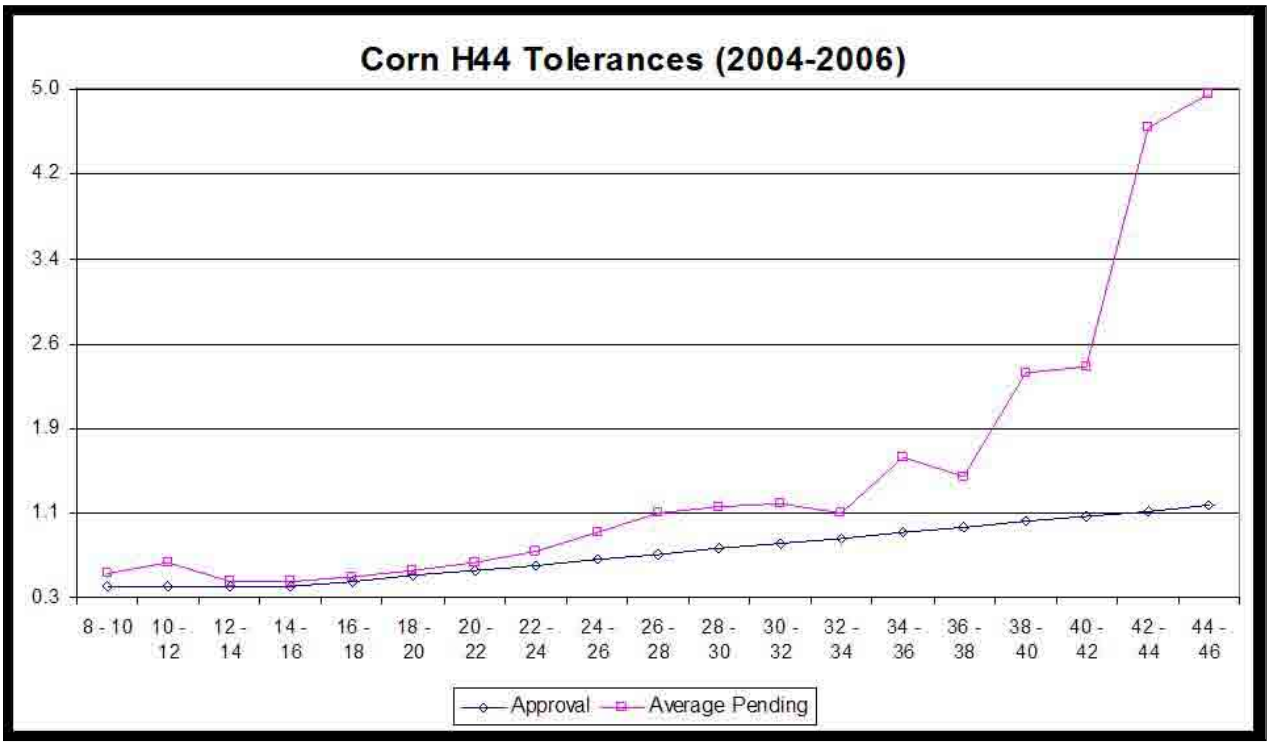


**Figure 4.1 – Corn Moisture Tolerances**

**Recommendation (1):** Based on the review of historical data, the NTEP laboratory has proposed grain specific recommendations for the following moisture ranges and limits:

- **Basic 6-Percent 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 percent intervals where the majority of samples have been available and where the basic approval tolerance (one-half the HB44 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 – 14% moisture interval instead of the 10 – 16% moisture interval presently specified in Publication 14. The NTEP lab proposes that the Basic 6-Percent Interval for Oats be changed to 8 – 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-Percent 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 – 22% | 24% | 80 |
| "All Class" Rough Rice | 7 – 25% | 10 – 16% | 10 – 22% | 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 |

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

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

1. The most recent three 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 two-percent moisture intervals. The report will indicate whether the calibration meets or exceeds the appropriate NTEP tolerances for each two-percent interval within the standard range and whether it meets or exceeds the overall moisture bias of $\pm$ 0.20 percent 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-percent 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 | Avg. Bias | STD. | 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:<br>* - meets the NTEP approval tolerance<br>** - does not meet NTEP approval tolerance, but meets pending tolerance<br>*** - does not meet either tolerance | | | | | | |

| **Table 4.4 - Proposed Long Grain Rough Rice Report** | | | | | | | |
|---|---|---|---|---|---|---|---|
| Moisture Level | NO. of Samples | Avg. Bias | STD. | One-half HB44 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 | 0.45 | * |
| 14 – 16 | 70 | 0.12 | 0.34 | 0.40 | NA | 0.47 | * |
| 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:<br>* - meets the NTEP tolerance<br>** - does not meet NTEP tolerance | | | | | | | |

**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 two-percent 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<br>Designation: Corn<br>Calibration Version: 200705<br>Moisture Range – Approved: 8 – 28%<br>Moisture Range – Pending: 8 – 28%<br>Calibration Constants:<br>K1 = 0001 K2 = 0020 K3 = 0300 | Corn<br>Designation: Corn<br>Moisture Calibration Version: 200705<br>Calibration Constants:<br>K1 = 0001 K2 = 0020 K3 = 0300 |

**Proposed:** Make the following amendments/changes to the Grain Moisture Meter Chapter of NCWM Publication 14 to avoid reducing a previously evaluated approved/pending moisture range due to lack of data in the OCP (Phase II):

## 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 percent 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.

Calibrations for corn, HRW wheat and soybeans will be approved initially based upon type evaluation testing over a 6 percent moisture range ~~and manufacturer supplied data over the remainder of the calibration range~~. The bias of all samples in a 2 percent 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 Meter under test and air oven is: ± 0.4 for this bias check. ~~data collected as part of the ongoing national calibration program. Approval tolerances will again be one-half of the Handbook 44 acceptance tolerance and will be applied in 2 percent intervals over the range of available data.~~ An overall bias will ~~may~~ be applied to the calibration in making approval decisions.

In order for a calibration to remain on the certificate of conformance, the calibration must continue to meet ~~"Approved"~~ tolerances for all 2 percent moisture intervals in the standard ~~basic 6 percent~~ moisture range. This requirement is waived if a 2 percent moisture interval contains fewer than five samples. For 2 percent moisture intervals outside the basic 6 percent moisture range, tolerances used to require a change in calibrations will include the application of a 95 percent confidence interval to the maximum tolerance for each 2 percent 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.

~~New~~ Updated calibrations will be approved based upon the re-predicted moisture values. ~~Approval tolerances~~Tolerances will be one-half of the Handbook 44 acceptance tolerance and will be applied in 2 percent intervals over the standard moisture range ~~of available data~~. Tolerances will include the application of a 95 percent confidence interval to the maximum tolerance for each 2 percent 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 H-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 percent moisture, calculated using the most recent calibration and all available raw data collected within the last 3 years ~~for the entire~~ through the maximum moisture limit~~range~~.

Failure to meet the requirements in either 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 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".

~~The status of all calibrations will be listed on the NTEP Certificate of Conformance. The categories are (1) approved, (2) pending, and (3) not available. The categories can be described as follows:~~

~~**Approved:** Corn, HRW wheat, and soybean calibrations will be approved based upon performance over the 6 percent type evaluation moisture range and manufacturer supplied data. Continued approval requires acceptable performance as part of the ongoing national calibration effort.~~

~~Calibration data, collected as part of the national calibration program, must indicate that calibration performance meets the tolerances for each 2 percent moisture interval before additional grains will be approved. Continued approval again requires acceptable performance as part of the national calibration effort, (i.e., none of the average differences between predicted and reference values for the respective 2 percent moisture intervals exceed one-half the Handbook 44 acceptance tolerance within the basic 6 percent moisture range and one-half the Handbook 44 acceptance tolerance plus a 95 percent confidence interval outside the basic 6 percent moisture range).~~

~~**Pending:** A new calibration that has not been validated by ongoing calibration data collected as part of the national calibration program will automatically be placed in this category.~~

~~This category also includes calibrations that have not yet met the criteria for approval, but that also have not performed badly enough to be listed as not approved. Such calibrations may be used on NTEP-approved meters.~~

~~**Not Available:** A calibration is not available for this grain included in the national calibration program. A calibration for this grain type shall not be used on NTEP approved meters.~~

~~For grains other than corn, soybeans, and hard red winter wheat, a calibration will not be listed on the Certificate of Conformance until it has had its calibration bias checked 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. "Multi-class" calibrations must meet the overall bias requirements for the test sets of each individual class.~~

~~For this bias, check the maximum allowable overall bias between Meter under test and air oven is: ± 0.4.~~

~~During bias testing of such pending calibrations, if biases are detected which exceed the limits shown above, the Type Evaluation Laboratory shall immediately notify the manufacturer. The manufacturer shall then make changes or adjustments to the calibration which, in the manufacturer's best judgment, minimize the differences between the manufacturer's meter and the official air oven.~~

~~In support of such changes, the Manufacturer shall forward to the Type Evaluation Laboratory:~~

~~1. Detailed descriptions of the changes,~~

~~2. an explanation of how the changes affect the previous test results,~~

~~3. the calibration coefficients for the revised calibration, and~~

~~4. the unique identifier of the revised calibration.~~

~~The Type Evaluation Laboratory shall not forward a recommendation for certification to NCWM until the Manufacturer supplies this information or notifies the Type Evaluation Laboratory that it wants to amend the application for type approval to show the calibration in question as "NOT AVAILABLE." Testing of the revised calibration by the Type Evaluation Laboratory will not be required.~~

## V. Criteria for NTEP Moisture Calibration Review

By grain, the Basic 6-Percent Moisture Interval, Standard Moisture Range, and Maximum Upper Limit for moisture calibration review are:

| GrainType or Class | Basic 6-Percent 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 – 22% | 24% |
| All-class Rough Rice | 10 – 16% | 10 – 22% | 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.~~determine "approved" and "pending approval" moisture ranges.~~

**Special Cases Dealing with Inadequately Represented Moisture Intervals:**

**Case I.**

A single sample appears in a 2 percent moisture interval that is at the end of the standard moisture ~~calibration data~~ range.

a. If the sample bias is outside the approval tolerance, the calibration "fails" ~~is "not approved"~~ in that moisture interval.

b. If the sample bias is within ~~the approval~~ tolerance, the calibration "passes" ~~is "pending approval"~~ in that moisture interval.

**Case II**.

The samples in a 2 percent moisture interval at the end of the standard moisture ~~calibration data~~ range do not represent at least one-fourth of the moisture range. For example, there are no samples with a moisture content greater than or equal to 18.5 percent in the 18 to 20 percent moisture interval.

a. If the average bias for the samples is outside the approval tolerance, the calibration "fails" ~~is "not approved"~~ in that moisture interval.

b. If the average bias for the samples is within the approval tolerance, the calibration "passes" ~~is "pending approval"~~ in that moisture interval.

**Case III.**

There are two or more consecutive 2 percent moisture intervals at the end of the standard moisture ~~calibration data~~ range that each contain only one sample. (Similar to Case I.)

a. If the bias for each 2 percent interval is within ~~the approval~~ tolerance, the calibration "passes"~~is "pending approval"~~ for those moisture ranges.

b. If the bias for any of the inner intervals is within ~~the approval~~ tolerance, apply the criteria for Case I to successive intervals working in from the ends of the calibration range.

c. If the bias for the outer interval is within the approval tolerance but the bias for an inner interval is not, the calibration "fails" ~~is "not approved"~~ beyond (and including) the innermost interval that is determined to have "failed" ~~be "not approved"~~ when applying the criteria for Case I.

**Case IV.**

A 2 percent moisture interval that contains no data points is bordered by intervals with data points.

The calibration approval status for the empty interval is the same as that for the outer bordering interval.

**Case V.**

A 2 percent moisture interval that contains one data point is bordered by intervals with more than one data point.

a. If the bias for the single point is within ~~the approval~~ tolerance and the bias for samples in the adjoining outer interval is within ~~the approval~~ tolerance, the calibration "passes"~~is "approved"~~ for the interval with the single sample.

~~b. If the bias for the single point is within the approval tolerance and the bias for samples in the adjoining outer interval is within the pending approval tolerance, the calibration is "pending approval" for the interval with the single sample.~~

~~c. If the bias for the single point is within the approval tolerance and the bias for samples in the adjoining outer interval is outside the pending approval tolerance, the calibration is "pending approval" for the interval with the single sample.~~

~~d. If the bias for the single point is within the pending approval tolerance and the bias for samples in the adjoining outer interval is within the pending approval tolerance, the calibration is "pending approval" for the interval with the single sample.~~

be. If the bias for the single point is outside the ~~approval~~ tolerance and the bias for samples in the adjoining outer interval is outside ~~the pending approval~~ tolerance, the calibration "fails" ~~is "not approved"~~ for the interval with the single sample.

**General Considerations:**

~~**Case VI.**~~

~~All "approved" and "pending approval" calibration ranges listed on certificates of conformance will begin and end with even numbers.~~

~~**Case VII.**~~

~~Manufacturers may submit supplementary data to extend calibration "pending approval" ranges beyond available NTEP moisture ranges. All or a portion of the NTEP calibration data not included in the last three crop years may be submitted as manufacturer data. Only manufacturer data supplied in the standard data format, as defined in Appendix C, will be considered when determining calibration ranges and pending approval status.~~

~~a. An initial calibration report is prepared using the most recent three years of NTEP calibration data. "Approval" and "pending approval" moisture ranges are determined using the criteria in Section IV ("Tolerances for Calibration Performance") and Section V ("Special Cases Dealing with Inadequately Represented Moisture Intervals"). "Approval" ranges are determined solely on the basis of the most recent three years of NTEP calibration data and cannot be extended by including manufacturer data. "Pending approval" ranges can be extended through the use of manufacturer data.~~

~~b. The process described in (a) is repeated using a second calibration report prepared using the most recent three years of NTEP calibration data plus manufacturer submitted data. Moisture intervals listed as "not approved" on the initial calibration report can be upgraded to "pending approval" if the bias to air oven is within the approval tolerance for that moisture interval. Confidence intervals are not applied to approval tolerances for use in determining pending approval ranges when manufacturer data is used.~~

**Special Considerations for "Multi-Class Calibrations.**

**Case VI~~V~~~~III~~.**

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 ~~and to determine the moisture ranges to be listed on the certificate for "multi-class" calibrations~~.

~~An "overall moisture range" will be defined and listed on the certificate for each "multi-class" calibration. The "overall moisture range" is intended to be used as the "Moisture Range of the Grain or Seed" referred to in NIST Handbook 44, Section 5.56(a), Paragraph S.1.3.(c).~~

~~The "pending" and "approved" moisture ranges for each individual class included in a "multi-class" calibration will also be listed on the certificate.~~

~~The "overall moisture range" for a "multi-class" moisture calibration normally covers the range from the lowest "pending" low-moisture limit of the included classes to the highest "pending" high-moisture limit of the included classes.~~ 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.~~the low and high moisture listed for the "overall moisture range." In addition, the data will be reviewed to determine that there is no moisture interval that does not meet either the approved or the pending tolerances but does contain an adequate number of samples. If a moisture interval contains an adequate number of samples and does not meet either the approved or the pending tolerances, then the "overall moisture range" will be adjusted to exclude that moisture interval.~~
~~See example below:~~

~~Example:~~

~~A "Hard Wheat" calibration including Hard Red Spring Wheat, Hard Red Winter Wheat, and Hard White Wheat, resulted in the following "approved" and "pending" limits for the included classes:~~

~~Hard Red Spring Wheat~~
~~Moisture Range - Approved: 8 - 20%~~
~~Moisture Range - Pending: 6 - 24%~~

~~Hard Red Winter Wheat~~
~~Moisture Range - Approved: 6 - 18%~~
~~Moisture Range - Pending: 6 - 18% (There are 20 samples in the 18 - 20% interval, but they do not meet either tolerance.)~~

~~Hard White Wheat~~
~~Moisture Range - Approved: 6 - 16%~~
~~Moisture Range - Pending: 6 - 18%~~

~~The lowest "pending" low-moisture limit is 6%. The highest "pending" high-moisture limit is 24%, but Hard Red Winter Wheat failed to meet either "approved" or "pending" tolerances in the 18 - 20 % interval. Thus, the "overall moisture range" for the Hard Wheat calibration must be reduced to 6 - 18% until a calibration change is made to correct the problem.~~

**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"**

**Discussion:** At their 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".

**Proposed:**

**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 Their Minimum Acceptable Abbreviations***

| ***Grain Type*** | ***Grain Class*** | ***Minimum Acceptable Abbreviation*** |
|---|---|---|
| *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* |
| *Corn* | --- | *CORN* |
| *Sunflower seed (Oil)* | --- | *SUNF* |
| *Grain Sorghum* | --- | *SORG or MILO* |
| *Soybeans* | --- | *SOYB* |
| *Barley* | *Two-Rowed Barley* | *TRB* |
| | *Six-Rowed Barley* | *SRB* |
| | *All-Class Barley** | *BARLEY* |
| *Oats* | --- | *OATS* |
| *Rice* | *Long Grain Rough Rice* | *LGRR* |

| ***Table S.1.2. Grain Types and Multi-Class Groups Considered for Type Evaluation and Their Minimum Acceptable Abbreviations*** | | |
|---|---|---|
| ***Grain Type*** | ***Grain Class*** | ***Minimum Acceptable Abbreviation*** |
| | *Medium Grain Rough Rice* | *MGRR* |
| | *All-Class Rough Rice** | *RGHRICE* |
| *Small Oil Seeds (under consideration)* | --- | --- |

[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*** |
| *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* |
| *Barley* | *Two-Rowed Barley* | *TRB* |
| | *Six-Rowed Barley* | *SRB* |
| | *All-Class Barley** | *BARLEY* |
| *Corn* | --- | *CORN* |
| *Soybeans* | --- | *SOYB* |

[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:

- Does your jurisdiction inspect devices for accuracy in test weight determination? How is that working out? Are the test procedures and tolerances appropriate?
- Has your jurisdiction done 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 Handbook 44?
- 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 States approach administrators for travel funds.

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

- 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.

- 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:
    - **Statutory authority:** The Colorado Measurement Standards Act provides for the licensing of grain moisture meters but not for NIR grain analyzers.
    - **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.
    - **Industry input:** We have not yet contacted our industry partners for input.
    - **Handbook 44, Section 5.57, Paragraph N.1.2.** specifies 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.

- All six states had no problems with current test procedures and tolerances for grain moisture; however, several areas of concern were mentioned:
    - **Testing with high moisture corn** – difficult to determine if a "failed" inspection is due to the meter or the sample.
    - **Sample preparation** – some 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?
    - **Testing meter to unlike meter** – consistent problems approving one specific type and a large percentage of rejects of another type.

  One state suggested that it might be helpful to do a round robin air-oven comparison between labs.

The Sector is asked to determine what action can be taken to address the suggestions and concerns of those responding to Don Onwiler's outreach letter.

### 7. Report on OIML TC17/SC1 IR59 "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 TC17/SC1. 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/SC1 last met in September 2004 in Paris, France to review comments to the April 2004 2nd CD of OIML R 59. Since that time, revisions and comments have been handled by mail. A 4th 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 3rd CD for inclusion in the 4th CD, a copy of the collated comments to the 3rd CD from all participating countries was forwarded to the USNWG in May of 2007.

The U.S. will host the next meeting of TC 17/SC1 at NIST September 24 and 25, at which time comments on the 4th CD will be reviewed.

**Discussion**: Diane Lee, NIST/WMD, will brief the Sector on the status of comments to the 4th CD of IR59 and will bring the Sector up-to-date on plans for the TC17/SC1 meeting to be held at NIST.

### 8. Report on OIML TC17/SC8 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 TC17/SC8. The first meeting of OIML TC17/SC8, 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 TC17/SC8. 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-indirect measuring devices.

The U.S. 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 1st 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 U.S. will host the next meeting of the TC 17/SC8 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, will brief the Sector on comments received to Australia's proposed MPE's for protein and will bring the Sector up-to-date on plans for the TC17/SC8 meeting to be held at NIST.

## 9. Report on OIML TC5/SC2 Draft "General Requirements for Software Controlled Measuring Devices" and NTEPTC Software Sector Activities.

**Background:** This item was included on the Sector's agenda to provide a summary of the activities of OIML TC5/SC2 and the NTEPTC 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 Secretariat (Germany and France). When complete, this document will serve as guidance for OIML technical committees addressing software requirements in Recommendations for software-controlled instruments. The 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 to 1WD, has been distributed recently by the Secretariat. Copies 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 working 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, will report on the current status of the OIML TC5/SC2 1st CD document, and Steve Patoray, NTEP Director, will bring us up to date on the activities and the schedule for future meetings of the Software Sector.

### 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 the 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 the application of Handbook 44 code. 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 (ie 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.

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

**Source:** DICKEY-john Corporation

**Discussion:** 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 costs producers 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 percent moisture with any other NTEP meter up to 20% moisture. Above 20% moisture, the GAC2100 moisture indication increases to over 0.4 percent moisture above other NTEP meters and peaks to 1.3 percent 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:

**GUR.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.

**GUR.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.*

## 12. Time and Place for Next Meeting

A tentative date and location will be selected for the next meeting. A late August meeting in St. Louis or Kansas City is suggested.