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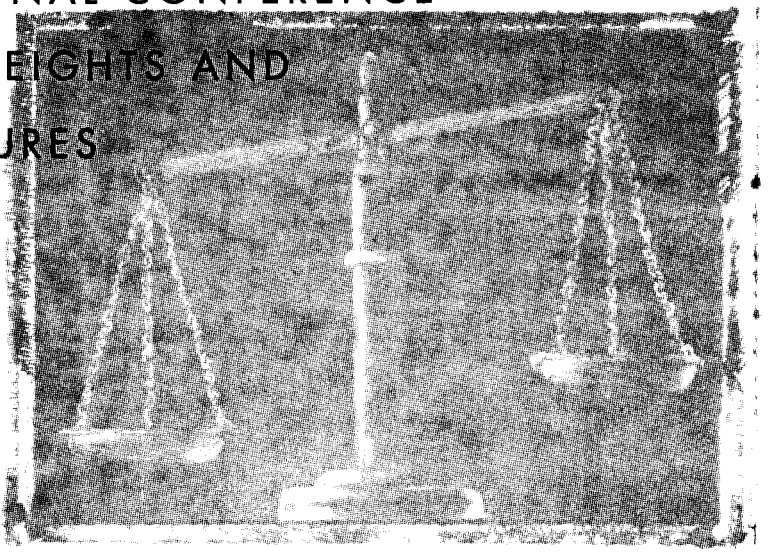
REPORT OF THE 86TH NATIONAL CONFERENCE ON WEIGHTS AND MEASURES



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REPORT OF THE

86TH NATIONAL CONFERENCE

ON WEIGHTS AND MEASURES

Washington, D.C. - July 22-26, 2001

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NATIONAL CONFERENCE ON WEIGHTS AND MEASURES
is supported by the National Institute of Standards and Technology and attended by Officials from the Various States, Counties, and Cities, and Representatives from the U.S. Government, Other Nations, Industry, and Consumer Organizations

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Abstract

The 86th Annual Meeting of the National Conference on Weights and Measures (NCWM) was held July 22 through 26, 2001, at the Grand Hyatt Washington at Washington Center, Washington, D.C. The theme of the meeting was "Success Through Communication and Cooperation."

Reports by the NCWM Board of Directors, Standing Committees, and Special Purpose Committees constitute the major portion of this publication, along with the addresses delivered by Conference officials and other authorities from government and industry.

Special meetings included those of the Scale Manufacturers Association, Meter Manufacturers Association, Gasoline Pump Manufacturers Association, American Petroleum Institute, National Association of State Departments of Agriculture, the Industry Committee on Packaging and Labeling, Associate Membership Committee, and Metrology Subcommittee.

Key words: laws and regulations; legal metrology; meters; scales; specifications and tolerances; training; type evaluation; uniform laws, weights and measures.

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Note: The policy of the National Institute of Standards and Technology is to use metric units of measurement in all of its publications. In this publication, however, recommendations received by the NCWM technical committees have been printed as they were submitted and, therefore, may contain references to inch-pound units where such units are commonly used in industry practice. Opinions expressed in non-NIST papers are those of the authors and not necessarily those of the National Institute of Standards and Technology. Non-NIST speakers are solely responsible for the content and quality of their material.

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General Session

Standing Committee Reports

Past Chairmen of the Conference

Conference	Year	Chairman
43rd	1958	J. P. McBride, MA
44th	1959	C. M. Fuller, CA
45th	1960	H. E. Crawford, FL
46th	1961	R. E. Meek, IN
47th	1962	Robert Williams, NY
48th	1963	C. H. Stender, SC
49th	1964	D. M. Turnbull, WA
50th	1965	V. D. Campbell, OH
51st	1966	J. F. True, KS
52nd	1967	J. E. Bowen, MA
53rd	1968	C. C. Morgan, IN
54th	1969	S. H. Christie, NJ
55th	1970	R. W. Searles, OH
56th	1971	M. Jennings, TN
57th	1972	E. H. Black, CA
58th	1973	George L. Johnson, KY
59th	1974	John H. Lewis, WA
60th	1975	Sydney D. Andrews, FL
61st	1976	Richard L. Thompson, MD
62nd	1977	Earl Prideaux, CO
63rd	1978	James F. Lyles, VA
64th	1979	Kendrick J. Simila, OR
65th	1980	Charles H. Vincent, TX
66th	1981	Edward H. Stadolnik, MA
67th	1982	Edward C. Heffron, MI
68th	1983	Charles H. Greene, NM
69th	1984	Sam F. Hindsman, AR
70th	1985	Ezio F. Delfino, CA
71st	1986	George E. Mattimoe, HI
72nd	1987	Frank C. Nagele, MI
73rd	1988	Darrell A. Guensler, CA
74th	1989	John J. Bartfai, NY
75th	1990	Fred A. Gerk, NM
76th	1991	N. David Smith, NC
77th	1992	Sidney A. Colbrook, IL
78th	1993	Allan M. Nelson, CT
79th	1994	Thomas F. Geiler, MA
80th	1995	James C. Truex, OH
81st	1996	Charles A. Gardner, Suffolk Co., NY
82nd	1997	Barbara J. Bloch, CA
83rd	1998	Steven A. Malone, NE
84th	1999	Aves D. Thompson, AK
85th	2000	G. Wes Diggs, VA

The following designated State Representatives were present and voted on reports presented by the Conference Standing and Annual Committees.

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Alaska	Aves D. Thompson
American Samoa	None
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Arkansas	None
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North Dakota	None

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Rhode Island	None
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Virgin Islands	None
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National Conference on Weights and Measures, Inc., Organization Chart 2000-2001

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*National Type Evaluation Program (NTEP) Committee Member
[F]Finance Committee Member

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*(Grain Moisture Meter Sector only)

Special Address

Richard F. Kayser, Director of Technology Services, National Institute of Standards and Technology, addressed the Conference July 24, 2001, at the General Session. The following is a copy of his speech. The speech was followed by a special viewing of the "NIST at 100: Foundations for Progress" Video to celebrate the NIST Centennial.

President's Address for the 86th NCWM

This year in which NIST celebrates its 100th Anniversary is a time for reflection -- a time to pause and take a moment to review the successes of the past before we go forward to work on the challenges of the future. It is also a time to recognize the partnerships and friendships that have made our successes possible.

As you can see from the banner behind me, the National Conference on Weights and Measures has been a significant part of NIST history for 96 of its 100 years. During that time, our joint commitment to achieving uniformity and quality in regulatory weights and measures activities has brought about some major accomplishments. Some of these accomplishments are described in a new NIST Centennial publication, "A Century of Excellence in Measurements, Standards, and Technology," which contains a series of short articles or vignettes on some of the most significant NIST publications issued over the last 100 years. The article on "Uniformity in Weights and Measures Laws and Regulations" describes how we have worked together and what we have achieved.

For example, our collaboration to produce NIST Handbook 44, Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices, has resulted in a standard that has been adopted by all 50 States as the legal basis for regulating commercial weighing and measuring devices. Handbook 44 was first published under its current designation in 1949, but its predecessors go all the way back to 1918.

Similarly, our collaboration on NIST Handbook 130, Uniform Laws and Regulations, which was first published as a compilation in 1979, has resulted in uniform legal metrology laws and regulations that have served as models for State and local weights and measures jurisdictions and have been widely adopted. The Uniform Weights and Measures Law in Handbook 130, for instance, has been adopted or used as a guideline by 43 States, and the Uniform Packaging and Labeling Regulation has been adopted or used a guideline by 44 States. By now you have probably all heard or seen the numbers that we have compiled on the impact of weights and measures laws, but I think I should repeat them here because they really show the significance of our work. It has been estimated that weights and measures laws and regulations impact transactions involving $4.5 trillion (52.8%) of the $8.51 trillion U.S. Gross Domestic Product (1998 figures). That's an extraordinary impact, and it highlights the great importance of the decisions that are made by the NCWM.

One other Handbook I should mention is Handbook 133, Checking the Net Contents of Packaged Goods, the Fourth Edition of which NCWM will be considering for adoption this week. This is another historic document that evolved over the years from Handbook 67, published by NIST in 1959, to Handbook 133, which was first adopted by NCWM in 1985. Now 48 States say that they use Handbook 133 as the basis for their package checking programs.

Supporting the Handbooks is an additional set of remarkable documents -- the Reports of the National Conference on Weights and Measures. The Reports serve as the legislative history for the Handbooks. They also contain a wealth of historical information on the evolution of weights and measures activities in the United States. NIST has edited and published the reports of the Conference since the first one in 1905. NIST, then known as the National Bureau of Standards, called the first Conference "in order to bring about uniformity in the State laws referring to weights and measures, and also to effect a close cooperation between the State inspection services and the National Bureau of Standards." That cooperation continues to this day.

The National Type Evaluation Program (NTEP) is another success story. At one time there were a number of separate State programs to approve new designs of commercial weighing and measuring devices. The lack of uniformity among the numerous programs created problems for device manufacturers. NTEP was created to facilitate trade and reduce the burden on both the States and the manufacturers. In part because of the outstanding support of the program by the NCWM's associate members, NTEP has been widely adopted by the States and has

even been expanded to include our neighbors in Canada. Until last year, NIST administered NTEP. Now that the NCWM has assumed that responsibility, NIST continues to provide technical support and resources to the program.

Yet another example of our successful partnership is the State Laboratory Program. The close relationship between the State metrology labs and NIST actually goes back to 1836 when NIST's predecessor, the Office of Weights and Measures, was established under the direction of the Superintendent of the Coast Survey in the U.S. Treasury Department in order to carry out the provisions of a Congressional resolution providing for the construction and delivery of sets of weights and measures to the States. Over the years, NIST has provided not only physical measurement standards for the States, but a continuing program of training and other support. The NCWM has served as a forum where the State metrologists can meet and discuss issues of importance to the weights and measures community and also receive training from NIST staff and others.

Today I have mentioned just a few of the accomplishments that we have achieved together in our long, rewarding history of cooperation. I know that the future will bring many more opportunities and successes. I would like to thank all of you -- State and local weights and measures officials, representatives of industry and commerce, other Federal officials, and our international colleagues for the part that you have played in a history of which I think we can all be proud.

Now I would like to share with you a video that NIST created to celebrate its first 100 years. I hope you enjoy it.

Chairman's Address at the 86th Annual Meeting 2001
Presented by Louis E. Straub, Chief
Maryland Weights and Measures Section

Good afternoon, it is with a great deal of pleasure that I welcome you to Washington, D.C. for the 86th Annual Meeting of the National Conference on Weights and Measures. In the preceding twelve months I have had the opportunity to represent this conference at meetings of numerous organizations. These included the Western Weights and Measures Association, the Central Weights and Measures Association, the Northeast Weights and Measures Association, and my regional association, the Southern Weights and Measures Association.. I also attended meetings of the Scale Manufactures Association, National Industrial Scale Association, and Canadian Forum on Trade Measurement hosted by Measurement Canada. I found these meetings and my interaction with the participants to be a truly valuable experience. I now understand how much respect our Conference has in the Weights and Measures community.

At our Annual Meeting last year in Richmond, Virginia, I decided to focus my Chairmanship on completing some of the work that was already before the Conference. I think we have made great strides in this effort.

The transition of the NTEP management from OWM to the Conference went as planned on October 1, 2000. To the vast majority of our customers the transition was seamless and uneventful– what a relief! Unless you were directly involved in the transition, you can't appreciate the enormity of this project. Henry Oppermann and Beth Palys can attest to this, I'm sure they know their hard work is appreciated.

All of the NCWM NTEP Certificates of Conformance are now available on our website, www.ncwm.net through a searchable database. In addition, our headquarters office electronically forwards all new CC's to each state weights and measures office, generally at the first of each month.

If you remember, last July I referred to our NTEP Director as our "missing piece of the puzzle". I am happy to report that we have an NTEP Director and that Stephen Patoray is not missing, even though I am sure the thought has crossed his mind. Steve brings a great deal of professional and technical expertise to the program. During my year as Chairman, I've had a number of opportunities to work with Steve. I have observed him speak for NTEP, attended meetings he has organized and run and have been very impressed. In this short period of time he has convinced me that we selected the right person for the job. Thanks Steve! I look forward to working with you next year as Chairman of the NTEP Committee.

We have added a searchable database of members on our web site. This site was created to replace NIST Publication 2 which was last published in 1999. We have also published the first two issues of our newsletter. Our goal is to have something for every member. We welcome your input and hope that you find the newsletter valuable.

In January of this year, Alan Johnston of Measurement Canada and I signed a new 10 year U.S./Canada Mutual Recognition Agreement for weighing devices. This fall we plan to continue discussions with Measurement Canada, possibly expanding the current agreement to include additional weighing devices and developing a new draft agreement for liquid measuring devices.

I have also had some preliminary discussions with PTB Germany concerning a possible bi-lateral agreement with the NCWM to exchange R60 and R76 test data. At this time no formal agreements have been proposed, but I believe that discussions of this nature will be a positive step for the Conference in the international arena. As a conference member, I did not grasp the significance of this area. Chuck Erhlich, Chief NIST Standards Management Program, has been extremely helpful in bringing me up to speed.

Tomorrow afternoon the Conference will begin its voting session. There are two items before the Conference I would like to address this afternoon. The first is Item 250-4 of the Laws and Regulations (L & R) Report, the adoption of the 4th Edition of NIST Handbook 133. In 1981 the Conference adopted the 1st Edition of Handbook 133. At that time, many weights and measures officials had reservations about some aspects of the handbook.

Some were concerned about the more complicated sampling procedures, especially category A. Some believed the MAV's (maximum allowable variations) proposed in Handbook 133 were too large for random pack packages. Twenty years later and I'm sure I can find someone with a concern, but Handbook 133 has proven to be an effective and fair document. I believe we are ready to take the next step and adopt the 4th Edition of Handbook 133. The second item is actually two, Items 310-1A and 310-1B, on the Specifications and Tolerances (S & T) final report concerning remanufactured devices. As you know, this issue has been discussed by the Conference for a number of years. I will not stand here and tell you that this item is perfect, but I believe Jim Truex and the Task Force on Remanufactured Devices and the S&T Committee have worked hard on these proposals and now it is your opportunity to be heard.

This past year has been busy and productive, but what lies ahead for the Conference? On Saturday your Board of Directors adopted a new Five Year Strategic Plan. You're probably asking yourself, don't we already have a strategic plan? Strategic planning is not a one time event. This process can only stay current and relevant when the plan is updated and reviewed on an annual basis. Some may think our Plan is too aggressive, but I believe much of our Strategic Plan is obtainable. With hard work by 2006 the NCWM should:

(1) provide new and innovative educational and training programs,
(2) foster universal acceptance of NTEP,
(3) be financially secure and stable,
(4) utilize technology to better communicate with members and to create a variety of forums for knowledge exchange and member services,
(5) enjoy increased recognition, awareness and image with essential stake holders as a major player in the weights and measures community, and
(6) posses a larger membership and have increased attendance at our conference.

The Board of Directors will continue to keep you informed of our progress. Our future can be exciting! I hope everyone will continue to work with the Board of Directors to help make it a reality.

Our conference theme this year is "Success Through Communication and Cooperation". I would like to quote from the 1989 keynote address given by NIST, Acting Director Ray Kammer. "I refer to it as "our" annual meeting because I believe that the National Institute of Standards and Technology (NIST) should be very close to the Conference and that we have a shared responsibility to provide the United States with the basis for weights and measures and fair trade. We cannot fulfill this responsibility separately - we can only do it together; therefore, it is important for the country that we cooperate." I feel that Henry Oppermann and I have renewed that commitment again. I am convinced it is the only way we both win!

I would like to make one final observation. I have been fortunate in my career to have attended each regional association meeting at least once before my recent tour as Chair and Chair-Elect. During my last two years of travel, I noticed one common trend at each meeting, and even at our annual meeting this year - "the lack of participation". Why? Is it a funding issue? Is it a lack of support? Is there something the Conference is not supplying? The Board of Directors continues to discuss this issue, but I am soliciting you help. If you have an idea or suggestion please share it with us. A volunteer organization needs active members to be successful.

In closing, let me take this opportunity to thank a few people who have made my chairmanship a little easier.

- My staff in Maryland who have handled my responsibilities during the many weeks I've traveled.
- Beth Palys and her staff at Management Solutions Plus who were there for me all year and have helped make this meeting a success.
- Henry Oppermann and the OWM staff for their continued technical support to the Conference and their willingness to forge a new relationship.
- Ron Murdock, Wes Diggs and the Board of Directors for their guidance, help and support this year.
- Last and certainly not least, I want to thank my wife, Debbie for her unending support.

Thank you for allowing me to be your Conference Chairman.

NCWM 86th Annual Meeting
Honor Awards

Beth W. Palys, CAE:

10 years	Celeste Bennett, Michigan
	Buddy Clark, Indiana
	William Lagemann, Delaware
	George Shefcheck, Oregon
	Curtis Simpkins, Indiana
	Robert Traettino, Liquid Controls, LLC
15 years	Charles Carter, Oklahoma
	Maxwell H. Gray, Florida
	John Skuce, FTI Measurement Solutions
	Richard C. Suiter, Maryland
	Aves Thompson, Alaska
20 years	Charles Carroll, Massachusetts
	Robert L. Land, Indiana
	James Truex, OH
25 years	Thomas Geiler, Massachusetts
	Chip Kloos, Colgate-Palmolive Company
30 years	N/A
35 years	Otto Warnlof, Maryland

Special Recognition Awards

Beth W. Palys, CAE:

"The success of this Conference is the result of the dedication and hard work of many individual members. The work of the members we now honor is not complete until the official closing of the 86th Annual Meeting on Thursday. However, we would like to recognize them at the general session for their contributions over the year within their respective committees and for their contributions to the National Conference in general. We congratulate those members who are completing work on behalf of this Conference this year. Again, please come up to receive your certificate from Lou."

Board of Directors
Richard Davis, Georgia Pacific Corporation
Wes Diggs, Virginia
Dennis Ehrhart, Arizona
Gary West, New Mexico

Laws and Regulations Committee
Robert Williams, Tennessee

Specifications and Tolerances Committee
George Shefcheck, Oregon

Administration and Public Affairs Committee
Bruce Adams, Minnesota

Remanufactured Device Task Force
Jim Truex, Ohio, Chairman
Mark Buccelli, Minnesota
Jack Jeffries, Florida
Thomas McGee, PMP Corporation
Dave Quinn, Fairbanks Scales
Robert Renkes, Petroleum Equipment Institute
Richard Tucker, Tokheim Corporation
Gary West, New Mexico

NTEP Program-Grain Moisture Meter Sector and Near-Infrared Protein Analyzer Sector
Richard Wotthlie, Maryland

Presiding Officers
Stephen Gill, Missouri
Joe Gomez, New Mexico
Carol Fulmer, South Carolina
Robert McGrath, Massachusetts

Sergeants-at-Arms
Vernon Lee Massey, Tennessee
Ed Payne, Maryland

Special Purpose Committees
"We will now recognize those members who work hard to insure that all of our business is accomplished smoothly and efficiently at the Interim and Annual meetings; they are the members of the various Special Purpose Committees who are completing their
appointments."

Credentials Committee:
Anthony Lori, New Jersey

Nominating Committee:
Wes Diggs, Chairman, Virginia
Charles Gardner, Suffolk County, New York
Christopher Guay, Proctor & Gamble
Jack Kane, Montana
Steven A. Malone, Nebraska
N. David Smith, North Carolina
Aves Thompson, Alaska

Retiring NIST Staff
"We would like to recognize Joan Koenig, who has given dedicated service and support to the National Conference on Weights and Measures over many years. Please join me in thanking Joan."

In Memorium - N/A

Report of the Board of Directors

Louis E. Straub, Chairman
Chief
Maryland Weights and Measures

Reference
Key Number

100 Introduction

This is the Report of the Board of Directors (BOD) for the 86th Annual Meeting of the National Conference on Weights and Measures (NCWM). The Report is based on the Interim Report offered in NCWM Publication 16, Committee Reports; the Addendum Sheets issued at the Annual Meeting; and actions taken by the membership at the Voting Sessions of the Annual Meeting.

The Report contains items related to the management of the NCWM (items in the 101 Series). Items addressed by the National Type Evaluation Program (NTEP) Committee (formerly the 102 Series) are in a separate report (the 500 Series). Table A, which is an index of reference key items included in the report, lists the reference key number, title, and page number for each item. Voting items are indicated with a "V" after the item number. An "I" denotes issues that are reported for information. Table B lists the Appendices to the report.

Table A
Index to Reference Key Items

*National Institute of Standards and Technology staff members do not serve as technical advisors for these items.

Table B
Appendices

Table C
Voting Results

Reference Key No.	House of State Representatives		House of Delegates		Associate and Advisory Members		Results
	Yeas	Nays	Yeas	Nays	Yeas	Nays	
101-15 Voice Vote	All Yeas	No Nays	All Yeas	No Nays	All Yeas	No Nays	Passed
101-17A Voice Vote	All Yeas	No Nays	All Yeas	No Nays	All Yeas	No Nays	Passed
100 (Report in its Entirety) Voice Vote	All Yeas	No Nays	All Yeas	No Nays	All Yeas	No Nays	Passed

Details of All Items

101-1 I Strategic Planning

The Board of Directors (BOD) held a strategic planning meeting on March 28 to 29, 2001, at the NCWM Headquarters Office in Rockville, MD, to review and update its strategic plan. The Board unanimously approved the draft strategic plan developed in March 2001. Following some minor editorial changes, the plan will be sent to Dr. Richard Kayser, Mr. Tom Gills, Mr. Henry Oppermann, and Dr. Charles Ehrlich of NIST for their review and comments. The plan will then be shared with the NCWM membership via the NCWM newsletter and web site. The Board will reinitiate the copyright issue with NIST regarding Handbooks 44, 130, and 133 and the NCWM Final Report.

During a discussion of the role of the Legislative Liaison committee for the immediate future, the BOD decided it did not have any issues for the committee to pursue at this time. The BOD plans to keep the committee in reserve, and if an issue develops, the Board will appoint appropriate individuals to the committee to pursue the issue.

101-2 I Financial Report

A copy of the NCWM, Inc., financial statement for the period October 1, 1999, to September 30, 2000, is included in Appendix A. The statement was reviewed and approved by the NCWM's independent auditors.

101-3 I Associate Membership Committee Report

The Associate Membership (AM) met during the afternoon of January 15, 2001. The financial report was reviewed and approved. The following allocations of funds were approved for the year 2001:

- The AM will make available to the NCWM the amount of $10,500 to be administered by the A&P Committee. The A&P Committee must advise the Associate Membership Committee (AMC) Chairman on the use of the money. The AMC will approve the use of the money and make the funds available.

- The AM will make available to the NCWM a maximum sum of $10,000 for the 2001 Annual Meeting Outing. In the event that the standard 60 percent contribution does not require the complete $10,000, the remaining funds are to be returned to the AM.

Rich Davis reported that the AM needed to nominate a replacement for the Associate Member on the NCWM Board of Directors to serve a 3-year term beginning in July 2001. Dave Quinn was elected as the AM nominee for the position. The nomination was given to the NCWM Nominating Committee to put on the slate that the NCWM membership will vote on in July.

It was reported that David Cook, Kraft Foods, Inc., had resigned from the AMC. The Associate Members present agreed that, since Mr. Cook's term expired in July of 2001, his replacement would not have to be determined until the July 2001 meeting.

It was reported that Jennifer Banks, National Air Transportation Association, would not be available to complete her AMC term. It was agreed that William Sveum, Kraft Foods, Inc., would fill her position through 2005.

Rich Davis reported on the activities of the Board of Directors. He reported that an NCWM membership directory will be made available to all Conference members via the NCWM web site. The member listing will include member's name, company, fax and phone numbers, and e-mail address. The listing will not include the member's mailing address to prevent the list from being used as a general mailing list. The Board also discussed the National Type Evaluation Technical Committee Sectors' structure and funding. The Sector Committees will remain unchanged and new members may be added if approved by the NTEP Committee Chairman. The NCWM will fund participation of four public members (one from each major NTEP Laboratory) on the Weighing Sector, three members on the Measuring Sector, with the remaining Sector funding to be determined. The Sector Meetings will be open to anyone; however, non-Conference members will be charged a registration fee, which is to be determined. Decisions of the Sectors will be presented to the Board for approval before being officially adopted.

Alan Nelson reported on the activities of the A&P Committee. He mentioned that the Committee looked to be very strong on moving agenda items forward and showed a major interest in addressing the National Training Program.

A report on the activities of the Laws and Regulations Committee was not presented.

The Associate Membership Committee (AMC) met during the afternoon of July 23, 2001. After the opening of the meeting Charles Bruckner, Pennsylvania Department of Agriculture asked to address the committee. Mr. Bruckner expressed his thanks for the industry support of the Pennsylvania weights and measures program and thanked the committee for their support by offering scholarships. Mr. Bruckner mentioned that the funds were used to offset the cost of printed material used in their training program and help pay transportation cost to enable field inspectors to attend the training classes. The committee thanked Mr. Bruncker for his kind words and wished his program more success in the future.

The minutes of the January 15, 2001 meeting in Mesa, Arizona, were approved as distributed with one spelling error noted and corrected.

The financial report was reviewed and approved. It was mentioned that as of July 17, 2001, only $1,500 in scholarships has been allocated.

Rich Davis reported on the activities of the Board of Directors. He reported that the BOD has placed a concentrated effort on cutting costs and finding the best people suited to address and work on key programs. Mr. Davis also reported that the BOD has developed a 3 to 5 year strategic plan. Highlights of this plan are to increase the efficiency of the Chairman by having the Chairman-elect and the Board member from the region to represent the NCWM at the regional meeting. Mr. Davis also mentioned that the BOD is investigating copyrighting Handbooks 44, 130, 133 and the Annual Conference Report. It was also reported that the strategic plan places a large emphasis on the role on the NCWM role in the global weights and measures community. Lastly, it was noted that this was Mr. Davis' last year as the industry representative on

the BOD. The committee thanked Mr. Davis for his efforts in this position and thanked him for a job well done.

Chris Guay reported on the activities of the L&R Committee. His report included comments and current status of the fourth draft of Handbook 133. This included the fact that the April 10th revision of the document was the one being offered for an acceptance vote at this meeting. Several Association Committee members voiced, comments regarding the comments made by the Northeastern and Central Regional Meetings. This concern was around the question of these comments being included in the revision on which to be voted. Mr. Guay reported that the proposed document did not include these comments but that comments could be offered as an addendum to the document during the voting session. Mr. Guay ended his report with a short discussion of the upcoming Interamerican Packaging and Labeling Workshop to be held on September 18th and 19 in Miami Beach.

Under the category of "Old Business," it was noted that a new secretary/treasurer was needed for the coming year. Mr. William Sveum volunteered for the position. He was nominated and approved by committee member vote. Mr. Sveum also will replace J. Baker as a committee member. In addition, two committee member positions needed to be filled due to the expiration of the terms of C. Guay and D. Cook. The committee members nominated and approved M. Galletta, Nestle USA and R. Murnane, Seraphin Test Measures for these positions. The Chairman noted a request from R. Fuehne to be replaced as the industry representative on the A&P Committee for personal reasons. The committee nominated and approved the recommendation of Chip Kloos to complete the remaining two years of this appointment.

Under the category of "New Business," Mr. David Quinn, nominated and approved as Mr. Davis's replacement as the industry representative on the BOD, expressed his willingness to work with each industry member to assure that any issues are properly addressed.

The committee thanked Mr. Alan Nelson for his leadership and efforts as the Committee Chairperson this past year and welcomed Ms. Cary Frye to the position.

101-4 I Organization, Appointments, and Assignments, Status Report

The following are appointments that have been made by NCWM Chairman Lou Straub and NTEP Committee Chairman Wes Diggs (as of March 19, 2001):

Board of Directors:
Max Gray, FL, 3-year term, replacing Mike Hile, AR
Dennis Ehrhart, AZ, 1-year term, replacing Ron Murdock who assumes the position of Chairman-Elect
George Shefchek, OR, 1-year term, replacing Gary West, NM, who has retired.

Presiding Officers:
Carol Fulmer, SC, 1-year term
Steve Gill, MO, 1-year term
Joe Gomez, NM, 1-year term
Robert McGrath, City of Boston, MA, 1-year term

Laws and Regulations:
Larry Hatfield, KY, 5-year term

Specifications and Tolerances:
Jack Kane, MT, 5-year term

Administration & Public Affairs:
Bruce Adams, MN, 1-year term replacing Richard Philmon, IL
Mike Sikula, NY, 5-year term

Nominating Committee:
G.W. Diggs, VA, Chairman
Charles Gardner, Suffolk Co., NY
Chris Guay, Procter & Gamble Co.
Jack Kane, MT
Steve Malone, NE
N. David Smith, NC
Aves Thompson, AK

Credentials Committee:
Larry Stump, IN, 3-year term

Parliamentarian:
Bruce Adams, MN, 1-year term

Chaplain:
Mike Belue, Belue Associates, 1-year term, replacing Mike Hile

Associate Membership Committee:
Steve Langford, Cardinal Scale Mfg. Co., 5-year term
William Sveum, Kraft Foods, Inc., 4-year term

National Type Evaluation Technical Committee Sectors

Measuring Sector:
Maurice Forkert, Tuthill Transfer Systems
Wayne Stiefel, NIST

Weighing Sector:
William Bates, GIPSA
Ken Butcher, NIST
Rafael Jimenez, Association of American Railroads
Steve Langford, Cardinal Scale Mfg. Co., replacing William Goodpaster
Walter Young, Emery Winslow Scale Co.

Belt-Conveyor Scales:
Ken Butcher, NIST
Rafael Jimenez, Association of American Railroads

Grain Moisture Meter Sector:
Ken Butcher, NIST

Between the Interim and Annual Meetings, the following appointments were made by NCWM Chairman Straub:

Presiding Officer:
Steve Casto, WV, 1-year term replacing Carol Fulmer, SC

Laws and Regulations Committee:
Joe Gomez, NM, 4-year term, replacing Larry Hatfield, KY

Sergeants -At -Arms:
Vernon Lee Massey, Shelby County,TN, 1-year term
Edward A. Payne, Jr., MD, 1-year term

Credentials Committee:
Kenneth Deitzler, PA, 1-year term, replacing Anthony Lori
Bruce Minthorne, VA, 1-year term, replacing John Bates, VA

The following appointments were made by NTEP Committee Chairman Diggs to Sectors of the National Type Evaluation Technical Committee (NTETC):

Grain Moisture Meter and Near-Infrared Protein Analyzer Sectors:
Cassie Eigenmann, DICKEY-john Corp., Chair

101-5 I Membership

The total NCWM membership, as of July 20, 2001, was 3054. The membership breakdown by category is as follows:

State Government	941	(30.8%)	Associate Members	1144	(37.4%)
Local Government	633	(20.7%)	Foreign Associate	36	(11.8%)
U.S. Government	42	(1.4%)	Foreign Government	26	(0.9%)
			Retirees	231	(7.6%)

101-6 I Meetings, Annual and Interim, Future

As of July 23, 2001, the plans for future meetings are as follows:

2002 Interim Meeting
The meeting is scheduled for January 27 to 30 at the, Hyatt Hotel in Bethesda, MD.

2002 Annual Meeting
The meeting is scheduled for July 14 to 18, at the Omni Netherland Hotel in Cincinnati, OH.

2003 Interim Meeting
The meeting is scheduled for January 12 to 15 at the Omni Jacksonville Hotel in Jacksonville, FL.

2003 Annual Meeting
The meeting is scheduled for July 13 to 17 at John Ascuaga's Nugget Hotel in Sparks, NV.

2004 Interim Meeting
The meeting will be held at the Hyatt Hotel in Bethesda, MD.

2004 Annual Meeting
The meeting is scheduled for July 11-15 at the Hilton Hotel, Pittsburgh, PA.

101-7 I Program, OWM and NIST

Henry Oppermann, Chief of the NIST Office of Weights and Measures (OWM), provided a status report on staffing and other support that OWM and NIST provide to the Conference. Highlights of his report are as follows:

Staffing

1. Steve Cook was hired from the State of California. He will serve as the OWM Technical Advisor to the NTEP Weighing and Belt-Conveyor Scale Sectors. Dick Suiter remains the Technical Advisor to the NTEP Measuring Sector and Dick has been assigned as co-Technical Advisor to the Specifications and Tolerances Committee.
2. Val Miller, previously a metrologist with the State of North Carolina, was hired to assist Georgia Harris in the State Laboratory Program.
3. The NIST Metric Program has joined OWM. There are three people in the Metric Program: Gerry Iannelli, Jim McCracken, and Linda Crown. OWM will be exploring with the Metric Program staff how best to integrate our activities and support metric activities within the NCWM and with our industry partners.

NCWM Activities

1. Handbook 133, Checking the Net Contents of Packaged Goods, has been extensively revised and the fourth draft of the Fourth Edition was distributed in December.
2. OWM sponsored a workshop on weights and measures issues regarding e-business in April 2001 to further advance the issues being considered by the Laws and Regulations Committee.
3. As a result of discussions with the Board of Directors, Dick Suiter explored alternatives with the U.S. Department of Agriculture to develop standards, performance specifications, and test procedures for instruments to measure fat on animal carcasses. Both the NCWM and OWM will participate in the development of these standards.

   Representatives from the U.S. Department of Agriculture, NCWM, and OWM contacted ASTM to explore a cooperative effort to develop standards for carcass fat-measuring devices. ASTM agreed to serve as the secretariat for this effort. An organizational meeting of interested parties was held in April 2001 at the ASTM Headquarters. The participants agreed to develop the desired standards and a working meeting was held in Kansas City in July 2001. As a result of the meeting, the name and scope of the committee were decided, four subcommittees were formed, Chairs of the subcommittees were selected, and two Task Groups were formed. The structure is as follows:

   ASTM Committee F 10 on Livestock, Meat, and Poultry Evaluation Systems
   Subcommittees:
   F 10.10 Design Specifications; Richard Suiter, Chair
   F 10.20 Device Performance Criteria; Darryl Brown, Chair
   F 10.30 User Requirements; Duane Short, Chair
   F 10.40 Predictive Accuracy; Dave Meisinger, Chair

   Task Group for Executive Committee Officers: John Edmonds, Ray Bjornson, Mohammad Koohmaraie
   Task Group for Bylaws: Drew Azzara, James Vanderwielen

4. OWM has contracted with Paul Chase as a consultant on belt-conveyor scales to collect and analyze data regarding the variation in the zero reference value for belt-conveyor scales and its effect on measurement accuracy.
5. In May 2001, OWM hosted a technical workshop to discuss and develop belt-conveyor scale issues that have been on the agenda of the S&T Committee for several years.
6. With the objective of developing additional field manuals, OWM is updating the Handbook 44 references contained in the Examination Procedure Outlines to have a correct and current set of references, both for current device inspections as well as for future development of training material. The update of the Handbook 44 references for the Examination Procedure Outlines should be completed by the end of September 2001.

Laboratory Metrology

1. The MEASUREnet-gov system was used successfully on November 17, 2000, for a customer-driven training session on "Youden Chart Analysis of Round Robin Data." MEASUREnet-gov is an Internet-based interactive video conferencing system established by NIST to aid training and collaborative work among NIST and the State metrology laboratories. The Youden chart analysis has been used for round robin intercomparisons supported by NIST since 1981. With assistance and training from NIST, Ken Fraley, Oklahoma metrologist, has performed the bulk of these analyses in recent years. Mr. Fraley developed and conducted the training session for the 11 participating MEASUREnet-gov laboratories. Georgia Harris of OWM provided resources and guidelines and served as moderator.

2. OWM has contracted for the development of a 12-hour multimedia CD-ROM training course on Basic Mass Metrology. The course, which covers the subject matter on mass measurements that is presented in OWM's Basic and Intermediate Metrology Seminars for the States and industry, is scheduled for completion in early 2002.
3. OWM held a Combined Regional Metrology Meeting in March 2001 in Gaithersburg, MD. Several NIST staff members will be making presentations at the meeting.
4. OWM continues to participate in the national key comparison of mass standards with the NIST Mass Group and the States.

National Type Evaluation Program

1. Diane Lee of OWM has developed a template of a Quality Manual for the NTEP Laboratories. When the manual is published, it will be distributed to the NTEP Laboratories and added to the OWM web site.
2. OWM continues to support the Grain Moisture Meter calibration program. Diane Lee presented a training seminar on Grain Moisture Meters in June 2001. The seminar covered laboratory procedures for preparing grain moisture standards and field procedures for testing grain moisture meters.
3. Steve Cook of OWM worked with Stephen Patoray of NCWM to develop and present administrative and technical training for NTEP Laboratory staff at the training session on June 10 to 13, 2001. Steve Cook is also planning to conduct a laboratory intercomparison for weighing devices among four NTEP Laboratories: California, Maryland, New York, and Ohio. Measurement Canada has also been invited to participate.
4. OWM staff members are assisting NCWM with an update of the NTEP checklists and test procedures in NCWM Publication 14.
5. OWM continues to work with NIST's Technical Standards Activities Program and NCWM in support of efforts to get international recognition of NTEP test data.

Other

1. OWM has completed and mailed the 2001 Editions of NIST Handbooks 44, Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices, and 130, Uniform Laws and Regulations, and NIST Special Publication 957, Report of the 85th NCWM. In addition, OWM has published NIST Special Publication 964, Index to the Reports of the National Conference on Weights and Measures from the first to the eighty-fifth (1905 - 2000).
2. OWM established an e-mail list server for State Weights and Measures Directors. As of July 2001, Directors from 39 States and the District of Columbia have subscribed to the list-server.
3. OWM has scheduled two workshops for administrators of weights and measures programs. One workshop will be held on September 25-26, 2001, in Denver, CO. The second workshop will be held in Nashville, TN, on October 24-25, 2001. The agenda will be the same for both workshops, which will focus on discussion of critical issues faced by weights and measures administrators.

101-8 I Program, International Organization of Legal Metrology

Charles Ehrlich, Chief of the NIST Standards Management Program, discussed and updated his report on U.S. participation in OIML standards development activities in legal metrology. (See Appendix B for a copy of his report.)

101-9 I Metrology Subcommittee Report

The Metrology Subcommittee provided a written report to the Board after the Combined Regional Metrology Meeting in March 2001. (See Appendix F for a copy of the report.) The workload survey of the State weights and measures laboratories was completed and a summary report was developed and distributed. The survey contains detailed information regarding the work performed in the State laboratories.

101-10 I Mentoring Program

The BOD is considering different ways to identify and mentor possible future NCWM leaders. The consensus of the Board members is that the Regional Weights and Measures Association Meetings are the best place to concentrate mentoring efforts. The BOD is planning to request assistance from State Weights and Measures Directors to identify and develop potential NCWM leaders.

The Board decided that in order to strengthen the role of the Regional representatives on the Board of Directors, as well as to relieve the travel burden of the Chairman, that the Chair-Elect and the Regional representative will represent the Board at each regional weights and measures association meeting.

101-11 I Service Technician Outreach

This was item 101-15 in the BOD's Report to the 84th NCWM, 1999, and item 101-14 in the BOD's Report to the 85th NCWM, 2000. The BOD has been discussing ways to work with and better serve the needs of NCWM members from the service agency sector of the weights and measures community. At the 2001 Interim Meeting, the BOD received a report on the Central Weights and Measures Association's (CWMA) efforts to develop a uniform Serviceperson's Test (see Appendix C for a description of CWMA's program). The CWMA reported that six States in the region have agreed to recognize the qualifying results of tests given in one of the six States to servicepersons in the region and recognize the servicepersons in all six participating States.

The Gasoline Pump Manufacturers Association (GPMA) reported that it had completed its training course for servicepersons and delivered the course to the Administration and Public Affairs (A&P) Committee (see item 403-5 in the report of the A&P Committee for more information). The Board is pleased to learn that the GPMA has completed this important project and extends its appreciation to GPMA for its work. The Board encourages service companies to provide this course to its technicians and requests that weights and measures officials promote the use of the course by service companies.

101-12 I Revision of NIST Handbook 44

This item was carried over from item 101-17 in the BOD's Report to the 84th NCWM, 1999, and item 101-16 in the BOD's Report to the 85th NCWM, 2000. In July 1999, NCWM Chairman Wes Diggs announced that he had appointed a Working Group headed by Ron Murdock, NC, to make recommendations for revisions to Handbook 44, Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices, that would modernize the Handbook and make it easier to use and understand. The Working Group had its first meeting on September 26, 1999, in Olympia, WA. During the meeting, the group developed a proposed work plan that was published in Appendix D of the BOD's Report to the 85th NCWM.

At the 2000 Interim Meeting, Working Group Chairman Murdock gave a status report on the group's progress. He emphasized that the Working Group would begin by focusing on the Handbook's organization and format rather than trying to rewrite it. He said the Working Group was considering such changes as putting the User Requirements in the front of the various Codes, including some of the information in the Fundamental Considerations section in the relevant Codes, and putting the definitions back in the Codes to which they apply. Mr. Murdock also noted that a number of groups were involved in reviewing the various Codes to identify changes that would make them easier to use. He stressed that the reorganization of the Handbook could be a long-term project.

Chairman Murdock announced at the 2001 Interim Meeting that the Working Group had completed a draft reorganization of the Liquid-Measuring Devices (LMD) Code in Handbook 44. Before beginning work on proposed revisions to the language and content of the LMD Code, the Working Group would like to get feedback from the NCWM membership on the appropriateness of the proposed reorganization. Consequently, a copy of the reorganized LMD Code is included in this report in Appendix D to this report. Comments on the reorganized Code should be sent to Ron Murdock (telephone no.: 919-733-3313; fax: 919-715-0524; e-mail: ron.murdock@ncmail.net).

101-13 I Remanufactured Devices Task Force Status Report

In the spring of 1999, NCWM Chairman Aves Thompson appointed a Task Force on Remanufactured Devices at the request of Specifications and Tolerances (S&T) Committee Chairman Darryl Brown. Both the National Type Evaluation Program (NTEP) Board of Governors (now the NTEP Committee) and the S&T Committee have addressed various aspects of this issue in recent years (see Board of Governors item 102-7 in the Report to the 81st NCWM, 1996, and item 310-1 in the S&T Report to the 84th NCWM, 1999, for more information). The Task Force was established to resolve the issue.

In August 2000, members of the Task Force, which is chaired by Jim Truex, OH, submitted their recommendations to the NCWM Specifications and Tolerances Committee. The Task Force is proposing several definitions and a General Code marking requirement for NIST Handbook 44, Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices. If the proposed definitions are adopted, the Task Force recommends that appropriate changes be made to the definitions in NCWM Publication 14, NTEP Administrative Procedures, Technical Policy, Checklists, and Test Procedures, and in the Uniform National Type Evaluation Regulation in NIST Handbook 130, Uniform Laws and Regulations, so that they are consistent with the definitions in Handbook 44.

At the 2001 Interim Meeting, Mr. Truex discussed the Task Force's recommendations with Board members and answered their questions. See S&T Committee items 310-1A and 310-1B for details on the proposed changes.

The Task Force revised and clarified the examples provided for repaired and remanufactured equipment. With the completion of its report, recommendations, and examples, the Task Force has completed its work and the issue is now before the Conference membership for consideration. Consequently, the Task Force is dissolved. On behalf of the NCWM, the Board extends its appreciation to the Task Force members for the hard work on the development and analysis of these complex issues.

101-14 I National Type Evaluation Technical Committee Sector Meetings

The NCWM, Inc., Board of Directors has been considering consolidation of the meetings of the National Type Evaluation Technical Committee (NTETC) Belt-Conveyor Scales, Measuring, and Weighing Sectors into a single meeting held in a central area of the country. They discussed the merits of having the Sectors meet consecutively with a joint meeting in between; for example, the order of the meetings might be as follows: Weighing, Belt-Conveyor Scales, Joint Meeting, Measuring. It was believed that this might represent a cost savings to the NCWM, Inc., since the costs of scheduling individual meetings would be consolidated and the travel costs for public members who would normally attend separate meetings would be reduced. Additionally, the combined meeting would eliminate the need for people on all three sectors to travel to multiple meetings and would result in more consistent and uniform decisions on issues that affect all Sectors.

The meeting schedules for the various NTETC Sectors have changed over the years in response to the needs of the individual Sectors. The complexity and the number of agenda items have increased as new technology has evolved and the number of different types of devices evaluated by NTEP has grown. As a result, Sector meetings have tended to become longer in length.

Several of the Sectors try to meet in conjunction with regional weights and measures associations to minimize the costs of the meeting and to reduce the travel requirements for individual Sector members. While these meetings are very successful and the Sectors have greatly appreciated the hospitality of the various organizations that have provided their hospitality, the BOD has discussed whether or not there might be a more efficient and cost effective approach.

The current practice of scheduling Sector meetings in conjunction with other related meetings causes problems for some members because it means that they may be away from their offices for an extended period of time. This can be particularly difficult for NTEP laboratory representatives since NTEP laboratory meetings are often scheduled in conjunction with the Sector meetings. Additionally, scheduling several meetings is more costly than scheduling a single meeting.

Another aspect of the Sectors' work that has been observed is that some areas addressed by individual Sectors tend to overlap. For example, many administrative issues and NIST Handbook 44 General Code issues apply to the evaluation of all device types. However, there is little opportunity for the Sectors to meet jointly to develop consistent policies for addressing these issues.

After considering the pros and cons of having a joint meeting, the BOD decided at its October 2000 meeting to continue the practice of having separate Sector meetings in 2001. The 2001 Measuring Sector meeting will be held in conjunction with the Southern Weights and Measures Association Annual Meeting in September 2001. Separate meetings of the Weighing Sector and the NTEP Laboratories will be held in Maryland, dates and exact locations to be determined.

The Board also discussed the National Type Evaluation Technical Committee Sectors' structure and funding. The Sector Committees will remain unchanged and new members may be added if approved by the NTEP Committee Chairman. The NCWM will fund participation of four public members on the Weighing Sector, three public members on the Measuring Sector, and three public members on the Grain Moisture Meter/Near-Infrared Protein Analyzer Sector, with the Belt-Conveyor Scale Sector funding to be determined. Based upon the issues that will be discussed at each meeting, the NTEP Director is authorized to select appropriate representatives from the NTEP participating laboratories to represent NTEP at the Sector meetings. The travel of these NTEP representatives will be funded to participate in the meetings. Other public members may participate in the meetings as non-funded members of the Sectors. The Sector Meetings will be open to anyone; however, non-Conference members will be charged a registration fee, which is to be determined. Decisions of the Sectors will be presented to the NTEP Committee for approval before being officially adopted.

The schedule for the NTEP Sector meetings for the remainder of 2001 is listed below.

August 22-24, Grain Moisture Sector Meeting, Kansas City, MO
September 28-29, Measuring Sector Meeting, Lexington, KY
October 14-16, Weighing Sector Meeting, Albany, NY

101-15 V Change to NCWM Bylaws - Establishing the NCWM Membership Records as Open for Public Review

Source: Southern Weights and Measures Association

Recommendation: Amend Article IV, Membership Fees and Records, of the NCWM Bylaws by adding a new Section 4 to read:

Section 4 - Inspection of Records

All records of the Corporation shall be open for inspection or review, except records pertaining to the National Type Evaluation Program (NTEP) that are deemed proprietary by the NTEP Committee, providing a request for review is submitted to the Organization or individual responsible for maintaining such records. The inspection of the records shall take place at the offices of the Corporation at a reasonable time, under reasonable conditions, and under the supervision of the custodian of the records or an individual designated by the Board of Directors to supervise the review of the records. The Corporation may collect fees to recover costs.

Background: Prior to the incorporation of the NCWM, the Office of Weights and Measures at NIST sponsored and provided technical, management, and clerical support for the Conference. The records of the NCWM were open for public inspection and review as are most records related to government activities. The Federal Government and most States have requirements for open public records providing established procedures for requesting access to the records are followed. Some States or local governments require that organizations for which membership is paid by public funds must have their records open for public inspection and review, providing the same or similar procedures for requesting access to the records are followed.

The NCWM is now incorporated and a management group is contracted to provide management and administrative support. The management contractor, when asked by an NCWM member to reaffirm that the records of NCWM, Inc., were open for public review, stated that the records were no longer open for public inspection since NCWM, Inc., is a private organization, and it is unusual for a private association or organization to open its records for public review. The NCWM member then asked the Southern Weights and Measures Association to submit a proposal to the BOD requesting a change to the NCWM bylaws to specify that certain records would be open to the public.

As a tax exempt, non-profit organization that primarily develops uniform laws, regulations, requirements, and procedures for use by government regulatory programs, the National Conference on Weights and Measures should offer its records for public inspection under normal circumstances. Public trust is critical in maintaining the NCWM's status as a national leader for measurement standards development. The appearance of closed records does not enhance the Conference's ability to develop and maintain public trust nor the trust of its membership.

Additionally, Article I, Section 2, of the NCWM Bylaws states strict requirements for the NCWM as a non-profit, tax-exempt corporation. As with any corporation, it is the responsibility of the BOD to assure compliance with the legal requirements. However, by making the records available for public inspection, the Board can enhance the open, trusting environment needed to improve the NCWM's chances of success. If States or local governments are prohibited from being able to pay for membership dues for employees, membership in the NCWM could drop, having a negative impact on the Conference's effectiveness and finances.

101-16 I U.S. – Canada Mutual Recognition of Type Evaluation Project

Source: NTEP Committee Carryover Item 501-1

Background: In 1994 Canada and the United States established a joint program that enables a manufacturer to submit certain types of weighing devices to either country for type evaluation testing. Under this program the device can be tested to both U.S. and Canadian requirements in a single evaluation. Upon completion of the testing, the country performing the evaluation forwards the results to the other country; the results can be used as a basis for issuing a type evaluation certificate in that country. Each country reserves the right to perform additional testing and to make the decision on whether or not to issue a type approval certificate based on the results. The program for weighing devices has operated successfully since its inception and was expanded over the years to include additional types of weighing devices.

In August 1998, initial work began to establish a similar program for liquid-measuring devices. The expansion to include liquid-measuring devices was placed on hold in January 1999 pending proposed reorganization of the NTEP; however, the weighing program continued to operate without interruption during this period.

In November 1999, following a decision by NCWM to assume responsibility for the administration of NTEP, Measurement Canada contacted the NCWM and expressed an interest in continuing the mutual recognition program with NCWM. Measurement Canada also expressed an interest in expanding the program to include additional device types. The NTEP Committee received a number of comments from industry indicating continued support for renewing the agreement with Canada. The NTEP Committee also received written and verbal comments from members of the measuring industry supporting expansion of the agreement to include liquid-measuring devices. NCWM Chairman Lou Straub worked with Measurement Canada's President, Alan Johnston, to establish the agreement and explore the possibility of expanding the agreement beyond weighing devices.

At the 2001 Interim Meeting, NCWM, Inc. and Measurement Canada signed an agreement to renew the Mutual Recognition of Type Evaluation Program for a 10-year period (see Appendix E for a copy of the agreement). The mutual recognition program currently covers the following types of devices:
1. Electronic weight-indicating elements (except those that are "software based," i.e., programmed by downloading parameters);
2. Electronic computing and noncomputing bench, counter, floor, and platform scales up to 1000 kg (2000 lb) capacity;
3. Weighing/load-receiving elements with capacities up to 1000 kg (2000 lb); and
4. Mechanical scales with capacities not exceeding 10 000 kg (20 000 lb).

The NCWM and Measurement Canada are exploring the possibility of establishing a 2-year mutual recognition program in the area of liquid-measuring devices. The NCWM and Measurement Canada have agreed to a pilot program of mutual recognition type evaluations for liquid-measuring devices. Also, they are considering expanding the existing agreement to include other weighing devices.

Discussions have been initiated with PTB, Germany, regarding a bilateral agreement to accept each other's type evaluation test data. Following the initial overture from PTB, the Board met with Dr. Manfred Kochsiek at the Annual Meeting to explore this possibility. The Board decided to actively pursue a bilateral agreement with PTB on the acceptance of type evaluation test data. Considerable work must be done before a bilateral agreement can be signed, but both parties agreed to develop a plan to reach this objective.

101-17 I NTEP Administrative Policy and Procedures

In addition to the technical checklists and test procedures used in type evaluation, the 1998 edition of NCWM Publication 14 included the Administrative Policy and Procedures for the National Type Evaluation Program (NTEP). With the changes that have taken place in NTEP management over the past 2 years, this portion of Publication 14 needed to be updated to reflect the current administrative structure. Wes Diggs, NTEP Committee Chairman, prepared a draft revision of this section and made it available for comment. The Board of Directors spent a significant amount of time at the 2001 Interim Meeting reviewing the draft and comments from interested parties. The revision has been completed and approved by the NTEP Committee. An updated copy of the Administrative Policy and Procedures will be available for purchase from NCWM Headquarters.

101-17A V Changes in the NCWM Bylaws to Reflect Changes in the NTEP Administrative Policy and Procedures

Upon recommendation of legal counsel, the Board of Directors is recommending a Bylaws change to Article IX - Committees, Section 3 - National Type Evaluation Program (NTEP) Committee. This change would reduce the size of the NTEP Committee.

The current paragraph reads:

'The NTEP Committee is comprised of eight members, from the active members of the Board of Directors, that is, the Past Chairman as Chairman of the NTEP Committee, the Chairman, the Chairman-Elect, the Treasurer, and the four Active Directors. In the event of a tie vote, the Chairman of the NTEP Committee shall have the deciding vote.'

Recommendation: Amend the first paragraph of Article IX - Committees, Section 3 - National Type Evaluation Program (NTEP) Committee to read:

The NTEP Committee is comprised of five members: the Immediate Past Chairman, the Chairman and the Chair-Elect of the Conference and two regional Directors from the Board of Directors. The NTEP Committee must include at least one member from each of the four regions.

L. Straub, Maryland, Chairman

G. W. Diggs, Virginia, Chairman of the NTEP Committee
R. Murdock, North Carolina, Chairman-Elect
T. Geiler, Barnstable, Massachusetts, Treasurer
R. Andersen, New York
D. Brown, Iowa
R. Davis, Georgia Pacific Corporation
D. Ehrhart, Arizona
M. Gray, Florida
M. Pinagel, Michigan
G. West, New Mexico

Executive Secretary: H. Oppermann, NIST

Advisors:
J. Koenig, NIST (Retired)
B. Palys, Executive Director, NCWM Headquarters
G. Vinet, Canada

Board of Directors

Appendix A
National Conference on Weights and Measures
Audited Financial Statement for the Period 10/1/99 to 9/30/00

Revenue

NTEP	$	151,344.00
Meeting Fees	$	84,215.00
Dues/Industry	$	52,311.00
Due/Government	$	49,287.00
Interest	$	31,782.00
NIST Reimbursement	$	22,472.00
Publications	$	11,879.00
Miscellaneous	$	75.00
TOTAL REVENUE	$	403,365.00

Expenses

Programs

NTEP	$	150,898.00
Annual Meeting	$	48,546.00
Interim Meeting	$	42,907.00
Associate Funds	$	20,395.00
Publications	$	15,399.00
Chairman/Chairman-Elect	$	15,297.00
Membership	$	9,419.00
Other programs	$	8,283.00
Seminars	$	3,703.00
Total Programs	$	314,847.00

Management & General

Management Fees	$	41,871.00
Website	$	9,773.00
Legal & accounting	$	6,720.00
Database conversion	$	6,237.00
Marketing	$	5,154.00
Bank fees	$	2,576.00
Telephone	$	2,073.00
Insurance	$	1,968.00
Printing	$	1,430.00
Miscellaneous	$	451.00
Office expenses	$	306.00
Total Management & General	$	78,559.00

Total Expenses before Prior Yr	$	393,408.00
Prior Year Expenses	$	29,041.00
TOTAL EXPENSES	$	422,449.00

Appendix B

Report on the Activities of the International Organization of Legal Metrology (OIML) and Regional Legal Metrology Organizations

Charles D. Ehrlich, Chief
Technical Standards Activities Program
Office of Standards Services, NIST

U.S. participation in OIML is coordinated by the Technical Standards Activities Program (TSAP) at NIST. To learn more about OIML activities, visit the TSAP website at http://ts.nist.gov/oiml or the OIML website at *http://www.oiml.org* on the Internet or contact Dr. Ehrlich at *charles.ehrlich@nist.gov* or by telephone at 301-917-4834 or by fax at 301- 975-5414.

Table of Contents

Reports

I. Report on the 11th International Conference of Legal Metrology and the 35th Meeting of the International Committee of Legal Metrology (CIML)

Representatives of 48 of the 57 member nations participated in the 11th quadrennial International Conference of Legal Metrology from October 9 to 13, 2000, in London, England. The CIML meeting was interspersed with the Conference. A half-day meeting of the OIML Development Council was also held, as was a half-day Round Table on Mutual Recognition. The United States was represented by Richard Kayser (NIST, Head of Delegation), Charles Ehrlich (NIST, CIML Member), James Williamson (U.S. State Department), Sam Chappell (NIST, retired), Ross Andersen (State of New York, representing the National Conference on Weights and Measures), and Tina G. Butcher (NIST Office of Weights and Measures [OWM]).

11th International Conference of Legal Metrology

The primary purposes of this Conference were to formally sanction the work completed by the Technical Committees since the previous Conference and endorse long-term policy, review interactions with liaison organizations, review the status of the OIML Certificate System, consider ways of assisting developing countries, and endorse administrative and financial matters, in particular the budget of the International Bureau of Legal Metrology (BIML) for the next 4 years. These activities are summarized below.

Technical Activities

The Conference sanctioned the following 12 new or revised Recommendations[1] (R) that had been previously approved by the CIML between 1997 and 1999:

[1] The two categories of OIML publications are Recommendations and Documents that are developed by technical committees comprised of the Member States. **International Recommendations (R)** are model regulations that establish the metrological characteristics required of measuring instruments and specify methods and equipment for checking their conformity; the OIML Member States shall implement these Recommendations to the greatest possible extent. **International Documents (D)** are informative in nature and intended to improve the work of the metrological services.

R 49 "Water Meters for Cold Potable Water (including both mechanical and electronic meters)"

R 60 "Metrological Regulation of Load Cells"

R 65 "Force Measuring System of Uniaxial Material Testing Machines"

R 81 "Dynamic Measuring Devices and Systems for Cryogenic Liquids (including tables of density for liquid argon, helium, hydrogen, nitrogen and oxygen)"

R 85 "Automatic Level Gauges for Measuring the Level of Liquid in Fixed Storage Tanks"

R 93 "Focimeters"

R 99 "Instruments for Measuring Vehicle Exhaust Emissions" (Note: This will be a joint International Organization for Standardization [ISO] 3930 and OIML R 99 publication.)

R 125 "Measuring Systems for the Mass of Liquids in Tanks"

R 129 "Multi-dimensional Measuring Instruments."

In addition, Draft Recommendations were sanctioned for the following instruments:

"Octave and One-Third Octave Band Filters"

"Polymethylmethacrylate Dosimetry Systems"

"Alanine EPR Dosimetry Systems"

OIML Long-term Policy

The "OIML Long-term Policy: 1999-2002 Action Plan" was approved by the Conference. The basis for this policy was the report on long-term policy prepared by past CIML President Knut Birkeland and the results of the Symposium on the "Role of Metrology in Economic and Social Development" in Braunschweig, Germany, in June 1998. The symposium was co-sponsored by Germany's Physikalisch-Technische Bundesanstalt[2], OIML, BIPM, and the International Measurement Confederation (IMECO).

The policy covers four major areas: (1) the need to recommend means for improving and accelerating the activity of the Technical Committees and Subcommittees and increasing member participation; (2) the need to develop procedures for mutual recognition and equivalence agreements, (3) the need to demonstrate the importance of legal metrology and identify the basis of legal metrology and its specific place among other aspects of metrology and related activities, and (4) the need to facilitate and improve the work of CIML members. The growing importance of Regional Legal Metrology Organizations (RLMO's) to the future work of OIML was also addressed in the policy. Several documents are under development to facilitate the implementation of this policy.

Liaisons with International and Regional Organizations

The OIML President, Gerard J. Faber of the Netherlands, CIML members, and Bernard Athané, Director of BIML, provided reports concerning liaisons with various international and regional bodies. These included the Mètre Convention (BIPM), the International Laboratory Accreditation Cooperation (ILAC), the Joint Committee for Guides on Metrology (JCGM), the International Standardization Organization (ISO), the International Electrotechnical Commission (IEC), the International Accreditation Forum (IAF), the World Trade Organization (WTO), the Western European Legal Metrology Cooperation (WELMEC), the Inter-American Metrology System (SIM), the Asia-Pacific Legal Metrology Forum (APLMF), and others.

[2] The PTB, Germany's national institute for science and technology, is the highest technical authority of the Federal Republic of Germany on metrology and physical safety engineering

All of the regional legal metrology organizations were invited to send representatives to participate in the Conference in an effort to better coordinate the work among them and to share information on the latest developments within OIML. Seton Bennett, CIML member for the United Kingdom, chaired a meeting of regional organization representatives to share regional experiences, seek closer cooperation, identify common issues, and explore ways to provide mutual support of each other's efforts. Mr. Cesar Luiz di Silva, Chairman of the Inter-American Metrology System (SIM) Legal Metrology Working Group, represented SIM.

OIML Certificate System

A detailed report was provided by the BIML on the current state of the OIML certificate system and guidelines for future developments. The total numbers of Certificates issued for R 76 "Non-Automatic Measuring Instruments" is 334, for R 60 "Metrological Regulation for Load Cells" (1991) is 226, and for R 60 (2000) is 21 as of February 2001. Developments reported since the last Conference include an increase in the number of Recommendations covered under the System from 16 to 30, the performance of three surveys on the implementation and operation of the system, and better coordination of the System with relevant activities performed by international and regional organizations concerned with testing, certification, conformity assessment and accreditation. The BIML emphasized the importance of the Secretariats to develop Recommendations for components where possible (e.g., R 49, R 76, and R 60). The BIML prepares a notice of certificates issued each quarter in the *OIML Bulletin* and reports annually to CIML members on the status of the System. The report identifies participating member nations with testing laboratories that are issuing authorities. Discussions concerning further developments focused on the work of TC 3/SC 5 "Conformity Assessment" and the "Mutual Acceptance Arrangement" that will be described below under the *Round Table* discussion.

Developing Countries

A meeting of the Development Council took place on October 11, 2000. Mrs. Annabi, CIML member for Tunisia and Chair of the Development Council, was re-elected to another term. It was noted that three out of every five countries participating in OIML (Members and Corresponding Members) are classified as "developing countries." Reports from the three working groups were provided: (1) Training, (2) Information, and (3) Equipment. The importance of quickly revising OIML Document 1 "Law on Metrology" was discussed. The possibility of establishing a joint working group on training with BIPM was put forward for consideration.

Administrative and Financial Matters

The Conference adopted a Resolution calling for an overall 1.5 percent per year increase in the OIML budget over the next 4 years to keep pace with inflation. The U.S. voted against this resolution and instead requested a zero-growth budget.

Future CIML Conference

It was agreed that the 12th International Conference of Legal Metrology will be held in 2004, but no country has submitted an offer to host it. If no offer is received by the CIML meeting in 2002, the BIML will arrange for the 2004 Conference to be held in Paris.

35th Meeting of the International Committee of Legal Metrology

Sam Chappell, former CIML Vice-President and U.S. CIML Member, was unanimously appointed an Honorary Member of the CIML.

Report on BIML Activities.

The BIML Director, Bernard Athané, submitted a brief written summary report and held a question and answer session on BIML activities since the last CIML meeting.

Technical Activities

It was decided that OIML TC 5 "Electronic Equipment and Software" does not need a Member State as Secretariat at this time. It was also agreed that TC 13 "Measuring Systems for Acoustics and Vibration" should not remain without a Secretariat. The Committee agreed that activities related to measuring instruments for vehicle exhaust emissions under TC 16/SC 1 "Instruments for Measuring Pollution" would be assumed by the Netherlands and that the other three work

projects will be the responsibility of the Russian Federation. Finally, the Committee reported the Russian Federation is interested in taking responsibility for TC 8/SC 2 "Measurement of Quantities of Fluids" provided the work is limited to the development of a format for the test report for R 125 "Measuring Systems for the Mass of Liquids in Tanks."

CIML Presidency and Vice Presidency

The 6-year term of President Faber and Dr. Chappell's term as Vice President ended in 2000. Mr. Faber announced that he would be a candidate for another (3-year) term, and Dr. Chappell announced that he would not. Seton Bennett, Chief Executive of the National Weights and Measures Laboratory (NWML) in Great Britain, ran against Faber, at the urging of several members who felt that the OIML President should be more involved in day-to-day legal metrology. Faber won by a single vote. Upon Dr. Chappell's retirement, Manfred Kochsiek became the new First Vice President. Running for the Second Vice President position (6-year term) were Lev Issaev (Russian Federation), Hide Imai (Japan), and Alan Johnston (Canada). Dr. Issaev was elected to this position.

BIML Director

The Committee appointed Jean Francois Magana, current CIML Member for France, as the next Director of the BIML. Mr. Magana was earlier identified by a selection committee as clearly the most outstanding candidate among the applicants.

Future CIML Meetings

It was confirmed that the 36th meeting of CIML would be held in Moscow during the week of September 22-27, 2001. The Committee noted that Israel confirmed its invitation to host the 37th meeting of CIML in 2002; the final decision will be taken during the 36th meeting of CIML in 2001.

Round Table on Mutual Recognition

A round table discussion on Mutual Recognition took place on Wednesday, October 11. Objectives of the Round Table were to inform OIML Members and liaison international and regional bodies about current developments on mutual recognition within OIML (in particular the "Mutual Acceptance Arrangement" for type evaluation results and proposals for an OIML International Quantity Mark on prepackaged products).

OIML TC 3 "Metrological Control"

Dr. Chappell reported on an International Working Group (IWG) meeting of OIML TC 3 "Metrological Control" held in Paris, France, from June 27 to 29, 2000. Thirty-six people attended. The purpose of that meeting was to review the 6th draft Document on the "Mutual Acceptance Agreement" (MAA) on type evaluation data. The United States is the Secretariat. Dr. Chappell reported that supplementary documents are also being prepared to facilitate implementing the MAA. These documents would include interpretations of applicable International Organization for Standardization and the International Electrotechnical Commission (ISO/IEC), guides and standards for assessing laboratories and authorities that issue test reports and certificates of conformance, and for conducting tests and preparing test reports. Dr. Chappell reported that at the June meeting it was agreed to incorporate "self-assessment" with peer review as an option for establishing mutual confidence in type evaluation data. Accreditation with peer review is the other option. Several countries, including the United States favor the self-assessment option.

Just prior to the Conference, Dr. Chappell had distributed to participating members the 7th draft document (plus ballot form) of what is now called the "Mutual Acceptance Arrangement" (the wording change reflects that the document is a framework document only, and is not at the government-to-government level). The draft was also made available to all attendees at the Conference. The new draft incorporates the "self-assessment" concept. There was enough vocal opposition expressed, predominantly from some European countries, about the "self-assessment" concept that a Resolution was adopted that concluded, "... However, there was a consensus about the fact that the mutual recognition of test results associated with OIML certificates is a necessary goal but that the way to reach this goal had still to be identified." The U.S. delegation asked for clarification of this statement, but satisfactory clarification was not given; it was stated that the matter would be taken up at the OIML Presidential Council meeting in February 2001, at BIML. (Note: Dr. Ehrlich has been invited to be a member of the Presidential Council; he will attend this meeting.) Both Dr. Ehrlich and Dr. Chappell requested that the proper process be followed, meaning that ballots and written comments are to be sent to the Secretariat by the January deadline. Copies of the 7th draft of the "Mutual Acceptance Arrangement on OIML Type Evaluation" are available from the Technical Standards Activities Program.

An "Issue Paper on the 7th Draft Mutual Acceptance Arrangement" was distributed to the NCWM Board of Directors and other interested parties prior to the Interim Meeting. The paper includes extensive discussions of the issues and questions that the NCWM may consider in developing a U.S. position on the MAA and is presented in section IV of this report.

TC 6 "Prepackaged Products" (U.S.)

Dr. Chappell reported on a meeting of a task group for TC 6 "Prepackaged Products" to discuss the revision by the United States as Secretariat of the OIML R 87 "Net Content in Packages." The revision will include a proposal for establishing within OIML an International Quantity (IQ) Mark System similar to the existing e-mark for prepackaged products within the European Union. The task group included representatives of Germany, the Netherlands, and the United States. For more information, see the report for "TC 6 Prepackaged Products" under the Activities of OIML Secretariats below.

Activities of OIML Secretariats

This section provides a report on the status of work in OIML Technical Committees (TCs) and Technical Subcommittees (SCs) of specific interest to members of the NCWM, to develop or revise OIML Recommendations (Rs) or Documents (Ds). Also included are reports on recent activities of those groups and schedules of future activities of Secretariats, the U.S. National Working Groups (NWGs), and the International Working Groups (IWGs) of committees and subcommittees.

TC 1 Terminology (Poland)

A draft revision of the "Vocabulary of Legal Metrology" (1978) was adopted in March 2000. BIML is assisting the Secretariat in the final revision of the vocabulary taking into consideration comments received from CIML members. The new edition of the vocabulary will be published in 2001.

TC 3 Metrological Control (U.S.)

TC 3/SC 1 Initial and Subsequent Verification (U.S.)

A draft OIML Document on "Initial Verification Utilizing the Manufacturer's Quality System" was approved in March 2000. The Secretariat is making editorial changes in consideration of comments received prior to publication of this Document by BIML.

A draft revision of OIML D-1 "Law on Legal Metrology" was prepared by the TSAP staff, based on review of laws and model legislation from the U.S., Canada, Australia, Russia and considering BIML's Director designate Magana's proposed version of the law. Following extensive consultation with Mr. Magana, a compromise version of the "Law on Metrology" was developed and submitted to a joint working group (OIML, BIPM and ILAC) for comment.

TC 3/SC 2 Metrological Supervision (Czech Republic)

A first draft revision of OIML Document 9 "Principles of Metrological Supervision" was distributed by the Secretariat for review and comment. The current edition of this document, which was published in 1984, contains a survey of the various principles that can be used to establish, organize, and manage legal metrology systems. Its purpose is to create the basis for international harmonization and to assist developing countries in the establishment of formal legal metrology programs. Several members of the National Conference on Weights and Measures assisted TSAP in reviewing and commenting on the draft. We will provide updates on this project when future drafts of D 9 are received from the Secretariat.

TC 3/SC 5 Conformity Assessment (U.S. and BIML)

See the discussion under OIML TC 3 "Metrological Control" in the section on the Round Table on Mutual Recognition for details on the work of this TC on the draft document on "Mutual Acceptance Arrangement.

TC 5 Electronic Instruments (Netherlands)

TC 5/SC 1 Electronic Instruments (Netherlands)

The U.S. National Working Group on OIML Technical Committee 9 (TC 9) recently submitted comments to the Netherlands on the proposed revisions to D 11 "General Requirements for Electronic Measuring Instruments." The Netherlands is the OIML Secretariat responsible for this project. OIML D 11 specifies the general metrological and technical characteristics that must be met by electronic scales and metering devices undergoing type evaluation. It provides details on how the relevant examinations and tests are conducted and its requirements are based on those in other international standards. Some of the influence factors examined under this document are high and low temperature, and humidity, power voltage variation, and electrostatic discharge. OIML Technical Committees use this document as a reference in developing new and revised Recommendations. Ambler Thompson of TSAP, who is the technical leader for this project, coordinated the development of the U.S. comments and position on D 11. This level of coordination is necessary since this Document impacts all of the OIML Recommendations on weighing and measuring instruments including those relating to devices for breath analyzers and pollution test equipment. For more information on this activity, contact Dr. Thompson at Ambler@nist.gov or in writing at:

Dr. Ambler Thompson
NIST Technical Standards Activities Program
NIST North (820) Room 248
100 Bureau Drive, Stop 2150
Gaithersburg, MD 20899-2150
Tel: 301-975-2333 Fax: 301-975-5414

TC 5/SC 2 - Software (France and Germany)

Following a workshop on computer software in Paris in the fall of 1999, a new subcommittee in OIML was formed to develop a guidance document to harmonize internationally the assessment of instrument software in type evaluation and verification. Considerable activity has been ongoing in Europe in this area. For an example, see the WELMEC homepage at *http://www.welmec.org* on the Internet for a status report on that organization's activities. A first draft of the document and an international meeting to discuss software issues is being planned for 2001.

A preliminary list of issues for consideration by the subcommittee includes:

- Reliability: protection against significant faults (see D 11)
- Protection against fraud by users or by external accesses (interfaces, network)
- Protection against accidental misuse
- Authentication and integrity of data (transmitted/stored/processed)
- Portability: compatibility with operating systems and with hardware
- Exhaustivity: existence (absence) of hidden functions
- Configuration during the life of the instruments (in particular after repair)
- Limits and interfaces of the approved system (which parts are submitted to the requirements)
- Verification of software in the field
- Flexibility allowed for updating the software after it is put into service

For more information on this activity, contact Dr. Thompson at address given above.

TC 6 Prepackaged Products (U.S.)

Sam Chappell chaired a meeting of TC 6 on February 24–25, 2000, at the Maison de la Chimie in Paris. Twenty-nine delegates attended the meeting from 16 Participating members and one Observer member, plus representatives of CECIP (Committee of European Constructors of Weighing Instruments) and the BIML. The first Committee Draft (CD) revision of R 87 "Net Content in Packages" was reviewed. Specific and substantive changes to the draft were proposed, discussed and agreed upon for the main clauses and annexes. In particular, the Secretariat agreed to add an annex on drained weight.

The International Quantity (IQ) Marking System proposed in Annex C of the CD, which is intended to facilitate international trade, was discussed in detail. The principle of whether the system should be described within R 87 or made the subject of a separate document (along the lines of that on the OIML Certificate System) was considered. It was felt that the present Annex should remain since it outlined the principles of the system, although a much more detailed

separate document would also be needed. The Secretariat agreed to revise Annex C in order to provide an explanation of its benefits to affected parties and simplify its application and implementation by all participants including regulatory bodies and small, medium and large packing firms. Resolutions of the meeting were:

1. To consider comments made at the meeting and others submitted by correspondence to the Secretariat on a first committee draft of R 87 by April 1, 2000.

2. To prepare a second CD revision of R 87 for review and comment no later than December 2000;

3. To endeavor to complete the revision of OIML R 87 for approval at the October 2001 CIML meeting;

4. To call this work to the attention of responsible authorities within OIML Member States and regions so that its requirements could be considered when revising and harmonizing applicable laws and regulations;

5. To recommend that mutual recognition of net content of product in packages be a topic for discussion at the Round Table during the 11th International Conference.

6. To ensure that the status of this project is made known to all relevant organizations and, in particular, to the Technical Barriers to Trade Committee of the World Trade Organization.

A second CD revision of R 87 was distributed to the International Working Group for TC 6 in December 2001 and we received more than 500 comments and recommended changes. Because of the substantive nature of the comments, we will prepare a 3rd CD that will represent a significant revision over the 2nd Draft. We plan on completing the 3rd Draft and distributing it to the International Working Group in the fall of 2001. One significant change will be removal of the provisions for the establishment of an International Quantity Mark (IQ Mark) that were included in the 2nd CD of R 87. The development of an OIML IQ Mark for packages will be made a separate project under TC 6 and will begin after a revision to R 87 has been completed.

TC 7 Instruments for Measuring Length and Associated Quantities (United Kingdom)

TC 7/SC 5 "Multi-dimensional Measuring Instruments" (Australia)

As indicated above, the CIML approved R 129 "Multi-dimensional Measuring Instruments." A format of the test report format for this Recommendation was adopted in 2000. Copies of the test report are available from BIML.

TC 8 Instruments for Measuring Quantities of Fluids (Switzerland)

TC 8/SC 3 "Measuring Instruments for Liquids other than Water." (Germany)

OIML R117 "Measuring Instruments for Liquids other than Water" is planned for an extensive revision -- incorporating new instrument technologies and merging the document with other OIML recommendations (R 86 and R 105). The Netherlands (NMi) has started the work required to accomplish this task as the convenor of the IWG TC8/SC3/WG2 "Revision of R 117." The U.S. is making significant contributions on this revision as both a participating member on WG2 and as the convenor of the working group tasked with merging R 117 and R 105.

In March 2001 Germany published the results of a questionnaire that was sent out to the international members of TC8/SC3 concerning the revision of R 86 "Drum Meters for Alcohol and their Supplementary Devices." These are volumetric meters with several movable measuring chambers, for the measurement of pure ethanol and mixtures of ethanol and water. The questionnaire found that only six Member States (Austria, Czech Republic, Germany, France, Romania, and Slovakia) currently use this technology. Based on the questionnaire responses, Germany has decided to combine R 86 with R 117 and then withdraw R 86. The Netherlands, Convenor of TC8/SC3/WG2, has been tasked with this project as part of their task of revising R117.

TC 8/SC 4 "Dynamic Mass Measurements (Liquids other than Water)" (U.S.)

Work has continued on the merger of OIML R 105 "Direct Mass Flow Measuring Systems for Quantities of Liquids" (for which the U.S. is the Secretariat) with OIML R 117 "Measuring Systems for Liquids other than Water" (for which Germany is the Secretariat). The U.S. is the convenor of the international working group TC8/SC4/WG1 named "Combination R 105/R 117." The IWG was formed after the proposal to merge the two OIML Recommendations was adopted during a joint February 2000 meeting of TC8/SC3 and TC8/SC4 that was held in Paris.

A meeting of the U.S. national working group on flowmeters was held in conjunction with the July 2001 Annual Meeting of NCWM. Several manufacturers are participating in the NWG effort to produce the combination R 105/R 117 document. The next NWG meeting is scheduled for September 2001 in conjunction with the NTEP Measuring Sector meeting in Lexington, Kentucky.

TC8/SC5 "Water Meters" (United Kingdom)

CIML approved a revision of R 49 for "mechanical and electronic" water meters in October 1999. Subsequent meetings of TC 8/SC 5/WG 2 were held to develop a test procedure and test report format. Meetings were held in November 1999 at NIST, February 2000 in Paris, and May 2000 in Copenhagen. The WG 2 presented an advanced working draft to OIML TC 8/SC 5 at a meeting in November 2000 in Paris. The Draft was approved by OIML TC8/SC5 and was distributed to the CIML members for ballot. The document OIML R 49-2 will be submitted for approval by the CIML at the September meeting in Moscow.

TC8/SC7 "Gas Metering" (Belgium and France)

An IWG meeting was held in Brussels in March 2001 to discuss a 2nd CD draft OIML Recommendation "Measurement Quantities of Gas Distributed by Pipeline" to include natural and compressed natural gas. The meeting focused on discussion of comments on the 2nd CD draft Recommendation. A second meeting of the IWG focused on a 2nd CD Recommendation "Compressed Gaseous Fuel Measuring Systems for Vehicles" and annexes covering performance tests for electronic devices and basic test procedures.

TC 8/SC 8 "Gas Meters" (Netherlands)

The Secretariat has sent the members of the committee a letter with the results of a questionnaire asking for comments to guide the initiation of a work program to revise R 6 "General provisions for gas volume meters," R 31 "Diaphragm Gas Meters" and R 32 "Rotary Piston Gas Meters and Turbine Gas Meters." A small majority of members voted to produce one new recommendation for gas meters, independent of the physical principle that will replace R 6, R 31 and R 32. The Secretariat reported that they would develop an initial draft. The new document, according to the Secretariat, may consist of a general chapter mainly consisting of R 6 and those aspects in common with R 31 and R 32 and separate chapters on household and industrial gas meters. The U.S. NWG provided comments and will participate in the development of the new Recommendation.

TC 9 Instruments for Measuring Mass and Density (U.S.)

OIML Certificates for Components

In response to a request from the NWG, the Secretariat is preparing a 1st CD Recommendation on "Indicators for Weighing Instruments." This draft will be distributed for review and comment by the U.S. National Working Group in 2002.

Load Cells

The Secretariat prepared an interpretation of the requirements for a manufacturer that has an OIML Certificate of Conformance (CC) for a model meeting the requirements of OIML R 60 (1991) to obtain an OIML CC for the same model load cell to the requirements of R 60 (2000). The document R 60 "Metrological Regulation for Load Cells: Certificate Transformation Requirements" has been published by BIML and copies are available from the Technical Standards Activities Program (TSAP). BIML recently issue a summary of editorial corrections to the English version of R 60 (2000) that is also available from BIML.

TC 9 OIML Recommendation 74 "Electronic Weighing Instruments" (U.S.)

A 1st Committee Draft revision of the 1993 edition of OIML R 74 "Electronic Weighing Instruments" was distributed to the International Working Group in the fall of 2000. The purpose of this work is to update R 74 to reflect changes in International Electrotechnical Commission (IEC) standards and to ensure it is revised concurrently with OIML D 11 "General Requirements for Electronic Measuring Instruments." According to comments received on the first draft, a majority of the participating members of TC 9 supported the proposed revisions. However, several comments stated that R 74 should be withdrawn since D 11 is being updated and that it will be much useful to the Technical Committees than R 74. The U.S. National Working Group has developed a second draft incorporating the technical changes suggested in

the previous draft. It is expected that the second draft will be distributed to the international working group by the spring of 2002. Copies of the most recent draft revision of R 74 are available from TSAP.

TC 9/SC 1 "Nonautomatic Weighing Instruments" (Germany and France)

On February 4, 1999, a U.S. NWG meeting was held. The group discussed items that should be addressed when R 76 is revised. In April 2000, TSAP contacted the TC 9/SC 1 Secretariats requesting information on any plans to begin the revision process or to call an IWG meeting and request a joint meeting of TC 9 to discuss issues with R 60 "Load Cells" and R 76 in 2000. On November 3, 2000, TSAP was advised by the German and French co-secretariats that they have decided to develop a second amendment to the existing OIML R 76 rather than initiate a complete revision of the document. According to the co-secretariats, this decision was based on a review of the comments received from the U.S. TC 9 Working Group and the Committee of European Constructors of Weighing Instruments (CECIP). Germany and France believe an amendment is the best approach, as they believe the suggested changes are editorial or minor technical issues. In the spring of 2001 the co-secretariats announced that they would update references to new international EMC standards with help from the TC 5/SC 1 Secretariat for OIML D 11 and will also harmonize R 76 with R 60-2000. A suggestion to use requirements from R 76 for certain type of instruments covered by R 51 was sent to the Secretariat for that Recommendation. Other issues to be addressed in the development of the amendment will be to consider the modular approach (especially for indicators) to type evaluation and to propose guidelines for the subsequent verification and in-service inspection (quantity of standard-weights, list of tests) of instruments. The co-secretariats have not finalized a timetable for this project and no meeting of TC 9/SC 1 has been announced.

TC 9/SC 2 "Automatic Weighing Instruments" (United Kingdom)

The Secretariat is considering revision R 51 "Automatic Catchweighing Instruments" and R 107 "Discontinuous Totalizing Automatic Weighing Instruments (hoppers)." The United States submitted comments to the Secretariat for its consideration. A meeting of the Working Group for OIML TC 9/SC 2 to begin the revision of R 51 "Automatic Catchweighing Instruments" was held in Teddington, England, on June 7 to 9, 2000. Participants included representatives of Belgium, China, Denmark, France, Germany, Netherlands, Sweden, United Kingdom, the BIML and other interested parties. The Working Group agreed that zero setting tests are ineffective on these instruments and that they should be replaced by a functionality test. It was agreed that there is a need for two higher classes for class X instruments (these will be introduced in an upcoming revision of R 51) to ensure a better alignment to the classes used in R 76. It was also agreed that Class Y instruments that are used for multiple weighings would be subjected to the requirements of R 51 but that the possibility of dual approval with R 107 will be maintained. There were also discussions regarding the issues of static weighing and associated testing and rounding errors. The debate on the latter focused on the practical question of how to allow for rounding errors on instruments without the facility to display to a high resolution in test mode. This issue was clearly understood although there was no clear agreement. The Secretariat was assigned the task of investigating various proposals, producing a 1st Committee Draft (CD) revision and reporting to the group. A 1st CD draft revision of R 51 may be distributed for review in the fall of 2001.

In May 2001 the Secretariat published a Draft Recommendation of "Automatic Weighing Instruments - Weighing Road Vehicles In-Motion" (Total Vehicle Weighing) for review. The first part of this draft Recommendation includes requirements that will apply to highway weight enforcement scales used to obtain a total vehicle weight of trucks while they are in motion. Beginning in the fall of 2001, the Secretariat will develop a second part that will deal with the additional requirements and tests for obtaining axle and axle-group loads by weighing a road vehicle in motion. If you would like to participate in the U.S. National Working Group for TC 9/SC 2 on this project, please contact TSAP.

TC 9/SC 3 "Weights" (U.S.)

The OIML International Working Group has adopted the 2nd Committee Draft Revision OIML Recommendation 111 "Weights," and the Secretariat is in the process of preparing the final draft using the comments received from the working group members. A final draft will be forwarded to CIML for adoption and publication by BIML in the near future. The International Working Group agreed that OIML R 52 "Hexagonal Weights" will not be withdrawn since its requirements may still be used in some developing countries. An updated edition of R 52 will be prepared and submitted to BIML for review and publication after the work on R 111 is complete.

OIML R 33 "Conventional Value of the Result of Weighing in Air" (U.S.)

At a May 1998 meeting on R 111, a Working Group composed of representatives from Germany, France, and the United States was formed to review, revise, and draft an International Document based on the OIML Recommendation, R 33 "Conventional Value of the Result of Weighing in Air." A 2nd CD was prepared and sent to the International Working

Group for TC 9/SC 3 in June 2001. It is expected that a final draft revision will be sent to CIML for adoption in the fall of 2001.

OIML R 59 "Moisture Meters for Cereal Grains and Oilseeds" (TC17/SC1)

In February 2001, the 1st Committee Draft Revision of OIML R 59 "Moisture Meters for Cereal Grains and Oilseeds" was received from the Peoples Republic of China. China is the Secretariat of OIML TC 17/SC 1 "Humidity" which is responsible for R 59 and other Recommendations relating to moisture measurement. The current edition of R 59 was developed in the 1980s and includes technical and metrological requirements for both automatic and manual meters. A U.S. National Working Group was formed to review the draft revision of R 59 and actively participate in the revision of this important Recommendation and its combined comments were sent to the Secretariat. In June 2001 Dr. Ambler Thompson attended a meeting of TC17/SC1 held in Berlin, Germany. The subject of the meeting was OIML Recommendation D 59. TSAP had submitted comments to the Peoples Republic of China that holds the OIML Secretariat for this Recommendation and these constituted the basis for the meeting and its discussions. Dr. Thompson presented U.S. proposals to clarify the scope and general direction that the revision process should take and highlighted the need to recognize new technologies and tolerances for these instruments. Another issue is the need for a global reference method for moisture determination. These proposals were well received in particular by France, China, and Germany. The Chairman of the meeting asked the U.S. to prepare an OIML draft based on the National Conference on Weights and Measures National Type Evaluation Program (NTEP) for review by an International Working Group (IWG) composed of France, Germany, Poland, China and the U.S. Dr. Thompson agreed to this and will consult with the NTEP Grain Sector and forward copies of the U.S. documents to the IWG. Please contact TSAP if you would like to participate in this working group.

II. Report on the 7th Annual Asia-Pacific Legal Metrology Forum (APLMF) October 1 to 3, 2000

The APLMF met in Taipei from October 1 - 3, 2000, and representatives of 13 of the 22 member economies attended. J.F. Magana, Director-elect of the International Bureau of Legal Metrology, also was present as an observer to represent the OIML. Mr. Magana was joined at the meeting by Gerard Faber, President of OIML, for the Forum, but not the Working Group meetings. E. Seiler of PTB, Germany, also attended the meeting, representing PTB directly. Charles Ehrlich led the U.S. delegation and accompanied by Mr. G. Weston Diggs, of the State of Virginia, who represented the NCWM. Mr. Neng-Jong Lin, Director General of the Bureau of Standards, Metrology and Inspection (BSMI) of Taiwan, opened the 7th APLMF meeting with a welcoming address. Mr. John Birch of Australia, who is President of the APLMF, then provided his own welcoming remarks, followed by Mr. Steve Ruey-Long Chen, Vice Minister of Economic Affairs in Taiwan. Mr. Birch obtained confirmation of the report of the 6th APLMF meeting held in Nusa Dua, Bali, Indonesia, in September 1999.

Working Group Reports

Working Group 1 - Mutual Recognition Arrangements

Dr. Ehrlich provided a report on the development of an OIML effort to establish a "Mutual Acceptance Arrangement on OIML Pattern Evaluations." The status of the development of a 6th draft of the Mutual Arrangement and associated Documents was also given. Both Australia and Japan expressed their concern that the proposed system of accreditation or self-assessment, followed by peer review, may not be the best way to proceed. However, Mr. Birch did not offer an alternative, and H. Imai (Japan) offered an alternative that more closely resembles the BIPM approach of regional organizations conducting intercomparisons. When questioned on the relative cost of his approach, Dr. Imai could provide no estimates. Mr. Birch reported that any effort to establish an APLMF Mutual Acceptance Arrangement for pattern, or type, approval test reports would wait upon the outcome of the OIML work.

One additional topic discussed concerning Mutual Recognition Arrangements/Agreements (MRA) in legal metrology was a review of bilateral MRAs. Details of the origins and operation of the U.S.-Canada MRA were reviewed first by A. Johnston and G. Vinet of Measurement Canada, and then Wes Diggs. An MRA between the Peoples Republic of China and the Netherlands for OIML R 76 (non-automatic weighing instruments) was described, as well as a general agreement between Australia and New Zealand based on accreditation to ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories." New Zealand also mentioned that they are working towards establishing an agreement with the U.K. on non-automatic weighing instruments.

Dr. Ehrlich was requested to assume Chairmanship of this Working Group and he accepted.

Working Group 2 - Training

The Working Group on Training is chaired by Kerry Marston, Regional Training Coordinator for the National Standards Commission of Australia. This has been an active WG, particularly in organizing and providing train-the-trainer courses for the pattern approval and verification of non-automatic weighing instruments according to the procedures in OIML R 76. An APLMF train-the-trainer course for the verification of fuel dispensers and LPG dispensers is planned for Shanghai, China, in March 2001. A workshop or seminar on accreditation and quality certification in legal metrology will be organized, highlighting possible issues for certifiers of private sector verifiers of weighing and measuring equipment, and certification of packers of goods packed by measure. Four areas identified for training priority for the future are high capacity weighing, high capacity flow measurement, goods packed by measure, and measurement uncertainty in legal metrology. Mr. Diggs will be investigating future applicability of these training courses to NCWM interests.

Working Group 3 - Utility Meters

The two major issues discussed at the Working Group on Utility Meters (chaired by Mr. Birch) were water meters and electricity meters. Dr. Ehrlich also provided a status report on the OIML work. Mr. Birch prominently discussed the recent NIST report "Changing Measurement and Standards Needs in a Deregulated Electric Utility Industry." It is anticipated that deregulation of electricity in the Asia-Pacific region will have a large impact on legal metrology offices. Dr. Ehrlich reported that the NIST Technical Standards Activities Program (TSAP) will be participating in the OIML work on electricity meters being started by Germany, but NIST will not be able to attend the one-day organizational meeting in Germany because of previous commitments to other OIML TCs.

Working Group 4 - Goods Packed by Measure

John Barker of New Zealand chaired the WG on Prepackaged Goods. Mr. Birch reported on two recent meetings concerning R 87 "Net Content in Packages" (U.S. is Secretariat). Dr. Ehrlich reported that a next draft should be available in December 2000. Mr. Magana reported on a meeting between WELMEC and the European Commission on proposals for a compliance system for prepackaged goods based on quality management systems. The APLMF will express support to OIML for continued work in this area, but has no action plan of its own.

Working Group 5 - Medical Measurements

Activity this year of the WG on Medical Measurements, chaired by Chen Jay-San of Chinese Taipei, consisted of circulating a survey on the regulation of sphygmomanometers (blood pressure meters) in APLMF member economies, primarily for informational purposes. TSAP provided an extensive response. It was decided to invite a speaker to the next APLMF meeting to discuss the importance of metrological control of medical measuring instruments, particularly sphygmomanometers. Dr. Ehrlich suggested that someone from Austria be invited since that country provides the Secretariat of the OIML Subcommittee responsible for this work.

Working Group 6 - Rice Moisture Measurement

The WG on Rice Moisture Measurement is also chaired by Mrs. Marston (Australia), although Japan later agreed to assume responsibility for this WG. The major activity was a report by Dr. Seiler on the evaluation by PTB of three rice moisture meters (two manufactured in Taiwan, one in Vietnam). Reported variations (3.5 percent) were larger than expected. Dr. Seiler asked if studies were done elsewhere; Mr. Diggs reported on the standing NTEP Committee on Grain Moisture. It was decided that for next year a study of the Rice Measurement Control System of Japan would be undertaken during the last week of August in 2001.

Working Group 7 - Taximeters

Mr. Birch chaired the Working Group on Taximeters, which had conducted a survey on the regulation of taximeters in the APLMF economies. TSAP had coordinated the U.S. response. Mr. Magana provided a report on the status of the current OIML Recommendation 21 "Taximeters" and on plans to update it. In a related area, Mr. Magana also provided a report on developments of a conference on testing software for legal metrology purposes held in Paris last year. The APLMF agreed to support OIML in the revision of its Recommendation 21 "Taximeters."

Working Group 8 - Intercomparison Testing

The APLMF WG on Intercomparison Testing and Calibration has also been very busy coordinating comparisons for nonautomatic weighing instruments and load cells and planning comparisons for mass standards. The recently completed report on nonautomatic weighing instruments was briefly reviewed and will be sent to the OIML Bulletin for publication. The report on load cells will be completed this year and circulated to members. The intercomparison testing of mass standards (Singapore is the coordinator) is to begin in 2002.

Nonautomatic Weighing Instruments.

APLMF sponsored an intercomparison involving the type evaluation of a nonautomatic-weighing instrument. Participants included the United States, Canada, Australia, and other countries. A report prepared by the Australia National Standards Commission was published in July 2000. Copies are available from TSAP.

Mass

An intercomparison involving mass has been delayed pending information from Asia-Pacific Metrology Program (APMP). The APMP has also conducted a mass intercomparison. The APLMF Convenor wants to review the results from that intercomparison before beginning an APLMF mass intercomparison.

Load Cells

A load cell intercomparison was completed that involved several laboratories including NIST, Australia's National Standards Commission (NSC), Japan, United Kingdom, Germany, and others. This intercomparison was conducted using two 250-kg load cells and two 20 000-kg load cells. A report is being prepared by the Force Group at NIST and may be published in 2002 in the *OIML Bulletin* and "*NIST's Journal of Research.*"

Flowmeters

Plans for an intercomparison of master flowmeters have been cancelled.

Country Reports by Member Economies

Reports were presented by the following member economies: Australia, Canada, Peoples Republic of China, Indonesia, Japan, Republic of Korea, Malaysia, New Zealand, Singapore, Chinese Taipei, Thailand, United States (NCWM – by Wes Diggs), and Vietnam. Of general concern in several countries was how to achieve metrological control under conditions of electricity deregulation. Japan's government will change in January and as a result the three Japanese national measurement laboratories will be "amalgamated" next year. Dr. Imai will be the Director. Also, Malaysia reported that there is no regulatory control of medical instrumentation there and the government of Malaysia has privatized the verification process for weights and measures. Thailand has been active in collaborations with New Zealand and particularly Germany (PTB). Both Indonesia and Singapore eagerly await guidance from OIML on a model law for Legal Metrology. New Zealand has prepared a report on "Metrology and the Economy" (copy available from TSAP upon request) and is focusing on water meter issues. Vietnam has established a national standards laboratory. Mr. Diggs provided the U.S. report, highlighting the incorporation of NCWM and the transition of NTEP administration from NIST to NCWM. Other topics he covered were the OIML Certificate Project, production-meets-type issues, repaired and remanufactured devices, taximeters, temperature compensation on vehicle-mounted systems, the 4th draft of NIST Handbook 133, "Checking the Net Contents of Packaged Goods," issues related to e-commerce, and devices used to measure fat content in animal carcasses.

Reports of Specialist Bodies of the Asia-Pacific Economic Cooperation (APEC)

Reports were provided on the following bodies within the region: APLAC, APLMF, APMP, PAC, PASC, and the APEC Standards and Conformance Subcommittee.

OIML Issues

G. Faber, OIML President, provided a report on OIML activities during the past year. He emphasized that there is an evolution in the way that OIML views regional legal metrology organizations, seeing them as very important and doing a lot of the work of OIML in the future. J. F. Magana discussed the status of the OIML TC work on software testing, saying that a lot of dialogue is taking place via the Web/Internet. OIML was asked to give priority to the rapid development of D

1 "Law on Metrology" in order that developing countries may use this document to develop their own national metrology laws. Mr. Birch pointed out that it is important to consider not only the development of model legislation, but also whether or not the legislation can be effectively administered.

APLMF Work Program for 2000 – 2001

A detailed APLMF work program for the next year was prepared and presented by Mr. Birch. A copy is available from TSAP.

President of APLMF for 2000 –2001

It was requested that member economies identify someone to be considered for the position of President (formally Convenor) of APLMF. No candidates were put forth. John Birch had been requested to accept the position. He has been the Convenor for 6 years, but had agreed to accept the position as President on a temporary basis until someone from another member economy could replace him. While no one agreed to accept the position, Japan committed to finding a suitable candidate for next year. However, they made no financial commitment to fund the APLMF. Therefore, it was decided that, in order to fund a full-time APLMF Secretariat, the membership fees would be effectively quadrupled next year. The United States agreed to this in principle, but made no guarantee due to the current budgetary situation. Based on the in-principle agreement, Australia agreed to continue funding to cover the additional year.

Next Meeting of the APLMF

New Zealand agreed to host the next APLMF forum (8^{th}) on November 13-15, 2001. Dr. Ehrlich will attend the meeting as U.S. Representative. The NCWM will be represented by Mr. Louis Straub of the State of Maryland and immediate past Chairman of the conference.

Dr. Charles Ehrlich attended the 4th meeting of the SIM LMWG, held at the headquarters of the Brazilian Association of Machinery and Equipment on December 4, 2000. Thirteen people attended, representing eight countries (Bolivia, Brazil, Costa Rica, Ecuador, Jamaica, Mexico, Uruguay, U.S.A). Seven of the attendees are on the LMWG. In addition, the new SIM President (Felipe Urresta, Ecuador), the SIM Secretary (Lea Contier de Freitas, Brazil), the SIM Representative to the Joint Committee on Regional Bodies (JCRB) (Ismael Castelazo) and the Chairman of the SIM Professional Development Committee (PDC) (Yoshito Mitani, Mexico) attended, along with two other members of the PDC. Mr. Freitas served as the Secretary of this meeting and will prepare and distribute the meeting minutes.

The meeting was opened by Cesar Luiz Leal Moreira da Silva, Technical Manager, Legal Metrology Directorate at INMETRO (Brazilian National Metrology Institute) and Chairman of the SIM LMWG. Mr. Urresta then provided welcoming remarks on behalf of SIM, by saying that legal metrology is very important to SIM. Mr. Freitas reiterated the importance of legal metrology to SIM and added that the LMWG could and should be the first SIM Working Group to have representation from all of the OAS (Organization of American States) countries. Mr. Mitani explained that the PDC is responsible for coordinating training activities in SIM and was very interested in the training ideas being developed in the LMWG. For the benefit of the several new attendees, Mr. Silva, Luis Garcia (Uruguay), and Dr. Ehrlich reviewed the history of the development of the LMWG beginning with the Workshop on Legal Metrology for the Americas (WLMA) at NIST in 1998 through the last LMWG meeting in Richmond in July 2000, which was held immediately after a NIST-sponsored Legal Metrology Seminar (LMS).

Initial review of necessary changes to the SIM Statutes to appropriately include the LMWG in SIM led to further discussion of who can/should represent a country on the LMWG since SIM is not a governmental organization but rather a "private club" of metrology organizations. This is a particular issue for legal metrology because in many cases the metrology and legal metrology authorities are in different organizations in a country. Mr. Silva will pursue the issue of changes to the Statutes (especially as they will pertain to voting rights in SIM).

Two Task Groups (TG) had been established in the LMWG at the last meeting. Task Group 1 is on "Laws and Regulations," which encompasses packaging and labeling requirements. Task Group 2 is on "Metrological Control of Measuring Instruments." At this meeting, Mr. Silva was formally appointed Chair of Task Group 1, and Dr. Ehrlich was appointed Chair of Task Group 2. Besides Brazil, the other countries represented on TG 1 are Uruguay and Argentina. Besides the United States, the other countries represented on TG 2 are now Costa Rica, Jamaica, and Bolivia. Draft "Terms of Reference" (renamed "Objective and Scope") for the two TGs were developed (by Mr. Garcia and Dr. Erhlich, respectively) prior to the meeting but had not been circulated to the other members for review. It was decided to circulate these new materials to all of the LMWG members for their comment prior to the next LMWG meeting. During this

discussion Dr. Ehrlich first raised the idea of a possible manufacturer's forum in connection with the package and labeling industry. This suggestion elicited favorable comments from the Costa Rican representative, Beatriz Paniagua, who said that labeling requirements are very strict in her country, from Mr. Mitani, and from Mr. Urresta, who offered to host such a forum.

Responsibilities were next assigned for accomplishing each of the 10 Resolutions developed at the LMS and adopted by the LMWG (the Resolutions are presented at the end of this report). Resolutions 1, 2, 6, 8, 9, and 10 were assigned to TG 1, and Resolutions 3, 4, and 5 to TG 2. Several of the Resolutions involve developing surveys or questionnaires to establish the state of different aspects of legal metrology in the OAS countries. It was agreed that TG 1 would undertake to develop the survey and organize a workshop/forum/training on packaging and labeling. Dr. Ehrlich was also solicited to assist since he had indicated that the U.S. packaging and labeling industry was very interested in such an activity (based on prior interactions with Chris Guay of Proctor and Gamble).

Final discussion centered on how to use the $25,000 allotted by the SIM Council to the SIM LMWG for calendar year 2001. Based on prior discussion at the meeting, it was decided to allocate $5,000 for one meeting of the SIM LMWG and use the balance of the funds for one or two training sessions on packaging and labeling requirements in the Americas. Besides the offer by Mr. Urresta to host such a session in Ecuador, Mr. Paniagua tentatively offered to host a second session in Costa Rica (in order to minimize travel costs while maximizing participation from all of the SIM regions). June was identified as the optimal month to hold these workshops. Since the SIM PDC does not have a budget of its own to provide funds or other resources for training, other sources were considered. Two that were mentioned were the National Conference of Standards Laboratories International (NCSLI) and the Physikalisch-Technische Bundesanstalt (PTB) (both of which are Associate Members of SIM), although this was not pursued further. The planning was left at this state, with everyone to go back to their countries, establish interest levels, and send their thoughts and comments to Mr. Silva. It was decided that the next meeting of the SIM LMWG should be held at the conclusion of the second packaging and labeling training/workshop/forum that will be held September 18-19, 2001 in Miami, Florida.

On December 5 to 8, 2000, Dr. Ehrlich attended Metrologia-2000, in particular the sessions pertaining to legal metrology (proceedings available on CD-ROM, however most are in Portuguese). While interpretation was provided for most of the main sessions, there was no interpretation provided for the sessions of the Brazilian legal metrology organization. Dr. Ehrlich used that time to interact on numerous issues with many of the European attendees, including Bernard Athané (Director of the International Bureau of Legal Metrology), Terry Quinn (Director of the International Bureau of Weights and Measures), Andrew Wallard (Director-elect of the International Bureau of Weights and Measures), Bob Kaarls, Paul deBievre, and Klaus Sommer, with whom Dr. Ehrlich is collaborating on an OIML Document on Uncertainty in Legal Metrology. Dr. Ehrlich also resolved an issue for a U.S. scale manufacturer who thought it was being unfairly excluded from the Brazilian market when, in fact, Brazil does not issue type approval certificates for the product in question (i.e., load cells).

Resolutions
Legal Metrology Seminar for the Americas
Richmond, Virginia
July 2000

Resolution 1-- An inquiry should be distributed to develop a listing of the national responsible body for legal measuring instruments in each member state of the Organization of American States (OAS). Note: the instruments listed initially and addressed in the other resolutions should be nonautomatic weighing instruments, meters for measuring liquids, and vehicular fuel dispensers.

Resolution 2 -- An inquiry should be distributed to OAS member states to determine the metrological and technical requirements that measuring instruments must meet in order for a manufacturer or importer to market those instruments for legal-for-trade applications.

Resolution 3 -- A Mutual Acceptance Arrangement (MAA) for type evaluation of measuring instruments should be developed for voluntary consideration in the Americas based on the ongoing work on this subject in OIML. This MAA is intended to develop confidence among participants that accept and issue test reports and certificates of conformity and those that only accept test reports and certificates.

Resolution 4 -- A draft procedure of general requirements for initial verification should be prepared for consideration in harmonizing such procedures within the Americas.

Resolution 5 -- Training courses should be developed and implemented for the testing of measuring instruments during initial and subsequent verification.

Resolution 6 -- An inquiry should be distributed to OAS member states requesting copies of (or references to Internet sites containing) their laws on legal metrology.

Resolution 7 -- OIML should be requested to give priority for the revision of Document 1 "Law on Metrology."

Resolution 8 -- An inquiry should be distributed to OAS member states requesting copies of their packaging and labeling laws and regulations (or references to Internet sites containing this information) and an identification of responsible bodies.

Resolution 9 -- Training courses should be developed for implementing packaging and labeling based on the requirements of OIML Recommendations R 79 "Labeling Requirements for Prepackaged Products" and R 87 "Net Content in Packages."

Resolution 10 -- Information should be exchanged among the member states to educate consumers and others in the area of legal metrology.

Resolution 11 -- These resolutions shall be submitted to the SIM Working Group on "legal metrology" for consideration in implementing within the scope of their work by December 31, 2000. Consideration shall be given to pursue those items not covered by the SIM working group.

IV. Issue Paper on the 7th Draft of the "Mutual Acceptance Arrangement on OIML Type Evaluations"

Published: December 20, 2000

The purpose of this paper is to assist the NCWM in the development of a consensus U.S. position on the 7th Draft of a Mutual Acceptance Arrangement (MAA) on OIML Type Evaluations.

Background

In April 1998 the United States initiated a global effort to explore the possibility of establishing mutual recognition of test data with associated certificates for type approval. This initiative was undertaken to contribute to the OIML efforts toward establishing mutual confidence globally in legal metrology activities. An up-to-date history of this effort can be found in the Explanatory Note of the 7th Draft of the "Mutual Acceptance Arrangement on OIML Type Evaluations" dated October 2000. Copies of the MAA are available from TSAP.

Of particular note, the MAA is structured to be an unsigned, framework document that must be approved by the voting participants in OIML TC 3/SC 5 "Conformity Assessment" and subsequently by the CIML. Mutual acceptance arrangements of test reports for particular categories of instruments and devices would be established through individual Declarations of Mutual Confidence (DoMCs), which would be signed and are described in the MAA (see Clause 4 and Annex A).

Summarizing the key elements of the 7th Draft MAA:

1) Instruments and devices covered by DoMCs are only those that fall under the OIML Certificate system. OIML Certificates are issued only for those categories of instruments for which the applicable Recommendation includes a test procedure and the test report format (see MAA 4.1).

2) Issuing authorities and testing laboratories ('bodies') participating in a DoMC must undergo an assessment of their competence either through a formal accreditation process (carried out by a recognized accreditation body) or through a self-assessment (NOT to be confused with a self-declaration). The assessment report prepared by either an accreditation team or self-assessment will be peer reviewed by experts representing potential participants or existing participants of a DoMC. The peer review process may require an on-site evaluation. If an on-site assessment is required, the body being assessed pays for that assessment. It should be noted that any decision to proceed with on-site peer assessment would focus on only those areas where questions remain and would generally require only one or a limited number of experts. In order to participate in a specific DoMC, a participant would already have to be a participant in the OIML Certificate System for the category of instruments covered (see MAA 4.4, B.4 and B.5).

3) The DoMC will be an arrangement among representatives of OIML Member States. If a country (OIML Member State) requires additional testing beyond the requirements in the OIML Recommendation in order to issue its national type approval certificate, these additional requirements must be specified in a DoMC. Testing laboratories have the option of carrying out such additional tests. For the anticipated initial DoMCs, the NCWM, representing local jurisdictions, would reflect any additional requirements needed for national type approval in the United States (see MAA 5.1, 5.3).

4) Participation in the MAA is voluntary. Signatories to a DoMC are morally (but not legally) bound to utilize the test data from another participant to issue a national type approval certificate once competence of that participant has been established according to one of the processes specified in the MAA. Questionable test data are not required to be used although efforts to resolve the questionable aspect of the data without additional testing are expected to be pursued. Acceptance of a test report by another participant in the arrangement implies the use of those test report results as a basis for making its own decision about compliance to national type approval requirements. The accepting party will have its usual legal liability extended to decisions based on accepted results (see MAA 1.1, 1.3, 3.13, 5.2, 5.5, 8.2).

These elements raise several issues and questions concerning the U.S. position on the 7th Draft MAA, and possible future U.S. participation in DoMCs. (Note: The United States could approve the 7th Draft MAA but choose not to participate in any DoMCs.) The following issues and questions are therefore separated into two groups. The first group of questions directly addresses issues regarding the U.S. position on the framework document (7th Draft MAA). The second group addresses issues regarding conditions that the United States needs to consider prior to participating in DoMCs. The answers to the questions in the second group may influence the overriding question in the first group of whether the United States should approve the framework document as it is presently worded, or suggest possible rewording. The issues and questions are as follows:

The U.S. position on the 7th Draft MAA (framework document)

Group 1: Issues and Questions (with Sample Answers based on an interpretation of the current text of the MAA for discussion)

1. Is the self-assessment option for establishing competence, with peer review and without on-site evaluation being necessary in all cases, acceptable to the United States? (Note: This would be less expensive than accreditation.)

   Sample Answer: That would have to be decided by the BOD of the NCWM. For the likely community of participants in any DoMC of interest, self-assessment could likely provide the same level of confidence in competence as assessment by an accreditation body. Self- assessment would certainly reduce costs and time and could be as effective.

2. Who in the U.S. would bear the cost of accreditation or on-site peer review assessment? What would be the estimated costs? Would the anticipated costs of accreditation and/or self-assessment be acceptable? (What assessments are now made/required of the NTEP issuing authority and NTEP Laboratories and how frequently are such assessments carried out?)

   Sample Answer: Generally the NTEP laboratory bears the cost of an accreditation and that would be anticipated in this case. Cost estimates can be made for the NTEP laboratories based on other similar evaluations they have undergone. Typical costs of NVLAP evaluations of some of the State metrology laboratories have been in the $6000 to $8000 range, but in some cases additional international travel costs may accrue. Whether or not the anticipated costs are acceptable depends on a number of factors that the NTEP laboratories must identify and evaluate.

3. Would there be any possible advantages, such as to U.S. manufacturers, for the United States to approve the 7th Draft MAA, but not plan to participate right away in any DoMCs?

   Sample Answer: One possible advantage is that U.S. manufacturers might be able to get a test report in a participating OIML member state that would be accepted in all other participating OIML member states as a condition for receiving national type approval. This would save time and effort for the manufacturers wishing to market their instruments in such participating countries.

4. Is the United States better off giving up the responsibility for developing the MAA and entering into a few select bilateral type approval arrangements instead?

Sample Answer: A bilateral arrangement developed along the lines of the one now existing between the NCWM, Inc. and Measurement Canada may require a significant effort for each one developed. That is why a multilateral arrangement was sought; however, if the MAA is unsuccessful, it might be helpful to pursue, for the benefit of U.S. manufacturers, a bilateral or multilateral arrangement in a region that would provide maximum benefit. Germany has recently indicated an interest in a bilateral arrangement, and others such as the UK and the Netherlands would likely be interested as they have already indicated in the past.

Conditions that the United States should consider prior to participating in a DoMC

Group 2: Issues and Questions (with Sample Answers based on an interpretation of the current text of the MAA for discussion)

5. Who in the United States would be signatory to (e.g., responsible for) a DoMC? Chairman of NCWM, Inc.? Chairman of NTEP? and/or the U.S. CIML member?

   Sample Answer: The CIML member would sign on behalf of the national responsible body for the issuing authority and the testing laboratory for the category of instruments covered by the DoMC. Of initial interest would be instruments for which NTEP provides type evaluation and approval (e.g., Certificates of Conformance); therefore, the Board of Directors (BOD) of the NCWM, Inc., would make a decision to participate on behalf of the United States in the specific DoMC of interest. The CIML member would sign on behalf of the United States (NCWM) since the MAA would be an OIML program.

6. Who would decide for the United States whether or not to deem competent the other participants in a DoMC? Which organization (NCWM Inc., NIST, or both?) would participate for the United States on a peer review panel? With what frequency would such assessments need to be made?

   Sample Answer: The BoD of the NCWM would decide on behalf of the United States on the basis of information provided by the NTEP Committee, NIST, manufacturers and other members of the NCWM. NTEP would appoint technical representatives to participate for the United States on the peer review panel for a DoMC. Peer reviews are provided to determine and agree upon the competence of the initial and subsequent applicants for participation in a specific DoMC. This peer review conceivably could be carried out by correspondence or e-mail (comments on this point? Also see #1). Frequency of assessments would likely need to be established on a case-by-case basis.

7. Who in the United States would make the decision whether or not to accept test data from another participant in a DoMC?

   Sample Answer: The NTEP issuing authority would receive, review, and make the decision to accept the test data.

8. Are the NTEP labs willing to participate in DoMC's? If so, what needs to be done to authorize them?

   Sample Answer: The NTEP labs will have to answer this, both at the general level and on a case-by-case basis. The authorization procedure would be the same as that which now applies for authorizing such laboratories to conduct NTEP type evaluations.

9. How much anticipated workload would the NTEP laboratories have for particular DoMCs? Does the anticipated workload justify the anticipated up-front costs of accreditation or self-assessment?

   Sample Answer: The manufacturers will need to answer this question for each of the DoMCs desired. The workload for the laboratories would depend on the frequency of manufacturers requesting testing to OIML requirements. Many would likely combine a request for type evaluation for NTEP and OIML requirements. As for the issuing authority, the applications with test reports made by other participants in a DoMC, and the evaluations would likely reflect the same level of activity as for any other application. Whether up-front costs would be justified depends on many things, including cost-recovery mechanisms.

In addition to these issues, consistency of testing capabilities should be established among the NTEP laboratories for instruments or devices in a particular DoMC before the United States would make a commitment to be a participant. Possible mechanisms for establishing consistency include joint training and intercomparisons among laboratories. The

mechanism that is utilized now by the NTEP Committee at Sector meetings of bringing together representatives of NTEP laboratories periodically for information and training could be considered and utilized. NIST/OWM will be working with NTEP to conduct an intercomparison among the four full-capability NTEP weighing laboratories (and possibly Measurement Canada) in FY 2001. NIST/OWM is also working closely with the NTEP Director to help implement regular site assessments and to improve training activities for the NTEP Laboratories. These issues must be widely discussed among all U.S. stakeholders and a consensus position reached on the current ballot concerning whether to approve the 7th Draft MAA or, if not, whether it could be approved after the text was appropriately edited.

Please send your questions or comments to:

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V. 8th Draft of the "Mutual Acceptance Arrangement (MAA) on OIML Type Evaluations"

An 8th Draft of the MAA has been developed by S. Chappell and C. Ehrlich, based on comments received from members of OIML TC3/SC5 on the 7th Draft, discussion at the OIML Presidential Council meeting in February 2001, and feedback received from the NCWM NTEP Committee on the MAA Issue Paper (discussed above) concerning the acceptability of on-site visits (audits) of NTEP Laboratories. The significant modifications to the 7th Draft that are incorporated in the 8th Draft are: 1) the term "self assessment" has been deleted, replaced by "peer assessment", 2) an option for interlaboratory comparisons as a means of demonstrating competence of a testing laboratory is added, 3) clarification of the definitions of "issuing authority" and "national responsible body" are made, along with clarification of responsibilities and signatories to a "declaration of mutual confidence," and 4) the composition and roles of an "ad hoc committee on participation review" are established. This 8th Draft MAA will be presented at the upcoming meetings of the OIML Presidential Council and the International Committee of Legal Metrology (CIML) in September 2001, in Moscow.

Appendix C
CWMA Uniform Registered Serviceperson's Program

Several years ago, the weights and measures administrators from States comprising the Central Weights and Measures Association (CWMA) came up with an idea for "one-stop shopping" for registered servicepersons. That idea has finally come to fruition. A program has been developed to recognize one set of testing standards that all participating States will recognize for the purpose of registering servicepersons of commercial weighing and measuring devices.

This program in no way affects the regulations of each State in terms of required training, registration fees, privileges, and responsibilities. It is a compilation of new exams for various device types that will be administered according to the rules and guidelines developed by the CWMA. Each State is given the opportunity to take part in the program by signing a Memorandum of Understanding (MOU). The MOU is being circulated among State administrators within the CWMA for signatures.

The program is administered in the following manner: An applicant may apply for registration in any of the participating States. The applicant specifies the types of devices that will be serviced and the States where registration is desired. A participating State will administer the exam composed of various sections, one section for each device type, one section related to the Handbook 44 General Code and Fundamental Considerations, and one section for each State where registration is desired to address individual State regulations separate from Handbook 44. Each section of the test has 10 questions. The broader scope of the registrant's application in terms of geographic area and device types, the more lengthy the exam.

Upon completion of the exam, results are provided to each State where registration is sought. Each State will use its own administrative procedures to complete the registration process. The registration will be limited to the device types and jurisdictions where the applicant has demonstrated adequate knowledge with passing scores.

This program will allow a company to send servicepersons to the nearest testing facility to achieve registration in the entire region of its service area within the CWMA. Thanks to the vision and ingenuity of the CWMA leadership, the CWMA Uniform Registered Servicepersons Program is a reality.

Appendix D
Proposed Reorganization of the Liquid-Measuring Devices Code In NIST Handbook 44

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Current HB 44 format	Proposed HB 44 format
A. Application	A. Application
S. Specifications	D. Definitions
N. Notes	UR. User Requirements
T. Tolerances	S. Specifications
UR. User Requirements	T. Tolerances
D. Definitions	N. Notes

Sec. 3.30. Liquid-Measuring Devices

A. Application

A.1. - This code applies to:

(a) devices used for the measurement of liquids, including liquid fuels and lubricants, and

(b) wholesale devices used for the measurement and delivery of agri-chemical liquids such as fertilizers, feeds, herbicides, pesticides, insecticides, fungicides, and defoliants.
(Added 1985)

A.2. - This code does not apply to:

(a) meters mounted on vehicle tanks (see Sec. 3.31. Code for Vehicle-Tank Meters),

(b) devices used for dispensing liquefied petroleum gases (see Sec. 3.32. Code for Liquefied Petroleum Gas and Anhydrous Ammonia Liquid-Measuring Devices),

(c) devices used for dispensing other liquids that do not remain in a liquid state at atmospheric pressures and temperatures,

(d) water meters,

(e) devices used solely for dispensing a product in connection with operations in which the amount dispensed does not affect customer charges, or

(f) mass flow meters (see Sec. 3.37. Code for Mass Flow Meters.)
(Added 1994)

A.3. - In addition to the requirements of this code, liquid-measuring devices shall meet the requirements of Section 1.10. General Code.

3.30 Definitions

The specific code to which the definition applies is shown in [brackets] at the end of the definition. Definitions for the General Code [1.10] apply to all codes in Handbook 44.

apparent mass versus 8.0 g/cm^3. The apparent mass of an object versus 8.0 g/cm^3 is the mass of material of density 8.0 g/cm^3 that produces exactly the same balance reading as the object when the comparison is made in air with a density of 1.2 mg/cm^3 at 20 ∀C.[3.30, 3.32]

audit trail. An electronic count and/or information record of the changes to the values of the calibration or configuration parameters of a device.
[1.10, 2.20, 3.30] (Added 1993)

calibration parameter. Any adjustable parameter that can affect measurement or performance accuracy and, due to its nature, needs to be updated on an ongoing basis to maintain device accuracy, e.g., span adjustments, linearization factors, and coarse zero adjustments. [2.20, 3.30] (Added 1993)

configuration parameter. Any adjustable or selectable parameter for a device feature that can affect the accuracy of a transaction or can significantly increase the potential for fraudulent use of the device and, due to its nature, needs to be updated only during device installation or upon replacement of a component, e.g., division value (increment), sensor range, and units of measurement. [2.20, 3.30] (Added 1993)

contract sale. A sale where there is a written agreement stating the price as either a fixed price, a price above cost, or an adjustment from the posted price. [3.30] (Added 1993)

discharge line. A rigid pipe connected to the outlet of a measuring device. [3.30] (Added 1987)

discharge hose. A flexible hose connected to the discharge outlet of a measuring device or its discharge line. [3.30] (Added 1987)

dispenser. See motor-fuel device.[3.30]

dry-hose type. A type of device in which it is intended that the discharge hose be completely drained following the mechanical operations involved in each delivery. [See "dry hose."] [3.30, 3.34]

dry hose. A discharge hose intended to be completely drained at the end of each delivery of liquid. [See "dry-hose type."][3.30]

event counter. A nonresettable counter that increments once each time the mode that permits changes to sealable parameters is entered and one or more changes are made to sealable calibration or configuration parameters of a device. [2.20, 3.30] (Added 1993)

event logger. A form of audit trail containing a series of records where each record contains the number from the event counter corresponding to the change to a sealable parameter, the identification of the parameter that was changed, the time and date when the parameter was changed, and the new value of the parameter. [2.20, 3.30] (Added 1993)

face. That portion of a computing-type pump or dispenser which displays the actual computation of price per unit, delivered quantity, and total sale price. In the case of some electronic displays, this may not be an integral part of the pump or dispenser. [3.30] (Added 1987)

gravity type. A type of device designed for discharge by gravity. [3.30]

liquid-fuel device. A device designed for the measurement and delivery of liquid fuels.[3.30]

liquid-measuring device. A mechanism or machine designed to measure and deliver liquid by definite volume. Means may or may not be provided to indicate automatically, for one of a series of unit prices, the total money value of the liquid measured, or to make deliveries corresponding to specific money values at a definite unit price. [3.30]

liquid fuel. Any liquid used for fuel purposes, that is, as a fuel, including motor fuel. [3.30]

lubricant device. A device designed for the measurement and delivery of liquid lubricants, including, but not limited to, heavy gear lubricants and automatic transmission fluids (automotive). [3.30]

mass flow meter. A device that measures the mass of a product flowing through the system. The mass measurement may be determined directly from the effects of mass on the sensing unit or may be inferred by measuring the properties of the product, such as the volume, density, temperature, or pressure, and displaying the quantity in mass units. [3.30, 3.32]

minimum clear interval. The shortest distance between adjacent graduations when the graduations are not parallel. (Also see "clear interval.") [3.30]

motor-fuel device. A device designed for the measurement and delivery of liquids used as fuel for internal-combustion engines. The term "motor-fuel dispenser" means the same as "motor-fuel device"; the term "retail motor-fuel device" applies to a unique category of device (see definition of "retail device"). [3.30]

motor fuel. Liquid used as fuel for internal-combustion engines. [3.30]

point-of-sale system. An assembly of elements including a weighing or measuring element, an indicating element, and a recording element (and may also be equipped with a "scanner") used to complete a direct sales transaction. [2.20, 3.30, 3.32, 3.37] (Added 1986) (Amended 1997)

pressure type (device). A type of device designed for operation with the liquid under artificially produced pressure. [3.30]

remote configuration capability. The ability to adjust a weighing or measuring device or change its sealable parameters from or through some other device that is not itself necessary to the operation of the weighing or measuring device or is not a permanent part of that device. [2.20, 3.30] (Added 1993)

retail device. A device used for:

single deliveries of less than 378 L (100 gal),

retail deliveries of motor fuels to individual highway vehicles, or

single deliveries of liquefied petroleum gas for domestic use and liquefied petroleum gas or liquid anhydrous ammonia for nonresale use. (Amended 1987) [3.32]

side. That portion of a pump or dispenser which faces the consumer during the normal delivery of product. [3.30] (Added 1987)

slow-flow meter. A retail device designed for the measurement, at very slow rates (less than 4 L (10 gal) per hour), of liquid fuels at individual domestic installations. [3.30]

test liquid. The liquid used during the test of a device. [3.30]

unit price. The price at which the product is being sold and expressed in whole units of measurement. [3.30] (Added 1992)

visible type. A type of device in which the measurement takes place in a see-through glass measuring chamber.[3.30]

wet hose. A discharge hose intended to be full of liquid at all times. [See "wet-hose type."] [3.30]

wet-hose type. A type of device designed to be operated with the discharge hose full of liquid at all times. [See "wet hose."] [3.30]

wholesale device. Any device other than a retail device. [See "retail device."] [3.30, 3.32]

UR. User Requirements

UR.1. Selection Requirements.

UR.1.1. Discharge Hose.

UR.1.1.1. Length. - The length of the discharge hose on a retail motor-fuel device:

(a) shall be measured from its housing or outlet of the discharge line to the inlet of the discharge nozzle;

(b) shall be measured with the hose fully extended if it is coiled or otherwise retained or connected inside a housing; and

(c) shall not exceed 5.5 m (18 ft) unless it can be demonstrated that a longer hose is essential to permit deliveries to be made to receiving vehicles or vessels.

An unnecessarily remote location of a device shall not be accepted as justification for an abnormally long hose.
(Amended 1972 and 1987)

UR.1.1.2. Marinas and Airports.

UR.1.1.2.1. Length. - The length of the discharge hose shall be as short as practicable, and shall not exceed 15 m (50 ft) unless it can be demonstrated that a longer hose is essential.

UR.1.1.2.2. Protection. - Discharge hoses exceeding 8 m (26 ft) in length shall be adequately protected from weather and other environmental factors when not in use.
(Made retroactive 1974 and amended 1984)

UR.2. Installation Requirements.

UR.2.1. Manufacturer's Instructions. - A device shall be installed in accordance with the manufacturer's instructions, and the installation shall be sufficiently secure and rigid to maintain this condition.
(Added 1987)

UR.2.2. Discharge Rate. - A device shall be installed so that the actual maximum discharge rate will not exceed the rated maximum discharge rate. Automatic means for flow regulation shall be incorporated in the installation if necessary.

UR.2.3. Suction Head. - A piston-type device shall be installed so that the total effective suction head will not be great enough to cause vaporization of the liquid being dispensed under the highest temperature and lowest barometric pressure likely to occur.

UR.2.4. Diversion of Liquid Flow. - A motor-fuel device equipped with two delivery outlets used exclusively in the fueling of trucks shall be so installed that any diversion of flow to other than the receiving vehicle cannot be readily accomplished and is readily apparent. Allowable deterrents include, but are not limited to, physical barriers to adjacent driveways, visible valves, or lighting systems that indicate which outlets are in operation, and explanatory signs.
(Amended 1991)

UR.2.5. Product Storage Identification.

(a) The fill connection for any petroleum product storage tank or vessel supplying motor-fuel devices shall be permanently, plainly, and visibly marked as to product contained.

(b) When the fill connection device is marked by means of a color code, the color code key shall be conspicuously displayed at the place of business.
(Added 1975 and Amended 1976)

UR.3. Use of Device.

UR.3.1. Return of Indicating and Recording Elements to Zero. - On any dispenser used in making retail deliveries, the primary indicating element, and recording element if so equipped, shall be returned to zero before each delivery.

Exceptions to this requirement are totalizers on key-lock-operated or other self-operated dispensers and the primary recording element if the device is equipped to record.

UR.3.2. Unit Price and Product Identity.

(a) The following information shall be conspicuously displayed or posted on the face of a retail dispenser used in direct sale:

(1) except for dispensers used exclusively for fleet sales, other price contract sales, and truck refueling (e.g., truck stop dispensers used only to refuel trucks), all of the unit prices at which the product is offered for sale; and

(2) in the case of a computing type or money-operated type, the unit price at which the dispenser is set to compute.

Provided that the dispenser complies with S.1.6.4.1., it is not necessary that all the unit prices for all grades, brands, blends, or mixtures be simultaneously displayed or posted.

(b) The following information shall be conspicuously displayed or posted on each side of a retail dispenser used in direct sale:

(1) the identity of the product in descriptive commercial terms, and

(2) the identity of the grade, brand, blend, or mixture that a multi-product dispenser is set to deliver.
(Amended 1972, 1983, 1987, 1989, 1992, and 1993)

UR.3.3. Computing Device.

(a) Any computing device placed into service after January 1, 1990, in an application where a product or grade is offered for sale at more than one unit price (excluding fleet sales and other price contract sales), shall be used only for sales for which the device computes and displays the sales price for the selected transaction. Individual single unit-price computing devices installed to replace existing devices or to add to station capacity are exempt from this requirement. A computing device shall be used only for sales for which the device computes and displays the sales price for the transaction.
(Effective and retroactive as of January 1, 1999)
(Added 1989) (Amended 1992)

(b) A truck stop dispenser used exclusively for refueling trucks is exempt from the requirements in (a) and (b) if all purchases of fuel are accompanied by a printed receipt of the transaction containing the applicable price per gallon, the total gallons delivered, and the total price of the sale.
(Added 1993)

(c) Unless a truck stop dispenser used exclusively for refueling trucks complies with S.1.6.4.1. (Display of Unit Price), the price posted on the dispenser and the price at which the dispenser is set to compute shall be the highest price for any transaction which may be conducted.
(Added 1993)

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

UR.3.5. Steps After Dispensing. - After delivery to a customer from a retail motor-fuel device:

(a) the starting lever shall be returned to its shutoff position and the zero-set-back interlock engaged; and

(b) the discharge nozzle shall be returned to its designed hanging position unless the primary indicating elements, and recording elements, if the device is equipped and activated to record, have been returned to a definite zero indication.

UR.3.6. Temperature Compensation, Wholesale.

UR.3.6.1. Automatic.

UR.3.6.1.1. When to be Used. - If a device is equipped with a mechanical automatic temperature compensator, it shall be connected, operable, and in use at all times. An electronic or mechanical automatic temperature-compensating system may not be removed, nor may a compensated device be replaced with an uncompensated device, without the written approval of the responsible weights and measures jurisdiction.

[Note: This requirement does not specify the method of sale for product measured through a meter.]
(Amended 1989)

UR.3.6.1.2. Invoices.

(a) A written invoice based on a reading of a device that is equipped with an automatic temperature compensator shall show that the volume delivered has been adjusted to the volume at 15 ∀C (60 ∀F).

(b) The invoice issued from an electronic wholesale device equipped with an automatic temperature-compensating system shall also indicate: (1) the API gravity, specific gravity or coefficient of expansion for the product; (2) product temperature; and (3) gross reading.
(Amended 1987)

UR.3.6.2. Nonautomatic.

UR.3.6.2.1. Temperature Determination. - If the volume of the product delivered is adjusted to the volume at 15 ∀C (60 ∀F), the product temperature shall be taken during the delivery in:

(a) the liquid chamber of the meter, or

(b) the meter inlet or discharge line adjacent to the meter, or

(c) the compartment of the receiving vehicle at the time it is loaded.

UR.3.6.2.2. Invoices. - The accompanying invoice shall indicate that the volume of the product has been adjusted for temperature variations to a volume at 15 ∀C (60 ∀F) and shall also state the product temperature used in making the adjustment.

S. Specifications

S.1. Indicating and Recording Elements and Recorded Representations.

S.1.1. General. - A liquid-measuring device:

(a) shall be equipped with a primary indicating element, and

(b) may be equipped with a primary recording element.

S.1.2. Units. - A liquid-measuring device shall indicate, and record if the device is equipped to record, its deliveries in liters, gallons, quarts, pints, or binary-submultiples or decimal subdivisions of the liter or gallon.
(Amended 1987, 1994)

S.1.2.1. Retail Motor-Fuel Devices. - Deliveries shall be indicated and recorded, if the device is equipped to record, in liters or gallons and decimal subdivisions or fractional equivalents thereof.
(Added 1979)

S.1.2.2. Agri-Chemical Liquid Devices.

S.1.2.2.1. Liquid Measure. - Deliveries shall be indicated and recorded in liters or gallons and decimal subdivisions or fractional equivalents thereof.

S.1.2.3. Value of Smallest Unit. - The value of the smallest unit of indicated delivery, and recorded delivery if the device is equipped to record, shall not exceed the equivalent of:

(a) 0.5 L (1 pt) on retail devices;

(b) 5 L (1 gal) on wholesale devices.

This requirement does not apply to manually operated devices equipped with stops or stroke-limiting means. (Amended 1983 and 1986)

S.1.3. Advancement of Indicating and Recording Elements. - It shall not be possible to advance primary indicating and recording elements except by the mechanical operation of the device. Clearing a device by advancing its elements to zero is permitted, but only if:

(a) once started, the advancement movement cannot be stopped until zero is reached, and

(b) in the case of indicating elements only, such elements are automatically obscured until the elements reach the correct zero position.

S.1.4. Graduations.

S.1.4.1. Length. - Graduations shall be varied in length so that they may be conveniently read.

S.1.4.2. Width. - In a series of graduations, the width of:

(a) every graduation shall be at least 0.2 mm (0.008 in) but not greater than the minimum clear interval between graduations, and

(b) main graduations shall be not more than 50 percent greater than the width of subordinate graduations.

S.1.4.3. Clear Interval Between Graduations. - The clear interval between graduations shall be not less than 1.0 mm (0.04 in). If the graduations are not parallel, the measurement shall be made:

(a) along the line of movement of the tip of the index of the indicator as it passes over the graduations, or

(b) if the indicator extends over the entire length of the graduations, at the point of widest separation of the graduations.

S.1.5. Indicators.

S.1.5.1. Symmetry. - The portion of the index of an indicator associated with the graduations shall be symmetrical with respect to the graduations.

S.1.5.2. Length.

(a) If the indicator and the graduations are in different planes, the index of the indicator shall extend to each graduation with which it is to be used.

(b) If the indicator is in the same plane as the graduations, the distance between the index of the indicator and the ends of the graduations, measured along the line of the graduations, shall be not more than 1.0 mm (0.04 in).

S.1.5.3. Width.

(a) The index of an indicator shall not be wider than the width of the widest graduation.

(b) If the index of an indicator extends over the entire length of a graduation, it shall be of uniform width throughout the portion that coincides with the graduation.

S.1.5.4. Clearance. - If the indicator and the graduations are in different planes, the clearance between the index of an indicator and the plane of the graduations shall be no greater than 1.5 mm (0.06 in).

S.1.5.5. Parallax. - Parallax effects shall be reduced to the practical minimum.

S.1.6. Operating Requirements, Retail Devices (Except Slow Flow Meters).

S.1.6.1. Indication of Delivery. - The device shall automatically show on its face the initial zero condition and the quantity delivered (up to the nominal capacity).

However, the first 0.03 L (or 0.009 gal) of a delivery and its associated total sales price need not be indicated. (Amended 1982)

S.1.6.2. Provisions for Power Loss.

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

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

S.1.6.3. Return to Zero.

(a) The primary indicating elements, and primary recording elements if the device is equipped to record, shall be readily returnable to a definite zero indication. However, a key-lock operated or other self-operated device may be equipped with cumulative indicating or recording elements, provided that it is also equipped with a zero-return indicating element.

(b) It shall not be possible to return primary indicating elements, or primary recording elements beyond the correct zero position.

(Amended 1972)

S.1.6.4. Display of Unit Price and Product Identity.

S.1.6.4.1. Unit Price.

(a) A computing or money-operated device shall be able to display on each face the unit price at which the device is set to compute or to dispense.

(b) Whenever a grade, brand, blend, or mixture is offered for sale from a device at more than one unit price, then all of the unit prices at which that product is offered for sale shall be displayed or shall be capable of being displayed on the dispenser using controls available to the customer prior to the delivery of the product. It is not necessary that all of the unit prices for all grades, brands, blends, or mixtures be simultaneously displayed prior to the delivery of the product. This subsection shall not apply to fleet sales, other contract sales, or truck refueling sales (e.g., sales from dispensers used to refuel trucks). [Effective and nonretroactive as of January 1, 1991.]

(Amended 1989 and 1997)

S.1.6.4.2. Product Identity.

(a) A device shall be able to conspicuously display on each side the identity of the product being dispensed.

(b) A device designed to dispense more than one grade, brand, blend, or mixture of product also shall be able to display on each side the identity of the grade, brand, blend, or mixture being dispensed.

S.1.6.5. Money-Value Computations.

(a) A computing device shall compute the total sales price at any single-purchase unit price (i.e., excluding fleet sales, other price contract sales, and truck stop dispensers used only to refuel trucks) for which the product being measured is offered for sale at any delivery possible within either the measurement range of the device or the range of the computing elements, whichever is less.
[Effective and nonretroactive as of January 1, 1991].

(b) The analog sales price indicated for any delivered quantity shall not differ from a mathematically computed price (quantity x unit price = total sales price) by an amount greater than the value in Table 1.
(Amended 1984, 1989, and 1993)

S.1.6.5.1. Money-Value Divisions, Analog. - The values of the graduated intervals representing money values on a computing type device shall be no greater than those in Table 1.
(Amended 1991)

S.1.6.5.2. Money-Value Divisions, Digital. - A computing type device with digital indications shall comply with the requirements of paragraph G.S.5.5. Money Values, Mathematical Agreement, and the total price computation shall be based on quantities not exceeding 0.05 L for devices indicating in metric units and 0.01-gal. intervals for devices indicating in inch-pound units.
(Added 1980)

S.1.6.5.3. Auxiliary Elements. - *If a system is equipped with auxiliary indications, all indicated money value divisions of the auxiliary element shall be identical with those of the primary element.*
[Nonretroactive and enforceable as of January 1, 1985.]

S.1.6.5.4. Selection of Unit Price. - *Except for dispensers used exclusively for fleet sales, other price contract sales, and truck refueling (e.g., truck stop dispensers used only to refuel trucks), when a product or grade is offered for sale at more than one unit price through a computing device, the selection of the unit price shall be made prior to delivery using controls on the device or other customer-activated controls.* A system shall not permit a change to the unit price during delivery of product.
[Effective and nonretroactive as of January 1, 1991.]
(Added 1989)(Amended 1991, 1992, 1993, and 1996)

Table 1.
Money-Value Divisions and
Maximum Allowable Variations for Money-Value
Computations on Mechanical Analog Computers

Unit Price		Money Value Division	Maximum Allowable Variation	
From	To and including		Design Test	Field Test
0	0.25/liter or $1.00/gallon	1¢	± 1¢	± 1¢
0.25/liter or $1.00/gallon	0.75/liter or $3.00/gallon	1¢ or 2¢	± 1¢	± 2¢
0.75/liter or $3.00/gallon	2.50/liter or $10.00/gallon	1¢ or 2¢	± 1¢	± 2¢
0.75/liter or $3.00/gallon	2.50/liter or $10.00/gallon	5¢	± 2 1/2¢	± 5¢

S.1.6.5.5. Display of Quantity and Total Price. *- When a delivery is completed, the total price and quantity for that transaction shall be displayed on the face of the dispenser for at least 5 minutes or until the next transaction is initiated by using controls on the device or other customer-activated controls.*
[Effective and nonretroactive as of January 1, 1994.]
(Added 1992)(Amended 1996)

S.1.6.6. Agreement Between Indications. - When a quantity value indicated or recorded by an auxiliary element is a derived or computed value based on data received from a retail motor fuel dispenser, the value may differ from the quantity value displayed on the dispenser, provided the following conditions are met:

(a) all total money values for an individual sale that are indicated or recorded by the system agree; and

(b) within each element, the values indicated or recorded meet the formula (quantity x unit price = total sales price) to the closest cent.
[Nonretroactive as of January 1, 1988.]
(Added 1985) (Amended 1987 and 1988)

S.1.6.7. Recorded Representations. *- Except for fleet sales and other price contract sales, a printed receipt providing the following information shall be available through a built-in or separate recording element for all transactions conducted with point-of-sale systems or devices activated by debit cards, credit cards, and/or cash:*

(a) the total volume of the delivery,

(b) the unit price,

(c) the total computed price, and

(d) the product identity by name, symbol, abbreviation, or code number.
[Nonretroactive as of January 1, 1986.]
(Added 1985) (Amended 1997)

S.1.6.8. Lubricant Devices, Travel of Indicator. -The indicator shall move at least 2.5 cm (1 in) in relation to the graduations, if provided, for a delivery of 0.5 L (1 pt).

S.1.7. Operating Requirements, Wholesale Devices Only.

S.1.7.1. Travel of Indicator. - A wholesale device shall be readily operable to deliver accurately any quantity from 200 L (50 gal) to the capacity of the device. If the most sensitive element of the indicating system utilizes an indicator and graduations, the relative movement of these parts corresponding to a delivery of 4 L (1 gal) shall be not less than 5 mm (0.20 in).
(Amended 1987)

S.1.7.2. Money Values-Mathematical Agreement. - Any digital money-value indication and any recorded money value on a computing-type device shall be in mathematical agreement with its associated quantity indication or representation to within one cent of money value.

S.2. Measuring Elements.

S.2.1. Vapor Elimination.

(a) A liquid-measuring device shall be equipped with a vapor or air eliminator or other automatic means to prevent the passage of vapor and air through the meter.

(b) Vent lines from the air or vapor eliminator shall be made of metal tubing or other rigid material.
(Amended 1975)

S.2.1.1. Vapor Elimination on Loading Rack Metering Systems.

(a) A loading rack metering system shall be equipped with a vapor or air eliminator or other automatic means to prevent the passage of vapor and air through the meter unless the system is designed or operationally controlled by a method, approved by the weights and measures jurisdiction having control over the device, such that air and/or vapor cannot enter the system.

(b) Vent lines from the air or vapor eliminator (if present) shall be made of metal tubing or other rigid material.
(Added 1994)

S.2.2. Provision for Sealing. - Adequate provision shall be made for an approved means of security (e.g., data change audit trail) or physically applying security seals in such a manner that no adjustment may be made of:

(a) any measurement element, or

(b) any adjustable element for controlling delivery rate when such rate tends to affect the accuracy of deliveries.

When applicable, the adjusting mechanism shall be readily accessible for purposes of affixing a security seal.

(c) Audit trails shall use the format set forth in Table S.2.2. [Nonretroactive and enforceable as of January 1, 1995.]
(Amended 1991, 1993, and 1995)

S.2.3. Directional Flow Valves. - Valves intended to prevent reversal of flow shall be automatic in operation.

S.2.4. Stop Mechanism.

S.2.4.1. Indication. - The delivery for which the device is set shall be conspicuously indicated.
(Amended 1983)

S.2.4.2. Stroke Limiting Elements. - Stops or other stroke limiting elements subject to direct pressure or impact shall be:

(a) made secure by positive, nonfrictional engagement of these elements; and

(b) adjustable to provide for deliveries within tolerances.
(Amended 1983)

S.2.4.3. Setting. - If two or more stops or other elements may be selectively brought into operation to permit predetermined quantities of deliveries,

(a) the position for the proper setting of each such element shall be accurately defined; and

(b) any inadvertent displacement from the proper setting shall be obstructed.
(Amended 1983)

Table S.2.2. Categories of Device and Methods of Sealing

Categories of Device	*Method of Sealing*
Category 1: No remote configuration capability.	*Seal by physical seal or two event counters: one for calibration parameters and one for configuration parameters.*
Category 2: Remote configuration capability, but access is controlled by physical hardware. *Device shall clearly indicate that it is in the remote configuration mode and record such message if capable of printing in this mode.* *[Category 2 applies only to devices manufactured prior to January 1, 2005. Devices with remote configuration capability manufactured after that date must meet the sealing requirements outlined in Category 3. Devices without remote configuration capability manufactured after that date will be required to meet the minimum criteria outlined in Category 1.]*	*[The hardware enabling access for remote communication must be on-site. The hardware must be sealed using a physical seal or an event counter for calibration parameters and an event counter for configuration parameters. The event counters may be located either at the individual measuring device or at the system controller; however, an adequate number of counters must be provided to monitor the calibration and configuration parameters of the individual devices at a location. If the counters are located in the system controller rather than at the individual device, means must be provided to generate a hard copy of the information through an on-site device.]* *[*Nonretroactive as of January 1, 1996]*
Category 3: Remote configuration capability access may be unlimited or controlled through a software switch (e.g., password). The device shall clearly indicate that it is in the remote configuration mode and record such message if capable of printing in this mode or shall not operate while in this mode. [Nonretroactive as of January 1, 2001] *Nonretroactive as of January 1, 2005, all devices with remote configuration capability must comply with the sealing requirements of Category 3.*	*An event logger is required in the device; it must include an event counter (000 to 999), the parameter ID, the date and time of the change, and the new value of the parameter. A printed copy of the information must be available through the device or through another on-site device. The event logger shall have a capacity to retain records equal to ten times the number of sealable parameters in the device, but not more than 1000 records are required. (Note: Does not require 1000 changes to be stored for each parameter.)*

[Nonretroactive and enforceable as of January 1, 1995.] (Table Added 1993) (Amended 1995, 1998, and 1999)

S.2.5. Zero-Set-Back Interlock, Retail Motor-Fuel Devices. - A device shall be constructed so that:

(a) after a delivery cycle has been completed by moving the starting lever to any position that shuts off the device, an automatic interlock prevents a subsequent delivery until the indicating elements, and recording elements if the device is equipped and activated to record, have been returned to their zero positions;

(b) the discharge nozzle cannot be returned to its designed hanging position (that is, any position where the tip of the nozzle is placed in its designed receptacle and the lock can be inserted) until the starting lever is in its designed shut-off position and the zero-set-back interlock has been engaged; and

(c) in a system with more than one dispenser supplied by a single pump, an effective automatic control valve in each dispenser prevents product from being delivered until the indicating elements on that dispenser are in a correct zero position.

(Amended 1981 and 1985)

S.2.6. Temperature Determination and Wholesale Devices. - *For test purposes, means shall be provided to determine the temperature of the liquid either:*

(a) in the liquid chamber of the meter, or

(b) immediately adjacent to the meter in the meter inlet or discharge line.
[Nonretroactive as of January 1, 1985.]
(Added 1984)(Amended 1986)

S.2.7. Wholesale Devices Equipped with Automatic Temperature Compensators.

S.2.7.1. Automatic Temperature Compensation. - A device may be equipped with an automatic means for adjusting the indication and registration of the measured volume of product to the volume at 15 ºC (60 ºF).

S.2.7.2. Provision for Deactivating. - On a device equipped with an automatic temperature-compensating mechanism that will indicate or record only in terms of gallons compensated to 15 ºC (60 ºF), provision shall be made for deactivating the automatic temperature-compensating mechanism so that the meter can indicate, and record if it is equipped to record, in terms of the uncompensated volume.
(Amended 1972)

S.2.7.3. Provision for Sealing Automatic Temperature-Compensating Systems. - Provision shall be made for applying security seals in such a manner that an automatic temperature-compensating system cannot be disconnected and that no adjustment may be made to the system without breaking the seal.

S.2.7.4. Temperature Determination with Automatic Temperature Compensation. - For test purposes, means shall be provided (e.g., thermometer well) to determine the temperature of the liquid either:

(a) in the liquid chamber of the meter, or

(b) immediately adjacent to the meter in the meter inlet or discharge line.
(Amended 1987)

S.2.8. Exhaustion of Supply, Lubricant Devices Other than Meter Types. - When the level of the supply of lubricant becomes so low as to compromise the accuracy of measurement, the device shall:

(a) become inoperable automatically, or

(b) give a conspicuous and distinct warning.

S.3. Discharge Lines and Valves.

S.3.1. Diversion of Measured Liquid. - No means shall be provided by which any measured liquid can be diverted from the measuring chamber of the meter or its discharge line. Two or more delivery outlets may be installed only if automatic means are provided to ensure that:

(a) liquid can flow from only one outlet at a time, and

(b) the direction of flow for which the mechanism may be set at any time is clearly and conspicuously indicated.

A manually controlled outlet that may be opened for purging or draining the measuring system or for recirculating product in suspension shall be permitted only when the system is measuring food products or agri-chemicals. Effective means shall be provided to prevent passage of liquid through any such outlet during normal operation of the measuring system and to inhibit meter indications (or advancement of indications) and recorded representations while the outlet is in operation.
(Amended 1991, 1995, and 1996)

S.3.2. Exceptions. - The provisions of S.3.1. Diversion Prohibited shall not apply to:

(a) truck refueling devices when diversion of flow to other than the receiving vehicle cannot readily be accomplished and is readily apparent. Allowable deterrents include, but are not limited to, physical barriers to adjacent driveways, visible valves, or lighting systems that indicate which outlets are in operation, and explanatory signs;

(b) other devices, when all discharge outlets designed to operate simultaneously are 3.8 cm (1.5 in) in diameter or larger.
(Amended 1982, 1990, and 1991)

S.3.3. Pump-Discharge Unit. - A pump-discharge unit equipped with a flexible discharge hose shall be of the wet-hose type.

S.3.4. Gravity-Discharge Unit. - On a gravity-discharge unit:

(a) the discharge hose or equivalent pipe shall be of the dry-hose type with no shutoff valve at its outlet end unless the hose or pipe drains to the same level under all conditions of use;

(b) the dry hose shall be sufficiently stiff and only as long as necessary to facilitate drainage;

(c) an automatic vacuum breaker, or equivalent mechanism, shall be incorporated to prevent siphoning and to ensure rapid and complete drainage; and

(d) the inlet end of the hose or outlet pipe shall be high enough to ensure complete drainage.

S.3.5. Discharge Hose, Reinforcement. - A discharge hose shall be reinforced so that the performance of the device is not affected by the expansion or contraction of the hose.

S.3.6. Discharge Valve. - A discharge valve may be installed in the discharge line only if the device is of the wet-hose type. Any other shutoff valve on the discharge side of the meter shall be of the automatic or semiautomatic predetermined-stop type or shall be operable only:

(a) by means of a tool (but not a pin) entirely separate from the device, or

(b) by mutilation of a security seal with which the valve is sealed open.

S.3.7. Antidrain Means. - In a wet-hose pressure-type device, means shall be incorporated to prevent the drainage of the discharge hose.
(Amended 1990)

S.4. Marking Requirements.

S.4.1. Limitation on Use. - The limitations on its use shall be clearly and permanently marked on any device intended to measure accurately only:

(a) products having particular properties; or
(b) under specific installation or operating conditions; or
(c) when used in conjunction with specific accessory equipment.

S.4.2. Air Pressure. - If a device is operated by air pressure, the air pressure gauge shall show by special graduations or other means the maximum and minimum working pressures recommended by the manufacturer.

S.4.3. Wholesale Devices.

S.4.3.1. Discharge Rates. - A wholesale device shall be marked to show its designed maximum and minimum discharge rates. However, the minimum discharge rate shall not exceed 20 percent of the maximum discharge rate.

S.4.3.2. Temperature Compensation. - If a device is equipped with an automatic temperature compensator, the primary indicating elements, recording elements, and recorded representation shall be clearly and conspicuously marked to show that the volume delivered has been adjusted to the volume at 15 ∀C (60 ∀F).

S.4.4. Retail Devices. *- On a retail device with a designed maximum discharge rate of 100 L (25 gal) per minute or greater, the maximum and minimum discharge rates shall be marked on an exterior surface of the device and shall be visible after installation. The minimum discharge rate shall not exceed 20 percent of the maximum discharge rate. [Nonretroactive as of January 1, 1985.]*
(Added 1984)

S.5. Totalizers for Retail Motor-Fuel Dispensers. *- Retail motor-fuel dispensers shall be equipped with a nonresettable totalizer for the quantity delivered through the metering device. [Nonretroactive as of January 1, 1995.]*
(Added 1993; Amended 1994)

T. Tolerances

T.1. Application to Underregistration and to Overregistration. - The tolerances hereinafter prescribed shall be applied to errors of underregistration and errors of overregistration, whether or not a device is equipped with an automatic temperature compensator.

T.2. Tolerance Values.

T.2.1. Retail Devices Except Slow-Flow Meters.

T.2.1.1. Devices Indicating in Metric Units.

(a) The maintenance tolerance on normal and special tests, shall be 20 mL, plus 4 mL per indicated liter, and never less than 40 mL.

(b) The acceptance tolerance on normal and special tests shall be 10 mL, plus 2 mL per indicated liter and never less than 20 mL.

(c) The tolerance applied to a 19-liter draft shall be that tolerance applicable to a 20-liter draft.
(Amended 1981 and 1986)

T.2.1.2. Devices Indicating in Inch-Pound Units.

(a) The maintenance tolerance on normal and special tests shall be 1 in^3 plus 1 in^3 per indicated gallon and never less than 2 in^3.

(b) The acceptance tolerance on normal and special tests shall be 1/2 in^3 plus 1/2 in^3 per indicated gallon and never less than 1 in^3.
(Amended 1981 and 1986)

T.2.1.3. Repeatability. - When multiple tests are conducted at approximately the same flow rate, the range of the test results for the flow rate shall not exceed 40 percent of the absolute value of the maintenance tolerance.

T.2.1.4. Tolerances for Devices Designed to Primarily Deliver Less than One Gallon. - Maintenance tolerances and acceptance tolerances shall be as shown in Table 2. Tolerances for Slow-Flow Meters.
(Added 1999)

T.2.2. Slow-Flow Meters. - Maintenance tolerances and acceptance tolerances shall be as shown in Table 2.

T.2.3. Wholesale Devices.

T.2.3.1. Measurement of Agri-Chemical Liquids. - Acceptance tolerances and maintenance tolerances shall be 0.3 percent and 0.5 percent, respectively.
(Amended 1995)

(Added 1992)

Table 2.
Tolerances for Slow-Flow Meters

Indication	Normal tests				Special tests	
	Maintenance tolerance		Acceptance tolerance		Maintenance and acceptance tolerance	
	percent	minims	percent	minims	percent	minims
1 gill	1.0	20	0.75	15	1.25	25
0.05 gallon	1.0	30	0.75	25	1.25	40
1/2 pint	1.0	40	0.75	30	1.25	50
0.10 gallon	1.0	60	0.75	45	1.25	75
1 pint	1.0	75	0.75	60	1.25	95
0.20 gallon	1.0	120	0.75	90	1.25	155
		fl drams		fl drams		fl drams
1 quart	1.0	2-1/2	0.75	2	1.25	3
1/2 gallon	0.75	4	0.60	3	1.0	5
1 gallon and over	0.75	8 per gallon	0.60	6 per gallon	1.0	10 per gallon

T.2.3.2. Measurement of Asphalt. - Maintenance tolerances and acceptance tolerances shall be:

	Acceptance	Maintenance
Asphalt below 50 °C	0.2%	0.3%
Asphalt above 50 °C	0.3%	0.3%

T.2.3.3. Measurement of Other Liquids. - Maintenance tolerances and acceptance tolerances shall be:

	Acceptance	Maintenance
Normal test	0.2%	0.3%
Special test	0.5%	0.5%

T.2.3.4. Repeatability. - When multiple tests are conducted at approximately the same flow rate, the range of the test results for the flow rate shall not exceed 40 percent of the applicable tolerance. This tolerance does not apply to the test of the automatic temperature-compensating system.
(Added 1992)

T.2.3.5. Automatic Temperature-Compensating Systems. - *The difference between the meter error (expressed as a percentage) for results determined with and without the automatic temperature-compensating system activated shall not exceed:*

(a) 0.2 percent for mechanical automatic temperature-compensating systems; and

(b) 0.1 percent for electronic automatic temperature-compensating systems.

The delivered quantities for each test shall be approximately the same size. The results of each test shall be within the applicable acceptance or maintenance tolerance.
[Nonretroactive as of January 1, 1988.]
(Added 1987) (Amended 1992 and 1996)

N. Notes

N.1. Test Liquid.

N.1.1. Type of Liquid. - The liquid used for testing a liquid-measuring device shall be the type the device is used to measure, or another liquid with the same general physical characteristics.

N.1.2. Labeling. - Following the completion of a successful examination of a wholesale device, the weights and measures official should attach a label or tag indicating the type of liquid used during the test.

N.2. Volume Change. - Care shall be taken to minimize changes in volume of the test liquid due to temperature changes and evaporation losses.

N.3. Test Drafts.

N.3.1. Retail Piston-Type and Visible-Type Devices. - Test drafts shall include the full capacity delivery and each intermediate delivery for which the device is designed.

N.3.2. Slow Flow Meters. - Test drafts shall be equal to at least four times the minimum volume that can be measured and indicated through either a visible indication or an audible signal.

N.3.3. Lubricant Devices. - Test drafts shall be 1 L (1 qt). Additional test drafts may include 0.5 L (1 pt), 4 L (4 qt), and 6 L (6 qt).

N.3.4. Other Retail Devices. - On devices with a designed maximum discharge rate of:

(a) less than 80 L (20 gal) per minute, tests shall include drafts of one or more amounts, including a draft of at least 19 L (5 gal).

(b) 80 L (20 gal) per minute or greater, tests shall include drafts of one or more amounts, including a draft of at least the amount delivered by the device in one minute at the maximum flow rate of the installation.
(Amended 1984)

N.3.5. Wholesale Devices. - The delivered quantity should be equal to at least the amount delivered by the device in one minute at its maximum discharge rate, and shall in no case be less than 200 L (50 gal).
(Amended 1987 and 1996)

N.4. Testing Procedures.

N.4.1. Normal Tests. - The "normal" test of a device shall be made at the maximum discharge flow rate developed under the conditions of installation. Any additional tests conducted at flow rates down to and including one-half of the sum of the maximum discharge flow rate and the rated minimum discharge flow rate shall be considered normal tests.
(Amended 1991)

N.4.1.1. Wholesale Devices Equipped with Automatic Temperature-Compensating Systems. - On wholesale devices equipped with automatic temperature-compensating systems, normal tests shall be conducted:

(a) by comparing the compensated volume indicated or recorded to the actual delivered volume corrected to 15 °C (60 °F); and

(b) with the temperature-compensating system deactivated, comparing the uncompensated volume indicated or recorded to the actual delivered volume.

The first test shall be performed with the automatic temperature-compensating system operating in the "as found" condition.

On devices that indicate or record both the compensated and uncompensated volume for each delivery, the tests in (a) and (b) may be performed as a single test.
(Amended 1987)

N.4.2. Special Tests. - "Special" tests, to develop the operating characteristics of a liquid-measuring device and any special elements and accessories attached to or associated with the device, shall be made as circumstances require. Any test except as set forth in N.4.1. shall be considered a special test.

N.4.2.1. Slow-Flow Meters. - A "special" test shall be made at a flow rate:

(a) not larger than twice the actual minimum flow rate, and

(b) not smaller than the actual minimum flow rate of the installation.

N.4.2.2. Retail Motor-Fuel Devices.

(a) Devices with a flow-rate capacity less than 100 L (25 gal) per minute shall have a "special" test performed at the slower of the following rates:

(1) 19 L (5 gal) per minute, or

(2) the minimum discharge rate marked on the device, or

(3) the minimum discharge rate at which the device will deliver when equipped with an automatic discharge nozzle set at its slowest setting.

(b) Devices marked with a flow-rate capacity 100 L (25 gal) or more per minute, shall have a "special" test performed at the slowest of the following rates:

(1) the minimum discharge rate marked on the device, or

(2) the minimum discharge rate at which the device will deliver when equipped with an automatic discharge nozzle set at its slowest setting.
(Added 1984)

N.4.2.3. Other Retail Devices. - "Special" tests of other retail devices shall be made at the slower of the following rates:

(a) 50 percent of the maximum discharge rate developed under the conditions of installation, or

(b) the minimum discharge rate marked on the device.

N.4.2.4. Wholesale Devices. - "Special" tests shall be made to develop the operating characteristics of a measuring system and any special associated or attached elements and accessories. "Special" tests shall include a test at the slower of the following rates:

(a) 20 percent of the marked maximum discharge rate; or

(b) the minimum discharge rate marked on the device.

N.4.3. Money-Value Computation Tests.

N.4.3.1. Laboratory Tests. - When testing the device in the laboratory:

(a) compliance with paragraph S.1.6.5., Money-Value Computations, shall be determined by using the cone gear as a reference for the total quantity delivered;

(b) the indicated quantity shall agree with the cone gear representation with the index of the indicator within the width of the graduation; and

(c) the maximum allowable variation of the indicated sales price shall be as shown in Table 1.
(Amended 1984)

N.4.3.2. Field Tests. - In the conduct of field tests to determine compliance with paragraph S.1.6.5., the maximum allowable variation in the indicated sales price shall be as shown in Table 1.
(Added 1982; Amended 1984)

N.5. Temperature Correction on Wholesale Devices. - Corrections shall be made for any changes in volume resulting from the differences in liquid temperatures between time of passage through the meter and time of volumetric determination in the prover. When adjustments are necessary, appropriate petroleum measurement tables should be used.
(Amended 1974)

Liquid-Measuring Device Code Index

Appendix E
Mutual Recognition Agreement

made the 14th day of January, 2001,

Between:

Measurement Canada
An Agency of Industry Canada
Tunney's Pasture, Standards Building No 4
Holland Avenue
Ottawa, Ontario K1A 0C9
Canada

- and -

the National Conference on Weights and Measures, Inc.
15245 Shady Grove Road # 130
Rockville, MD 20850
United States

1. *Purpose*

The purpose of this Mutual Recognition Agreement (MRA) is to establish a working relationship to implement a voluntary program for the mutual recognition of the device evaluations administered and performed by Measurement Canada (MC) of Industry Canada and by the National Type Evaluation Program (NTEP) of the National Conference on Weights and Measures, Inc. (NCWM) of the United States.

2. *Background*

MC and NCWM operate ongoing type evaluation systems for commercial weighing devices. Canada, many States, and several U.S. Federal agencies require the evaluation and approval of the design and performance of device prototypes prior to their sale for commercial use.

Rather than submitting commercial devices for the United States market to NTEP laboratories and essentially the same devices for the Canadian market to the MC's Approval Services Laboratories, manufacturers requested that the United States and Canada (1) combine their evaluation tests and (2) recognize either NTEP laboratory or MC laboratory results of the combined evaluation as the basis upon which NTEP and MC would each issue their evaluation documents (either the NTEP Certificate of Conformance or the Canadian Notice of Approval). Expected benefits include: increased uniformity of test methods reducing unnecessary differences, misunderstandings, and unnecessary duplications; reduced costs and improved turn-around time by accessing a single source for type evaluation for both nations; increased competitiveness for both U.S. and Canadian manufacturers by accelerating the time from design to the end markets.

The following policy was adopted in January 1993 by the National Conference on Weights and Measures (the predecessor to the National Conference on Weights and Measures Inc.,) in concert with Measurement Canada (then known as Legal Metrology Branch):

"With respect to weights and measures devices, the parties agree that the most effective means to remove barriers to free trade is to achieve mutual recognition of device type evaluation testing. This will necessarily involve the comparative analysis of type evaluation codes and test procedures together with the intent of streamlining and minimizing differences in so far as possible so as to enable efficient device evaluation while preserving the technical capability and competence of their mutual laboratories."

3. *Agreement*

The United States National Type Evaluation Program (NTEP) of the National Conference on Weights and Measures, Inc. (NCWM) and Measurement Canada (MC) agree to recognize each other's type evaluation results:

NCWM will recognize the results of the tests performed by the MC for the purpose of issuing NTEP Certificates of Conformance for the device types set out in the annex to this agreement.

MC will recognize the results of the tests conducted by the NTEP Participating Laboratories for the purpose of issuing a Canadian Notice of Approval for the device types set out in the annex to this agreement.

Each party will continue to issue its own document (either the NTEP Certificate of Conformance or the Canadian Notice of Approval).

Each party will:

make all information available to the other party, maintaining confidentiality of proprietary information;

collaborate in the development of additional areas of mutual recognition;

collaborate in the development of requirements and test methods for commercial devices and systems;

collaborate in the development and maintenance of proficiency and uniformity of evaluation; and

collaborate to preserve the technical capability and competence of their mutual laboratories.

4. *Collaboration*

Both parties will collaborate to eliminate or minimize differences in requirements and test methods so as to enable efficient device evaluation.

5. *Resolution of Complaints*

This MRA does not create obligations binding under international law. However, each party will investigate complaints that the other party brings forward, and both parties will work together to seek satisfactory resolution of such complaints.

6. *Duration and Termination*

This MRA will become effective on January 14, 2001. It will remain in effect for a period of ten (10) years and may be extended by mutual consent. This MRA may be terminated at any time by either party upon six (6) months written notice to the other party.

7. *Application for Type Approval*

Under this agreement, any applicant for type approval is free to apply to either country when requesting type approval in either Canada, the United States or both countries.

For Measurement Canada	**For the National Conference on Weights and Measures**
Alan E. Johnston President	Louis E. Straub Chairman

Appendix F
2001 Report of the Metrology Subcommittee

Subcommittee Membership:

Ken Fraley, OK (SWAP), Chair
Dan Newcombe, ME (NEMAP) Vice-Chair
Ron Balaze, MI (MidMAP)
L.F. Eason, NC, (SEMAP)
Joe Rothleder, CA (WRAP)
Jose Torres, PR (CaMAP)

This is an update and status report on the activities of the NCWM Metrology Subcommittee since the 2000 Annual Meeting in Richmond, VA.

Meetings with NIST Management:

Meetings with management from various NIST programs were held on March 15 and 16, 2001. Representing the Metrology Subcommittee were Ron Balaze, Ken Fraley, and Dan Newcombe. Meetings were held with the following NIST Managers:

- **Rich Kayser, Technology Services Director; Tom Gills, Chief, Office of Measurement Services; John Rumble, Acting Chief, Calibration Program, also Chief, Standard Reference Data Program; and Henry Oppermann, Chief, Office of Weights and Measures.**
  Items of discussion included the MeasureNet-gov System on-line training, the value added from NVLAP laboratory accreditation, and the infrastructure support required for mass measurement at the national and State laboratory levels. The Subcommittee will collect and present data in order to demonstrate and document program improvement using round robin results from 1984 through 2001. This information will be presented at the next Subcommittee meeting with NIST management.
- ***Doug Faison and Steve Doty of National Voluntary Laboratory Accreditation Program (NVLAP).***
  In November of 1999 two State Laboratories (MN, VA) were accredited by NVLAP. Eight SLP applications were pending although none had been processed. NVLAP had been overburdened with an unexpected number of applications from environmental laboratories due to new regulations. This slowed the processing of the applications for the State metrology laboratories. Another factor in the delay had been the limited number of mass calibration technical experts available for onsite audits. Since November of 1999, there have been four State laboratories (MI, IN, WA, OK) that have been fully accredited, and there are three other labs (NY, ME, AZ) that have completed their onsite audits. Additionally, five laboratories (IL, MD, NC, OR, OH) have applied for accreditation and are awaiting their onsite audits. Doug Faison also indicated that the technical expert shortage has been resolved.
- **Georgia Harris and Val Miller of the Office of Weights and Measures.**
  The following list of projects currently underway were discussed:
  Training CD-ROM on Basic Mass Metrology,
  HB105-X Weight Carts,
  HB105-1 Class F mass standards,
  Uncertainties associated with field testing of commercial scales,
  Update of U.S. Pharmacopoeia,
  National Key Comparison of Mass Standards – data entry of Phase II,
  Update of HB145,
  Analysis and publication of the results of the national rigid rule round robin, and
  Initiation of a magnetism round robin with those States using gauss meters.
- **Clayton Teague, Chief, Manufacturing Metrology Division, and Zeina Jabbour, Group Leader, Mass and Force Group.**
  Dr. Teague gave a presentation titled "Maintaining the National Measurement Infrastructure." The protocol for calibration fees was also discussed. Fees must be recovered and are limited to: labor, supplies, materials, travel and per diem, computer time, Fabrication Technology Division services, contingency costs (training), cost of equipment when equipment is used solely for services to a particular sponsor. A surcharge of 25 percent is also charged and used to improve measurement services inside the division. Costs of maintaining the system, as discussed in Dr. Teague's presentation, are not included in the calculation of the fees. It has been calculated that it requires 2.0 full time employees to "maintain" the mass system and 1.5 employees to "maintain" the force system.
- ***Dean Ripple, Group Leader, Thermometry Group.***

Dr. Ripple explained the scope of the Thermometry Group and gave examples of technology transfer to industry, including the presentation of thermometry workshops that were attended by 32 participants during this past year. The Thermometry Group has completed its quality manual and is ANSI Z-540 compliant. The group is in the process of publishing a research report that will recommend longer calibration cycles for some types of thermocouples. Dr. Ripple indicated that his group is willing to review draft thermometry uncertainty budgets from State laboratories.

Budget Proposal for 2002 NIST Management Meeting
See Attachment 1.

Metrology Subcommittee Projects

Weight Cart Project (This is a NIST Working Group Project.)

- After the 1999 NCWM Annual Meeting, the draft of NIST Handbook 105-XX was circulated to all laboratory representatives and directors who had previously submitted comments. All comments from the first circulation were included in this circulation.
- At the 2000 NCWM Annual Meeting, the weight cart issue was addressed and discussed. Val Miller, NIST/OWM, will be formally characterizing the stability and design types of weight carts that are currently in use. This information will be presented at the 2001 NCWM metrology meeting and a working group will be established.

HB130 Project – Reciprocal Acceptance of Accredited Lab Reports

- Bruce Adams, MN, and Rick Calkins, Rice Lake, are working on this project.

Attachment 1
NATIONAL CONFERENCE ON WEIGHTS AND MEASURES

Proposed Funding for Special Needs During Next Year's (2001) Budget
Metrology Subcommittee – Submitted by Ken Fraley

Amendment Title: Funding for Annual NCWM and NIST Management Meeting

Committee Priority: One

Description:
Fund travel expenses for an annual NCWM Metrology Subcommittee and NIST management meeting for the Chair, Vice Chair, and past Chair of the Metrology Subcommittee. Attendance by three members of the Subcommittee assures the continuity of the meeting from year to year. The NCWM representatives would meet with representatives from NIST Technology Services (OWM and the Calibration Program), Manufacturing Engineering (mass, force, and dimensional), and Chemical Sciences Technology (fluid flow, volume, and temperature), and other management representatives.

Rationale:
On March 15 and 16, 2001, Ron Balaze, Ken Fraley, and Dan Newcombe met with NIST management as described in this report. Continuation of this meeting as an annual event will reinforce and expand the dialog that was initiated during the past few meetings. It will serve to review the needs of the State Laboratory Program and the National Conference on Weights and Measures in support of accurate measurement standards. It will help to ensure that the NCWM member States have the technical support, measurement standards, and services needed to enforce legal requirements and meet the needs of indigenous agencies and industry. It will also serve to communicate the scope and effects of State weights and measures programs and metrology laboratories to the relevant groups at NIST. It is critical for communication to be maintained and enhanced since our work (regulatory and industrial) depends on traceability to NIST and cooperation between NIST and the NCWM.

Resource Narrative:
Maximum of $1,500 per person each year for travel and per diem for three representatives to attend a 2- to 3-day meeting. Maximum total expense of $4,500.

Proposed Source of Funding: General revenues.

Report of the Laws and Regulations Committee

Robert G. Williams
Chairman
Tennessee Department of Agriculture

Reference
Key Number

200 Introduction

This is the report of the Laws and Regulations Committee (Committee) for the 86th Annual Meeting of the National Conference on Weights and Measures (NCWM.) It is based on the Interim Report offered in the NCWM Publication 16, "Committee Reports," testimony at public hearings, comments received from the Regional Weights and Measures Associations and other parties, the Addendum Sheets issued at the annual Meeting, and actions taken by the membership at the Voting Session of the Annual Meeting. The informational items presented below were adopted as presented when the Committee's report was approved.

Table A identifies agenda items by Reference Key Number, title, and page number. The first three digits of the Reference Key Numbers of the items are assigned from the subject series listed below. Voting items are indicated with a "V" after the item number. Consent calendar items are marked with a "VC." Items marked with an "I" after the item number are for information. Items marked "W" have been withdrawn from consideration. Items marked with a "D" after the key number are developing issues. The developing designation indicates an item has merit; however, the item is returned back to the submitter for further development before any action at the national level. Table B lists the appendices to the report, and Table C provides a summary of the results of the voting on the Committee's items and the report in entirety. This report contains recommendations to amend National Institute of Standards and Technology (NIST) Handbook 130, 2002 edition, "Uniform Laws and Regulations," or NIST Handbook 133, "Checking the Net Contents of Packaged Goods," Fourth Edition. Revisions proposed by the Committee are shown in **bold face print** by ~~crossing out~~ information to be deleted and underlining information to be added. New items proposed for the handbooks are designated as such and shown in **bold face print.** Proposals presented for information are shown in *italic* type unless identified as informational. The section mark, "§," is used in most references in the text and is followed by the section number and title (for example, § 1.2.Weight.) When used in this report, the term "weight" means "mass."

Subject Series

Handbook 130 - General	210 Series
Uniform Laws	220 Series
Weights and Measures Law (WML)	221 Series
Weighmaster Law (WL)	222 Series
Engine Fuels, Petroleum Products, and Automotive Lubricants Inspection Law (EFL)	223 Series
Uniform Regulations	230 Series
Packaging and Labeling Regulation (PLR)	231 Series
Method of Sale of Commodities Regulation (MSCR)	232 Series
Unit Pricing Regulation (UPR)	233 Series
Voluntary Registration of Servicepersons and Service Agencies for Commercial Weighing and Measuring Devices Regulation (VREG)	234 Series
Open Dating Regulation (ODR)	235 Series
National Type Evaluation Regulation (NTER)	236 Series
Engine Fuels, Petroleum Products, and Automotive Lubricants Regulation (EFR)	237 Series
Interpretations and Guidelines	238 Series
Price Verification	239 Series
NIST Handbook 133	250 Series
Other Items	260 Series

Table A
Index to Reference Key Items

Table B
Appendices

Table C

Voting Results					
Reference Key Number	House of Representatives		House of Delegates		Results
	Yeas	Nays	Yeas	Nays	
221-1	41	0	65	0	Passed
231-1	41	0	65	0	Passed
231-2	37	2	53	7	Passed
236-2	29	6	47	16	Passed
236-3	41	0	65	0	Passed
239-1	38	0	60	2	Passed
250-1	38	0	59	2	Passed
250-2	4	19	0	63	This Item Failed
250-3	39	0	61	0	Passed
250-4	37	0	56	0	Passed
260-1	33	2	39	5	Passed
200 Committee Report in its Entirety	40	0	56	0	Passed

Details of All Items
(In Order by Reference Key Number)

221 Weights and Measures Law

221-1 VC Information Required on Packages

(This item was adopted)

Source: Central Weights and Measures Association (CWMA)

Background: There is no Federal exemption from having a product identity statement for non-food commodities. Furthermore, the Federal exemption for food items only applies if they are "repackaged in a retail establishment." The current NIST Handbook 130 (Uniform Weights and Measures Law) exemption does not make these distinctions and can only lead to non-uniform enforcement by State and local weights and measures officials. Federal law requires that non-food items and meat and poultry have an identity statement. The recommended amendment changes the language to be the same as what currently exists in 21 CFR 101 (b) (3)

Recommendation: Amend Section 19 of the Uniform Weights and Measures Law, NIST Handbook 130 as follows:

Section 19. Information Required on Packages

Except as otherwise provided in this Act or by regulations promulgated pursuant thereto, any package, whether a random package or a standard package, kept for the purpose of sale, or offered or exposed for sale shall bear on the outside of the package a definite, plain, and conspicuous declaration of:

(a) **The identity of the commodity in the package, unless the commodity is a food, other than meat or poultry, that was repackaged in a retail establishment and the food is displayed to the purchaser under either of the following circumstances: (1) its interstate labeling is clearly in view or with a counter card, sign or other appropriate device bearing prominently and conspicuously the common or usual name of the food or (2) the common or usual name of the food is clearly revealed by its appearance ~~same can be easily identified through the wrapper or container~~;**

Comments: The Committee reviewed all of the information concerning this issue and voted to move the item forward using language proposed by the Food Marketing Institute (FMI). Adoption of the proposed language provides a uniform standard for Federal, State and local levels of enforcement.

221-2 W Permit Multiple Unit or Total Prices to Appear on a Package Label

Source: Southern Weights and Measures Association (SWMA)

Background: Retailers are making widespread use of "Bonus Cards," "VIP Cards," etc., and in some cases this approach may cause consumer confusion. Section 20, Declaration of Unit Price on Random Weight Packages, in the Uniform Weights and Measures Law of NIST Handbook 130 states: "In addition to the declarations required by Section 19 of this Act, any package being one of a lot containing random weights of the same commodity, at the time it is offered or exposed for sale at retail, shall bear on the outside of the package, a plain and conspicuous declaration of the price per kilogram or pound and the total selling price of the package."

Recommendation: Amend Section 20, the Model Weights and Measures Law of NIST Handbook 230, as follows;

Section 20. Declarations of Unit Price on Random Weights Packages

In addition to the declarations required by . 19 of this Act, any package being one of a lot containing random weights of the same commodity, at the time it is offered or exposed for sale at retail, shall bear on the outside of the package ~~a plain and conspicuous~~ at least one declaration of the price per kilogram or pound and total selling price of the package. All declarations shall be plain and conspicuous.

Comments: The Committee withdrew this item due to a lack of support.

231 Packaging and Labeling Regulation

231-1 VC Declaration of Identity

(This item was adopted)

Source: Central Weights and Measures Association (CWMA)

Background: There is no Federal exemption from having a product identity statement for non-food commodities. Furthermore, the Federal exemption for food items only applies if they are "repackaged in a retail establishment." The current Uniform Packaging and Labeling Regulation, Section 3.1 exemption (Note 2) in the NIST Handbook 130 does not make these distinctions and can lead to non-uniform enforcement by State and local weights and measures officials. Federal law requires that non-food items and meat and poultry must have an identity statement. The recommended amendment changes the language in the exception to be the same as what currently exists in 21 CFR 101.100 (b) (3).

Recommendation: Amend NIST Handbook 130, Packaging and Labeling Regulation, Section 3.1, Note 2, as follows:

Section 3.1 Declaration of Identity: Consumer Package. – A separate declaration of identity on a consumer package shall appear on the principle display panel and shall not be misleading or deceptive. The identity shall be in terms of:

(a) the name specified in or required by any applicable Federal or State law or regulation, or in the absence of this,

(b) the common or usual name or, in the absence of this,

(c) the generic name or other appropriate description, including a statement of function (such as "cleaning powder").

***Note 2: Section 19: (a) of the Uniform Weights and Measures Law (and 21 CFR 101.100 (b)(3) for non-meat and non-poultry foods) specifically exempts food packages from identity statements if* the commodity is a**

food, other than meat or poultry, that was repackaged in a retail establishment and the food is displayed to the purchaser under either of the following circumstances: (1) its interstate labeling is clearly in view or with a counter card, sign or other appropriate device bearing prominently and conspicuously the common or usual name of the food or (2) the common or usual name of the food is clearly revealed by its appearance. ~~*the identity of the commodity "can easily be identified through the wrapper or container."*~~

Comments: The Committee reviewed all of the information concerning this issue and voted to move the item forward using language proposed by Food Marketing Institute (FMI). Adoption of the proposed language provides a uniform standard for Federal, State, and local levels of enforcement.

231-2 V Random Packages – Indirect Sales - Labeling Exemptions

(This item was adopted)

Source: The Southern Weights and Measures Association (SWMA), The Food Marketing Institute (FMI).

Background: On-line food retailing allows consumers new and flexible alternatives in the way in which they order and receive their groceries. For example, many food retail web sites allow customers to place an on-line order on one day and to take delivery of the order several days or even weeks later. Although prices may change during the period between order and delivery, customers are guaranteed the prices in effect on the day the products are ordered, or in some cases a lower price if the price decreases between the date of order and the date of delivery.

However, the very flexibility afforded to consumers presents on-line retailers with a significant operational challenge related to the labeling of random weight products. Specifically, random weight food products ordered on different days may have different unit prices associated with the food despite the fact that the food may be packaged and labeled for delivery on the same day. For example:

Customer	Item	Order Date	Order Price	Delivery Date
Mrs. Smith	Ground Beef	Oct. 10	$2.29 per lb	Oct. 17
Mrs. Randall	Ground Beef	Oct. 12	$2.39 per lb	Oct. 17
Mrs. Stone	Ground Beef	Oct. 16	$2.49 per lb	Oct. 17

In the foregoing example, the retailer will probably weigh, package, and label all three orders on October 17th because the products must be delivered on the 17th despite the fact that they were ordered on a variety of earlier days and, therefore, have different unit prices.

Packaging and Labeling Section 6.16 of NIST Handbook 130 currently requires all random weight packages (with one exception not relevant here) to bear a label conspicuously declaring the net weight, unit price, and total price. The provision requiring the unit price and total price to be displayed on the package is difficult for on-line retailers to accomplish because the unit price may vary from package to package depending on the order date. To include the unit price and total price on each package, the retailer would have to re-program the labeling equipment for each product ordered on a different date or to develop an overly complex and costly system to separate product by price as well as weight.

Moreover, providing unit price and total price information on the label of random weight products is less meaningful to consumers in an on-line setting because consumers will not see the package label until after the product is delivered. However, on-line customers can receive pricing information in the following useful way. The unit price is provided to consumers in the on-line description that is then reviewed at the time that they select a product and specify the weight of the random weight product that they would like to purchase. Following completion of the order, customers often receive an order confirmation that provides all of the information required by Section 6.16 for random weight packages, including the unit price, the weight ordered by the customer, and the calculated total price. In some cases, on-line retailers will specify a tight range on the net weight and total price to allow for minor variations when the product is actually weighed, e.g., 1.00 – 1.05 lb. in the case of sliced meat. All of the information required in Section 6.16 is often again set forth on the printed receipt that the customer receives at the time that the food is delivered.

Recommendation: Amend NIST Handbook 130, Uniform Packaging and Labeling Regulation, Section 11, Random Packages, by adding Section 11.1.1.

11.1.1 Indirect Sale of Random Packages - A random package manufactured or produced and offered for indirect sale (e.g., e-commerce, on-line, phone, fax, catalog, and similar methods) shall be exempt from the labeling requirements of:

(a) unit price
(b) total price

when the following requirements are met:

At the time of the delivery, each package need only bear a statement of net weight, provided that:
(a) the unit price is set forth and established in the initial product offering;
(b) the maximum possible net weight, unit price, and maximum possible price are provided to the customer by order confirmation when the product is ordered; and
(c) when the product is delivered, the customer receives a receipt bearing the following information: identity, declared net weight, unit price, and the total price.

Indirect Sales: For the purpose of Section 11.1.1., "Indirect sales" include all forms of sales where the customer is not physically present at the time and location of product selection and order. Examples of such indirect methods include, without limitation, Internet or on-line sales, sales conducted by telephone or facsimile, and catalog sales.

Comments: The Committee wishes to thank the Southern Weights and Measures Association (SWMA), the Food Marketing Institute (FMI) and representatives of e-business companies for all of their efforts on behalf of this item.

232 Method of Sale of Commodities Regulation

232-1 I Stored Tare Weights

Source: Southern Weights and Measures Association (SWMA)

Background: Vehicle tare weights are being used for long time periods and have often been found to be incorrect. The errors found in surveys range from a truck weighing 8,900 pounds less than the stored tare to trucks weighing 2,680 pounds more than the stored tare. A load of sand or gravel at a cost of $5.50 per ton with a tare error of 750 pounds has a monetary value for each weighing error of $2.06. If this error is multiplied by four transactions per day per truck for 240 working days, it results in an overcharge of more than $1,977 per year. Since the practice of using stored tare weights is followed by other types of businesses (e.g., landfills and asphalt plants) where prices may reach $70 or more per ton, an error of 750 pounds in the tare weight of a truck would equal $26 per weighment. If this truck were involved in four transactions per day for 240 working days, the overcharge would total more than $25,000 per year.

Recommendation:

1. Develop a method of sale regulation for stored vehicle tare weights and require scale operators to maintain accurate and up-to-date tare weights. The SWMA submitted the following suggested requirements for a new method of sale.

   3.5 – Vehicle Tare Weights - Whenever stored vehicle tare weights are employed, the following conditions and requirements shall apply:

   3.5.1 - Allowable differences. - The difference between actual tare weight and stored tare weight must not exceed plus or minus 2 percent.

   3.5.2 - All stored vehicle scale tare weights shall be accurately determined to the nearest scale division.

   3.5.3 - Stored vehicle scale tare weights shall be verified at regular intervals, not to exceed 3

months, unless pre-empted by a more stringent guideline/requirement.

2. Adopt appropriate allowable differences between actual tare weight and stored tare weight.

3. Develop an Examination Procedure Outline (EPO) and enforcement procedures.

4. Collect data from States that have not yet responded to a survey conducted by the States of Maryland and North Carolina.

Comments: The Northeastern Weights and Measures Association (NEWMA) supports development of this item. According to the NEWMA report, some States already prohibit stored tares in present enforcement programs, but it is feared that the practice is fairly widespread. NEWMA officials support the concept of timely verification of stored tare weights. Stored tare weights should also be subject to increased surveillance by officials during device inspections. There was also some question that the use of stored tare weights is inconsistent with the provisions of the Uniform Weighmaster Law because the tare weights are not actually measured by the weighmaster thus invalidating any weight tickets issued. The Western Weights and Measures Association (WWMA) recommends further development by considering other States' tare regulations.

Many additional comments have been received from the regional associations encouraging further development of this item. Specific areas of concern for consideration are as follows:

- Should the use of stored tare weights be limited to the weighing of certain applications such as quarries and landfills?

- It may be appropriate to develop a proposal for consideration by the Specifications & Tolerance Committee to require disclosure on the weigh ticket that stored tare weights were used in arriving at the net weights as has been done with manual weight entries.

- It may be appropriate to remove the mandatory verification interval of three months. Some jurisdictions may prefer to verify the accuracy of the stored tare weights at their leisure and not provide the operator with a time frame during which non-compliance may be permitted.

- Some comments suggest that the tolerance of 2 percent is too large. One suggestion is to limit the tolerance to the absolute value of the maintenance tolerance for the value of the tare weight.

232-2 W Temperature Compensated Sale of Petroleum Products

Source: Northeastern Weights and Measures Association (NEWMA)

Background: A proposal was submitted to the Specifications and Tolerances Committee item to add temperature compensation to the Vehicle Tank Meter Code and recognize it for all devices in the Liquid Measuring Device code. A parallel change needs to be made to the Method of Sale Regulation to permit compensated sales of petroleum products. NEWMA notes that Pennsylvania, New Hampshire, Maine, and Canada permit compensated sales in areas like retail sales of home heating oil and retail sales of gasoline. The development of stable electronic temperature compensation permits compensated transactions to take place accurately and inexpensively. This new technology is the reason for the reemergence of this issue that the Committee first explored in the 1970s. According to NEWMA, the lack of specific guidance in Handbook 130 does not promote uniformity. States are forced to use the lack of standards in Handbook 44 to try to stop compensated sales. Sometimes, as in the case of Maine, this does not hold up. Officials agree that if temperature compensation is used, then all sales of petroleum products should be conducted on a temperature compensated basis including the traditional requirement that temperature compensation be used for a 12-month period. NEWMA believes it is time for the NCWM to recognize this method of sale as the most equitable way to sell products.

Recommendation: Change NIST Handbook 130, Method of Sale Regulation, to permit compensated sales of petroleum products.

Comments: Several NCWM members representing both NEWMA and their jurisdictions testified concerning this issue. They all requested its removal from the L&R agenda. The Committee voted to withdraw the item.

236 Uniform Regulation for National Type Evaluation

236-1 I Ensuring the NTEP Regulation is Consistent with NTEP Policies

Source: Northeastern Weights and Measures Association (NEWMA)

Background: Recent changes have been made to the National Type Evaluation Program Administrative Procedures, Technical Policy, Checklists, and Test Procedures (NCWM Publication 14) to institute classes of certificates: active, inactive, and withdrawn, but these changes have not been added to the Uniform Regulation for NTEP. NEWMA requested that the Committee determine if changes should be made to harmonize the provisions of Publication 14 and the NTEP regulation.

Prior to adopting NTEP maintenance fees, Certificates of Conformance (CC) did not expire. Under the maintenance fee system, manufacturers can only sell new devices that have an active CC or those manufactured before the CC expired. However, the regulation does not prohibit a manufacturer from producing and selling devices with an inactive CC. NEWMA believes that definitions are needed for the class of certificate and language is needed to clarify the meaning of "traceable to a CC." NEWMA believes that the current Section 3 is vague and that if a company is prohibited from selling a new device under an inactive or withdrawn certificate, States may be challenged. The Committee conducted a review of the regulation and identified several areas where it needs to be modified to reflect recent changes in Publication 14. The Committee carried this item over pending further action by the NTEP Board of Governors. The proposed changes will be presented in full after the Committee has had an opportunity to consider the impact of the change in NTEP administration.

Recommendation: Harmonize the provisions of Publication 14 and the Uniform Regulation for National Type Evaluation.

Comments: The Committee voted to make this item informational. The NCWM Board of Directors (BOD) is working to complete a revised edition of Publication 14. The Committee believes that this item (236-1) will require further study and development when the revision to Publication 14 is completed.

236-2 V Uniform Regulation for National Type Evaluation (URNTE)

(This item was adopted)

Source: Northeastern Weights and Measures Association (NEWMA)

Background: NEWMA believes that the actions of the NCWM Board of Directors at the last two Annual Meetings have made the URNTE obsolete and unenforceable. In particular, the regulation does not recognize a Certificate of Conformance issued by NCWM. The regulation also does not recognize that there are now various status levels for certificates and that a CC can expire (become inactive or be withdrawn). The critical point is that State regulations, based either on automatic adoption of the URNTE or on rulemaking using the URNTE as a model, are inconsistent with the actual operation of the NTEP program.

The proposal in Appendix A reflects several changes necessary to make the regulation consistent with present NTEP operations. First, it removes references to NIST for functions that NIST no longer performs, i.e., issue certificates or authorize laboratories. Second, all references to a Certificate have been changed to reference the "active" certificate. Devices manufactured under an active certificate are valid for use in the State. If they are manufactured while the CC is in any other status, they are invalid for use. **Note:** An "effective" certificate is considered an "active" certificate for this purpose. Finally, the old Section 6 was eliminated because it was redundant. The title of Section 4 was changed to show that it actually contains the prohibitions to sell or use a device that is not traceable to an active certificate and the exemptions permitted.

Recommendation: Adopt the changes as indicated in Appendix A.

Comments: The Committee received guidance from the NCWM Board of Directors regarding its intention to revise NCWM Publication 14. It is the opinion of the Board that this item, if adopted, will not be in conflict with its actions. The original language in Appendix A acknowledged only NTEP Certificates of Conformance issued under the authority of the NCWM. While NCWM does not reissue certificates to replace inactive NTEP certificates issued under NIST management, many devices are still traceable to inactive NIST certificates. Such devices are still considered traceable to an NTEP certificate and need to be recognized in the URNTE. To resolve this concern, the Committee modified

Appendix A to recognize NTEP Certificates of Conformance without reference to the issuing authority. The Committee voted to forward the proposal found in Appendix A as a Voting item.

236-3 VC Definition for Remanufactured Device, Remanufactured Element, Repaired Device, and Repaired Element.

(This item was adopted)

Source: NCWM Remanufactured Device Task Force, Southern Weights and Measures Association (SWMA)

Background: The Specifications and Tolerances (S&T) Committee Agenda (Item 310-1A) includes proposed definitions for "Remanufactured Device," "Remanufactured Element," "Repaired Device," and "Repaired Element" that will affect NCWM Publication 14 and the Uniform National Type Evaluation Regulation in NIST Handbook 130. The proposed definitions for repaired and remanufactured devices are different from those currently in the regulation.

The purpose of this item is to notify interested parties that the NCWM S&T Committee is taking the lead on these proposals and has included them in its report for NCWM consideration. It is not appropriate to have definitions in NIST Handbook 44 that are different from those in Publication 14 and NIST Handbook 130. Therefore, the definitions contained in NCWM Publication 14 and NIST Handbook 130 will be changed, in the interest of uniformity, if the NCWM adopts new definitions for repaired and remanufactured devices. If adopted, the definitions for repaired and remanufactured elements will also be added to the regulation.

Recommendation: Harmonize the definitions contained in NCWM Publication 14, NIST Handbook 44, and NIST Handbook 130.

237 Uniform Engine Fuels, Petroleum Products, and Automotive Lubricants Regulation

237-1 W Compliance Procedures for the Premium Diesel Fuel Regulation

Source: Petroleum Subcommittee

Background: In response to the 1998 NCWM adoption of premium diesel regulations, the SWMA requested the Committee to develop guidelines on regulatory procedures to assist States in ensuring compliance with the rule. The Premium Diesel Work Group developed an initial draft document based on the request. The draft document was presented to the Laws and Regulations Committee at the 1999 Interim Meeting. After reviewing the document, the Committee agreed with the recommendation and requested that the Premium Diesel Work Group continue to develop the document into a final version. In an effort to solicit NCWM membership comments on the desired content of the guideline material, the document was presented in Appendix A of last year's report.

However, at the 2000 Interim Meeting the Committee was advised that ASTM Standard D6468, Standard Test Method for High Temperature Stability of Distillate Fuels, had been adopted. The Committee then voted to make this item informational. At the 2001 Interim Meeting, there was no interest in completing and updating the draft guidelines. The Committee voted to withdraw this item.

237-2 I Petroleum Subcommittee Agenda Items

Source: Petroleum Subcommittee

Background: The Subcommittee submitted several proposed projects for its 1999-2000 work plan. The Committee will develop an agenda for the Subcommittee based on the comments received on the following projects at the Annual Meeting.

Federal Kerosene Dye Information – It was suggested that information on the new Internal Revenue Service kerosene dye policies be prepared and distributed to the States. The Subcommittee proposes to develop and distribute this information.

Publication 21: The Western Weights and Measures Association recommends that the Petroleum Subcommittee also revise the sampling procedures and container requirements in NCWM Publication 21-*Petroleum Products Sampling Procedures and Safety Manual* to provide adequate precautions regarding the use of clear glass containers for product

specification conformance testing. This recommendation is based on data presented to the NCWM by Chevron Products Company and the State of Tennessee.

Update the Engine Fuels, Petroleum Products, and Lubricants Laboratory Guideline – This guideline is contained in the Interpretations and Guidelines Section of NIST Handbook 130 and was last updated in 1994. Since that time, the cost of equipment has changed and new test methods have been developed. The Subcommittee proposes to revise and update the guideline.

Automotive Lubricants – The Uniform Engine Fuels, Petroleum Products, and Automotive Lubricants Regulation implies that the document covers lubricants. When the regulation was developed, the Subcommittee gave developing engine fuel requirements priority with the understanding that in the future they would address lubricants. The uniform law gives broad authority to regulate lubricants; however, the regulation has no requirements. The Subcommittee has proposed developing requirements for lubricants for the Committee to consider.

Recommendation: Develop an Agenda for the Petroleum Subcommittee.

Comments: The Committee received information from the Board of Directors (BOD) that monetary support for the Subcommittee's work is available and will be provided. The Committee believes that the work of the Petroleum Subcommittee is extremely important and requests that Randy Jennings and the Subcommittee proceed with the development of the issues presented in this agenda, including the changes to Publication 21. The Committee further reviewed the proposal and established the agenda priorities as listed above.

237-3 W Nozzle Requirements for Diesel Fuel Dispensers

Source: Southern Weights and Measures Association (SWMA)

Background: This requirement was intended to prevent consumers from inadvertently filling their vehicle gasoline tank with diesel fuel. In 1997, the American Automobile Manufacturer's Association (AAMA) reported that the fill pipe diameter was compatible with current diesel-powered vehicles and those on the drawing board for the future. The AAMA and several jurisdictions expressed support for this item.

Recommendation: Amend NIST Handbook 103, Engine Fuels, Petroleum Products, and Automotive Lubricants Regulation, Section 3.3, "Diesel Fuel" by adding a new Section 3.3.5, "Requirements for Diesel Fuels" as presented below.

3.3.5. Nozzle Requirements for Diesel – Within 12 months of the effective date of this section, each dispensing device from which fuel is sold shall be equipped with a nozzle spout having a terminal end with an outside diameter of not less than 23.63 mm (0.930 inch.).

Comments: The Committee received information indicating that the Environmental Protection Agency (EPA) may require different nozzle sizes for diesel pumps depending on the sulfur content in the fuel. The Committee believes that if the EPA proposal becomes a requirement it could possibly conflict with this item; therefore, the Committee voted to withdraw this item.

239 Price Verification

239-1 V Enforcement Procedures

(This item was adopted)

Source: Central Weights and Measures Association (CWMA)

Background: The current language in the Examination Procedure for Price Verification implies that the establishments being inspected are allowed two overcharges before higher levels of enforcement action are taken. The example "when overcharges exceed 2 percent on a sample" was recently questioned in a court case as to whether or not this 2 percent represented a tolerance. The intent of the example was not to provide a tolerance. The limit at which higher levels of enforcement action are to be taken becomes a decision of the regulatory authority in each jurisdiction. The amendment would clarify the regulatory official's ability to determine when and if to impose higher levels of enforcement (e.g., fines

and penalties).

Recommendation: Amend the Examination Procedure for Price Verification, Section 11.1. Enforcement Steps, paragraph (d) and Section 11.2. Model Enforcement Levels, paragraph (b)(3) and paragraph (d), as follows:

Section 11.1. Enforcement Steps

(d) Overcharges and undercharges are used to determine lower levels of enforcement actions, but higher levels of enforcement action (e.g., fines or penalties) are taken only on the overcharges found in the sample (~~e.g., when overcharges exceed 2% in a sample~~).

Section 11.2 Model Enforcement Levels

(b)(3) A third inspection should be made within 60 business days. If the price accuracy is again less than 98 percent, higher levels of enforcement action should be taken ~~if the overcharges are more than 2 percent~~.

If the store is on an increased inspection frequency, a warning should be issued and the store re-inspected within 30 business days. If price accuracy is less than 98 percent, higher levels of enforcement action should be taken ~~if overcharges are more than 2 percent~~.

(d) Higher Levels of Enforcement Action. – Overcharges and undercharges are used to determine lower levels of enforcement actions, but higher levels of enforcement action (e.g., fines or penalties) are taken only on overcharges (~~e.g., when the overcharges exceed 2% on the sample~~). A store's history of error rates, the time it takes a store to correct the errors, the difference in inaccuracy rates found between "regular" and " sale" priced items, the ratio of overcharges to undercharges, a record of valid consumer complaints, and the magnitude of the error(s) may be used to support enforcement action.

Comments: The Committee believes that the examples were not intended to provide enforcement guidelines and should be removed.

250 NIST Handbook 133

250-1 V Sample Correction Factors

(This item was adopted)

Source: Laws and Regulations Committee and NEWMA

Background: Currently, NIST Handbook 133, "Checking the Net Contents of Packaged Goods," is comprised of the Third Edition (1988) and Supplements 1 (1990), 2 (1991), 3 (1992), and 4 (1994). Amendments adopted by the NCWM in 1998 and 1999 have not been published in supplemental form. There is little doubt that a new edition of the handbook must be published to eliminate the confusion caused by the supplements and to reduce the burden on inspectors and others who use the handbook. Developing a new edition is important so that the amendments to the handbook adopted in 1998 and 1999 can be published and adopted by jurisdictions that incorporate Handbook 133 by reference. Following guidance received from the NIST Handbook 133 Working Group and the Committee, the Office of Weights and Measures (OWM) prepared two drafts of the Fourth Edition of NIST Handbook 133. Comments on the second draft generally support the plain language, the question and answer format, and the elimination of some of the detailed explanations, examples, and other information included in the original Third Edition of the Handbook published in 1988. While most of the comments have been supportive, several jurisdictions expressed concern over the new format and the elimination of some explanatory information. One comment was that the new format is appropriate for use as a field inspector's manual but is not an acceptable replacement for the current handbook. This comment suggested that OWM update the Third Edition published in 1988, retaining all of the current information, pictures, and examples. A second comment proposed a different organization of the handbook, while a third suggested an extensive preface addressing State and local adoption and use of the handbook. The proposed preface would explain Federal preemption and describe the procedures officials should follow before taking legal action on small lots of packages in retail stores. One of the most significant comments pointed out the need to use a more statistically valid method to compute the sample correction factor.

OWM requested guidance from the NCWM and held a public hearing on how to proceed with this project. The Committee met with the Board of Directors after the public hearing and it was decided that OWM should continue to develop the Fourth edition using the question and answer format. It was also decided that any technical changes from the current requirements would be subject to review and approval of the L&R Committee and would be forwarded to the Conference as informational items. OWM issued a fourth draft of the handbook incorporating the comments received on the third draft.

Technical Changes and Corrections to NIST Handbook 133

The Committee received hundreds of comments and suggestions on the second and third drafts of the Fourth Edition of NIST Handbook 133. Several comments addressed statistical issues, lot sizes, and the need for officials to follow due process procedures when they take action on packages that fail to meet the average or individual package requirements in the handbook.

The sample correction factors in Table 2-1. Sampling Plans for Category A were originally computed using *2/square-root of n.* Numerous comments on the second draft pointed out that the statistically correct approach to computing the sample correction factor should use the t-statistic that sets the correction factor to match the sample size. NIST agrees that this change should be made to make the handbook correction factors statistically correct, bringing it into closer harmony with *OIML 87 "Net Contents in Packages*. If this change is adopted, the following correction factors will replace those currently in Table 2-1.

Sample Size	Sample Correction Factor
1	Apply MAV
2	8.984
3	2.484
4	1.591
5	1.241
6	1.050
7	0.925
8	0.836
9	0.769
10	0.715
11	0.672
12	0.635
24	0.422
48	0.291

Recommendation: Adopt the sample correction factors using the t-statistic in NIST Handbook 133, Fourth Edition.

Comments: The Committee recommended separating the three technical changes into distinct voting items.

250-2 V Recommended Division of Inspection Lot

(This item failed)

Source: NCWM Laws and Regulations Committee.

Background: Comments received on the second draft of the Fourth Edition of Handbook 133 pointed out some concern that the 48-item sample for lots with more than 3200 packages resulted in actions being taken against lot sizes up to 200,000 packages. Field inspectors have difficulty properly collecting a random sample from very large lots, so most inspectors try to divide very large lots into more manageable sizes. Even though the inspectors determine the lot size, the current version of the handbook provides no guidance on dividing lots. *OIML 87 "Net Contents in Packages"* recommends that lots of more than 10,000 packages be divided into smaller lots. NIST recommends that similar guidance be added to the Fourth Edition of the handbook sampling plans in the form of a note so the handbook provides guidance that is consistent with OIML 87.

Recommendation: Adopt the recommendation that inspection lots of more than 10,000 packages should be divided into smaller inspection lots, by amending NIST Handbook 133, Fourth Edition, Chapter 2, Section 2.3. Basic Test Procedure,

Define the inspection lot, to include the following note: **Note:** Any inspection lot may be divided into smaller inspection lots at the discretion of the inspector.

Comments: The Committee believes that while the proposed note does not mandate dividing inspection lots, the ability to determine the inspection lot is provided to the inspector in NIST Handbook 133, Chapter 2, The Basic Test Procedure, Define the inspection lot. The Committee recognizes that inspections of large and small lots are statistically correct when NIST Handbook 133 procedures are followed. While the intent of the note was to provide guidance when testing large inspection lots, some saw the addition of the note to be redundant, restrictive and therefore unnecessary.

250-3 V Tare Determination - Ratios

(This item was adopted)

Source: NCWM Laws and Regulations Committee.

Background: Comments on NIST Handbook 133 correctly pointed out that the ratios and number of packages to be opened in the tare determination tables in the Fourth Edition draft are not consistent with the Third Edition. OWM has re-computed all of the tare determination tables to identify and correct any errors that may have occurred in calculating or rounding the values. The fourth draft of the Fourth Edition of the handbook includes updated tables to ensure that the contribution of tare to overall variation is no more than 5 percent, the limit NCWM adopted in 1994.

Recommendation: Adopt the corrected Tare Determination tables as included in the fourth draft of the Fourth Edition, NIST Handbook 133. (A copy of NIST Handbook 133, Fourth Edition, may be obtained at http://www.nist.gov/owm or by contacting the Office of Weights and Measures at 301-975-4004)

250-4 V Adoption of NIST Handbook 133, Fourth Edition

(This item was adopted)

Source: NCWM Laws and Regulations Committee

Background: The Fourth Edition of NIST Handbook 133 was prepared as a procedural guide for compliance testing of net contents statements on packaged goods. Compliance testing of packaged goods is the determination of the conformance of the results of the packaging, distribution, and retailing process (the packages) with specific legal requirements for net content declarations. Although Handbook 133 was developed primarily for use by government officials, it is useful to commercial and industrial establishments involved in the packaging, distribution, and sale of commodities.

The handbook provides procedures using statistical sampling techniques to test inspection lots of packages for conformance with legal requirements. It also includes statistical procedures that recognize reasonable variations in "good" packaging practice. Anything that is put into a container, wrapped, or banded (or merely measured in advance of sale) and labeled as to quantity may be inspected.

The labeled quantity may be in units of weight, volume, linear, square, or cubic measure, count, or combinations thereof. Packaged commodities may be examined to determine conformance with Federal, State, or local net content labeling regulations. Compliance testing of packaged goods is generally directed toward protecting the consumer/purchaser from receiving packages with less than the labeled quantity of contents while protecting business/industry from unfair business practices, thus improving equity in the marketplace.

Recommendation: Adopt NIST Handbook 133, Fourth Edition. (A copy of NIST Handbook 133, Fourth Edition may be obtained at http://www.nist.gov/owm or by contacting the Office of Weights and Measures at 301-975-4004)

260 Other Items

260-1 V Enhanced Product – USDA/FSIS Meat and Poultry Products

(This item was adopted)

Source: Central Weights and Measures Association (CWMA)

Background: Meat and poultry processors are currently marketing fresh meat and poultry products containing added water-based solutions of various composition. The producers of these products report that the added solutions "enhance juiciness and/or flavor" and overall palatability. However, recent wet tare testing of meat and poultry products suggests that some of this added liquid is no longer contained in the product and is leaching into the soaker pads or may be free liquid inside the packaging material.

The practice of enhancing meat products is permitted by the USDA/FSIS and can range up to an added 33 percent in weight. Product labels are required to state the quantity of added weight. Typical label declarations for these products are "contains up to 33 percent added weight," "juiciness and flavor enhanced with up to 33 percent of a solution of water and sodium phosphate," and "up to 33 percent of product weight is added ingredients." Wet tare testing indicates that the high levels of solutions that are being added to meat and poultry products may not be completely retained in the commodity.

Dry or dry-used tare testing of meat and poultry does not determine to what extent the added liquid is retained in or has leached from these products because this liquid may be either absorbed in the soaker pads or remain free flowing in the packaging material. Recent laboratory tests on fresh, "enhanced" poultry products sold in Michigan using wet tare have revealed moisture loss from meat products ranging from 2 to 6.5 ounces of fluid per package. At this time there is no guidance on how much moisture loss is reasonable and how much moisture loss is excessive.

Fresh poultry processed using a bath chilling method can cause the carcasses to uptake water (up to 8 percent [whole] or 12 percent [cut up]). In addition, "enhanced products" such as poultry may be sold as "enhanced with up to a 15 percent of a solution," resulting in a product that may contain up to 27 percent added water. Since dry and/or dry-used tare testing does not provide data useful in determining reasonable moisture allowances, this subject requires specific study using wet-tare approaches.

The Committee believes that it is important that weights and measures jurisdictions begin the process of establishing a moisture allowance based on what the NCWM determines to be reasonable moisture loss from meat and poultry products when performing inspections according to established NIST Handbook 133 procedures.

Recommendation: The Committee recommends that the NCWM:

a. establish a Working Group to study current market conditions for enhanced versus non-enhanced meat and poultry products, to determine the extent to which water and/or other added solutions are no longer retained in the product at the time of sale (i.e., are lost into the packaging material or are otherwise free-flowing) recognizing Federal regulations that are in place which govern labeling of such products; and

b. direct the Working Group to make recommendations to the L&R Committee based on findings of the study concerning what is to be considered "reasonable moisture allowances" when conducting Handbook 133 inspections of enhanced meat and poultry products.

Comments: The Committee believes that without defined reasonable moisture allowances it is difficult for weights and measures officials to conduct net content inspections in accordance with NIST Handbook 133 procedures. Therefore, the Committee is proposing that the NCWM establish a Working Group to study current market conditions and recommend reasonable moisture allowances. The Committee supports the Administration and Public Affairs Committee recommendation that a presentation on this subject be included on the agenda of the July 2001 Annual Meeting.

R.Williams, Tennessee, Chairman

D. Onwiler, Nebraska
D. Johannes, California
P. D'Errico, New Jersey
L. Hatfield, Kentucky

Associate Membership Committee Representative: C. Guay, Procter & Gamble Company

Petroleum Subcommittee: Randy Jennings, Tennessee, Chairman

Canadian Technical Advisors: J. Watters, and B. Lemon
NIST Technical Advisor: T. Coleman
NIST Technical Advisor on the Uniform Regulation for National Type Evaluation: T. Butcher

Committee on Laws and Regulations

Appendix A
Uniform Regulation for National Type Evaluation
Section 1. Application

This regulation shall apply to any type of device and/or equipment covered in National Institute of Standards and Technology Handbook 44 for which evaluation procedures have been published in National Conference on Weights and Measures, Publication 14, "National Type Evaluation Program, Administrative Procedures, Technical Policy, Checklists, and Test Procedures."

NOTE 1: This section can be amended to include a list of devices or device types to which NTEP evaluation criteria do not apply. Additionally, a State can amend this section to allow it to conduct a type evaluation and issue a "Certificate of Approval/Conformance". This approach should be limited to occasions where formal NTEP Type Evaluation criteria do not apply and to new technologies or device applications where the development of criteria is deemed necessary by the director.

Section 2. Definitions

2.1. Active Certificate of Conformance. - A document issued ~~by the National Conference on Weights and Measures~~ based on testing by a Participating Laboratory, which the certificate owner maintains in active status under the National Type Evaluation Program (NTEP). ~~said~~ The document constitut~~ing~~es evidence of conformance of a type with the requirements of this document and the NIST Handbooks 44, 105-1, 105-2, or 105-3. By maintaining the Certificate in active status, the Certificate owner declares the intent to continue to manufacture or remanufacture the device consistent with the type and in conformance with the applicable requirements. For manufacturers of grain moisture meters, maintenance of active status also involves annual participation in the NTEP Laboratory On-going Calibration Program, OCP (Phase II). -A device is traceable to an active Certificate of Conformance if it was manufactured during the period that the Certificate was maintained in active status.

2.2. Device. -- Device means any weighing and measuring device as defined in § 2.12. Commercial and Law Enforcement Equipment.

2.3. Director. -- Means the _____ of the department of _____ .

2.4. National Type Evaluation Program. -- A program of cooperation between the National Conference on Weights and Measures, National Institute of Standards and Technology, other Federal agencies, the States, and the private sector for determining, on a uniform basis, conformance of a type with the relevant provisions of National Institute of Standards and Technology Handbook 44, "Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices," and National Conference on Weights and Measures, Publication 14, "National Type Evaluation Program, Administrative Procedures, Technical Policy, Checklists, and Test Procedures."

2.5. One-of-a-Kind Device. -- A (non-NTEP) device designed to meet unique demands for a specific installation and of a specific *design* which is not commercially available elsewhere (one such device per manufacturer). If a device manufactured for sale by a company has been categorized and tested as a "one-of-a-kind" device and the manufacturer then decides to manufacture an additional device or devices of that same type, the device will no longer be considered a "one-of-a-kind." This also applies to a device that has been determined to be a "one-of-a-kind" device by a weights and measures jurisdiction in one State and the manufacturer decides to manufacture and install another device of that same type in another State. In this case, the manufacturer of the device must request an NTEP evaluation on the device through the normal application process unless NTEP has already deemed that such evaluation will not be conducted. (Amended 1998)

2.6. Participating Laboratory. -- Any State Measurement Laboratory, ~~that has been accredited by the National Institute of Standards and Technology in accordance with its program for the Certification of Capability of State Measurement Laboratories,~~ or any State Weights and Measures Agency or other laboratory that has been authorized to conduct a type evaluation under the National Type Evaluation Program.

2.7. Person. -- The term "person" means both plural and the singular, as the case demands, and includes individuals, partnerships, corporations, companies, societies, and associations.

2.8. Remanufactured Device. -- A device to which an overhaul or replacement of parts has been performed so the device can be installed in a new location.

2.9. Repaired Device. - The maintenance or replacement of parts for a device to remain or return to service in the same location.

2.10. Type. -- A model or models of a particular device, measurement system, instrument, or element that positively identifies the design. A specific type may vary in its measurement ranges, size, performance, and operating characteristics as specified in the Certificate of Conformance.

2.11. Type Evaluation. - The testing, examination, and/or evaluation of a type by a Participating Laboratory under the National Type Evaluation Program.

2.12. Commercial and Law Enforcement Equipment. -- (a) Weighing, and measuring equipment commercially used or employed in establishing the size, quantity, extent, area, or measurement of quantities, things, produce, or articles for distribution or consumption, purchased, offered, or submitted for sale, hire, or award, or in computing any basic charge or payment for services rendered on the basis of weight or measure. (b) Any accessory attached to or used in connection with a commercial weighing or measuring device when such accessory is so designed that its operation affects the accuracy of the device. (c) Weighing and measuring equipment in official use for the enforcement of law or for the collection of statistical information by government agencies.

NOTE 2: The section is identical to G-A.1. 1.10, General Code, National Institute of Standards and Technology Handbook 44 for definition of "commercial" and "law enforcement equipment."

Section 3. Certificate of Conformance

The Director shall require a device to be traceable to ~~a~~ an active Certificate of Conformance prior to its installation or use for commercial or law enforcement purposes.

Section 4. ~~Certificate of Conformance;~~ Prohibited Acts and Exemptions

(1) Except for a device exempted by this section, no person shall sell a device unless it is traceable to ~~a~~ an active Certificate of Conformance.

(2) Except for a device exempted by ~~subsection (3), (4), or (5) of~~ this section, no person shall use a device unless it is traceable to ~~a~~ an active Certificate of Conformance.

(3) A device in service in this State prior to _____, 20_, that meets the specifications, tolerances, and other technical requirements of National Institute of Standards and Technology Handbook 44 shall not be required to be traceable to ~~a~~ an active Certificate of Conformance.

(4) A device in service in this State prior to _____, 20_, removed from service by the owner or on which the department has issued a removal order after _____,20_, and returned to service at a later date shall be modified to meet all specifications, tolerances, and other technical requirements of National Institute of Standards and Technology Handbook 44 effective on the date of the return to service. Such a device shall not be required to be traceable to ~~a~~ an active Certificate of Conformance.

(5) A device in service in this State prior to _____, 20_, which is repaired after such date shall meet the specifications, tolerances, and other technical requirements of National Institute of Standards and Technology Handbook 44 and shall not be required to be traceable to ~~a~~ an active Certificate of Conformance.

(6) A device in service in this State prior to _____, 20_, that is still in use may be installed at another location in this State provided the device meets requirements in effect as of the date of installation in the new location; however, the device shall not be required to be traceable to ~~a~~ an active Certificate of Conformance

(7) A device in service in another State prior to _____, 20_ may be installed in this State; however, the device shall meet the specifications, tolerances, and technical requirements for weighing and measuring devices in National Institute of Standards and Technology Handbook 44, and be traceable to ~~a~~ an active Certificate of Conformance.

(8) One-of-a-kind Device. — The Director may accept the design of a one-of-a-kind device without an NTEP evaluation pending inspection and performance testing to satisfy that the device complies with Handbook 44 and is capable of performing within the Handbook 44 requirements for a reasonable period of time under normal conditions of use.

Indicators and load cells in all "one-of-a-kind" scale installations must have ~~a~~ an active NTEP CC as evidence that the system meets the influence factor requirements of Handbook 44. (Amended 1998)

(9) Repaired Device. -- If a person makes changes to a device to the extent that the metrological characteristics are changed, that specific device is no longer traceable to the active Certificate of Conformance.

(10) Remanufactured Device. -- If a person repairs or remanufactures a device, they are obligated to repair or remanufacture it consistent with the manufacturer's original design; otherwise, that specific device is no longer traceable to ~~a~~ an active Certificate of Conformance.

(11) Copy of a Device. -- The manufacturer who copies the design of a device that is traceable to ~~a~~ an active Certificate of Conformance, but which is made by another company, must obtain a separate Certificate of Conformance for the device. The Certificate of Conformance for the original device shall not apply to the copy.

(12) Device Components -- If a person buys a load cell(s) and an indicating element that are traceable to Certificates of Conformance and then manufactures a device from the parts, that person shall obtain ~~a~~ an active Certificate of Conformance for the device.

Section 5. Participating Laboratory and Agreements

The Director is authorized to:

(1) Operate a Participating Laboratory as part of the National Type Evaluation Program. In this regard, the Director is authorized to charge and collect fees for type evaluation services.

(2) Cooperate with and enter into agreements with any person in order to carry out the purposes of the act.

~~**Section 6. Unlawful Acts**~~

~~It shall be unlawful for any person to:~~

~~(1) Use a device in a commercial application unless an active Certificate of Conformance has been issued for such device unless exempt in Section 4.~~

~~(2) Sell a device for use in a commercial application unless an active Certificate of Conformance has been issued for such device unless exempt in Section 4.~~

Section ~~7~~ 6. Revocation of Conflicting Regulations

All provisions of all orders and regulations heretofore issued on this same subject that are contrary to or inconsistent with the provisions of this regulation, ~~and specifically,~~ are hereby revoked.

Section ~~8~~ 7. Effective Date

This regulation shall become effective on -.

Report of the Committee on Specifications and Tolerances

George S. Shefcheck, Chairman
Administrator Measurement Standards
Oregon Department of Agriculture

Reference
Key Number

300 Introduction

This is the final report of the Committee on Specifications and Tolerances (S&T) for the 86th Annual Meeting of the National Conference on Weights and Measures (NCWM). The report is based on the 86th Interim Report offered in NCWM Publication 16, "Committee Reports," the Addendum Sheets issued at the Annual Meeting, and actions taken by the membership at the Voting Session of the Annual Meeting.

Table A identifies the agenda items in the report by Reference Key Number, Item Title, and Page Number. The item numbers are those assigned in the Interim Meeting Agenda. Voting items are indicated with a **"V,**" or if the item was part of the consent calendar by the suffix **"VC"** after the item number. Items marked with an **"I"** after the reference key number are information items. Items marked with a **"D"** after the key number are developing issues. The developing designation indicates an item has merit; however, the item is returned to the submitter to develop further before any action is taken at the national level. The Committee withdrew items marked with a **"W."** Items marked with a **"W"** generally will be referred to the regional weights and measures associations because they either need additional development, analysis, and input, or did not have sufficient Committee support to bring them before the NCWM. Table B lists the Appendices to the report, and Table C provides a summary of the results of the voting on the Committee's items and the report in entirety.

The attached report contains many recommendations to revise or amend National Institute of Standards and Technology (NIST) Handbook 44, 2001 Edition, "Specifications, Tolerances, and other Technical Requirements for Weighing and Measuring Devices." Proposed revisions to the handbook are shown in **bold face print** by ~~crossing out~~ text to be deleted, and underlining information to be added. Requirements that are proposed to be nonretroactive are printed in italics. Entirely new paragraphs or sections proposed for addition to the handbook are designated as such and shown in **bold face print.**

Note: The policy of the National Institute of Standards and Technology is to use metric units of measurement in all of its publications; however, recommendations received by the NCWM technical committees have been printed in this publication as they were submitted and may, therefore, contain references to inch-pound units.

Reference
Key Number

Table A
Index to Reference Key Items

Table B
Appendices

Table B
Appendices (continued)

Table C
Voting Results

Reference Key Number	House of State Representatives		House of Delegates		Results
	Yeas	Nays	Yeas	Nays	
300 (Consent Calendar)					Passed
310-1A	32	0	34	4	Passed
310-1B	27	8	27	18	Passed
310-2	29	5	30	12	Passed
324-1	Voice Vote All Yeas				Passed
330-4	42	1	39	0	Passed
300 (Report in its Entirety) Voice Vote	All Yeas	No Nays	All Yeas	No Nays	Passed

Details of all Items Follow in Numerical Order

310 General Code

310-1A V Appendix D; Definitions for Manufactured, Repaired and Remanufactured Devices and Elements

(This item was adopted.)

(At the recommendation of the Remanufactured Device Task Force S&T Agenda Item 310-1 was split into two parts 310-1A, Appendix D Definitions, and 310-1B, G-S.1. Identification to separately consider the merits of each proposal.)

Source: Carryover Item 310-1 (This item originated from the Central Weights and Measures Association and first appeared on the S&T Committee's 1997 agenda as Item 310-1.)

Recommendation: Modify the current Handbook 44 Appendix D definition of manufactured device as follows:

> **manufactured device. Any ~~new device or any other device that has been removed from service and substantially altered or rebuilt.~~ commercial weighing or measuring device shipped as new from the original equipment manufacturer.**

Add the following new definitions to Handbook 44:

> **remanufactured device. A device that is disassembled, checked for wear, parts replaced or fixed, reassembled and made to operate like a new device of the same type.**
>
> **remanufactured element. An element that is disassembled, checked for wear, parts replaced or fixed, reassembled and made to operate like a new element of the same type.**
>
> **repaired device. A device to which work is performed that brings the device back into proper operating condition.**
>
> **repaired element. An element to which work is performed that brings the element back into proper operating condition.**

Editor's Note: In preparing the 2002 edition of NIST Handbook 44 for publication, Handbook editors noted that the terms "repaired device" and "repaired element" are not used in Handbook 44 and, thus, do not include the required code references in the definitions. An editorial note was added to the 2002 Handbook 44 General Code paragraph G-S.1.1. acknowledging that these two definitions are included in Appendix D to assist in interpreting and using the terms "remanufactured device" and "remanufactured element" which appear in G-S.1.1. Consequently, the definitions for "repaired device" and "repaired element" appear with a code reference of Section 1.10. General Code.

Discussion: This issue first appeared on the NCWM Board of Directors (BOD formerly Executive Committee) 1996 Agenda as Item 102-8. In 1997, proposals to modify NIST Handbook 44 to address remanufactured devices were discussed in a special meeting of the NCWM Specifications and Tolerances (S&T) Committee. Weights and measures officials and industry representatives worked diligently to reach a consensus on language that was clear and nonrestrictive and could be uniformly enforced. In 1999, the NCWM BOD agreed with the S&T Committee's recommendation to appoint a task force to resolve enforcement and NTEP issues surrounding remanufactured devices.

In August 2000, the NCWM Remanufactured Device Task Force released its report and proposals for defining and marking remanufactured devices (See Appendix A). The Task Force asked that the S&T Committee take the lead role in presenting the findings to the NCWM. The Task Force proposed changes to NIST Handbook 44 Appendix D to address remanufactured and repaired equipment. The Task Force asked that both the NCWM Laws and Regulations and National Type Evaluation Program (NTEP) Committees make corresponding changes to NIST Handbook 130 and NCWM Publication 14 to ensure uniformity of the terminology in the documents. The Task Force also recommended revisions to NIST Handbook 44 General Code paragraph G-S.1. under S&T Agenda Item 310-1B.

The Task Force considered how current NTEP Policy addressed remanufacture or repair work, where any design and/or metrological changes affect a device's traceability to a Certificate of Conformance. The Task Force worked from NCWM Publication 14 list of device parameters affecting metrological characteristics to develop definitions. The Task Force intended that the definitions be concise to avoid any misinterpretation of lengthy text. The Task Force created a list of examples to clarify each definition. They also provided guidance on the appropriate committees to consult, if further direction was needed on related terms and enforcement of the proposals. The Task Force recognized that each jurisdiction establishes its own policies for remanufactured devices that lack markings or do not comply with other requirements.

The regional weights and measures associations reviewed the Task Force's proposals and expressed appreciation for the work to complete the report and proposals while they waited for industry's input. The regional associations recommended the marking requirement proposal move forward to the NCWM S&T Agenda although several asked questions in an effort to clarify the intent of the definitions. The regional associations also recommended an editorial change to clarify that the marking requirement is intended for remanufactured devices *and* remanufactured elements. The associations also recommended including the guidelines in more widely publicized documents such as Publication 14 and Handbook 44. The associations asked about (1) the use of qualifying terms such as "enough" to define repaired equipment, (2) the application of the definitions to pre-NTEP devices, (3) how to distinguish what is considered normal maintenance that requires no reinspection from repairs that do require inspection and test by a weights and measures official, and (4) expanding the list of parameter changes to include more examples of measuring devices to clarify what is meant by the term "disassemble."

At the January 2001 NCWM Interim Meeting, the Committee commended the Task Force on its work to address issues raised about the enforcement of the proposed remanufactured device requirements and their effect on NTEP Policy. The Committee supported the theory and concept behind identifying devices to enable operators and weights and measures officials to determine when a device is remanufactured rather than repaired.

The Committee heard a number of comments in favor of the proposed definitions; however, NCWM members also cited several instances where the examples did not agree with current practices and in which they had difficulty determining when work is "enough" to consider a device remanufactured rather than repaired. For example, adjustments are made to a scale during a routine maintenance, the owner then decides to have worn pivots and bearings replaced. The replacing of these parts makes this a remanufactured device according to the proposed guidelines. Chairman Truex noted that "enough" work only brings the device into compliance whereas remanufacturing involves replacing parts to return it to a like new condition.

The Committee had similar concerns with some of the interpretations of the guidelines presented in the examples. After the 2001 NCWM Interim Meeting, the Task Force revisited the examples and clarified the guidelines by addressing concerns expressed about what qualifies as "enough" work. The Task Force developed alternate definitions for repaired device and repaired element shown in the recommendation above which no longer contain any reference to "enough." The alternate guidelines developed by the Task Force are included in Appendix A in table format.

During the July 2001 NCWM Annual Meeting, the Committee recognized that the issue of remanufactured devices remains a complex one and that there will be instances where field officials will need guidance to determine when a device is remanufactured. The Committee agreed that there are several examples in the table that require further review and clarification. For instance, in example I.N. where 2 of 8 load cells are removed and replaced with identical cells requires work to clarify whether the replacement of fewer than 2 cells or more than 2 cells would be considered a "remanufacture" of the device. Therefore, the Committee carried over the Table of Guidelines as an item for its January 2002 NCWM Interim Agenda. The Committee agreed to consider adding the table as an Appendix to a later edition of Handbook 44 after 310-1A and 310-1B are adopted by the NCWM.

For additional background information on this item, refer to the 1997 through 2000 final reports of the S&T Committee.

310-1B V G-S.1. Identification; Remanufactured Devices and Main Elements

(This item was adopted.)

Source: (*At the recommendation of the Remanufactured Device Task Force S&T Agenda Item 310-1 was split into two parts 310-1A, Appendix D Definitions, and 310-1B, G-S.1. Identification to separately consider the merits of each proposal. This item first appeared on the S&T Committee's 1997 Agenda as Item 310-1.)*

Recommendation: Add the following marking requirement to the General Code:

G-S.1.1. Remanufactured Devices and Remanufactured Main Elements. – All remanufactured devices and main elements shall be clearly and permanently marked for the purposes of identification with the following information:

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

(b) the remanufacturer's or distributor's model designation if different than the original model designation.

[Nonretroactive as of January 1, 2002.]

Discussion: In August 2000, the NCWM Remanufactured Device Task Force completed its work to address requirements for remanufactured devices. The Task Force developed the marking requirements in the recommendation above for remanufactured devices and main elements.

Both the regional weights and measures associations and the Gasoline Pump Manufacturers Association supported the Task Force's proposed marking requirements.

The Committee commends the Task Force on its work to address its primary charge of developing a marking requirement that identifies the party responsible for work performed on a device. The Task Force noted that Publication 14 Administrative Procedures, Table 1 which lists devices, elements, and systems includes good examples of equipment that are subject to the proposed marking requirements. The list may not be all inclusive, but it describes equipment which affects the measurement process or the validity of the transaction and all equipment to the point of the first indicated or recorded representation of the final quantity on which the transaction will be based. It is important to determine the party responsible for equipment that affects the metrological characteristics of the device. The Task Force provided examples about how the marking requirement applies to specific work performed on devices (See Appendix A Tables in Sections I, II, and III). The Task force did so because it finds there is too much ambiguity when terms such as "metrologically significant" are used to describe equipment. The proposed marking information is intended to supplement the original equipment manufacturer's markings.

The Committee considered comments from the Central Weights and Measures Association (CWMA) recommending an editorial change to clarify that the remanufactured equipment marking requirement is intended for both devices *and* elements. There were numerous other regional comments supporting the marking requirement.

The Committee heard some questions concerning the permanence of the required markings. The Committee noted that the current interpretation of permanence for marking requirements in Publication 14 applies to the proposal. The Committee also noted that labels that indicate "void" should be evaluated carefully on a case-by-case basis to ensure that they are suitable for marking a remanufactured device because the badge might be easily removed, losing the intended purpose for the marking. The Committee has concerns about what is the appropriate location for marking electronics such as circuit boards that are remanufactured and asks for input from the NTEP technical sectors and regional associations.

310-2 V G-S.1. Identification; Certificate of Conformance Number

(This item was adopted.)

Source: Carryover Item 310-3 (This item originated from the Southern Weights and Measures Association (SWMA) and first appeared on the S&T Committee's 2000 agenda.)

Recommendation: Modify paragraph G-S.1. Identification as follows:

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

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

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

(c) the model designation shall be prefaced by the term "Model," "Type," or "Pattern." These terms may be followed by the term "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.)
[Nonretroactive January 1, 2003]

[Note: Prefix lettering may be initial capitals, all capitals, or all lower case.]

(d) except for equipment with no moving or electronic component parts, a nonrepetitive serial number;
[Nonretroactive as of January 1, 1968.]

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

(f) the serial number shall be prefaced by the words "Serial Number" or an abbreviation of that term. Abbreviations for the word "Serial" shall, as a minimum, begin with the letter "S," and abbreviations for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., S/N, SN, Ser. No, and S No.). ~~.~~ ; and
[Nonretroactive as of January 1, 2001.]

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

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

Discussion: This proposal first appeared on the S&T Committee's 2000 agenda. The requirement was intended to provide information that makes it easier for field officials to trace a device design to an NTEP CC. The Committee made the item informational to await input from industry and weights and measures officials, to ensure that the language did not conflict with OIML requirements, and was fully developed.

One manufacturer continued to express concern about which industry representative is permitted to place a CC Number on a device and what occurs when a CC Number becomes inactive. NTEP Policy defines an inactive CC as one which was previously active, but the devices are no longer being manufactured for commercial applications. Provided NTEP is supplied with the serial number or date code of the last device of that model manufactured, new devices already sold or in inventory, but not yet sold, may be sold under an inactive CC. If NTEP is not supplied with the last serial number or date code, new devices already manufactured but not sold may be sold under an inactive CC for a period of 12 months.

In 2000, the Western, Northeastern, and Southern Weights and Measures Associations believed the proposal had merit, but also supported the Scale Manufacturers Association (SMA) which stated that it intended to develop an alternate proposal. The SWMA asked the SMA to address weights and measures officials' concerns that an OIML number does not relate to an NTEP CC number and may create further confusion. During its Fall 2000 meeting, the SMA decided to support the proposal hearing no opposition from its international members. However, the SMA noted it still had concerns that the term "approval" might be associated with the regulatory officials approval seal.

The Committee recognized that the proposal requires additional information to be marked on the device, but believes the field inspector needs this information. The Committee acknowledged that the CC information is available on the Internet; however, not all jurisdictions are equipped with personal computers or laptops with Internet access. The Committee modified the proposal as shown in the recommendation above to recognize that it is acceptable to mark the device with either the NTEP original parent CC number or subsequent addended CC Number.

The Committee reiterated that there is precedence for identifying the model with the term "approval" in the Mass Flow Meters Code. The Committee also believes that accepting the use of the term "approval" allows the manufacturer to use one generic label in both the U.S. and international markets. The Committee agreed to modify the proposed requirement

to clarify that this is a mandatory requirement by including the text "shall be prefaced." The Committee agreed with comments that the text stating "the device may be marked with either the NTEP original parent CC number or subsequent addended CC number that covers the particular device" might create confusion. Consequently, the text was deleted from the proposal. The Committee recognized that either number may be used as long as that CC lists the specific device options, features, and particular application. The Committee reiterated the importance of carefully reviewing a device's CC to determine what specific parameters and applications the Certificate covers.

For additional background information on this item refer to the 2000 final report of the S&T Committee.

310-3 VC G-S.1. Identification; Abbreviation of the Term "Model"

(This item was adopted.)

Source: National Type Evaluation Technical Committee (NTETC) Measuring Sector

Recommendation: Modify paragraph G-S.1. Identification as follows:

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

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

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

(c) the model designation shall be prefaced by the term "Model," "Type," or "Pattern." These terms may be followed by the term "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.) <u>The abbreviation for the word "Model" shall be "Mod" or "Mod."</u> [Nonretroactive January 1, 2003.]

[Note: Prefix lettering may be initial capitals, all capitals, or all lower case.]

(d) except for equipment with no moving or electronic component parts, a nonrepetitive serial number; [Nonretroactive as of January 1, 1968.]

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

(f) the serial number shall be prefaced by the words "Serial Number" or an abbreviation of that term. Abbreviations for the word "Serial" shall, as a minimum, begin with the letter "S," and abbreviations for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., S/N, SN, Ser. No, and S No.). [Nonretroactive as of January 1, 2001.]

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

Discussion: In July 2000, the NCWM added language to General Code paragraph G-S.1. that requires the model designation to be clearly identified on a device.

In discussing the implementation of this requirement, the NTEP Measuring Laboratories agreed that acceptable abbreviations for the term "model" must be specified in order to ensure uniform application of the requirement. Consequently, the Measuring Laboratories submitted a proposal to the NTETC Measuring Sector and asked the Sector to consider forwarding the proposal to the S&T Committee for consideration.

One laboratory noted that liquid measuring device manufacturers place a premium value on the display screen space and prefer less required marking information. The Sector agreed to submit a proposal to the S&T Committee to specify that

the term "Mod" is the only acceptable abbreviation for the term "model." The Sector also agreed that "Mode" is not an acceptable abbreviation of the term "model."

During discussions of this item at the 2001 NCWM Interim Meeting, the Committee heard support for the proposal and agreed that listing acceptable abbreviations for the term "Model" ensures uniform interpretation of Handbook 44 marking requirements. The Committee concluded that either the term "Mod" or the term "Mod." is an acceptable abbreviation of the term "Model." Consequently, the Committee modified the recommendation to include both terms.

310-4 W G-S.1. Identification; Information Location

(This item was withdrawn.)

Source: Northeastern Weights and Measures Association (NEWMA)

Discussion: The Committee considered the following proposal to modify paragraph G-S.1. Identification as follows:

> G-S.1. Identification. – All equipment, except weights and separate parts necessary to the measurement process but not having any metrological effect, shall be clearly and permanently marked for the purposes of identification with the following information:
>
> (a) the name, initials, or trademark of the manufacturer or distributor;
>
> (b) a model designation that positively identifies the pattern or design of the device;
>
> *(c) the model designation shall be prefaced by the term "Model," "Type," or "Pattern." These terms may be followed by the term "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.)*
> *[Nonretroactive as of January 1, 2003.]*
>
> *[Note: Prefix lettering may be initial capitals, all capitals, or all lower case.]*
>
> *(d) except for equipment with no moving or electronic component parts, a nonrepetitive serial number;*
> *[Nonretroactive as of January 1, 1968.]*
>
> *(e) the serial number shall be prefaced by words, an abbreviation, or a symbol, that clearly identifies the number as the required serial number; and*
> *[Nonretroactive as of January 1, 1986.]*
>
> *(f) the serial number shall be prefaced by the words "Serial Number" or an abbreviation of that term. Abbreviations for the word "Serial" shall, as a minimum, begin with the letter "S," and abbreviations for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., S/N, SN, Ser. No, and S No.).*
> *[Nonretroactive as of January 1, 2001.]*
>
> The required information shall be so located that it is readily and safely observable without the reader being required to assume an unsafe or unhealthy position and that the print be of such size as to provide readability from a standing position without the necessity of the disassembly of a part requiring the use of any means separate from the device.

The location of the identity (ID) badges found on retail motor-fuel dispensers has been a NEWMA concern for some time. Presently, as required, ID badges are located on a permanent part of the dispenser. In most cases, the plates are located in the extreme lower corners of the device. This location requires an inspector to be on hands and knees to read the badge. The position that the inspector must assume to read the ID badge is unsafe, because of his or her poor visibility to vehicular traffic. In northern climates the proximity of the badges exposes them to road salt residue which defaces the badges to the extent they require cleaning before the print can be read.

During the 2001 NCWM Interim Meeting, the Committee received the following alternate proposal from NEWMA to add a new paragraph S.4.X. to the Liquid-Measuring Devices Code rather than modifying General Code paragraph G-S.1.

S.4.X. Location of Marking Information; Retail Motor-Fuel Dispensers. – The required marking information in the General Code, Paragraph G-S.1. shall appear as follows:

(a) The information may appear on the outside area of the dispenser when placed above the midpoint of the dispenser;

(b) If the information appears below the midpoint of the dispenser, it shall be placed on the framework of the dispenser behind the lower access door or panel. The use of a dispenser key shall not be considered a tool separate from the device.

The Committee believed that NEWMA's alternate proposal has merit, but is not fully developed. Consequently, the Committee agreed to withdraw Agenda Item 310-4 and retitle and renumber the alternate proposal to Developing Agenda Item 360-4, Appendix H, Item 1, S.4.X. Location of Marking Information. The Committee also heard that the alternate proposal represents substantial changes that might affect equipment in commercial use and must also be reviewed by manufacturers and weights and measures officials. For additional discussion on the alternate proposal see new Agenda Item 360-4 Appendix H, Item 1.

320 Scales

320-1 VC Table S.6.3.a. Marking Requirements

(This item was adopted.)

Source: Carryover Item 320-2 (This item originated from the National Type Evaluation Technical Committee (NTETC) Weighing Sector and first appeared on the S&T Committee's 2000 agenda.)

Recommendation: Modify Table S.6.3.a. as follows:

Table S.6.3.a.
Marking Requirements

Weighing Equipment **To Be Marked With**	Weighing, load-receiving, and indicating element in the same housing **or covered on the same CC[1]**	Indicating element not permanently attached to weighing and load-receiving element **or covered by a separate CC**	Weighing and load-receiving element not permanently attached to indicating element **or covered by a separate CC**	Load cell with CC (11)	Other equipment or device (10)
…					
Section Capacity (14)(20)		x	x		

Add new Footnote 1 to Table S.6.3.a. to read as follows:

[1]Weighing/load receiving elements and indicators which are in the same housing or which are permanently attached will generally appear on the same CC. If not in the same housing, elements shall be hard wired together or sealed with a physical seal or an electronic link. This requirement does not apply to peripheral equipment that has no input or effect on device calibrations or configurations.

Add the following new definition to Appendix D:

electronic link. An electronic connection between the weighing/load receiving or other sensing element and indicating element where one recognizes the other and neither can be replaced without calibration.

Discussion/Background: In 1998 and 1999, the Weighing Sector considered several proposals to modify Table S.6.3.a., to provide more definitive guidelines for determining when devices are "not permanently attached." The Sector heard

concerns about unmarked indicators because there are no means to readily determine whether or not the indicator was originally submitted and tested by NTEP as a separate component or within a single housing and intended to be part of a system. The Sector agreed that devices should be classified as "not permanently attached" based on the technical aspects of how the elements interface. One proposal considered by the Sector changed the headings of the 3rd and 4th column in Table S.6.3.a. to read "Indicators with CC" and "Weighing and Load-Receiving Elements with CC," respectively. The S&T Committee was concerned that this proposed change would essentially eliminate marking requirements for non-permanently attached indicators in non-NTEP states.

In January 2000, the Sector submitted a proposal to the S&T Committee to add a footnote to the 4th column in Table S.6.3.a. to specify "permanently attached components may be hard wired or secured together with a physical or electronic seal." The Committee considered the Sector's 2000 proposal, but agreed with one jurisdiction's concern that the proposed footnote might be misinterpreted to mean no markings are required when indicators are physically sealed.

During the July 2000 NCWM Annual Meeting, the Committee considered two alternate proposals from the Scale Manufacturers Association (SMA). The Committee made this issue an information item to allow sufficient time for industry and weights and measures officials to ensure the proposal correctly addressed the Sector's original intent. (For additional background information on this item refer to the1998 and 2000 final reports of the S&T Committee.)

At its September 2000 meeting, the Sector agreed that the original intent of the proposed changes to Table S.6.3. was to address instances where "permanently attached" elements are not located in the same housing rather than apply the changes to elements in the column that represent "Weighing and Load-receiving Element Not Permanently Attached to Indicating Element." Proposals that appeared on the S&T Committee agenda up to that point implied that elements with separate CCs must be sealed together. Therefore, the proposed footnote was changed to apply to elements in column two (same housing or same CC) of Table S.6.3.a.

One method of permanently attaching elements is to use an "electronic seal." An "electronic seal" was a method developed by Mettler-Toledo, Inc. to tie or link individual elements together. The electronic seal links the elements by electronically-encoding information that link the elements together. When the elements are physically separated the link is broken and recalibration of the elements is required for the equipment to operate again. The equipment is prevented from operating when substitute or replacement elements are used because the individual elements do not recognize the electronically-encoded information. Although this meets the intent of permanently attaching the elements together, Publication 14 did not recognize this method of permanently attaching elements when not in the same housing. Therefore, the Sector developed a definition to recognize the electronic security seal as a means to permanently attach elements.

The Western Weights and Measures Association (WWMA) reviewed the July 2000 proposal and the alternate proposal developed at the September 2000 Weighing Sector Meeting. The WWMA agreed that the 2000 Weighing Sector's proposal better clarified when marked and unmarked elements are permanently attached and how those elements must be covered on CCs and/or interface with other components to create a weighing system.

The Southern Weights and Measures Association (SWMA) supported the Weighing Sector's recommendation to modify Table S.6.3.a. to address devices that are not permanently attached. The SWMA believed the Sector's proposed definition of "electronic security seal" did not address audit trails which are an electronic form of securing adjustable device features. The SWMA also noted that any definition of electronic security seals, like current Handbook 44 codes, should list specific sealing features that are required for each category of device; and therefore recommended changing all references to the term "electronic security seal" to "electronic link."

During the 2001 Annual Meeting, the Committee acknowledged that there are other device technologies with electronic links such as electronic taximeters that secure metrologically significant components with electronic links. The electronically linked components become inoperable when physically separated; the components become operable again only when reconnected to the components with which they were calibrated. The Committee modified the proposed definition to recognize other device technologies. The Committee also modified the footnote to clarify that the marking requirements in Table S.6.3.a. does not apply to equipment that has no affect on device calibration or configuration.

320-2 VC S.6.4. Railway Track Scales

(This item was adopted.)

Source: National Type Evaluation Technical Committee (NTETC) Weighing Sector

Recommendation: Modify paragraph S.6.4. as follows:

> **S.6.4. Railway Track Scales. – A railway track scale shall be marked with the maximum capacity of each section of the load-receiving element of the scale. Such marking shall be accurately and conspicuously presented on, or adjacent to, the identification or nomenclature plate that is attached to the indicating element of the scale.** ***The nominal capacity of a scale with more than two sections shall not exceed twice its rated section capacity. The nominal capacity of a two-section scale shall not exceed its rated section capacity.***
> ***[Nonretroactive as of January 1, 2002.]***

Add the following definition to Handbook 44, Appendix D:

> **section capacity. The section capacity of a scale is the maximum live load that may be divided equally on the load pivots or load cells of a section.**

Discussion: During the 1998 Weighing Sector Meeting, the Scale Manufacturers Association (SMA) was asked for input on the minimum amount of known test standards for evaluating railway track scales. Existing NTEP policy for modular scales permitted a Certificate of Conformance (CC) to cover 135 percent of the scale capacity evaluated. For example, the evaluation of a scale with a capacity of 400 000 lb would result in a CC which covered devices with a capacity up to 540 000 lb.

At its 1999 meeting, the Weighing Sector questioned the appropriateness of applying the modular criteria to railway track scales. The Sector asked that the SMA consider any limiting factors and avoid conflicts with current American Association of Railroad (AAR) and U.S. Department of Agriculture, Grain Inspection Packers and Stockyard Administration requirements as SMA continued work on the minimum standards for railway track scale evaluations.

At its September 2000 meeting, the Sector heard one suggestion that a capacity limit for railway track scales could be based on criteria similar to the AAR handbook, which for full electronic scales uses the section capacity of the scale, based on the capacity of the individual load cells, to determine the maximum capacity for the scale. The Sector agreed that modifying paragraph S.6.4. and adding a new definition for section capacity to Handbook 44 are needed to clarify how capacity limits apply to railway track scales. The capacity limits are based on load cell criteria and are not intended to conflict with load cell capacity or other scale design principles.

At the 2001 NCWM Annual Meeting, the Committee recognized that there may be devices in use that would not comply with the proposed requirement and, therefore, modified the proposal to become a nonretroactive requirement. The Committee heard recommendations to modify the definition by removing the reference to the "live load" because Handbook 44 contains no definition for the term. The Committee noted that there is a need to distinguish between live and dead loads and believes these terms are understood. The Committee agreed to modify the proposed definition of section capacity by replacing the term "greatest" with "maximum" for consistency with the terminology used in other Scales Code requirements.

320-3 VC N.1.3.4.(a)Vehicle Scales, Axle-Load Scales, and Livestock Scales With More Than Two Sections; Prescribed Test Pattern

(This item was adopted.)

Source: Carryover Item 320-3 (This item originated from the Southern Weights and Measures Association (SWMA) and first appeared on the S&T Committee's 2000 agenda.)

Recommendation: Modify paragraph N.1.3.4.(a) as follows:

> **(a) Prescribed Test Pattern. The normal prescribed test pattern shall be an area of 1.2 m (4 ft) in length and ~~as wide as the scale platform~~ 3.0 m (10 ft) in width or the width of the**

scale platform, whichever is less. Multiple test patterns may be utilized when loaded in accordance with Paragraph (b).

Discussion: The Committee believed the proposal as written clarifies the appropriate dimensions of the test pattern and placement of test weights for livestock scales. The Committee considered an SMA recommendation to remove the term "livestock" from paragraph N.1.3.4. because the CLC test pattern is not suitable for livestock scales. The SMA indicated livestock scales should have a separate requirement that addresses the appropriate test pattern. The Committee also heard that paragraph N.1.3.8. All Other Scales Except Crane Scales, Hanging Scales, Hopper Scales, Wheel-Load Weighers and Portable Axle-Load Weighers was not intended to apply to devices with more than two sections. Therefore, the Committee recommended that adequate shift test procedures for livestock scales with more than two sections be included in paragraph N.1.3. Shift Test with Grain Inspection Packers and Stockyards Administration's input. The Committee Technical Advisors developed diagrams proposing shift test patterns for livestock scales based on the Committee's recommendation (See Agenda Item 320-4).

Background: The SWMA supported the Fairbanks Scale's recommendation that the test pattern in paragraph N.1.3.4.(a) be modified so that it is consistent with the maximum axle load concentration pattern described in the definition of concentrated load capacity (CLC). Fairbanks expressed concern about advertisements misrepresenting a scale's CLC when that value is based on weights loaded in test patterns other than prescribed in Handbook 44.

During the 2000 NCWM Interim Meeting, the Committee considered a proposal to modify paragraph N.1.3.4.(a) to limit the area of the normal prescribed test pattern width to 2.4 m (8 ft) rather than the width of the scale platform. The Committee also heard a suggestion to address test patterns for scales which are 10 feet wide or less separately from those that exceed 10 feet in width. The Committee still had concerns that the proposal may impose restrictions on weights and measures field test equipment. Safety issues may occur when large amounts of test weights are stacked within the proposed 4-foot by 8-foot test pattern. The Committee agreed that the proposal had merit because scale accuracy tests "as used" are necessary and are the best indicator of device performance.

Many weights and measures jurisdictions and NTEP laboratories also had safety and equipment concerns about stacking weights and weight carts in an 8-foot wide test pattern. One solution to those concerns was to allow a test pattern of 10 feet or the scale width, whichever is less. The suggested test pattern width of 10 feet or the scale width, whichever is less, might resolve all issues with the original proposal, as well as the problem with wider scale configurations.

The Committee acknowledged that the Metrology Subcommittee is gathering data on weight cart dimensions to avoid similar conflicts between any new weight cart standards and existing or proposed Handbook 44 requirements. At the 2000 Annual Meeting, the Committee agreed it was appropriate to modify the test pattern width to 10 feet rather than 8 feet.

The Northeastern, Western, and Southern Weights and Measures Association supported a test pattern of 10 feet or the width of the scale, whichever is less because those dimensions better address the original concerns about an appropriate test pattern and also accommodate most jurisdiction's test equipment.

For additional background on this item refer to the 2000 final report of the S&T Committee.

320-4 I N.1.3.4. Vehicle Scales, Axle-Load Scales, and Livestock Scales with More Than Two Sections; Table S.6.3.a. Marking Requirements, Table S.6.3.b. Notes, and Appendix D; Definition for Concentrated Load Capacity

(This item was changed from a voting item to an information item at the Annual Meeting.)

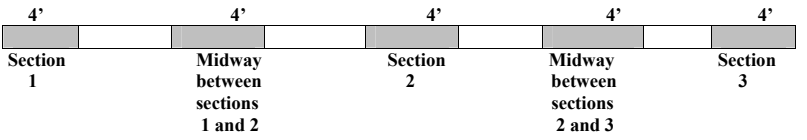
Source: National Type Evaluation Technical Committee (NTETC) Weighing Sector

Recommendation: Modify paragraph N.1.3.4. as follows:

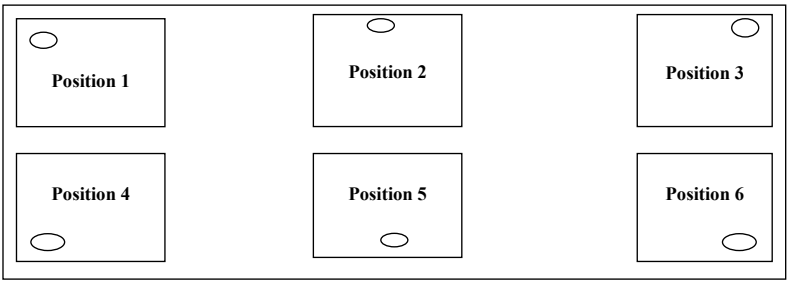
N.1.3.4. Vehicle Scales, Axle-Load Scales, and Livestock Scales with More Than Two Sections. - At least one shift test shall be conducted with a minimum test load of 12.5% of scale capacity and may be performed anywhere on the load-receiving element using the prescribed test patterns and maximum test loads specified below. (Two-section livestock scales shall be tested consistent with N.1.3.8.)

(a) **Prescribed Test Pattern. The normal prescribed test pattern shall be an area of 1.2 m (4 ft) in length and ~~as wide as the scale platform~~ 3.0 m (10 ft) in width or the width of the scale platform, whichever is less. Multiple test patterns may be utilized when loaded in accordance with Paragraph (b) or (c) as applicable.**

Prescribed Test Pattern for Vehicle and Axle-Load Scales:



Prescribed Test Pattern For Livestock Scales With More Than Two Sections: Test load is one-quarter nominal capacity, where ⬭ represents the load cell or load bearing point.



(b) **Maximum Loading *for Vehicle and Axle Load Scales*. When loading the scale for testing, one side of the test pattern shall be loaded to no more than half of the concentrated load capacity or test load before loading the other side. The area covered by the test load may be less than 1.2 m (4 ft) *x 3.0 m (10 ft) or* the width of the scale *whichever is less*; for test patterns less than 1.2 m (4 ft) in length the maximum loading shall meet the formula: [(wheel base of test cart or length of test load divided by 48 in) x 0.9 x CLC]. The maximum test load applied to each test pattern shall not exceed the concentrated load capacity of the scale. When the test pattern exceeds 1.2 m (4 ft), the maximum test load applied shall not exceed the concentrated load capacity times the largest "r" factor in Table UR.3.2.1. for the length of the area covered by the test load. For weighing elements installed prior to January 1, 1989, the rated section capacity may be substituted for concentrated load capacity to determine maximum loading. An example of a possible test pattern is shown ~~below~~ above:**

(c) ***Maximum Loading for Livestock Scales. When loading the scale for testing, one side of the test pattern shall be loaded to no more than half of the test load as specified in the prescribed test patterns above before loading the other side. The area covered by the test load may be less than 1.2 m (4 ft) x 3.0 m (10 ft) or the width of the scale whichever is less. The maximum test load applied to each test pattern shall not exceed the section capacity of the scale.***

(~~c~~ d) Multiple Pattern Loading. To test the nominal capacity, multiple patterns may be simultaneously loaded in a manner consistent with the method of use. For livestock scales manufactured between January 1, 1989 and January 1 2002, the required loading shall be no greater than one-half CLC.

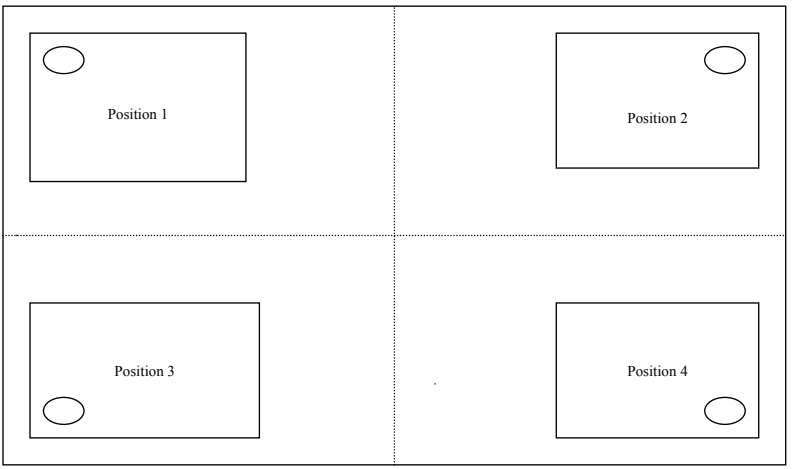
~~(d)~~ (e) Other Designs. Special design scales and those that are wider than 3.7 m (12 ft) shall be tested in a manner consistent with the method of use but following the principles described above.

(Amended 1988)

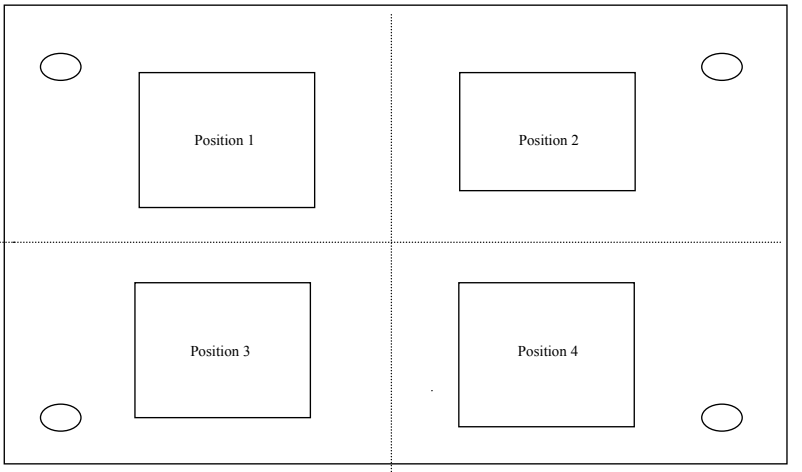
Modify paragraph N.1.3.8. as follows:

N.1.3.8. All Other Scales Except Crane Scales, Hanging Scales, Hopper Scales, Wheel-Load Weighers, and Portable Axle-Load Weighers. – A shift test shall be conducted with a half-capacity test load centered, as nearly as possible, successively at the center of each quarter of the load-receiving element, or with a quarter-capacity test load centered, as nearly as possible, successively over each main load support.

Prescribed Test Pattern For Livestock Scales: Test load is one-quarter of nominal capacity not to exceed one-half of rated section capacity, where ⬭ represents the load cell or load bearing point.



Prescribed Test Pattern For Livestock Scales: Test load is one-half nominal capacity not to exceed one-half of rated section capacity centered at the center of each quarter of the load-receiving element, where ⬭ represents the load cell or load bearing point.



Modify Table S.6.3.a. as follows:

Table S.6.3.a.
Marking Requirements

Weighing Equipment To Be Marked With	Weighing, load-receiving, and indicating element in same housing	Indicating element not permanently attached to weighing and load-receiving element	Weighing and load-receiving element not permanently attached to indicating element	Load cell with CC (11)	Other equipment or device (10)
. . .					. . .
Concentrated Load Capacity CLC (12) (20) *(22)*		**x**	**x (9)**		
. . .					. . .
Section Capacity (14) (20) *(22)*		**x**	**x**		

For applicable notes see Table S.6.3.b.

Modify the following paragraphs 9, 12, and 14 in Table S.6.3.b. as follows:

9. ***For vehicle, <u>and</u> axle-load, ~~and livestock~~ scales only. The CLC shall be added to the load-receiving element of any such scale not previously marked at the time of modification. [Nonretroactive as of January 1, 1989.]***

12. **Required on the indicating element *and the load-receiving element* of vehicle, <u>and</u> axle load, ~~and livestock~~ scales. *Such marking shall be identified as "concentrated load capacity" or by the abbreviation "CLC."**
*[*Nonretroactive as of January 1, 1989.]***

14. Required on ~~the indicating element of~~ *livestock scales* and* railway track scales ~~only~~. When marked on vehicle and axle-load ~~and livestock~~ scales manufactured before January 1, 1989, it may be used as the CLC. For livestock scales manufactured between January 1, 1989 and January 1, 2002, required markings shall be either CLC or section capacity.
[*Nonretroactive as of January 1, 2002].

Add the following new paragraph 22 to Table S.6.3.b.

22. Combination vehicle/livestock scales must be marked with both the CLC for vehicle weighing and the section capacity for livestock weighing. All other requirements relative to these markings will apply. [Nonretroactive January 1, 2002.]

Modify the Appendix D definition of Concentrated Load Capacity as follows:

concentrated load capacity (CLC). A capacity rating of a vehicle, or axle load ~~or live stock~~ scale, specified by the manufacturer, defining the maximum load ~~concentration~~ applied by a group of two axles with a centerline spaced 4 feet apart and an axle width of 8 feet for which the weighbridge is designed. ~~In the case of vehicle and axle-load scales, it is the maximum axle-load concentration (for a group of two axles with a centerline spaced 4 feet apart and an axle width of 8 feet) for which the weighbridge is designed as specified by the manufacturer.~~ The concentrated load capacity rating is for both test and use [2.20]

Discussion: The Committee agreed with the proposal to modify paragraph N.1.3.4. and further modified the loading pattern in paragraph N.1.3.4. to be consistent with current rounding practices for equivalent SI and inch-pound values in Handbook 44. During the NCWM 2001 Interim Meeting, the Committee considered an SMA recommendation to remove the term "livestock" from paragraph N.1.3.4. because the CLC test pattern is not suitable for livestock scales. The SMA indicated livestock scales should have a separate requirement that addresses the appropriate test pattern. The Committee also heard that paragraph N.1.3.8. was not intended to apply to devices with more than two sections. The Committee recognized that any prescribed test pattern should address adequate tests of livestock scale corner sections as recommended by Grain Inspection Packers and Stockyards Administration (GIPSA). Therefore, the Committee recommended developing adequate shift test procedures with GIPSA's input for livestock scales with more than two sections in paragraph N.1.3. Following the 2001 Interim Meeting, the Technical Advisors developed proposed shift test patterns for livestock scales that agree with recommended GIPSA test procedures, which are shown in the recommendation above.

The Committee made additional changes to the proposal to ensure the language is consistent with all other Handbook 44 references to livestock scales, based on OWM recommended language. The Committee modified the definition of CLC to delete any reference to livestock scales because livestock applications would now be addressed under the proposed section capacity marking requirements. The Committee further modified Table S.6.3.b. Note 14. to clarify that section capacity markings are required for livestock scales. The modified wording in Note 14 also clarified the status of scales manufactured between 1989 and the nonretroactive January 1, 2002 effective date.

The Committee heard from the Sector Technical Advisor, and private and public sector members that there is general agreement that the proposal requires further changes to separate the livestock scale requirements from other applications. The Committee also heard comments from GIPSA that using six positions for a prescribed test pattern exceeds current field test practices. GIPSA noted that they designate test positions in a clockwise pattern. Consequently, the Committee gave the item informational status so that it can be referred back to the Weighing Sector for additional development.

Background: The NIST Handbook 44 definition for CLC addresses vehicle scales and describes the vehicle footprint where the load may be concentrated during scale use and test. The Handbook 44 formula for CLCs on vehicle scales is derived from the Federal Highway Bridge Formula and represents the maximum load concentration for a group of two or more axles with a centerline spaced 4 feet apart and an axle width of 8 feet. Handbook 44 requires marking of a CLC on livestock scales; however, the CLC maximum load test pattern that applies to vehicle scales does not represent the typical loading pattern of a livestock scale platform. The weight load of live animals may be distributed randomly or animals may group together in one corner of the platform. The USDA GIPSA recommends a maximum load of 110 pounds per square foot for livestock scales.

During its September 2000 meeting, the Weighing Sector considered a formula to determine a livestock scale capacity based on a new term "area load ratio." The term "area load ratio" was based on the GIPSA recommended maximum load

of 110 pounds per square foot. The Sector decided that livestock scales should be marked with a section capacity rather than creating new capacity terminology. The Sector considered that there is a separate proposal (Agenda Item 320-3) to modify paragraph N.1.3.4.(a) to change the width of the prescribed test pattern from a scale width of 8 ft to 10 ft or the scale width, whichever is less. The Sector agreed with that proposal and included similar text in its proposal to address livestock scales. The Sector agreed to the proposal shown in the recommendation above which addresses the test pattern, maximum loading capacity, and markings for livestock scale applications.

At its 2000 Meeting, the Southern Weights and Measures Association (SWMA) raised questions about the differences between GIPSA and Handbook 44 requirements. The SWMA was concerned there are conflicts with Handbook 44 and GIPSA guidelines for minimum division size on animal and livestock scales.

The NIST Office of Weights and Measures (OWM) noted that there were several points that might be considered to ensure the requirements correctly address livestock scale applications. The proposed area width covered by the test load should be rounded to one decimal place to be consistent with other Handbook 44 criteria. The diagram of the sample test pattern was not consistent with paragraph N.1.3.8. where the shift test for two-section livestock scales is performed at the center of each quadrant of the load-receiving element.

NIST-OWM also noted that the proposal, as submitted, to modify paragraphs N.1.3.4. (b) and (c) and Table S.6.3.b. Note 9. did not address scales manufactured between 1989 and 200X. Paragraph (b) did not address these devices at all since it will no longer apply to any livestock scales, and paragraph (c) will not recognize these devices since they would be marked with a CLC rather than a section capacity rating. Therefore, paragraph N.1.3.4.(c) needed modification to address the marking differences for scales manufactured prior to 1989 and the proposed effective date of 2002.

NIST-OWM also noted the requirement in Table S.6.3.b. Note 9. might be clarified by adding a statement such as "Also applies to livestock scales manufactured between 1989 and 200X." The nonretroactive status of Table S.6.3.b. Note 14. only applies to markings for livestock scales. Therefore, the date in Note 14. needed clarification as to which applications require section capacity markings. Changes were also needed to the definition of CLC to delete any reference to livestock scales because livestock applications would now be addressed under the proposed section capacity marking requirements.

While the markings or lack of markings may not pose a problem for such devices since they have been in the field some time, there still may be some confusion about the appropriate test procedure to use.

320-5 VC T.N.3.8. Dynamic Monorail Weighing System

(This item was adopted.)

Source: National Type Evaluation Technical Committee (NTETC) Weighing Sector

Recommendation: Modify paragraph T.N.3.8. as follows:

> **T.N.3.8. Dynamic Monorail Weighing System. – Acceptance tolerance shall be the same as the maintenance tolerance shown in Table 6. On a dynamic test of 20 or more individual test loads, 10 percent of the individual test loads may be in error, each not to exceed two times the tolerance. The error on the total of the individual test loads shall not exceed ± 0.2 percent. (See also Note in N.1.3.6.1.)** ***For equipment undergoing type evaluation, a tolerance equal to one-half the maintenance tolerance values shown in Table 6. shall apply.***
> ***[Nonretroactive as of January 1, 2002.]***

Background/Discussion: In 1999, Nebraska Weights and Measures provided data to the Central Weights and Measures Association (CWMA) to demonstrate the differences between in-motion monorail scale performance when known test weights were used under the controlled conditions of a type evaluation and scale performance when carcasses were used under actual use conditions. When the test loads were fresh carcasses, the CWMA found that even devices just placed into service and operating under ideal test conditions could not attain acceptance tolerance.

The CWMA believed that officials need the ability to test in-motion scales under actual use conditions; this can only be done using carcasses. Although devices can meet acceptance tolerances when known weights are used, the devices are unable to meet tolerances when carcasses are used. The tolerances proposed in 1999 were intended to allow inspectors to test a device during actual production and apply reasonable and attainable tolerances, thus eliminating the need to conduct inspections after normal business hours, between shifts, or during short breaks under inappropriate conditions.

The Committee believed that dynamic monorail scales operate in a unique environment. The Committee agreed that maintenance tolerance is appropriate for processing plant monorail scales because of the uncertainties that affect the accuracy of the weighments with freshly slaughtered carcasses. Consequently, paragraph T.N.3.8. was modified in 1999 to make maintenance and acceptance tolerances the same.

During its September 2000 meeting, the Sector heard that the CWMA did not intend for maintenance tolerance to apply during the type evaluation process. Devices are capable of meeting acceptance tolerances under the controlled conditions of type evaluation. Consequently, the Sector proposed modifying T.N.3.8. as outlined in the proposal above to reflect the original intent of CWMA.

The Committee heard support for the proposal from the Scale Manufacturers Association and did not hear any unfavorable comments on the proposal. The Committee believed it is appropriate to require one-half the maintenance tolerance tolerances during type evaluation of dynamic monorail weighing systems and, therefore, the Committee supported the proposal as written.

320-6 I U.R.1.X. Remote Display, Class III L Vehicle Scales

Source: Southern Weights and Measures Association (SWMA)

Background/Discussion: The SWMA noted that Handbook 44 General Code paragraph G-UR.1.1. Suitability of Equipment currently requires that equipment be suitable for the service in which it is used with respect to elements of its design, including the location of its indicating and recording elements. Paragraph G-UR.3.3. Position of Equipment requires that a device used in direct sales be positioned so that its indications may be accurately read from some reasonable customer and operator position. Many owners and operators of vehicle scales claim that their devices meet these requirements when they designate some area for vehicle drivers to get out of the vehicle and stand to view the scale indications, sometimes through a window. However, this provision does not allow for the driver to view the zero indication and often prevents the driver from determining if the indication is gross or net. Viewing both indications are critical to enable drivers to ensure weighments are accurate and not fraudulently determined.

The SWMA believed that paragraph G-U.R.3.3. is written in a general manner such that it relies solely on the judgement of the weights and measures official and tends to lead to problems with uniformity from one jurisdiction to another. Additionally, the remote displays in use today are not all designed to clearly indicate gross and net indications or to indicate the unit of measure. The scale operator may enter a tare weight value through the keypad which displays as a net weight value on the primary indicator; however, the remote display value does not agree because it is not capable of identifying the numerical value as a net indication. This type of system allows the operator to deduct weight from the loaded vehicle without the customer knowing that this has occurred.

The SWMA proposed adding a new paragraph UR.1.X. and modifying the definition of direct sale as follows:

> UR.1.X. Remote Display, Class IIIL Vehicle Scales. – A vehicle scale that is equipped with a digital indicating element and used in direct sales shall have a remote display with digits at least 10 cm (4 in) in height. The display shall be so positioned that its zero indication and indications during the weighing operation can be viewed from the driver's position in the vehicle. The remote display must adequately identify the unit of measure.
>
> direct sale. A sale in which both parties or their agent are present when the quantity is being determined. An unattended automated or customer operated weighing or measuring system is considered to represent the device/business owner in transactions involving an unattended device. [1.10]

The SWMA agreed that it is appropriate to require a remote display in vehicle scale weighing operations. The proposal was not intended to address (1) vehicle scales seldom used in direct sale applications such as scales at mining operations; where the vehicles weighed are owned or operated by the owner of the device or (2) weighing for hire operations that only verify if a combined vehicle load complies with highway weight enforcement load limits. The SWMA believed that public weighing should be defined as charging for the service of providing a certified weight when the scale operator is not involved in buying or selling any commodity being weighed.

The SWMA intended for this requirement to clarify for the customer whether the values displayed in vehicle scale applications represent net, gross, or zero indications. The SWMA believed the proposal benefits both parties in a commercial weighing transaction by providing a fair weighing environment that does not easily facilitate fraud.

The Committee heard numerous objections to the proposed display size requirements because (1) existing installations would not comply, (2) the visibility of indications is dependent on the customer position which varies at each installation, and (3) there are concerns about the equipment cost associated with adding a remote display. The Committee had concerns because there is no corresponding proposal that addresses the visibility of indications at installations with mechanical scales. One option also discussed is a nonretroactive requirement for an indication that indicates the device is at zero such as a light that signals when the scale has returned to zero. Additional concerns were expressed about how the proposals affect weighmaster regulations. One jurisdiction indicated they prohibit the driver from remaining in the vehicle at weighmaster installations. This jurisdiction also indicated that weighmaster operations are not considered direct sale applications. The Committee made this an information item to allow the SWMA time to address all manufacturer's concerns about the proposal.

Initially, the Scale Manufacturers Association (SMA) opposed design specifications to Handbook 44 and found the modifications to the definition of "direct sale" ambiguous. During the 2001 Annual Meeting, the Committee heard that Maryland has a policy which addresses many issues related to the use of remote displays. The SMA agreed to provide alternate language based on Maryland's policy related to remote displays. The Committee encouraged Florida as the submitter of the original proposal to work with SMA to reach language that is acceptable to all parties.

320-7 W UR.2.4. Foundation, Supports, and Clearance

(This item was withdrawn.)

Source: Northeastern Weights and Measures Association (NEWMA)

Background/Discussion: NEWMA believed that presently few, if any, vehicle scales meet the requirement in paragraph UR.2.4. for the clearance between the load receiving elements and the coping on the bottom edge of the scale platform to be greater than at the top edge of the platform. New York Bureau of Weights and Measures conducted an informal survey and found a limited number of scales in compliance with the clearance requirements. New York reported that the clearance between pit walls for most scales is equal to or runs parallel to the edges of the platform. NEWMA believed that most vehicle scales would have to be modified to meet paragraph UR.2.4. Consequently, NEWMA recommended the following proposal:

> UR.2.4. Foundation, Supports, and Clearance. – The foundation and supports of any scale installed in a fixed location shall be such as to provide strength, rigidity, and permanence of all components, and clearance shall be provided around all live parts to the extent that no contacts may result when the load-receiving element is empty, nor throughout the weighing range of the scale. *On vehicle and livestock scales, the clearance between the load-receiving elements and the coping at the bottom edge of the platform shall be greater than* <u>*or equal to the clearance*</u> *at the top edge of the platform.*
> *[Nonretroactive as of January 1, 1973.]*

The Committee heard many comments from industry and weights and measures officials indicating that paragraph UR.2.4. is a necessary user requirement that was intended to prevent scales from binding when rocks and other debris enter the space between the pit wall and scale platform. The Committee also supported current paragraph UR.2.4. as written in Handbook 44 and the Committee believed that the requirement is appropriate. Therefore, the Committee agreed to withdraw the item from its agenda.

320-8 I Appendix D; Definition of Substitution Test and Test Load

Source: Carryover Item 320-6 (This item originated from the Western Weights and Measures Association (WWMA) and first appeared on the S&T Committee's 2000 agenda.)

Recommendation: The Committee considered a proposal to add the following definitions for substitution test and test load to Handbook 44:

> **<u>substitution test. The test of a scale in which material, product, or other objects are substituted in amounts equal to the known test weights on the load-receiving element of the scale for known test weights, and then the known test weights are placed on the load-receiving element again. This process shall not be repeated more than three times. It permits the scale to be tested to a load greater than the amount of known test weights available. The</u>**

tolerances for the substitution test are the tolerances for the entire test load developed using the substitution test procedure.

test load. The sum of the combination of field test standard test weights and any other applied load used in the conduct of a test using substitution test methods.

Discussion: During the January 2001 NCWM Interim Meeting, the Committee agreed with industry and weights and measures jurisdiction comments that the proposed definition for "substitution test" is not well-developed enough to add to Handbook 44. The Committee believed it is more appropriate to develop procedures for testing rather than including them in the definition. The Committee acknowledged that substitution test procedures for a field test will vary from, for example, the controlled conditions of an NTEP test, where it is necessary for laboratories to verify more than a scale's linear performance. The Committee reiterated its July 2000 recommendation that test notes be included in Handbook 44 to separately address substitution test on (1) vehicle, livestock, and railway track scales, (2) hopper scales, and (3) other applications such as automatic bulk weighing devices as required.

At the January 2001 NCWM Interim Meeting, Ross Andersen, New York Bureau Weights and Measures, provided an update on his study about the uncertainties in vehicle scale testing procedures. Mr. Andersen reported that environmental factors contribute more than other factors to the uncertainties in the process. Mr. Andersen recommended the definition not include test methods. Mr. Andersen noted that scales which are nonlinear fail to comply during the increasing load test. Mr. Andersen plans to continue gathering data on uncertainties and concurs with the conclusion of the Metrology Subcommittee about the accumulation of uncertainties during substitution tests. New York has agreed to provide data on substitution tests conducted on vehicle scales at the January 2002 Interim Meeting. New York also noted that there is no limit to the number of substitution tests in other Handbook 44 code sections.

Consequently, the Committee agreed to keep this an information item to allow sufficient time to address these areas of concern.

Background: During its September 1999 meeting, the WWMA took the position that there was a need to define substitution test, where the amount of substituted weight is brought or adjusted to the exact amount of error as the known weight. The WWMA recognized that the term "test load" in Footnote 1 of Table 4 Minimum Test Weights and Test Loads refers to a substitution test; however, the term is not listed in Handbook 44 definitions. The WWMA proposed that a definition for test load be based on the text in Footnote 1. The final format of the proposed definition was similar to the current definition of "strain load;" however, the WWMA clarified the process, test material, and tolerances to apply.

During the 2000 NCWM Annual Meeting, the Metrology Subcommittee reported to the Committee its concern about the total additive uncertainties in the test process and their effect on the Fundamental Consideration requirement for standard errors.

At its September 2000 meeting, the WWMA received no new input or data on the proposal. After lengthy discussion, the WWMA reversed its position on the exact amount of substituted material. Because of comments received which opposed bringing the material load exactly to the known test weight indication, the WWMA recommended the following alternate proposal to define "substitution test":

> substitution test. The test of a scale in which material, product, or other objects are substituted for the known test weights on the load-receiving element of the scale for known test weights, and then the known test weights are placed on the load-receiving element again. This process shall not be repeated more than three times. It permits the scale to be tested to a load greater than the amount of known test weights available. The tolerances for the substitution test are the tolerances for the entire test load developed using the substitution test procedure.

During its October 2000 meeting, NEWMA restated its opposition to adding to Handbook 44 any proposed definition of substitution test that requires substituting material to indicate the exact weight of the previous test weights. In theory this would be ideal, but the time involved in the field to achieve an exact substitution might outweigh the benefit, especially when considering scales are tested with three substitution loads. NEWMA believed that, as long as the substituted material is less than and close to the previous indication, the linearity in today's electronic scales could be predicted to be very close. NEWMA questioned how many jurisdictions currently match the substituted material exactly to the indication when conducting routine field tests of electronic vehicle scales. Some members of NEWMA would like to have definitions of the terms "build-up test," "substitution test," and "strain load test" which appear in the Examination Procedure Outlines. These members commented that, once the definitions appear in Handbook 44, there is no flexibility to choose the test method that meets the specific circumstances of the installation.

The Southern Weights and Measures Association (SWMA) believed that materials should be substituted in amounts equal to the known test weights; otherwise, the test becomes a strain load test. The SWMA recommended the proposal in the recommendation above move forward for a vote at the 2001 NCWM Annual Meeting.

For additional background information on this item refer to the 2000 Final Report of the S&T Committee.

321 Belt-Conveyor Scale Systems

321-1 VC UR.2.2.1.(l) Conveyor Installation; Belt Composition and Maintenance

(This item was adopted.)

Source: Carryover Item 321-3. (This item originated from the National Type Evaluation Technical Committee (NTETC) Belt-Conveyor Scale (BCS) Sector and first appeared on the S&T Committee's 1999 Agenda as Item 321-3.)

Recommendation: Amend paragraph UR.2.2.1. (l) Belt Composition and Maintenance to read as follows:

UR.2.2. Conveyor Installation. – The design and installation of the conveyor leading to and from the belt-conveyor scale is critical with respect to scale performance. Installation shall be in accordance with the scale manufacturer's instructions and the following:

(l) Belt Composition and Maintenance. - Conveyor belting shall be no heavier than is required for normal use. In a loaded or unloaded condition, the belt shall make ~~full~~ constant contact with ~~the carry roll (center or~~ horizontal and wing rollers ~~portion)~~ of the idlers in the scale area. Splices shall not cause any undue disturbance in scale operation (see N.3.).

Add the following new definition to Handbook 44:

belt-conveyor scale systems scale area. The scale area refers to the scale suspension, weigh idlers attached to the scale suspension, 5 approach (-) idlers, and 5 retreat (+) idlers. [2.21.]

Discussion: At a May 2001 NIST-OWM Belt-Conveyor Scale Technical Seminar, participants noted the primary reason for belt contact with the idlers in the weighing area was to maintain a constant zero reference or belt tare during all load conditions. Belt material composition must be durable and flexible enough to provide consistent tare during all phases of loading. The entire weight of the belt must be zeroed; if not, accuracy problems occur with variations in flow rates (i.e. feed rates). Belt contact with idlers is relevant only for parts of the belt-conveyor scale system that affect weighing accuracy. The participants noted that the term "scale area" is used repeatedly in the Belt-Conveyor Scale Code, but it is not defined. The participants proposed a new definition for "scale area" for clarity that is consistent with industry terminology.

At the July 2001 NCWM Annual Meeting, the Committee concluded that the above alternate proposal and new definition recommended by the participants at the May 2001 technical seminar adequately address the Sector's original concerns about belt contact with idlers that is necessary to maintain the appropriate zero condition. Consequently, the Committee recommended the Seminar's alternate proposal shown above.

The Committee also recommended the Seminar's new definition of scale area to clarify which idlers have significance in the weighing operation. The Committee further modified the Seminar participants' definition to clarify that the scale area definition applies to belt-conveyor scale systems rather that other weighing technology.

Background: Based on a proposal from the Belt Conveyor Scale Sector, the NCWM voted in 1998 to require the belt in a belt conveyor scale system to make full contact with the carry roll. In October 1999, the Sector acknowledged that it is difficult to determine if there is full contact with the belt because variations in troughing and temperature make the determination subjective. Therefore, the Sector forwarded a recommendation to change "full" to "continuous" contact.

In January 2000, the Committee asked the Sector to clarify in the proposal how much of the belt must contact the carry roll. During the 2000 NCWM Annual Meeting, the Committee heard comments that the Sector's proposal for continuous belt contact as written did not address the original problems that can occur because of improper belt thickness. The proposal might imply that this is a belt alignment requirement because of the reference to multiple idlers. The original

intent of the proposal was to ensure that the appropriate belt thickness is maintained at a particular installation. The Committee encouraged the Belt-Conveyor Scale Sector to cover this proposal at its next meeting; however, the Sector did not meet in 1999 and 2000 and was not able to develop comments for the S&T Committee.

At its September 2000 meeting, the Western Weights and Measures Association (WWMA) heard comments from a representative of Southern Companies Services indicating that the issue was more of an alignment problem than a belt composition and thickness issue. The representative indicated that a properly aligned belt would have full contact with all associated weighing idlers under all conditions of ambient temperature. A belt that was too thick would rise off all idlers (not just one) in cold ambient temperatures. The WWMA recognized that belting should have the necessary flexibility to assure contact with all scale area idler rolls when the belt is running empty. After further discussions, the WWMA agreed that modifying paragraph (l) to require full belt contact with the idlers would address the original concerns of the submitter.

The Southern Weights and Measures Association (SWMA) disagreed with the WWMA recommendation to modify the proposal to require the belt make "full" contact with the carry roll idler. The SWMA recommended the NCWM follow the Sector's recommendation for "continuous" belt contact with the idlers and get input from belt-conveyor scale industry experts on the effects of the proposal.

The Committee recognized that paragraph UR.2.2.1.(l) was intended to address belt composition, not belt alignment. Initially, the Committee agreed with a proposal heard at the January 2001 Interim Meeting that the term "continuous" adequately described the amount of contact the belt must make with the center of the idlers. The Committee requested a review of this and all belt-conveyor scale issues by the participants in the NIST-OWM Belt-Conveyor Scale Technical Seminar scheduled in Spring 2001 at NIST, Gaithersburg, Maryland. The Committee decided to move forward with the proposal for continuous belt contact because it had not heard sufficient opposition to the proposal.

For additional background, refer to the 1998, 1999, and 2000 S&T Final Reports.

324 Automatic Weighing Systems

324-1 V T.7.3.1.(a) Power Supply, Voltage and Frequency; Alternating Current

(This item was adopted.)

Source: National Type Evaluation Technical Committee (NTETC) Weighing Sector

Recommendation: Modify paragraph T.7.3.1. as follows:

> **T.7.3.1. Power Supply, Voltage and Frequency.**
>
> **(a) Alternating Current. – Weighing devices that operate using alternating current must perform within the conditions defined in paragraphs T.3. through T.7., inclusive, over the line voltage range of 100V to 130V or 200V to 250V rms as appropriate, and over the frequency range of 59.5 Hz to 60.5 Hz.**
>
> **Note: *This requirement applies only to metrologically significant voltage supplies.***

Background/Discussion: At its September 2000 meeting, the Weighing Sector reviewed current NIST Handbook 44 test requirements for automatic weighing systems which require the supply voltage to be reduced to the minimum and increased to the maximum. The Sector reports that all systems submitted to NTEP use a single voltage source for the entire system. Recently, NTEP received an application for a system that uses normal 110/115 V AC single-phase 60 Hz power for the indicator and 440 V three phase for the drive motors.

The Sector questioned whether it is necessary to regulate the power voltage during a test. One NTEP Participating Laboratory reported difficulty in verifying the alternating current because its equipment was unable to convert to the device's entire voltage range in the laboratory. The Sector acknowledged that Canada and OIML regulate voltage during their tests. The Sector agreed that voltage supplies which have no metrological affect on the device should not be held to the voltage range requirements in paragraph T.7.3.1.

At the 2001 NCWM Annual Meeting, the Scale Manufacturers Association expressed support for the proposal in principle, but recommended clarifying that the requirement applies only to voltage supplies to metrologically significant

elements. The Committee modified the proposal as outlined in the recommendation above to clarify that the requirement applies to *all* metrologically significant power sources (i.e., voltage and frequency).

330 Liquid-Measuring Devices

330-1A I Appendix D, Definition for Retail Device

(This item was changed from a voting item to an informational item at the 2001 Annual Meeting.)

(Agenda Item 330-1 was split into two parts 330-1A Appendix D, Definitions and 330-1B Retail Device Tolerances to facilitate review of the item.)

Source: Carryover Item 330-2 (This item originated from the Western Weights and Measures Association (WWMA) and first appeared on the Committee's 1999 agenda as Item 330-5.)

Recommendation: Modify the definition of retail devices as follows:

retail device. A liquid measuring device primarily used for non-resale use.

~~**single deliveries of less than 378 L (100 gal),**~~

~~**retail deliveries of motor fuels to individual highway vehicles, or**~~

~~**single deliveries of liquefied petroleum gas for domestic use and liquefied petroleum gas or liquefied anhydrous ammonia for nonresale use.**~~
(Amended 1987 and 200X) [3.30, 3.31, 3.32, 3.37]

Background/Discussion: At the July 2000 NCWM Annual Meeting, the Committee considered splitting this item into two separate issues, (1) the definitions and (2) a table of tolerances, to facilitate the review process. One jurisdiction recommended that the Committee establish minimum delivery amounts rather than revise the definitions of retail and wholesale. The Committee understands that questions remain about the ability of high volume retail meters to meet the proposed tighter tolerances. The Committee planned to contact the regional and several industry associations about collecting data to demonstrate the performance of these meters at tolerances more stringent than those currently specified in Handbook 44.

At the September 2000 Interim Meeting of the CWMA, the GPMA supported the Committee's approach to split the item into two separate issues. GPMA questioned the placement of the table in the Liquid-Measuring Devices Code, as it includes applications for devices covered by other codes. GPMA also questioned whether or not any "field testing" has been conducted using the proposed tighter tolerances.

At its September 2000 Meeting, the WWMA recommended changing the status of the item from informational to developmental. The WWMA heard comments that the item includes two separate issues: (1) the definition of "retail" and (2) tolerances. There also needs to be input from the GPMA regarding the impact of the tolerance changes. Additionally, the WWMA recommended removing products not applicable to the Liquid-Measuring Devices Code from the table until such time as there is a single device code that includes all products regardless of the measurement technology utilized.

NEWMA continues to support the proposed tolerance table; however, the table needs to be in all affected codes until such time as Handbook 44 is reorganized. At their October 2000 meeting, NEWMA questioned whether the flow rate of 100 L/min in Accuracy Class 0.3 is the flow rate marked on the device or the flow rate developed at the installation. NEWMA believes it is the flow rate marked on the device.

At its October 2000 Meeting, the SWMA recommended keeping this item informational until industry provides information on the ability of current high volume dispensers to meet the tighter tolerances.

At the NCWM 2001 Interim Meeting, the Committee agreed to split the proposal into two parts, Agenda Item 310-1A which modifies the definition of "retail device" and 310-1B which proposes adding a new tolerance table that is based on device accuracy classes. The Committee heard there is still concern about how to interpret when a device is "primarily"

used and if there should be a specific percentage value assigned to the term. The Committee believes that "primarily" is an appropriate term that provides jurisdictions with the ability to make judgments on a case-by-case basis. The Committee recognizes that 310-1B may still need more work and is being left as an informational item. The Committee agreed that Agenda Item 310-1A will not have a significant detrimental effect on existing equipment and is ready for a decision by the NCWM voting members.

During the 2001 NCWM Annual Meeting, the Committee considered several proposals that define retail devices as those that deliver product to the final user. The Committee agreed that these proposals change devices, previously classified as wholesale devices, to retail applications that are held to a lesser tolerance. Consequently, the Committee decided to change the status of this item to information while it looks at the suitability of the proposed definition and table of tolerances for retail devices.

For more background information, refer to the 1999 and 2000 S&T Final Report.

330-1B I Tolerances, Table T.X. Accuracy Classes for Section 3.30 and 3.31. and Other Liquid-Measuring Devices

(Agenda Item 330-1 was split into two parts 330-1A Appendix D, Definitions and 330-1B Retail Device Tolerances to facilitate review of the item.)

Recommendation: The Committee recommends splitting proposed Table T.X. into two tables that cover applications currently listed in the Liquid-Measuring Device applications in Handbook 44 Section 3.30 through 3.38 as follows:

Table T.X Accuracy Classes for Liquid Measuring Devices Covered in NIST Handbook 44 Sections 3.30 and 3.31

Accuracy Class	Application	Acceptance Tolerance	Maintenance Tolerance	Special Test Tolerance*
0.3	Petroleum products including large capacity motor fuel devices (flow rates over 115 L/min (30 gpm)), heated products at or greater than 50 °C asphalt at or below temperatures 50 °C, all other liquids not shown where the typical delivery is over 200 L (50 gal)	0.2 %	0.3 %	0.5 %
0.3A	Asphalt at temperatures greater than 50 °C	0.3 %	0.3 %	0.5 %
0.5	Petroleum products delivered from small capacity (at or below 115 L/min (30 gpm)) motor-fuel devices, agri-chemical liquids, and all other applications not shown.	0.3 %	0.5 %	0.5%
1.1	Petroleum products and other normal liquids from devices with flow rates less than 1 gpm	0.75 %	1.0 %	1.25%
The maintenance tolerances for 5-gallon and 10-gallon test drafts are 6 cubic inches and 11 cubic inches, respectively. Acceptance tolerances are 3 cubic inches and 5.5 cubic inches.				
*where applicable				

Table T.X Accuracy Classes for Liquid Measuring Devices Covered in NIST Handbook 44 Sections 3.32 through 3.38					
Accuracy Class	**Application**		**Acceptance Tolerance**	**Maintenance Tolerance**	**Special Test Tolerance***
1.0	**Anhydrous ammonia, LP gas (including vehicle tank meters)**		**0.6 %**	**1.0 %**	**1.0 %**
1.5	**Water**		**1.5 %**	**1.5 %**	**+5.0 % - 1.5 %**
2.0	**Compressed natural gas as a motor fuel**		**1.5 %**	**2.0 %**	**2.0 %**
2.5	**Cryogenic products; liquefied compressed gases other than LP gas**		**1.5 %**	**2.5 %**	**2.5 %**
3.0	**Gases at low pressure (LP vapor)**	**Overregistration**	**1.5 %**	**1.5 %**	
		Underregistration	**3.0%**	**3.0%**	
***where applicable**					

Discussion: The Committee believes that applying the tolerances listed in the proposed accuracy class tables across differing meter technologies is more appropriate because those meters are used in similar applications. As noted in item 330-1A, the Committee is still interested in meter performance data for high flow meters at the proposed tolerances. The Committee made changes to the proposed table to remove the term "retail" and to harmonize the flow rating "for small capacity meters" with Canada's requirements. The Committee also believes that the tables might later be combined if work to revise Handbook 44 results in a single liquid-measuring device code. The Committee agreed that proposed Accuracy Class 0.3 of the first table should also be applicable to the Vehicle Tank-Meters Code. The Committee maintained the existing tolerances for 5-gallon and 10-gallon test drafts because of concerns about meeting tighter tolerances when there are proportionately larger start/stop errors associated with small deliveries. The Committee agreed that this item should remain informational to allow for additional study and work on the proposal.

During the 2001 NCWM Annual Meeting, the Committee acknowledged that the 5-gallon and 10-gallon draft test tolerances are expressed in cubic inches whereas other tolerances are expressed in percentages. The Committee notes that calculating 5-gallon and 10-gallon draft tolerances in percentage units results in fractions of cubic inches which are difficult to read on a prover sight gauge. The Committee also recognizes that existing test standards are designed with gauges reading in cubic inches. The Committee encourages the gasoline pump manufacturers and regional associations to continue in their efforts to verify that the proposed tolerances in the tables are appropriate. (See Item 330-1A for additional information and background.)

330-2 VC T.2.1.3. and T.2.3.4. Repeatability

(This item was adopted as part of the consent calendar.)

Source: National Type Evaluation Technical Committee (NTETC) Measuring Sector

Recommendation: Modify paragraph T.2.1. Retail Devices Except Slow-Flow Meters and T.2.3 Wholesale Devices as follows:

T.2. Tolerance Values.

T.2.1. Retail Devices Except Slow-Flow Meters.

T.2.1.3. Repeatability. - When multiple tests are conducted at approximately the same flow rate and draft size, the range of the test results for the flow rate shall not exceed 40 percent of

the absolute value of the maintenance tolerance and the results of each test shall be within the applicable tolerance. See also N.4.1.2.

T.2.3. Wholesale Devices

T.2.3.4. Repeatability. - When multiple tests are conducted at approximately the same flow rate and draft size, the range of the test results for the flow rate shall not exceed 40 percent of the absolute value of the maintenance tolerance and the results of each test shall be within the applicable tolerance. This tolerance does not apply to the test of the automatic temperature compensating system. See also N.4.1.2.

Add new paragraph N.4.1.2. Repeatability Tests as follows:

N.4.1.2. Repeatability Tests. – Tests for repeatability should include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors, such as temperature, pressure and flow rate are reduced to the extent that they will not affect the results obtained.

Background/Discussion: At the January 2001NCWM Interim Meeting, the Committee reviewed two proposals to modify the Handbook 44 Liquid Measuring Devices Codes Sections (3.30., 3.3.1., and 3.37.) that address device repeatability requirements. One was a proposal recommended by the CWMA. A second proposal was submitted by the Measuring Sector. Both proposals originated from a proposal submitted by Nebraska and Micro Motion Inc. to the CWMA and the Measuring Sector. The following proposal was submitted to the S&T Committee by the CWMA.

3.30. Liquid-Measuring Devices
T.2.3.4. Repeatability. - When multiple tests are conducted at approximately the same flow rate and similar draft size, the range of the test results for the flow rate shall not exceed 40 percent of the applicable basic tolerance (underregistration and overregistration). This tolerance does not apply to the test of the automatic temperature compensating system.

3.31. Vehicle-Tank Meters
T.4. Repeatability. - When multiple tests are conducted at approximately the same flow rate and similar draft size, the range of the test results for the flow rate shall not exceed 40 percent of the applicable basic tolerance (underregistration and overregistration).

3.37. Mass Flow Meters
T.3. Repeatability. - When multiple tests are conducted at approximately the same flow rate and similar draft size, the range of the test results for the flow rate shall not exceed:

(a) 0.2 percent for retail liquid motor fuel devices; and

(b) 40 percent of applicable basic tolerance (underregistration and overregistration) for all other devices listed in Table T.2. and the results of each test shall be within the applicable tolerance.

At its October 2000 meeting, the Measuring Sector reviewed the same proposal submitted by Nebraska and Micro Motion, Inc. The Nebraska/Micro Motion proposal was intended to clarify the fact that, unless a repeatability requirement stipulates the tolerance as an "absolute value," the repeatability tolerance is intended to be based upon a *range* of positive and negative values of the basic tolerance. The Sector agreed with Nebraska/Micro Motion that Handbook 44 should be clarified to indicate that repeatability tolerances should only apply to multiple tests made at approximately the same flow rate and at a similar draft size. The Measuring Sector took the proposal a step further and concluded that repeatability tolerances should apply uniformly regardless of the technology of the measuring device because different technologies are frequently used for similar measurement applications. The Sector agreed to submit a proposal to the S&T Committee to amend all Handbook 44 Section 3.30 codes to include the same requirement for a repeatability tolerance; the repeatability tolerance would be 40 percent of the absolute value of the maintenance tolerance and would apply to multiple tests conducted at approximately the same flow rate and similar draft size. The Measuring Sector proposal to modify T.2.1.3. and T.2.3.4. as follows.

T.2. Tolerance Values.

T.2.1. Retail Devices Except Slow-Flow Meters.

T.2.1.3. Repeatability. - When multiple tests are conducted at approximately the same flow rate and draft size, the range of the test results for the flow rate shall not exceed 40 percent of the absolute value of the maintenance tolerance and the results of each test shall be within applicable tolerance.

T.2.3. Wholesale Devices.

T.2.3.4. Repeatability. - When multiple tests are conducted at approximately the same flow rate and draft size, the range of the test results for the flow rate shall not exceed 40 percent of the absolute value of the maintenance tolerance and the results of each test shall be within the applicable tolerance. This tolerance does not apply to the test of the automatic temperature compensating system.

The Southern Weights and Measures Association (SWMA) agreed with the Measuring Sector's recommendation that all Handbook 44 measuring device codes which currently have a tolerance for repeatability should specify a similar repeatability tolerance for all devices. The SWMA questions whether or not it is appropriate to add repeatability tolerances to such codes as water meters and cryogenic measuring devices which presently do not have any repeatability requirements. Those Codes may not presently include a repeatability requirement because the devices are not capable of repeating within any of the requirements used in other Liquid-Measuring Devices Codes. The SWMA also agreed that clarification is needed to ensure that all conditions are the same when performing repeatability tests.

At the January 2001 NCWM Interim Meeting, the Committee heard comments from Steve Malone (Nebraska), who voiced concern over resulting tolerances for repeatability in the proposal from the Measuring Sector and supported the proposal submitted through the CWMA. The Committee agreed with the alternate proposal submitted by the Measuring Sector and supported by the SWMA with an editorial change to add the word "the" prior to applicable tolerance in the last sentence of T.2.1.3. as shown in the recommendation above. The Committee also modified the Measuring Sector proposal by adding new paragraph N.4.1.2. Repeatability Tests to the Notes Section to provide guidance in conducting tests for repeatability. The Committee agreed to submit the modified Measuring Sector proposal as a voting item.

During the 2001 NCWM Annual Meeting, the Committee received only positive comments on the item.

330-3 VC T.2.3.2. Measurement of Asphalt

(This item was adopted as part of the consent calendar.)

Source: Specifications and Tolerances Committee

Recommendation: Modify Table T.2.3.2. as follows:

T.2.3.2. Measurement of Asphalt. – Maintenance tolerances and acceptance tolerances shall be:

	Acceptance	**Maintenance**	**Special Test**
Asphalt ~~below~~ at 50 °C or below	**0.2 %**	**0.3 %**	**0.5 %**
Asphalt above 50 °C	**0.3 %**	**0.3 %**	**0.5 %**

(Added 1999)

Discussion: During preparation and review of the 2000 Edition of NIST Handbook 44 the NIST Office of Weights and Measures (OWM) noted that Table T.2. specifies tolerances for asphalt meter applications below 50 ^{0}C and above 50 ^{0}C, but does not specify tolerances for test applications *at* 50 ^{0}C. The S&T Committee agreed that Table T.2. should have additional language to clarify the original intent about which tolerances to apply when asphalt is below, at, and above 50 °C. Consequently, the Committee recommends modifying Table T.2.3.2. as shown above.

At its September 2000 Interim Meeting, the Central Weights and Measures Association recommended adding a tolerance for special tests to the table.

At their fall 2000 meetings the Western and Northeastern Weights and Measures Associations indicated support for the clarification to Table T.2.3.2.

At its October 2000 Annual Meeting, the SWMA supported the change to Table T.2.3.2., but recommends adding special test tolerances of 0.5 percent.

During its discussions at the January 2001 NCWM Interim Meeting, the Committee agreed to propose the item for a vote at the July 2001 NCWM Annual Meeting, and to add the special test tolerance to the recommendation as proposed by the SWMA. The Committee heard no unfavorable comments on this issue at either the January 2001 Interim Meeting or the July 2001 Annual Meeting.

For more background information, refer to item 330-6 of the 1999 S&T Final Report.

330-4 VC UR.3.4. Printed Ticket

(This item was adopted as part of the consent calendar.)

Source: Northeastern Weights and Measures Association (NEWMA)

Recommendations: Modify paragraph UR.3.4. Printed Ticket as follows:

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

Background/Discussion: At the January 2001 NCWM Interim Meeting, it was reported that NEWMA believes the text "either printed or in clear hand script" in paragraph UR.3.4. was originally intended to address and permit hand written receipts, but the requirement is unclear as written since the paragraph appears to only apply to computing devices, which must provide transaction information in electronic format.

The Committee believes that paragraph S.1.6.7. Recorded Representation already requires the unit price, quantity delivered, and total price to be included on a receipt issued by most computing-type devices. Systems exist, that display and print only one of the values such as a meter with a mechanical indicator and ticket printer; however, these are non-computing type devices. The Committee believes that removing the text "of the computing type" from paragraph UR.3.4. as shown above resolves any concerns about overlooking needed transaction information for a particular device application. The Committee recognizes there are mechanical devices where it is still necessary to provide transaction information in printed or hand script format.

331 Vehicle-Tank Meters

331-1 I Recognition of Temperature Compensation

Source: Carryover Item 331-1 (This item originated from the Western Weights and Measures Association (WWMA) and first appeared on the Committee's 2000 agenda.)

Background/Discussion: During the 2000 NCWM Interim Meeting, the Committee discussed a WWMA proposal to modify the Vehicle-Tank Meters Code to recognize Automatic Temperature Compensation (ATC). The Committee noted that the proposal does not address new technology which is capable of indicating in both the net and gross mode. Therefore, the Committee developed new paragraph S.2.4.2.X. Gross and Net Indications and added it to the WWMA proposal. The Committee agreed that paragraph UR.2.5.1.2. Invoices was established for wholesale meter applications. Consequently, the Committee also removed paragraphs UR.2.5.1.2.(b) Invoices and UR.2.5.2. Nonautomatic from the proposal. The modified proposal reads as follows:

> **S.2.4. Automatic Temperature Compensation.**
>
> **S.2.4.1. Automatic Temperature Compensation. - A device may be equipped with an automatic means for adjusting the indication and registration of the measured volume of product to the volume at 15 °C (60 °F).**

S.2.4.2. Provision for Deactivating. - On a device equipped with an automatic temperature-compensating mechanism that will indicate or record only in terms of liters (gallons) compensated to 15 °C (60 °F), provision shall be made for deactivating the automatic temperature-compensating mechanism so that the meter can indicate, and record if it is equipped to record, in terms of the uncompensated volume.

S.2.4.2.X. Gross and Net Indications – A device equipped with automatic temperature compensation shall indicate and record, if equipped to record, both the gross (uncompensated) and net (compensated) volume for testing purposes. If both values cannot be displayed or recorded for the same test draft, means shall be provided to select either the gross or net indication for each test draft.

S.2.4.3. Provision for Sealing Automatic Temperature Compensating Systems. - Provision shall be made for applying security seals in such a manner that an automatic temperature-compensating system cannot be disconnected and that no adjustment may be made to the system without breaking the seal.

S.2.4.4. Temperature Determination with Automatic Temperature Compensation. - For Test purposes, means shall be provided (e.g., thermometer well) to determine the temperature of the liquid either:

(a) in the liquid chamber of the meter, or

(b) immediately adjacent to the meter in the meter inlet or discharge line.

S.5.6. Temperature Compensation. - If a device is equipped with an automatic temperature compensator, the primary indicating elements, recording elements, and recording representation shall be clearly and conspicuously marked to show that the volume delivered has been adjusted to the volume at 15 °C (60 °F).

N.4.1.2. Automatic Temperature Compensating Systems. - On devices equipped with automatic temperature compensating systems, normal tests shall be conducted;

(a) by comparing the compensated volume indicated or recorded to the actual delivered volume corrected to 15 °C (60 °F); and

(b) with the temperature compensating system deactivated, comparing the uncompensated volume indicated or recorded to the actual delivered volume.

The first test shall be performed with the automatic temperature-compensating system operating in the "as found" condition. On devices that indicate or record both the compensated and uncompensated volume for each delivery, the tests in (a) and (b) may be performed as a single test.

N.5. Temperature Correction. - Corrections shall be made for any changes in volume resulting from the differences in liquid temperatures between the time of passage through the meter and time of volumetric determination in the prover. When adjustments are necessary, appropriate petroleum measurement tables should be used.

T.2.1. Automatic Temperature Compensating Systems. - The difference between the meter error (expressed as a percentage) for results determined with and without the automatic temperature compensating system activated shall not exceed:

(a) 0.2 percent for mechanical automatic temperature compensating systems; and

(b) 0.1 percent for electronic automatic temperature compensating systems.

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

UR.2.5. Temperature Compensation.

UR.2.5.1. Automatic.

UR.2.5.1.1. When to be Used. - If a device is equipped with an automatic temperature compensator, it shall be connected, operable, and in use at all times. An electronic or mechanical automatic temperature compensating system may not be removed, nor may a compensated device be replaced with an uncompensated device, without the written approval of the responsible weights and measures jurisdiction.

[Note: This requirement does not specify the method of sale for product measured through a meter.]

UR.2.5.1.2. Invoices.

(a) An ~~written~~ invoice based on a reading of a device that is equipped with an automatic temperature compensator shall show that the volume delivered has been adjusted to the volume at 15 °C (60 °F).

~~(b) The invoice issued from an electronic device equipped with an automatic temperature compensating system shall also indicate: (1) the API gravity, specific gravity, or coefficient of expansion for the product; (2) product temperature; and (3) gross reading.~~

~~UR.2.5.2. Nonautomatic.~~

~~UR.2.5.2.1. Temperature Determination. - If the volume of the product delivered is adjusted to the volume at 15 °C (60 °F), the product temperature shall be taken during the delivery in:~~

~~(a) the liquid chamber of the meter, or~~

~~(b) the meter inlet or discharge line adjacent to the meter, or~~

~~(c) the compartment of the receiving receptacle (e.g., storage tank) at the time it is loaded.~~

~~UR.2.5.2.2. Invoices. - The accompanying invoice shall indicate that the volume of the product has been adjusted for temperature variations to a volume at 15 °C (60 °F) and shall also state the product temperature used in making the adjustment.~~

At the January 2001 NCWM Interim Meeting, the Committee heard opposition to this issue from several members of NEWMA relating to the delivery of home heating oil; these members believe that using temperature compensation for that product would result in consumers receiving less product because the majority of deliveries are made during cold weather. In contrast, the Committee also heard that in some mid-Western states a large amount of fuel for crop irrigation is delivered in warm weather. In that case, temperature compensation would result in a gain for the consumer. The Committee noted that it is appropriate in either case to correct the measured volume back to a standard reference temperature; this correction recognizes the changes in volume caused by temperature differences and provides an accurate delivery of the indicated quantity. Also at the January 2001 NCWM Interim Meeting, the L&R Committee informed the S&T Committee that it withdrew the corresponding L&R Agenda Item 232-2 at the request of NEWMA. NEWMA had submitted the original proposal to the L&R Committee for a change to NIST Handbook 130, Method of Sale Regulation, to permit temperature compensated sales of petroleum products. The NEWMA proposal did not include the recommendation of any specific language to be added to the Method of Sale Regulation.

Prior to the January 2001 NCWM Annual Meeting NEWMA submitted the following comments to the S&T Committee.

NEWMA believes that any language addressing ATC in the Vehicle-Tank Meters Code of Handbook 44 should be permissive for States that have adopted by law this method of sale.

The Northeast United States consumes close to 80% of all home heating fuel sold in the United States, and home heating fuel is predicted to be at its highest selling price in history along with possible shortages. NEWMA cannot recognize and advocate at this time, a method of sale that would allow consumers to be billed for product adjusted to 60 °F when the average ambient temperature is well below 60 °F when the majority of this product is sold.

NEWMA does not advocate the sale of home heating fuel by ATC, but supports the adoption of the language contained in 331-1 to help States that have adopted or will be adopting legislation defining the sale of petroleum products adjusted to 60 °F when sold through vehicle-tank meters. NEWMA proposed the following new paragraph S.2.4.1. to make it clear that States need to seek legislation from within their respective Legislatures.

NEWMA recommends the following new paragraph S.2.4.1.

> **S.2.4.1. Automatic Temperature Compensation. - A device may be equipped with an automatic means for adjusting the indication and registration of the measured volume of product to the volume at 15 °C (60 °F), where authorized by State Law.**

NEWMA also recommends the following change to UR.2.5.1.1.

> **UR.2.5.1.1. When to be Used. - ~~If a device is equipped with an automatic temperature compensator, it~~ In a State, permitting by law, the sale of temperature compensated product a device equipped with an operable automatic temperature compensator shall be connected, operable, and in use at all times. An electronic or mechanical automatic temperature compensating system may not be removed, nor may a compensated device be replaced with an uncompensated device, without the written approval of the responsible weights and measures jurisdiction.**

During the July 2001 NCWM Annual Meeting, the Committee heard support for the NEWMA proposal, but also heard comments that requirements in NIST Handbook 44 need to be accompanied by a "method of sale" requirement in NIST Handbook 130. The S&T Committee agreed that any requirements for ATC in the Vehicle Tank-Meters (VTM) Code needs corresponding requirements in Handbook 130 to recognize ATC as the method of sale for products delivered through vehicle tank-meters. The S&T Committee agreed to keep the item on the S&T agenda as informational to give other regional associations the opportunity to submit language that defines the method of sale in Handbook 130 for commodities delivered through a vehicle tank-meter for consideration by the L&R Committee. If a recommendation to modify the Method of Sale Regulation is submitted to the L&R Committee by a regional association to permit temperature compensated sales of products delivered using a VTM, the S&T Committee intends to work with the L&R Committee to jointly develop the ensure that there are no conflicts between any new language placed in NIST Handbooks 44 and 130 regarding the use of ATC for VTM temperature compensation.

For additional background on this item see the 2000 Final Report of the S&T Committee in the Report of the 85th NCWM.

331-2 VC T.4. Repeatability

(This item was adopted as part of the consent calendar.)

Source: National Type Evaluation Technical Committee (NTETC) Measuring Sector

Recommendation: Modify paragraph T.4. as follows:

> **T.4. Repeatability. - When multiple tests are conducted at approximately the same flow rate and draft size, the range of the test results for the flow rate shall not exceed 40 percent of the ~~applicable tolerance~~ absolute value of the maintenance tolerance and the results of each test shall be within the applicable tolerance. See also N.4.1.2.**

Add new paragraph N.4.1.2. Repeatability Tests as follows:

> **N.4.1.2. Repeatability Tests. – Tests for repeatability should include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors, such as temperature, pressure and flow rate are reduced to the extent that they will not affect the results obtained.**

Background/Discussion: At its October 2000 meeting, the Measuring Sector reviewed a proposal submitted by Nebraska and Micro Motion, Incorporated to amend NIST Handbook 44 Section 3.30. Liquid-Measuring Devices paragraph T.2.3.4. Repeatability; Section 3.31. Vehicle-Tank Meters paragraph T.4. Repeatability; and Section 3.37. Mass Flow

Meters paragraph T.3. Repeatability. The background and rationale for this issue are outlined in the S&T Agenda Item 330-2 which addresses the proposed changes to Section 3.30 paragraph T.2.3.4.

At the January 2001 NCWM Interim Meeting, the Committee agreed with the alternate proposal submitted by the Measuring Sector and supported by the SWMA. The Committee also modified the Measuring Sector proposal by proposing a new paragraph N.4.1.2. Repeatability Tests to provide guidance in conducting tests for repeatability. The Committee agreed to submit the modified Measuring Sector proposal for a vote at the July 2001 NCWM Annual Meeting. At the July 2001 NCWM Annual Meeting the Committee heard no unfavorable comments.

332 LPG and Anhydrous Ammonia Liquid-Measuring Devices

332-1 VC T.3. Repeatability

(This item was adopted as part of the consent calendar.)

Source: National Type Evaluation Technical Committee (NTETC) Measuring Sector

Recommendation: Modify paragraph T.3. as follows:

> **T.3. Repeatability. - When multiple tests are conducted at approximately the same flow rate <u>and draft size,</u> the range of the test results for the flow rate shall not exceed 40 percent of the absolute value of the maintenance tolerance and the results of each test shall be within the applicable tolerance. This tolerance does not apply to the test of the automatic temperature compensating system. <u>See also N.4.1.2.</u>**

Add new paragraph N.4.1.2. as follows:

> **<u>N.4.1.2. Repeatability Tests. – Tests for repeatability should include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors, such as temperature, pressure and flow rate are reduced to the extent that they will not affect the results obtained.</u>**

Background/Discussion: At its October 2000 meeting, the Measuring Sector reviewed a proposal submitted by Nebraska and Micro Motion, Incorporated to amend NIST Handbook 44 Section 3.30. Liquid-Measuring Devices paragraph T.2.3.4. Repeatability; Section 3.31. Vehicle-Tank Meters paragraph T.4. Repeatability; and Section 3.37. Mass Flow Meters paragraph T.3. Repeatability. The background and rationale for this issue are outlined in the S&T Agenda Item 330-2 which addresses the proposed changes to Section 3.30 paragraph T.2.3.4.

At the January 2001 NCWM Interim Meeting, the Committee agreed with the alternate proposal submitted by the Measuring Sector and supported by the SWMA. The Committee also modified the Measuring Sector proposal by proposing a new paragraph N.4.1.2. Repeatability Tests to provide guidance in conducting tests for repeatability. The Committee agreed to submit the modified Measuring Sector proposal for a vote at the July 2001 NCWM Annual Meeting. At the July 2001 NCWM Annual Meeting the Committee heard no unfavorable comments.

333 Hydrocarbon Gas Vapor-Measuring Devices

333-1 I T.X. Repeatability

(This item was changed from a voting item to an informational item at the annual meeting.)

Source: National Type Evaluation Technical Committee (NTETC) Measuring Sector

Recommendation: Add a new paragraph T.X. and a new paragraph N.4.1.2. to NIST Handbook 44 Hydrocarbon Gas Vapor-Measuring Devices Code as follows:

> **<u>T.X. Repeatability. - When multiple tests are conducted at approximately the same flow rate and draft size, the range of the test results for the flow rate shall not exceed 40 percent of the absolute value of the maintenance tolerance and the results of each test shall be within the applicable tolerance. See also N.4.1.2.</u>**

N.4.1.2. Repeatability Tests. - Tests for repeatability should include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors, such as temperature, pressure and flow rate are reduced to the extent that they will not affect the results obtained.

Background/Discussion: At its October 2000 meeting, the Measuring Sector reviewed a proposal submitted by Nebraska and Micro Motion, Incorporated to amend NIST Handbook 44 Section 3.30. Liquid-Measuring Devices paragraph T.2.3.4. Repeatability; Section 3.31. Vehicle-Tank Meters paragraph T.4. Repeatability; and Section 3.37. Mass Flow Meters paragraph T.3. Repeatability. The background and rationale for this issue are outlined in the S&T Agenda Item 330-2 which addresses the proposed changes to Section 3.30 paragraph T.2.3.4.

In the review of this issue, at its October 2000 meeting, the Southern Weights and Measures Association (SWMA) agreed with the Measuring Sector's recommendation that for all Handbook 44 Codes which currently have a tolerance for repeatability should hold all devices to a similar repeatability tolerance; however, the SWMA questioned whether or not it is appropriate to add repeatability tolerances to such codes as water meters and cryogenic measuring devices which presently have no repeatability requirements. The SWMA expressed concern that these Codes may not presently include a repeatability requirement because the devices are not capable of repeating within any of the requirements used in other Liquid-Measuring Devices Codes.

At the January 2001 NCWM Interim Meeting, the Committee decided to change this item to informational status to provide the opportunity for interested parties to submit data on the capability of devices to meet repeatability tolerances. The technical advisors will notify the appropriate trade associations of the proposed requirements.

334 Cryogenic Liquid-Measuring Devices

334-1 W Recognition of Liquefied Natural Gas Application

Source: Carryover Item 334-1. (This item originated from the Southern Weights and Measures Association (SWMA) and first appeared on the Committee's 1999 agenda as Item 334-1.)

Discussion: At the July 2000 NCWM Meeting, Jeff Kelly (Hoffer Flow Controls) informed the Committee that The Society of Automotive Engineers (SAE) planned to conduct controlled tests to examine the measurement accuracy of several meter types delivering three LNG samples with various methane content. The Committee agreed to keep this item as informational to provide SAE the opportunity to submit data from the planned controlled tests. At the January 2001 NCWM Interim Meeting, the Committee heard that the SAE plans for controlled tests have been delayed and no other data has been submitted. Since no data was submitted, the Committee decided to withdraw the item. The Committee agreed to revisit this issue at a later date if it is resubmitted with accompanying meter performance and other pertinent data regarding the affect of changes in LNG composition on meter accuracy.

Background: In 1998, the SWMA reviewed the following proposal to change the Cryogenic Liquid-Measuring Devices Code to recognize Liquefied Natural Gas (LNG) applications.

Amend paragraphs A.2. (c) and (d) as follows:

A.2. - This code does not apply to the following:

(a) Devices used for dispensing liquefied petroleum gases (for which see Sec. 3.32; Code for Liquefied Petroleum Gas and Anhydrous Ammonia Liquid-Measuring Devices).

(b) Devices used solely for dispensing a product in connection with operations in which the amount dispensed does not affect customer charges.

~~(c) Devices used solely for dispensing liquefied natural gas.~~

(~~d~~c) mass flow meters (see Sec. 3.37. Code for Mass Flow Meters)

S.2.5. Provision for Sealing. - Adequate provision shall be made for an approved means of security (e.g., data change audit trail) or physically applying security seals in such a manner that no adjustment ~~or interchange~~ may be made of:

(a) any measurement element;

(b) any adjustable element for controlling delivery rate when such rate tends to affect the accuracy of deliveries; ~~and~~ or

(c) ~~any automatic temperature or density compensating system~~ the zero adjustment mechanism.

~~Any~~ When applicable, the adjusting mechanism shall be readily accessible for purposes of affixing a security seal.

Audit trails shall use the format set forth in Table S.2.5.

Add the following paragraphs to correspond to the Mass Flow Meters Code:

S.2.4. Provisions for Power Loss.

S.2.4.1. Transaction Information. - In the event of a power loss, the information needed to complete any transaction in progress at the time of the power loss (such as the quantity and unit price, or sales price) shall be determinable for at least 15 minutes at the dispenser or at the console if the console is accessible to the customer.

S.2.4.2. User Information. - The device memory shall retain information on the quantity of fuel dispensed and the sales price totals during power loss.

S.2.6.2. Display of Quantity and Total Price. - When a delivery is completed, the total price and quantity for that transaction shall be displayed on the face of the dispenser for at least 5 minutes or until the next transaction is initiated by using controls on the device or other user-activated controls.

S.2.7. Recorded Representations, Point of Sale Systems. - The sales information recorded by cash registers when interfaced with a retail motor-fuel dispenser shall contain the following information for products delivered by the dispenser:

(a) the total volume of the delivery,

(b) the unit price,

(c) the total computed price, and

(d) *the product identity by name, symbol, abbreviation, or code number. [Nonretroactive as of January 1, XXXX.]*

S.2.8. Indication of Delivery. - The device shall automatically show on its face the initial zero condition and the quantity delivered (up to the nominal capacity).

However, the first 0.03 L (0.009 gal) of a delivery and its associated total sales price need not be indicated.
[Nonretroactive as of January 1, XXXX.]

Add new paragraphs S.1.1.2..X and S.1.X. and Table T.1. as follows:

S.1.1.2.X. Liquefied Natural Gas Used as an Engine Fuel - When liquefied natural gas is dispensed as an engine fuel, the delivered quantity shall be indicated and recorded, if the device is equipped to record, in liters or gallons and decimal subdivisions or fractional equivalents thereof.

S.1.X. Liquefied Natural Gas Dispensers. - Except for fleet sales and other price contract sales, a liquefied natural gas dispenser used to refuel vehicles shall be of the computing type and shall indicate the quantity, the unit price, and the total price of each delivery. The

dispenser shall display the volume measured for each transaction either continuously on an external or internal display accessible during the inspection and test of the dispenser, or display the quantity in volume units by using controls on the device.

Table T.1. Accuracy Classes for Cryogenic Meter Applications			
Accuracy Class	**Application**	**Acceptance Tolerance**	**Maintenance Tolerance**
2.0	**Liquefied natural gas as a motor fuel**	**1.5%**	**2.0%**
2.5	**Bulk delivery of cryogenic liquids**	**1.5%**	**2.5%**

At the WWMA September 2000, meeting no comments were received on this item. WWMA recommended the item remain informational until test data from Hoffer Flow Controls is received and evaluated.

At its October 2000 meeting the SWMA recommended this item be withdrawn from the S&T Agenda if no data is received at the 2001 NCWM Interim Meeting.

For more background information, refer to the 1999 and 2000 S&T Final Report.

334-2 V T.X. Repeatability

(This item was adopted as part of the consent calendar.)

Source: National Type Evaluation Technical Committee (NTETC) Measuring Sector

Recommendation: A new paragraphs T.X. Repeatability and N.5.1.1. Repeatability Tests to the NIST Handbook 44 Cryogenic Liquid-Measuring Devices Code as follows:

T.X. Repeatability. - When multiple tests are conducted at approximately the same flow rate and draft size, the range of the test results for the flow rate shall not exceed 40 percent of the absolute value of the maintenance tolerance and the results of each test shall be within the applicable tolerance. See also N.5.1.1.

N.5.1.1. Repeatability Tests. – Tests for repeatability should include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors, such as temperature pressure and flow rate are reduced to the extent that they will not affect the results obtained.

Background/Discussion: At its October 2000 meeting, the Measuring Sector reviewed a proposal submitted by Nebraska and Micro Motion, Incorporated to amend NIST Handbook 44 Section 3.30. Liquid-Measuring Devices paragraph T.2.3.4. Repeatability; Section 3.31. Vehicle-Tank Meters paragraph T.4. Repeatability; and Section 3.37. Mass Flow Meters paragraph T.3. Repeatability. The background and rationale for this issue are outlined in the S&T Agenda Item 330-2 which addresses the proposed changes to Section 3.30 paragraph T.2.3.4. The Measuring Sector submitted an alternate proposal to the S&T Committee for consideration.

At the January 2001 NCWM Interim Meeting, the Committee agreed with the alternate proposal submitted by the Measuring Sector and supported by the SWMA. The Committee also modified the Measuring Sector proposal by proposing a new paragraph N.5.1.1. Repeatability Tests to provide guidance in conducting tests for repeatability. The Committee agreed to submit the modified Measuring Sector proposal for a vote at the July 2001 NCWM Annual Meeting.

In the review of this issue, at its October 2000 meeting, the Southern Weights and Measures Association (SWMA) agreed with the Measuring Sector's recommendation that for all Handbook 44 Codes which currently have a tolerance for repeatability should hold all devices to a similar repeatability tolerance; however, the SWMA questions whether or not it is appropriate to add repeatability tolerances to such codes as water meters and cryogenic measuring devices which presently have no repeatability requirements. The SWMA expressed concern that these Codes may not presently include a repeatability requirement because the devices are not capable of repeating within any of the requirements used in other Liquid-Measuring Devices Codes.

During the July 2001 NCWM Annual Meeting, the Committee reviewed data supplied by the only manufacturer of cryogenic meters having an NTEP Certificate of Conformance. The data verified the manufacturer's position that their devices have the ability to meet the proposed repeatability tolerances. Consequently the Committee maintained the issue as a voting item on its agenda.

335 Milk Meters

335-1 I T.X. Repeatability

(This item was changed from a voting item to an informational item at the annual meeting.)

Source: National Type Evaluation Technical Committee (NTETC) Measuring Sector

Recommendation: Add new paragraphs T.X. Repeatability and N.4.1.1. Repeatability Tests to the NIST Handbook 44 Milk Meters Code as follows:

> **T.X. Repeatability. - When multiple tests are conducted at approximately the same flow rate and draft size, the range of the test results for the flow rate shall not exceed 40 percent of the absolute value of the maintenance tolerance and the results of each test shall be within the applicable tolerance. See also N.4.1.1.**
>
> **N.4.1.1. Repeatability Tests. – Tests for repeatability should include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors, such as temperature pressure and flow rate are reduced to the extent that they will not affect the results obtained.**

Background/Discussion: At its October 2000 meeting, the Measuring Sector reviewed a proposal submitted by Nebraska and Micro Motion, Incorporated to amend NIST Handbook 44 Section 3.30. Liquid-Measuring Devices paragraph T.2.3.4. Repeatability; Section 3.31. Vehicle-Tank Meters paragraph T.4. Repeatability; and Section 3.37. Mass Flow Meters paragraph T.3. Repeatability. The background and rationale for this issue are outlined in the S&T Agenda Item 330-2 which addresses the proposed changes to Section 3.30 paragraph T.2.3.4.

In the review of this issue, at its October 2000 meeting, the Southern Weights and Measures Association (SWMA) agreed with the Measuring Sector's recommendation that for all Handbook 44 Codes which currently have a tolerance for repeatability should hold all devices to a similar repeatability tolerance; however, the SWMA questions whether or not it is appropriate to add repeatability tolerances to such codes as water meters and cryogenic measuring devices which presently have no repeatability requirements. The SWMA expressed concern that these Codes may not presently include a repeatability requirement because the devices are not capable of repeating within any of the requirements used in other Liquid-Measuring Devices Codes.

At the January 2001 NCWM Interim Meeting, the Committee decided to change this item to informational status to provide the opportunity for interested parties to submit data on the capability of devices to meet repeatability tolerances. The technical advisors will notify the appropriate trade associations of the proposed requirements.

336 Water Meters

336-1 I T.X. Repeatability

(This item was changed from a voting item to an informational item at the annual meeting.)

Source: National Type Evaluation Technical Committee (NTETC) Measuring Sector

Recommendation: Add new paragraphs T.X. Repeatability and N.4.1.1. Repeatability Tests to the NIST Handbook 44 Water Meters Code as follows:

> **T.X. Repeatability. - When multiple tests are conducted at approximately the same flow rate and draft size, the range of the test results for the flow rate shall not exceed 40 percent of the absolute value of the maintenance tolerance and the results of each test shall be within the applicable tolerance. See also N.4.1.1.**

N.4.1.1. Repeatability Tests. – Tests for repeatability should include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors, such as temperature pressure and flow rate are reduced to the extent that they will not affect the results obtained.

Background/Discussion: At its October 2000 meeting, the Measuring Sector reviewed a proposal submitted by Nebraska and Micro Motion, Incorporated to amend NIST Handbook 44 Section 3.30. Liquid-Measuring Devices paragraph T.2.3.4. Repeatability; Section 3.31. Vehicle-Tank Meters paragraph T.4. Repeatability; and Section 3.37. Mass Flow Meters paragraph T.3. Repeatability. The background and rationale for this issue are outlined in the S&T Agenda Item 330-2 which addresses the proposed changes to Section 3.30 paragraph T.2.3.4.

In the review of this issue, at its October 2000 meeting, the Southern Weights and Measures Association (SWMA) agreed with the Measuring Sector's recommendation that for all Handbook 44 Codes which currently have a tolerance for repeatability should hold all devices to a similar repeatability tolerance; however, the SWMA questions whether or not it is appropriate to add repeatability tolerances to such codes as water meters and cryogenic measuring devices which presently have no repeatability requirements. The SWMA expressed concern that these Codes may not presently include a repeatability requirement because the devices are not capable of repeating within any of the requirements used in other Liquid-Measuring Devices Codes.

At the January 2001 NCWM Interim Meeting, the Committee decided to change this item to informational status to provide the opportunity for interested parties to submit data on the capability of devices to meet repeatability tolerances. The technical advisors will notify the appropriate trade associations of the proposed requirements.

337 Mass Flow Meter Code

337-1 VC Table T.2. Accuracy Classes for Mass Flow Meter Applications; Asphalt at 50 °C

(This item was adopted as part of the consent calendar.)

Source: Specifications and Tolerances Committee

Recommendation: To clarify what tolerances apply to mass flow meters used to deliver asphalt at 50 °C, modify Table T.2. as follows:

Table T.2. Accuracy Classes for Mass Flow Meter Applications				
Accuracy Class	**Application or Commodity Being Measured**	**Acceptance Tolerance**	**Maintenance Tolerance**	**Special Tolerance**
0.3	**Loading rack meters, vehicle-tank meters, home heating oil, heated products (except asphalt above 50 °C), asphalt ~~below~~ 50 °C or below, milk and other food products, large capacity motor-fuel dispensers (maximum discharge flow rates greater than 100 L or 25 gallon per minute), all other liquid applications not shown in the table where the minimum delivery is at least 700 kg (1500 lb)**	**0.2%**	**0.3 %**	**0.5 %**
0.3A	**Asphalt above 50 °C**	**0.3 %**	**0.3 %**	**0.5 %**
0.5	**Small capacity (retail) motor-fuel dispensers, agri-chemical liquids, all other liquid applications not shown in the table**	**0.3%**	**0.5%**	**0.5 %**
1.0	**Anhydrous ammonia, LP Gas (including vehicle tank meters)**	**0.6%**	**1.0%**	**1.0 %**
2.0	**Compressed natural gas as a motor fuel**	**1.5%**	**2.0%**	**2.0 %**
2.5	**Cryogenic liquid meters, liquefied compressed gases other than LP Gas**	**1.5%**	**2.5%**	**2.5 %**

(Added 1994)

Background/Discussion: During preparation and review of the 2000 Edition of NIST Handbook 44 the NIST Office of Weights and Measures noted that Table T.2. specifies tolerances for asphalt meter applications below 50 ^{0}C and above 50 ^{0}C, but does not specify tolerances for test applications *at* 50 ^{0}C. The Committee agreed that Table T.2. should have additional language to clarify which tolerances apply when asphalt at 50 °C. Consequently, the Committee recommends modifying Table T.2. as shown above.

At its September 2000, meeting the WWMA agreed with the clarification to Table T.2.

At its October 2000 meeting, the SWMA recommended the item for a vote at the 2001 NCWM Annual Meeting; however, SWMA questions when a product is considered "heated" because the need to heat a product may vary as the ambient temperature changes based on the season of the year.

At the January 2001 NCWM Interim Meeting, the Committee received no opposition to the item during its open hearings. Therefore, the Committee agreed to submit the item for a vote at the 2001 Annual Meeting.

337-2 VC T.3. Repeatability

(This item was adopted as part of the consent calendar.)

Source: National Type Evaluation Technical Committee (NTETC) Measuring Sector

Recommendation: Modify paragraph T.3. as follows:

T.3. Repeatability. - When multiple tests are conducted at approximately the same flow rate and draft size, the range of the test results for the flow rate shall not exceed:

~~(a) 0.2 percent for retail liquid motor fuel devices; and~~

~~(b)~~ 40 percent of ~~applicable~~ the absolute value of the maintenance tolerance ~~for all other devices listed in Table T.2.~~ and the results of each test shall be within the applicable tolerance. See also N.6.1.1.

Add new paragraphs N.6.1.1. Repeatability Tests as follows:

N.6.1.1. Repeatability Tests. – Tests for repeatability should include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors, such as temperature pressure and flow rate are reduced to the extent that they will not affect the results obtained.

Background/Discussion: At its October 2000 meeting, the Measuring Sector reviewed a proposal submitted by Nebraska and Micro Motion, Incorporated to amend NIST Handbook 44 Section 3.30. Liquid-Measuring Devices paragraph T.2.3.4. Repeatability; Section 3.31. Vehicle-Tank Meters paragraph T.4. Repeatability; and Section 3.37. Mass Flow Meters paragraph T.3. Repeatability. The background and rationale for this issue are outlined in the S&T Agenda Item 330-2 which addresses the proposed changes to Section 3.30 paragraph T.2.3.4.

At the January 2001 NCWM Interim Meeting, the Committee agreed with the alternate proposal submitted by the Measuring Sector and supported by the SWMA. The Committee also modified the Measuring Sector proposal by proposing a new paragraph N.6.1.1. Repeatability Tests to provide guidance in conducting tests for repeatability. The Committee agreed to submit the modified Measuring Sector proposal for a vote at the July 2001 NCWM Annual Meeting. At the July 2001 NCWM Annual Meeting the Committee heard no unfavorable comments.

338 Carbon Dioxide Liquid-Measuring Devices

338-1 I T.X. Repeatability

(This item was changed from a voting item to an informational item at the annual meeting.)

Source: National Type Evaluation Technical Committee (NTETC) Measuring Sector

Recommendation: Add new paragraphs T.X. Repeatability and N.4.1.1. Repeatability Tests to the NIST Handbook 44 Carbon Dioxide Liquid-Measuring Code as follows:

T.X. Repeatability. - When multiple tests are conducted at approximately the same flow rate and draft size, the range of the test results for the flow rate shall not exceed 40 percent of the absolute value of the maintenance tolerance and the results of each test shall be within the applicable tolerance. See also N.4.1.1.

N.4.1.1. Repeatability Tests. – Tests for repeatability should include a minimum of three consecutive test drafts of approximately the same size and conducted under controlled conditions where variations in factors, such as temperature pressure and flow rate are reduced to the extent that they will not affect the results obtained.

Background/Discussion: At its October 2000 meeting, the Measuring Sector reviewed a proposal submitted by Nebraska and Micro Motion, Incorporated to amend NIST Handbook 44 Section 3.30. Liquid-Measuring Devices paragraph T.2.3.4. Repeatability; Section 3.31. Vehicle-Tank Meters paragraph T.4. Repeatability; and Section 3.37. Mass Flow Meters paragraph T.3. Repeatability. The background and rationale for this issue are outlined in the S&T Agenda Item 330-2 which addresses the proposed changes to Section 3.30 paragraph T.2.3.4.

In the review of this issue, at its October 2000 meeting, the Southern Weights and Measures Association (SWMA) agreed with the Measuring Sector's recommendation that for all Handbook 44 Codes which currently have a tolerance for repeatability should hold all devices to a similar repeatability tolerance; however, the SWMA questions whether or not it is appropriate to add repeatability tolerances to such codes as water meters and cryogenic measuring devices which presently have no repeatability requirements. The SWMA expressed concern that these Codes may not presently include a repeatability requirement because the devices are not capable of repeating within any of the requirements used in other Liquid-Measuring Devices Codes.

At the January 2001 NCWM Interim Meeting, the Committee decided to change this item to informational status to provide the opportunity for interested parties to submit data on the capability of devices to meet repeatability tolerances. The technical advisors will notify the appropriate trade associations of the proposed requirements.

342 Farm Milk Tanks

342-1 VC N.5.1. Verification of Master Metering Systems and N.5.2. Temperature Changes in Water Supply

(This item was adopted as part of the consent calendar.)

Source: Northeastern Weights and Measures Association (NEWMA)

Recommendation: Add new paragraphs N.5.1. Verification of Master Metering Systems and N.5.2. Temperature Changes in Water Supply to the Farm Milk Tanks Code:

> **N.5.1. Verification of Master Metering Systems. – A master metering system used to gauge a milk tank shall be verified before and after the gauging process. A master metering system used to calibrate a milk tank shall be verified before starting the calibration and reverified at least every quarter of the tank capacity, or every 2000 L (500 gal), whichever is greater.**
>
> **N.5.2. Temperature Changes in Water Supply. – When using a master metering system to gauge or calibrate a milk tank, the official shall monitor the temperature of the water before and after changing sources of supply. If the water temperature of the new source changes by more than 2.8 °C (5 °F) from the previous supply, the official shall reverify the accuracy of the master metering system as soon as possible after the system reaches temperature equilibrium with the new supply source.**

Background/Discussion: In recent years, weights and measures officials have noticed an increase in the capacity of bulk milk tanks including capacities as large as 7000 gallons. The test units used to test bulk milk tanks, which have water storage tanks ranging from 400 to 1200 gallons in capacity, have not kept pace with this increase in size. Bulk milk tank calibration frequently requires officials to seek additional water sources such as wells, ponds, or municipal water tanker trucks. When multiple sources are used to obtain sufficient water for testing, temperature variations of the test liquid during the test may result. Officials have observed that the wider the temperature differentials the greater the difficulty the system has maintaining the tolerance requirements in paragraphs T.3. Basic Tolerance Values and T.4. Basic Tolerance Values, Master Meter Method.

NEWMA recommended the addition of two test notes as outlined in the recommendation above to require that the inspector take the necessary steps to address differences in temperature in the testing process.

During discussions at the January 2001 NCWM Interim Meeting, one committee member voiced concern that other regions have not had a chance to review the item; however, others pointed out that there was adequate time for review by individual states prior to the July 2001 NCWM Annual Meeting. The Committee agreed that the proposal would increase the reliability of tests conducted when more than one water source is used and agreed to submit the item for a vote at the 2001 NCWM Annual Meeting. At the July 2001 NCWM Annual Meeting the Committee heard no additional comments on this issue.

354 Taximeters Code

354-1 VC S.7. Anti-fraud Provisions, Electronic Taximeters

(This item was adopted.)

Source: Northeastern Weights and Measures Association (NEWMA)

Recommendation: Add new paragraphs S.7(a) through (c) Anti-fraud Provisions, Electronic Taximeters to the Taximeter Code as follows:

S.7. Anti-fraud Provisions, Electronic Taximeters. – An electronic taximeter may have provisions to detect and eliminate distance input that is inconsistent with output of the vehicle's distance sensor. When a taximeter equipped with this feature detects input inconsistent with the distance sensor:

(a) The meter shall either filter out the inconsistent distance input signals or cease to increment fare based on distance until the distance input signal returns to normal. If the meter ceases to increment fare based on distance, the taximeter may continue to increment fare based on elapsed time,

(b) The taximeter shall provide a visible or audible signal that inconsistent input signals are being detected, and

(c) The taximeter shall record the occurrence in an event logger. The event logger shall include an event counter (000 to 999), the date, and the time of at least the last 1000 occurrences.

Discussion: The Committee heard no opposition to the proposal from industry or weights and measures representatives. The Committee agreed that it is more appropriate to have a permissive requirement for equipping electronic taximeters with an anti-fraud mechanism to detect fraudulent distance registration rather than the mandatory requirement originally proposed by NEWMA in 2000. NEWMA proposed that the recommendation above replace the mandatory proposal outlined in Developing Item 360-4 S.1.2. Advancement of Indicating Elements found in Appendix E . The Committee believed that NEWMA's alternate proposal better addresses how the anti-fraud mechanism must function than the mandatory requirement. Therefore, the Committee recommended the above proposal for a vote at the 2001 NCWM Annual Meeting and withdrew Appendix E.

Background: The background information for this item was excerpted from the NEWMA October 2000 Interim Meeting Report. NEWMA's proposal recognized the use of anti-fraud systems to detect and counteract the injection of false distance input signals to an electronic taximeter. The New York Taxi and Limousine Commission (TLC) regulates over 12 000 taxis, one of the largest taxi fleets in the country. The TLC reported finding electronic taximeters operating with external signal generators or "zappers." The "zapper's" fraudulent distance signals increase the distance traveled therefore causing the meter to overregister and overcharge the passenger.

In new vehicles, the distance input comes from the vehicle speed sensor, usually located in the transmission. The speed sensor output, in the form of electronic pulses, goes to the vehicle computer and from there is distributed to a number of other systems such as cruise control and anti-lock brakes. The wires, carrying the speed signal from the vehicle computer, travel throughout the vehicle and make it easy to hide a connection to an extraneous signal source, commonly called a "zapper."

The proposal recognized the use of "zapper" detection systems and specified three system requirements for operation to ensure the system detects inconsistent distance input. First, the system must act on the inconsistent signal. The taximeter may filter out the inconsistent signal. This allows a system to continue to correctly increment fare based on output from the vehicle speed sensor. The alternative for the taximeter is to stop incrementing fare based on distance until the signal returns to normal. In this situation, the meter may continue to increment based on time, provided the time-off control is not activated. The attempted use of a zapper will actually result in a loss to the taximeter operator since the distance typically increments fare faster than time. NEWMA believed this will serve as an additional deterrent to zapper use.

The second required feature is either a visual or audible signal that the system is detecting inconsistent distance signals. This signal serves several purposes. First, it alerts the operator that something is wrong. The TLC reported that in their studies that problems in the vehicle speed sensor occurred with several vehicles and were detected by the test systems as zappers. The signal will alert the operator to get the vehicle repaired as soon as possible. It also serves to alert anyone considering fraudulent activity that their "zapper" signals are being detected and eliminated. The regulatory official will also use these signals or indications to identify that the meter has detected inconsistent signals in the type evaluation and testing process.

The third required feature, the event logger, was proposed by the TLC as a necessary enforcement tool to monitor the number of instances in which an operator is trying to use a zapper. Event loggers were incorporated in the studies conducted by the TLC. The value of 1000 records was based on similar requirements in NIST Handbook 44 for data loggers used as audit trails in other devices. The TLC received comments that taximeter manufacturers did not see any problems in complying with this requirement and the event loggers are invaluable to service companies trying to correct problems, such as faulty vehicle speed sensors.

The proposal is intended to be a retroactive requirement. NEWMA believes there is no need to make this a non-retroactive requirement because it is permissive. However, any manufacturer wishing to market a new model of meter with this feature would have to comply with the requirements. If a manufacturer wants to upgrade an existing model of meter to include the feature, they may do so, provided the upgrade complies with the new requirements. NEWMA believed the enforcement status with respect to used and in-service devices in a particular jurisdiction may become an issue should this become a mandatory requirement.

The NEWMA proposal is part of a broad program undertaken in New York to deter and catch all parties who perpetuate fraud and to protect the riding public. This program includes inspection programs, undercover activities, and changing laws to make defrauding taxi customers a criminal offense. The TLC conducted a pilot project to test several versions of this antifraud technology.

Since the New York Bureau of Weights and Measures (New York) is involved in an ongoing basis at the national level developing proposals for the NCWM S&T Committee agenda to change Handbook 44, the TLC requested that New York promulgate regulations that recognize this new antifraud technology. Present NIST Handbook 44 requirements that address design and performance requirements of commercial devices, do not include specific provisions that recognize this new electronic technology. The use of antifraud technology, which in some instances stops all distance registration until correct distance signals are relayed to the sensor, might cause meters to fail other official tests conducted to current Handbook 44 requirements.

In response to the TLC requests, New York conducted its own research on the feasibility of "anti-zapper" systems. New York is a Participating Laboratory in the National Type Evaluation Program authorized in the area of taximeter type evaluation. New York is also involved in ongoing discussions with the TLC and meter manufacturers, and is gathering input from TLC public hearings on this subject. A TLC meeting was held to discuss fraud and other device issues on June 9, 2000 and was attended by representatives from eight major taximeter manufacturers, National Institute of Standards and Technology Office of Weights and Measures, New York, and the TLC. New York's research information indicated that these antifraud systems can detect and eliminate the effects of "zapper" technology now being used. Adding the proposed language to Handbook 44 will permit taximeter manufacturers to add these systems to taximeters to render the "zapper" ineffective and thereby protect consumers.

In addition to protecting the consumer, this technology would protect the taxicab owners. A majority of taxi fleet vehicles are leased to drivers. The driver pays a flat fee to lease the cab for one shift, and keeps any money made above the lease fee. However, it is the owner who has a substantial investment to protect. This investment includes the vehicle cost, insurance, and the medallion (an official requirement in many jurisdictions which is necessary to operate for hire). Today, a taxi medallion in New York City can be worth $250,000. If the taxi is found operating with a zapper it may be subject to seizure and the owner may be subject to severe fines and/or loss of the medallion. The taxi owners support the implementation of "anti-zapper" technology because they believe it shows a good faith effort on their part to prevent the use of "zappers" and, thus, protect the riding public as well as their investment.

NEWMA believes that while this antifraud technology is a significant step in stopping the use of "zappers," it is important to note that "zappers" are much like the computer viruses that plague our computer networks. It may be a constant battle to keep ahead of the individuals who intend to use these fraudulent mechanisms. The weights and measures community will have to be ever vigilant to uncover the latest "zapper" technology and ensure that anti-fraud provisions continue to protect customers.

356(a) Grain Moisture Meters

356(a)-1 VC N.1.1 Transfer Standard and N.1.2. Minimum Test, Footnote 1

(This item was adopted.)

Source: National Type Evaluation Technical Committee (NTETC) Grain Moisture Meter Sector

Recommendation: Delete all reference to Footnote 1 from the Grain Moisture Meters Code 5.56.(a) paragraphs N.1.1. and N.1.2. as follows:

N.1. Testing Procedures.

N.1.1. Transfer Standards.[1] – Official grain samples shall be used as the official transfer standards with moisture content values assigned by the reference methods. The reference methods shall be the oven drying methods as specified by the USDA GIPSA. Tolerances shall be applied to the average of at least three measurements on each official grain sample. Official grain samples shall be clean and naturally moist, but not tempered (i.e., water not added).

N.1.2. Minimum Test.[1] – A minimum test of a grain moisture meter shall consist of tests:

(a) with samples (need not exceed three) of each grain or seed for which the device is used, and

(b) with samples having at least two different moisture content values within the operating range of the device.

~~**[1]The U.S. Department of Agriculture, Grain Inspection, Packers and Stockyards Administration (GIPSA) uses a single brand and model of moisture meter for official inspection of moisture content in grains and other commodities. The calibrations for the model are based on the official air-oven method and are developed and monitored on an established schedule using a broad range (with respect to geographical source, kind, class, moisture content, maturity, etc.) of grain samples at its central laboratory. GIPSA uses a hierarchical series of meter-to-meter intercomparisons to determine whether its field meters are operating within acceptable tolerances (± 0.2 % with respect to standard meters). It has been shown that field meters checked by GIPSA procedures perform within H-44 maintenance tolerances (T.2.) when tested (N.1.) using official grain sample. Agencies lacking a sample capability representing the entire nation and traceable to the official laboratory reference method shall not use meter-to-meter field testing.**~~

Background/Discussion: The National Type Evaluation Technical Committee (NTETC) Grain Moisture Meter Sector recommended removing Footnote 1 from the Grain Moisture Meter Code because it served its original purpose of recognizing U.S. Department of Agriculture, Grain Inspection, Packers and Stockyards Administration (GIPSA) meter-to-meter field test procedures and explaining the calibration support required to make the meter-to-like-meter field test procedure a viable testing option. The Sector agreed that the NTEP on-going calibration program provides a similar level of calibration support and now allows state agencies to develop viable meter-to-like-meter field testing programs. Removal of Footnote 1 supports efforts to recognize meter-to-like-meter method transfer standards. GIPSA is not affected by removal of Footnote 1 because they have not adopted the Notes section of the Grain Moisture Meters Code.

The Central Weights and Measures Association (CWMA) supported the proposal as written.

At the 2001 NCWM Interim Meeting, the Committee heard no unfavorable comments on this proposal and moved the item forward for a vote at the 2001 NCWM Annual Meeting.

356(a)-2 VC Recognize Meter-to-Like-Type Meter Method Transfer Standards

(This item was adopted.)

Source: National Type Evaluation Technical Committee (NTETC) Grain Moisture Meter Sector

Recommendation: Modify 5.56.(a) Grain Moisture Meters Code as follows:

N.1. Testing Procedures. Field evaluation of grain moisture meters shall be performed by one of the following methods:

N.1.1. Air Oven Reference Method Transfer Standards.[1] Official grain samples shall be used as the official transfer standards with moisture content values assigned by the reference methods. The reference methods shall be the oven drying methods as specified by the USDA GIPSA. Tolerances shall be applied to the average of at least three measurements on each official grain sample. Official grain samples shall be clean and naturally moist, but not tempered (i.e. water added).

Add new paragraph N.1.X. as follows:

N.1.X. Meter to Like-Type Meter Method Transfer Standards. – Properly standardized reference meters using National Type Evaluation Program approved calibrations shall be used as transfer standards. A reference meter shall be of the same type as the meter under test. Tests shall be conducted side-by-side using, as a comparison medium, grain samples that are clean and naturally moist, but not tempered (i.e., water added).

Modify paragraph T.2. and corresponding Table T.2. to address tolerances for the Air Oven Reference Method as follows:

T.2. Tolerances.

T.2.1. ~~Tolerance Values~~ Air Oven Reference Method. – Maintenance and acceptance tolerances shall be shown as in Table T.2.1. Tolerances are expressed as a fraction of the percent moisture content of the official grain sample, together with a minimum tolerance.

Table T.2.1. Acceptance and Maintenance Tolerances ~~for Grain Moisture Meters~~ Air Oven Reference Method		
Type of Grain and Seed	**Tolerance**	**Minimum Tolerance**
Corn, oats, rice, sorghum, sunflower	**0.05 of the percent moisture content**	**0.8 percent in moisture content**
All other cereal grains and oil seeds	**0.04 of the percent moisture content**	**0.7 percent in moisture content**

Add new paragraph T.2.2 and corresponding Table T.2.2. to address tolerances for Meter to Like-Type Meter Method as follows:

T.2.2. Meter to Like-Type Meter Method. – Maintenance and acceptance tolerances shall be as shown in Table T.2.2. The tolerances shall apply to all types of grain and seed.

Table T.2.2. Acceptance and Maintenance Tolerances Meter to Like-Type Meter Method	
Sample Reference Moisture	**Tolerance**
Up to 22 percent	**0.5 percent in moisture content**

Delete Footnote 2 as follows:

T. Tolerances[2]

~~[2]These tolerances do not apply to tests in which grain moisture meters are the transfer standards.~~

Discussion: The Committee agreed that it is more appropriate to recognize meter to like-type meter transfer standards rather than side-by-side testing of meter to non-like meter. GIPSA advised that testing should be performed in a laboratory environment when the sample reference moisture is above twenty-two percent. Consequently, the proposal does not address tolerances when sample reference moisture is greater than twenty-two percent.

Background: In August 2000, the Sector agreed by letter ballot to recognize meter-to-like-type meter testing and to develop NIST Handbook 44 requirements to address this test method for grain moisture meters addressed in Code Section 5.56.(a). Handbook 44 does not endorse a particular method of inspection. The current Handbook 44 tolerances were established assuming that oven-tested grain would be used as the transfer standard. Moisture meters are calibrated by statistically examining a very large number of samples to determine a "best fit" relationship between air oven moisture results and the properties actually measured by the meter. This relationship varies somewhat from sample to sample and the Handbook 44 tolerances allow for this variance.

The Sector determined through studies that both air-oven and meter-to-like-meter methods are suitable for official testing of grain moisture meters. The Sector agreed that meter-to-meter inspections should be conducted using only National Type Evaluation Program (NTEP) approved grain moisture meters because these meters participate in the on-going calibration program that is a requirement for NTEP certification. Mandatory participation of NTEP meters in the on-going calibration program assures that calibrations used on NTEP meters (including the U.S. Grain Inspection Packers and Stockyard Administration official meter) are validated against the air oven using the same sample set. The NTEP ongoing calibration program assures uniformity between meters of different make and manufacture. This program also helps to prove the validity of calibrations and assure uniformity because meter-to-like-meter comparisons are legitimate. An additional benefit of the program is that it works as an effective means of determining that field meters are functioning properly. Tolerances can be reduced for meter-to-like-meter testing when the variance between air oven moisture results and the measured properties of individual samples is eliminated. The meter-to-meter testing program developed recognizes the air oven as the only suitable means for moisture determination to develop calibrations for grain moisture meters. The program also recognizes that a factory standardized reference meter using properly developed moisture calibrations is traceable to the air oven. The meter-to-meter evaluation verifies the use of approved calibrations and tests the hardware of the grain moisture meter.

Additionally, the Sector noted the importance of using like-type meters because of the variations between non-like meters. Without this program to validate and provide uniform calibrations, any jurisdictions electing to use the meter-to-like-meter method would have to conduct their own program to validate the calibrations used on non-NTEP meters. The Sector expressed concern that jurisdictions would not be able to use a large enough set of samples to adequately establish meter calibration validity or uniformity over the full moisture range.

The Sector drafted an Examination Procedure Outline (EPO) that contains a test procedure for the air oven reference method. This method includes using samples in field inspections which are labeled with a reference moisture derived from the laboratory air oven test. The draft EPO also includes a meter to like-type meter test procedure which allows use of a standardized meter to obtain the reference moisture in a side-by-side test of the moisture meter.

The Central Weights and Measures Association agreed with the Sector's proposal as written.

356(b) Grain Moisture Meters

356(b)-1 VC N.1.1 Transfer Standard, Footnote 1

(This item was adopted.)

Source: National Type Evaluation Technical Committee (NTETC) Grain Moisture Meter (GMM) Sector

Recommendation: Delete all reference to Footnote 1 from paragraph N.1.1. as follows:

N.1. Testing Procedures.

N.1.1. Transfer Standards.[1]— Official grain samples shall be used as the official transfer standards with moisture content values assigned by the reference methods. The reference methods shall be the oven drying methods as specified by the USDA GIPSA. Tolerances shall be applied to the average of at least three measurements on each official grain sample. Official grain samples shall be clean and naturally moist, but not tempered (i.e., water not added).

~~[1]The U.S. Department of Agriculture, Grain Inspection, Packers and Stockyards Administration (GIPSA) uses a single brand and model of moisture meter for official inspection of moisture content in grains and other commodities. The calibrations for the model are based on the official air-oven method and are developed and monitored on an established schedule using a broad range (with respect to geographical source, kind, class, moisture content, maturity, etc.) of grain samples at its central laboratory. GIPSA uses a hierarchical series of meter-to-meter intercomparisons to determine whether its field meters are operating within acceptable tolerances (0.2 % with respect to standard meters). It has been shown that field meters checked by GIPSA procedures perform within H-44 maintenance tolerances (T.2.) when tested (N.1.) using official grain sample. Agencies lacking a sample capability representing the entire nation and traceable to the official laboratory reference method shall not use meter-to-meter field testing.~~

Discussion: The National Type Evaluation Technical Committee (NTETC) Grain Moisture Meter Sector and the Central Weights and Measures Association (CWMA) recommended removing Footnote 1 from the Grain Moisture Meter Code 5.56.(b). Both groups reported that Footnote 1. served its original purpose of making the weights and measures community aware of the U.S. Department of Agriculture, Grain Inspection, Packers and Stockyards Administration (GIPSA) meter-to-like-meter field test. GIPSA is not affected by removal of Footnote 1 because they have not adopted the Notes section of the Grain Moisture Meters Code.

Footnote 1 also explains the necessity for calibration support to make the meter-to-like-meter field test procedure a viable testing option. The calibration program ensures that all meter calibrations are based on the same grain sample set and the grain sample set is made up of grain sample from across the united states. As such all calibrations for meters are linked relative to one national grain sample set. Selecting samples which measure the same on two meters does not guarantee that that the two calibrations are uniform with each other on all samples.

At the 2001 NCWM Interim Meeting, the Committee agreed to move the item forward for a vote at the 2001 NCWM Annual Meeting.

The Office of Weights and Measures (OWM) studied the proposal in detail and agreed that Footnote 1 outlines the criteria for a meter to like-type meter test program where the program operates with calibration support. Section 5.56.(b) addresses non-NTEP meters where there is no ongoing calibration program. Therefore, OWM believes that Footnote 1 should be revised rather than removed from Section 5.56.(b).

In March 2001, the Grain Moisture Meter Sector acknowledged OWM's concerns, but decided not to modify the proposal or the item's status. The Sector agreed to review the following alternate proposal developed by its Technical Advisor that revised Footnote 1 in August 2001:

> Calibration for moisture meters in the National Type Evaluation Program (NTEP) are verified for accuracy annually using data collected over a three year period on a National Sample Set traceable to the official air oven reference method. Grain samples in the National Sample Set are chosen for their diversity with respect to geographical source, kind, class, moisture content, maturity, etc. Once calibration accuracy is proven using a sufficiently diverse sample set, it has been shown that standard meters of like-type calibrated to factory specifications can be used in a side-by-side test to determine if field meters of like-type are functioning properly. Agencies wishing to apply this test procedure to non-NTEP meters of like-type must establish the validity of the calibrations, traceable to the official laboratory reference method, over the full range of moistures.

Editorial Note: During its August 2001 meeting, the Grain Moisture Meter Sector discussed the alternate proposal above. The Sector agreed that including the alternate footnote in Section 5.56.(b) was not necessary because of the steady decline of non-NTEP meters in the marketplace.

356(b)-2 W Recognize the Meter-to-Meter Method Transfer Standards

(This item was withdrawn.)

Source: Central Weights and Measures Association (CWMA)

Recommendation: Modify paragraph N.1.1. as follows:

N.1. Testing Procedures.

N.1.1. Transfer Standards.[1]— Official grain samples shall be used as the official transfer standards with moisture content values assigned by the reference methods. The reference methods shall be the oven drying methods as specified by the USDA GIPSA or by use of properly standardized reference meters of like-type as meters being inspected and using approved calibrations traceable to the air-oven drying methods as specified by USDA GIPSA. Tolerances shall be applied to the average of at least three measurements on each official grain sample. Official grain samples shall be clean and naturally moist, but not tempered (i.e., water not added).

Modify paragraph T.2. and corresponding Table T.2. to address tolerances for the Air Oven Reference Method as follows:

T.2.1. ~~Tolerance Values~~ Air Oven Reference Method. – Maintenance and acceptance tolerances shall be shown as in Table T.2.1. Tolerances are expressed as a fraction of the percent moisture content of the official grain sample, together with a minimum tolerance.

Table T.2.1. Acceptance and Maintenance Tolerances Air Oven Reference Method		
Type of Grain and Seed	**Tolerance**	**Minimum Tolerance**
Corn, oats, rice, sorghum, sunflower	**0.05 of the percent moisture content**	**0.8 percent in moisture content**
All other cereal grains and oil seeds	**0.04 of the percent moisture content**	**0.7 percent in moisture content**

Add new paragraph T.2.2 and corresponding Table T.2.2. to address tolerances for Meter to Like-type Meter Method as follows:

T.2.2. Meter to Like-Type Meter Method. – Maintenance and acceptance tolerances shall be as shown in Table T.2.2. The tolerances shall apply to all types of grain and seed.

Table T.2.2. Acceptance and Maintenance Tolerances Meter to Like-type Meter Method	
Sample Reference Moisture	**Tolerance**
Up to 22 percent	**0.5 percent in moisture content**

Delete Footnote 2 as follows:

T. Tolerances[2]

~~[2]These tolerances do not apply to tests in which grain moisture meters are the transfer standards.~~

Discussion: The Sector notes there are no calibration programs for non-NTEP meters which ensure uniformity in the calibration of non-NTEP meters. Consequently, the Committee concurred with the Sector's concerns and did not recommend meter-to-meter method for transfer standards when the master device is a non-NTEP meter. Consequently, the Committee is withdrawing this item from its agenda.

Background: The CWMA proposal established specific tolerances for a meter-to-meter test method that applies to all non-NTEP grain moisture meters. The CWMA stated that NIST Handbook 44 does not endorse a particular method of inspection. CWMA noted that current Handbook 44 tolerances were established assuming that sample reference moistures are determined in a laboratory. Subsequent use of grain samples to test grain moisture meters reduces the integrity of the samples. Handbook 44 tolerances allow for sample moisture variances during field tests. In contrast, the meter-to-meter test method eliminates the variables associated with sample moisture loss.

Nebraska reported that for over 40 years it has implemented a meter-to-meter testing with results that have withstood the scrutiny of studies on the effectiveness and uniformity standards for grain moisture meter inspection programs. Nebraska also indicated achieving superior uniformity in moisture testing at the commercial warehouse level while maintaining the air oven standard. Nebraska believed this demonstrates its ability to appropriately use this method of inspection for all grain moisture meters.

The National Type Evaluation Technical Committee Grain Moisture Meter Sector considered this same proposal; however, its members opposed recognizing the meter-to-meter test method for 5.56.(b) Grain Moisture Meters Code. The Sector noted the meter-to-meter test evaluation verifies only the hardware of a grain moisture meter and is not a good indication of the uniformity of the calibrations of different meter types. The NTEP program verifies meters based on the same sample set.

There are variances between the reference moisture and the properties meters actually measure over a range of samples. Calibration support guarantees uniform meter calibration by like-type meters over a national sample set. The Sector agreed that the NTEP on-going calibration program provides a similar level of calibration support and now allows state agencies to develop viable meter-to-like-meter field testing programs. Applying the meter-to-like-meter test to non-NTEP meters only shows that the two meters agree with each other; however, it does not show they will agree with the mean of the national sample set. Selecting samples which measure the same on both NTEP and non-NTEP meters does not guarantee that the two non-NTEP meter calibrations are uniform with each other over a range of samples.

357 Near-Infrared Grain Analyzers – Tentative Code

357-1 VC Near-Infrared Grain Analyzers Indication of Additional Constituent Values

(This item was adopted.)

Source: Carryover Item 357-2. (This item originated from the Near-Infrared (NIR) Grain Analyzer Sector and first appeared on the S&T Committee's 1999 agenda as Item 357-2.)

Discussion: The Committee reviewed the following proposal to modify the Near-Infrared Grain Analyzer (NIR) Code to include requirements for corn protein, oil, and starch, barley protein, and soybeans protein, and oil and issues of moisture bases.

Add new paragraphs A.3.1. Dual Type Approval and A.3.2. Calibration as follows:

> **A.3.1. Dual Type Approval. - In addition to meeting the requirements of this code, a whole grain NIR analyzer that displays a measured moisture value must also comply with the requirements of the Grain Moisture Meter Code and be type approved as a grain moisture meter.**
>
> **A.3.2 Calibrations. - The National Type Evaluation Program Certificate of Conformance (CC) shall indicate the native moisture basis of each calibration. The "native" moisture basis is the default moisture basis of the sealable constituent calibration (or constituent calibration pair when a non-displayed moisture calibration is also involved). If an NIR analyzer uses a self-generated moisture measurement internally but does NOT display or record a moisture value, the moisture calibration shall be considered to be a part of the constituent calibration. For such calibrations, the CC shall note: "Includes non-displayed moisture calibration." Changes to any part of such calibrations shall require changes to the CC.**

Modify paragraph S.1.1. as follows:

> **S.1. Design of Indicating, Recording, and Measuring Elements.**
>
> ***S.1.1. Digital Indications and Recording Elements.***
>
> ***(a) Analyzers shall be equipped with a digital indicating element.***
>
> ***(b) The minimum height for the digits used to display constituent values shall be 10 mm.***
>
> ***(c) Analyzers shall be equipped with a communication interface that permits interfacing with a recording element and transmitting the date, grain type or class, constituent values, the moisture basis for each constituent value (except moisture), and calibration version identification.***

(d) A digital indicating element shall not display, and a recording element shall not record, any constituent value before the end of the measurement cycle.

(e) ~~Wheat protein content shall be recorded and displayed as percent protein reported on a constant moisture basis of 12 percent wet basis.~~ Constituent content shall be recorded and displayed as percent of total mass. The moisture basis shall also be recorded and displayed for each constituent content result (except moisture). If a whole grain analyzer that is calibrated to display results on an "as is" moisture basis does NOT display or record a moisture value, it must clearly indicate that results are expressed on an "as is" moisture basis. Ground grain analyzers must ALWAYS display and record a moisture measurement for "as is" content results (except moisture).

(f) An analyzer shall not display or record any constituent value that is beyond the operating range of the device unless the constituent value representation includes a clear error indication (and recorded error message with the recorded representation).

(g) If an NIR analyzer is used to determine a moisture value, either to determine the moisture of an "as is" constituent content measurement, or to convert from one moisture basis to another, the moisture measurement must be concurrent with the measurement of other constituents.

[Nonretroactive and effective as of January 1, 2002.]

Modify Table S.1.2. Grain Types Considered for Type Evaluation and Calibration and Minimum Acceptable Abbreviations as follows:

Table S.1.2. Grain Types Considered for Type Evaluation and Calibration and Minimum Acceptable Abbreviations

Grain Type	*Minimum Acceptable Abbreviation*
Durum Wheat	*DURW*
Hard Red Spring Wheat	*HRSW*
Hard Red Winter Wheat	*HRWW*
Hard White Wheat	*HDWW*
Soft Red Winter Wheat	*SRWW*
Soft White Wheat	*SWW*
Soybeans	*SOYB*
Two-rowed Barley	*TRB*
Six-rowed Barley	*SRB*
Corn	*CORN*

Modify paragraph S.1.3.(b) as follows:

S.1.3. Operating Range. - An analyzer shall automatically and clearly indicate when the operating range of the device has been exceeded. The statement of the operating range shall be specified in the operator's manual and shall operate as follows:

(b) The constituent range at the moisture basis specified in Table N.1.1. shall be specified for each grain or seed for which the analyzer is to be used. A constituent value may be displayed when the constituent range is exceeded if accompanied by a clear indication that the constituent range has been exceeded.

Add a new Table N.1.1. Constant Moisture Basis for Type Evaluation and Field Inspection to NIR Code to read as follows:

Table N.1.1. Constant Moisture Basis for Type Evaluation and Field Inspection		
Grain Type or Class	***Constituent(s)***	***Moisture Basis***
Durum Wheat, Hard Red Spring Wheat, Hard Red Winter Wheat, Hard White Wheat, Soft Red Winter Wheat, Soft White Wheat	***Protein***	***12 percent***
Soybeans	***Protein*** ***Oil***	***13 percent***
Two-rowed Barley ***Six-rowed Barley***	***Protein***	***0 percent (dry basis)***
Corn	***Protein*** ***Oil*** ***Starch***	***0 percent (dry basis)***

Modify paragraph S.2.5.2 as follows:

S.2.5.2. Calibration Version. - An instrument must be capable of displaying either calibration constants, a unique calibration name, or a unique calibration version number for use in verifying that the latest version of the calibration is being used to make constituent determinations, and that the appropriate instrument settings have been made for the calibration being used.
[Nonretroactive and effective as of January 1, 2002.]

Modify paragraphs N.1.1. Field Inspection and N.1.2. Standard Reference Samples, Wheat to read as follows:

N.1. Testing Procedures.

N.1.1. Field Inspection. - Whole grain samples shall be used as the official field inspection standards. Five samples per grain type or class shall be used to check instrument performance. Each sample will be analyzed once. One of the samples will be analyzed an additional four times to test instrument repeatability. For ground grain instruments, the ground sample will be repacked four times. A new grind is not required. Test results must be converted to the standard moisture bases shown in Table N.1.1. before applying the tolerances of Table T.2. Test results on whole grain analyzers that produce results on an "as is" basis without displaying or recording a moisture value shall be converted to the standard moisture bases shown in Table N.1.1. using sample moisture values determined with the facility's moisture meter (which must be approved for commercial use).

~~Wheat protein~~ Constituent values shall be assigned to test samples by the Grain Inspection, Packers and Stockyards Administration (GIPSA). Tolerances shall be applied to individual sample measurements, the average of individual measurements on each of the five test samples, and the maximum difference (range) in results for five analyses on one of the test samples.

N.1.2. Standard Reference Samples, ~~Wheat.~~ - 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 ~~wheat protein~~ constituent values obtained using the GIPSA standard reference method and an official GIPSA NIR ~~wheat protein~~ grain analyzer does not exceed ~~0.3~~ one-half of the acceptance tolerance shown in Table T.2. for individual test samples or ~~0.15~~ 0.375 times the acceptance tolerance shown for the average of five samples.

Modify paragraph T.1. and Table T.2. to read as follows:

T.1. To Underregistration and to Overregistration. - The tolerances hereinafter prescribed shall be applied to errors of underregistration and errors of overregistration *and shall be based on constituent values expressed at the moisture bases shown in Table N.1.1..*

T.2. Tolerance Values. - Acceptance and maintenance tolerances shall be equal. Tolerances for individual samples and the average for five samples are as shown in Table T.2.

Table T.2. Acceptance and Maintenance Tolerances for NIR ~~Wheat Protein~~ Grain Analyzers

Type of Grain	Constituent	Individual Samples (percent)	Average for Five Samples (percent)	Range for Five Retests (percent)
Durum Wheat, Hard Red Spring Wheat, Hard Red Winter Wheat, Hard White Wheat, Soft Red Winter Wheat, Soft White Wheat	protein	0.60	0.40	0.40
Soybeans	protein	0.80	0.60	0.60
	oil	0.70	0.50	0.50
Two-rowed Barley Six-rowed Barley	protein	0.70	0.50	0.50
Corn	protein	0.80	0.60	0.60
	oil	0.70	0.50	0.50
	starch	1.00	0.80	0.80

Modify paragraphs UR.2.1. Operating Instructions, UR.2.3. Printed Tickets, and UR. 2.5. Sampling as follows:

UR.2. User Requirements.

UR.2.1. Operating Instructions. - The operating instructions for the NIR analyzer shall be readily available to the user, service technician, and weights and measures official at the place of installation. It shall include a list of accessory equipment if any are required to obtain constituent values, and the type or class of grain to be measured with the NIR analyzer. If an NIR analyzer has the capability, the user is permitted to select the moisture basis to be used on any measurement.

UR.2.3. Printed Tickets. -

(a) Printed tickets shall be free from any previous indication of constituent or grain type selected. The printed ticket shall indicate constituent values ~~reported on a constant~~ and the moisture basis associated with each constituent value (except moisture). If the analyzer is calibrated to display results on an "as is" moisture basis and does NOT display or record a moisture value, the ticket must clearly indicate that results are expressed on an "as is" moisture basis.

(b) The customer shall be given a printed ticket showing the date, grain type or class, constituent results, and calibration version identification. If the analyzer converts constituent results to a manually entered moisture basis, the "native" concentration and the "native" moisture basis must appear on the printed ticket in addition to the converted results and the manually entered moisture basis. If the manually entered moisture basis is intended to be the moisture value for an "as is" constituent concentration measurement, that moisture value must

have been obtained on the same sample and must have been measured on a moisture meter approved for commercial use. The information presented on the ticket shall be arranged in a consistent and unambiguous manner. The ticket shall be generated by the near-infrared grain analyzer system.
[Nonretroactive and effective as of January 1, 2002.]

UR.2.5. Sampling. - Samples shall be obtained by following appropriate sampling methods and equipment. These include, but are not limited to grain probes of appropriate length used at random locations in the bulk, the use of a pelican sampler, or other techniques and equipment giving equivalent results. The sample shall be taken such that it is representative of the lot. ***If an NIR analyzer permits user entry of the moisture value for an "as is" constituent measurement, that moisture value must have been obtained on the same sample and must have been measured on a moisture meter approved for commercial use.***

Editorial Note: All references to Table S.1.1.(e), which appeared in Publication 15 and 16, were editorially changed by renumbering that table to Table N.1.1. The table designation was changed because the moisture basis values needed to correspond to test procedures addressed in paragraph N.1.1. Field Inspection.

Discussion: During the 2001 NCWM Interim Meeting, the Committee reviewed Sector study data that demonstrated the constituent values and moisture basis must be considered to adequately evaluate near-infrared grain analyzers. The Committee noted that the NIR Code has tentative status, but should include the additional constituent values to address measurements performed on other grain types. Consequently, the Committee recommended the proposal for a vote at the 2001 NCWM Annual Meeting. The Committee modified the title of Table N.1.1. to reflect decisions made by the NIR Sector to address acceptable moisture bases values to address type evaluation and inspection applications rather than constituent displays and recordings.

At the July 2001 NCWM Annual Meeting, the Committee heard that the Central Weights and Measures Association supported the item as long as including additional constituent requirements does not delay the code in achieving permanent status.

Background: During the NIR Grain Analyzer Sector's March 1998 meeting, representatives reported seeing an increasing number of NIR Analyzers in their jurisdictions in the following applications: (1) commercial usage for corn and soybeans, (2) contracts directly with the producer to obtain "enhanced value" grains, and (3) measurement of protein and oil for an increasing number of grain types. In response to these observations, the Sector proposed modifying the Handbook 44 NIR Grain Analyzer Tentative Code to include requirements for corn protein, oil, and starch; barley protein; and soybean protein and oil.

In 1999, the S&T Committee considered the Sector's proposal to modify the Near-Infrared Grain Analyzer Code to recognize moisture basis for corn protein, oil, and starch; barley protein; and soybean protein and oil. The Sector provided comments from the grain industry to the Committee; these comments indicated that the current market is undecided on the appropriate moisture basis for wheat and other constituents. Therefore, the Committee gave the proposal information status to allow the Sector time to develop appropriate language that addresses moisture basis for new constituents and because industry commented that the requirements might be premature.

Industry agreed that establishing specific moisture bases for these products could create confusion and potentially disrupts the market if the proposed Handbook 44 moisture bases for corn and soybeans differ from the bases in commercial contracts.

The Sector noted that there were suitability issues because commercial NIR devices frequently had no clear moisture basis indicator and officials had no means to determine the moisture basis used to derive the device's calibration.

For additional background information on this issue refer to the 2000 final report of the S&T Committee.

360 Other Items

360-1 I Revise NIST Handbook 44

Source: Carryover Item 360-1 (This item originated from the Southern Weights and Measures Association (SWMA) and first appeared on the S&T Committee's 1999 agenda as Item 360-1.)

Background/Discussion: A Work Group was appointed in 1999 by then NCWM Chairman Wes Diggs to review and revise NIST Handbook 44 to simplify its language and format. This item is included in the S&T Committee Agenda to provide interested parties with information on work affecting Handbook 44.

The Committee continues to encourage the Work Group to carry on its efforts. The Committee recognized that the revision of Handbook 44 is a daunting task and recommended the BOD fund additional meetings to allow the group to complete its task. The Committee suggested holding Work Group meetings in conjunction with other weights and measures meetings because that may solve some of the logistic and financial issues that arise in meeting planning.

During the 2001 NCWM Interim Meeting, Chairman Murdock reported the Work Group completed a draft reorganization of the Liquid-Measuring Device (LMD) Code. The Working Group asks for input from the NCWM membership on the proposed reorganization of the LMD Code. For more details on the rework of the LMD Code, refer to Board of Director's (BOD) Agenda Item 101-12, Appendix D, Proposed Reorganization of the Liquid-Measuring Devices Code in NIST Handbook 44.

For additional background information see the 1999 and 2000 BOD and S&T Committee final reports.

360-2 V Section 3.30, S.1.3.3.(a) Width; Indicator Index

Source: Specifications and Tolerances Committee

Recommendation: Modify paragraph S.1.3.3. (a) in NIST Handbook 44 Code Sections 3.31., 3.32., 3.33., 3.34., 3.35., 3.36., and 3.38. to read as follows:

> **S.1.3.3. Width. - The width of the index of an indicator in relation to the series of graduations with which it is used shall not be greater than:**
>
> ***(a) The width of the ~~widest~~ narrowest graduation, and***
> ***[Nonretroactive as of January 1, 2002.]***
>
> **(b) The width of the minimum clear interval between graduations.**
>
> **When the index of an indicator extends along the entire length of a graduation, that portion of the index of the indicator that may be brought into coincidence with the graduation shall be of the same width throughout the length of the index that coincides with the graduation.**

Editorial Note: The recommendation that appeared in Publications 15 and 16 was provided to show the similarities between requirements adopted by the 2000 NCWM to the Liquid-Measuring Devices Code and changes proposed for a corresponding requirement in other measuring device codes. This final report includes the language the 2001 NCWM adopted that changes the term "widest" to "narrowest" in paragraph S.1.3.3.(a) Width, Indicator Index of the measuring device codes as shown in the recommendation above.

Discussion: The Committee heard no unfavorable comments on the proposal; however, the Committee Technical Advisors contacted equipment manufacturers for their input on the affects of the proposed changes. The Committee presented this item for a vote at the 2001 NCWM Annual Meeting because it heard no opposition to the proposal.

Background: In July 2000, the NCWM adopted changes to Liquid Measuring Devices Code paragraph S.1.5.3. (a) Width; Indicator Index to require the indicator index width to be no greater than the width of the *narrowest* graduation to align U.S. and Canadian requirements.

The Committee acknowledged that the following Liquid-Measuring Devices Codes contain similar requirements which might conflict with the proposal if those meters are used in multiple applications:

3.31 Vehicle-Tank Meters Code paragraph S.1.3.3.(a) Width
3.32 Liquefied Petroleum Gas and Anhydrous Ammonia Liquid-Measuring Devices Code paragraph S.1.3.3.(a) Width
3.33 Hydrocarbon Gas Vapor-Measuring Devices Code paragraph S.1.3.3.(a) Width
3.34 Cryogenic Liquid-Measuring Devices Code paragraph S.1.3.3.(a) Width
3.35 Milk Meters Code paragraph S.1.3.3.(a) Width
3.36 Water Meters Code paragraph S.1.3.3.(a) Width

3.38 Carbon Dioxide Liquid-Measuring Devices Tentative Code paragraph S.1.3.3.(a) Width

The Committee decided to review each code in the list above and make comparisons with corresponding Canadian and OIML requirements. The Committee was interested in the effect of making similar changes to those other liquid-measuring device codes.

The Committee would like to have seen all devices comply with the revised requirement immediately upon adoption; however, it realized that this is not practical. The Committee noted that the proposal language is nonretroactive as of January 1, 2002, to allow manufacturers time to comply with the requirement. The Committee did not plan to retain the old Handbook 44 language addressing indices not wider than the widest graduation. The Committee noted that devices in service prior to 2002 are not precluded from complying with the proposed requirement.

The Southern Weights and Measures Association recommended the proposal move forward as a voting item to ensure consistency in the requirements throughout the measuring device codes.

The WWMA also supported moving the proposal forward as a voting item, because it had heard no unfavorable comments from manufacturers affected by this issue.

For additional background information on the changes to Section 3.30, see the 2000 NCWM final report of the S&T Committee.

360–3 I International Organization of Legal Metrology (OIML) Report

A report on OIML activities prepared by the NIST Technical Standards Activities Program (TSAP) is included as part of the NCWM OIML Board of Director's 2001 final report Agenda Item 101-8 Program, International Organization of Legal Metrology Appendix B.

Many issues before the OIML, the Asian-Pacific Legal Metrology Forum (APLMF), and other international activities are within the purview of the S&T Committee. Additional information on OIML activities is available on the OIML web site at http://www.oiml.org.

For more information on weighing devices and taximeters, contact Ken Butcher, NIST TSAP, by telephone at 301-975-4859 or by e-mail at kenneth.butcher@nist.gov. For more information on measuring devices contact Wayne Stiefel, NIST TSAP, by telephone at 301-975-4011, or by e-mail at s.stiefel@nist.gov. For more information on electronic measuring devices and grain moisture meters contact Dr. Ambler Thompson, NIST TSAP by telephone at 301-975-2333 or by e-mail at ambler@nist.gov. For more information on the R117, Measuring Systems for Liquids Other Than Water and R105, Measuring Systems for Quantities of Liquids, and gas meters contact Ralph Richter by telephone at 301-975-4025 or by e-mail at ralph.richter.@nist.gov. Mr. Butcher, Mr. Stiefel, Mr. Richter, and Dr. Thompson can also be reached at NIST, 100 Bureau Drive-STOP 2150, Gaithersburg, MD 20899-2150 or by fax at 301-975-5414.

The Committee received written support from an industry representative for U.S. participation in the development of the intercomparison of master flow meter program and work to clarify the 7th Draft Mutual Acceptance Arrangement. TSAP representatives reported the work on intercomparison of master flow meters was cancelled.

360–4 Developing Issues

The NCWM established a mechanism to disseminate information about emerging issues which have merit and are of national interest. Developing issues have not received sufficient review by all parties affected by the proposals or may be insufficiently developed to warrant review by the NCWM S&T Committee. The developing issues listed are currently under review by at least one regional association or technical committee. The S&T Committee encourages interested parties to examine the proposals and send their comments to the contact listed in each item.

The developing issues are listed in the following appendices according to the specific Handbook 44 Code Section under which they fall:

Appendix B - General Code
Appendix C – Scales
Appendix D - Belt-Conveyor Scale Systems
Appendix E – Taximeters
Appendix F - Grain Moisture Meters

Appendix G – Other Items
Appendix H – Liquid-Measuring Devices

The Committee asked that the regional weights and measures associations and Sectors continue their work to fully develop each proposal. Should an association or Sector decide to discontinue work on a developmental item, the Committee asked that it be notified.

George S. Shefcheck, Oregon, Chairman

Constantine V. Cotsoradis, Kansas
Mark Coyne, City of Brockton, Massachusetts
Jack Kane, Montana
Richard W. Wotthlie, Maryland

Ted Kingsbury, Canada, Technical Advisor
Richard Suiter, NIST, Technical Advisor
Juana Williams, NIST, Technical Advisor

Committee on Specifications and Tolerances

Appendix A (Item 310-1A and Item 310-1B)
Remanufactured Device Task Force Memorandum, Report, and Proposals

MEMORANDUM

DATE: August 21, 2000

TO: NCWM NTEP Committee
Wes Diggs, Chairman, and Tina Butcher, Technical Advisor
NCWM S&T Committee
George Shefcheck, Chairman, and Juana Williams, Technical Advisor
NCWM L&R Committee
Bob Williams, Chairman, & Tom Coleman, Technical Advisor

COPY: Lou Straub, NCWM Chairman
Remanufactured Device Task Force

FROM: Remanufactured Device Task Force - Jim Truex, Chairman

SUBJECT: Report and Proposals of the Remanufactured Device Task Force

Included with this memo are the report and proposals (S&T Items 310-1A and 310-1B) of the Remanufactured Device Task Force. The Task Force is proposing several definitions and a General Code marking requirement for NIST Handbook 44. We are suggesting that the S&T Committee put the proposals forward for NCWM consideration as voting items and include the entire report of the Remanufactured Device Task Force in their report as an appendix.

The proposed definitions (Item 310-1A) also affect NCWM Publication 14 and NIST Handbook 130 [Uniform National Type Evaluation Regulation] since the proposed definitions for repaired and remanufactured devices are different from the definitions presently included in those documents. It is important to note that, other than the definitions, the Task Force is not proposing any changes to the current NTEP regulation or current NTEP policies and procedures. In fact, current NTEP policies and procedures were used as the basis for many of the conclusions.

Therefore, we are suggesting that the NCWM allow the S&T Committee to take the lead with the proposals and include them in their report for NCWM consideration. In the interest of uniformity, it is not advisable to have definitions in Handbook 44 that are different from those in Publication 14 and Handbook 130. Therefore, we are suggesting that the NTEP and L&R Committees add an item to their agenda recognizing item 310-1A on the S&T Committee agenda and alerting conference members to the fact that the definitions in Handbook 130 and Publication 14 will be changed if the conference adopts new definitions for repaired and remanufactured devices under the S&T agenda item. I will be happy to work with the committees on appropriate language if you desire.

Note to the NTEP and S&T Committees: Some regulatory members of the Remanufactured Device Task Force, NCWM, NTEP Committee, and the S&T Committee visited two different liquid measuring device/element remanufacturers facilities during the Central and Northeastern Weights and Measures Association conferences in the Spring of 2000. The consensus was that there was no major concern based on what they observed since the design of the devices/elements were not being changed. Also, both of the remanufacturers were attaching labels to the remanufactured devices/elements. The Task Force decided not to include this information in their report because it was not a Task Force visit or project. If the committees think the information is important enough to report, the Task Force recommends the committees put the information in their report(s) separate from the Task Force report.

The Remanufactured Device Task Force has agreed to be in “stand-by mode” throughout the next 12 months to clarify positions and answer any additional questions from the committees. Please don’t hesitate to contact any or all of us.

Appendix A Continued (Item 310-1A and Item 310-1B)
Remanufactured Device Task Force Memorandum, Report, and Proposals

Report of the Remanufactured Device Task Force
to the NCWM S&T Committee
Objective and Actions
August 21, 2000

(As amended by the Task Force following the January 2001 Interim Meeting)

Objective: To develop a proposal for remanufactured devices (S&T Item 310-1) for the NCWM by August, 2000.

Actions:

1. To determine why a marking requirement is necessary. If criteria are in place that determine when a device must be reevaluated, then how will a marking requirement change anything?

Conclusion: The Remanufactured Device Task Force was informed by several NCWM members that the NCWM wanted the opportunity to vote on a marking requirement for remanufactured devices. The primary charge of the Task Force was to develop a marking requirement proposal for NCWM consideration.

The Task Force thoroughly discussed and considered remanufactured and repaired device issues. There are many pros and cons to marking these devices. On one hand, in most cases it is difficult for weights and measures enforcement officials to determine if a device has been repaired or remanufactured, and even if it has, the official finds it difficult to determine what was done or if a modification was made that affects the metrological integrity of the device, element, or system. So why mark the device? On the other hand, NTEP prohibits repair agencies and remanufacturers from changing a device to the extent that the metrological characteristics are changed, or that specific device is no longer traceable to the NTEP Certificate of Conformance (CC). Therefore, it is already a weights and measures enforcement issue and a remanufacturer's marking would at least alert the official so the proper questions could be asked or directed to the appropriate parties.

Questions have been asked. Why are we considering a marking requirement? What problem are we trying to fix? The Task Force has come to the conclusion that original equipment manufacturers (OEMs) are concerned about their reputations and liability for the device when work is performed by a non-authorized agent or remanufacturer. Scale Manufacturers Association (SMA) members have gone on record to say, "We the manufacturers of weighing devices reserve the right to declare a device metrologically different from that certified. As the owner of the applicable Certificate we reserve the right to declare these devices no longer traceable to the Certificate."

The pros and cons are listed below:

1.a. To investigate the positive and negative impacts of requiring remanufacturer markings.

Positive:

Basic information is good for weights and measures officials to have available.
Aids in helping correct problems found with devices.
Helps determine who is responsible for the device: the OEM or the remanufacturer.
Benefits the end user and consumer who will be able to readily identify remanufactured equipment.
Fairness to the OEM.
May indicate the device is no longer traceable to the original CC.
May aid the weights and measures official in tracking a remanufacturer's CC for the device.
Identifies that a device is remanufactured so that the criteria in place may be applied, to determine who is responsible for the device and provide a fair marketplace.

Negative:

This approach leaves W&M officials to face an enforcement dilemma (S&T Committee). **NOTE** from the Task Force: If you are in an NTEP state, that dilemma already exists.

Appendix A (Continued)

W&M official cannot visually determine if an internal component is rebuilt or repaired.
Cost of marking labels.
Increased burden on the inspector if markings are deficient.
Some changes may only be apparent to the OEM.
Possible increased burden on the jurisdiction to determine traceability to a CC.
Ease of enforcement is not the criteria to determine the worthiness of a requirement. How a requirement will improve or maintain accuracy or equity in the marketplace is.

2. To identify the remanufacturer information that is necessary (e.g., name, address, phone no., date of remanufacture, etc.). Should the marking be a remanufacturer requirement or a user requirement?

Conclusion:

Name, initials, or trademark of the remanufacturer or distributor.

Model designation if different than the original model designation.

Marking is a manufacturer/remanufacturer responsibility even though, in most cases, weights and measures officials will hold the owner of the device responsible for assuring that all requirements are met.

2.a. To identify a location of the remanufacturer markings.

Comments Considered:

Just above the OEMs identification plate.

Located adjacent to the manufacturers label.

Proposal:

Adjacent to the original equipment manufacturers G.S.1. markings.

2.b. To determine the requirements if multiple businesses have remanufactured a device.

Proposal:

Only the most recent remanufacturers label is required.

NOTE: If the OEM remanufactures a device, a new label is not required since all necessary information is already available.

3. To determine when a device is required to be marked. What are the criteria? Will there be single or multiple criteria to meet before remanufacturer markings are required? [See the marking proposal S&T Item 310-1B]

3.a What constitutes a metrological change? (Question from the S&T Committee)

Conclusion: The question "What constitutes a metrological change?" often arises. S&T Committees and NTEP Sectors have struggled with this question for many years. It is difficult to come up with one answer that satisfies all circumstances.

Handbook 44 definition: metrological integrity (of a device). - The design, features, operation, installation, or use of a device or element that facilitates: (1) the accuracy and validity of a measurement or transaction, (2) compliance of the device or element with statutory requirements, and (3) the suitability of the device for a given application. [Page D-9]

NCWM Publication 14 discusses metrological parameters that can affect the measurement features that have a significant potential for fraud, and features or parameters whose range extends beyond that appropriate for device compliance with Handbook 44 or the suitability of equipment. Publication 14 also has tables containing lists of features and parameters to

Appendix A (Continued)

be sealed, many of them metrologically significant. A note under those tables states, "This list may not be all inclusive, and there may be parameters other than those listed which affect the metrological performance of the device and must, therefore, be sealed. If listed parameters or other parameters which may affect the metrological function of the device are not sealed, the manufacturer must demonstrate that the parameter will not affect the metrological performance of the device (i.e., all settings comply with the most stringent requirements of Handbook 44 for the applications for which the device is to be used)."

The Task Force used the philosophy above when using the term "metrological change." We are also aware that NTEP handles most metrologically significant decisions on a case-by-case basis.

The Task Force understands the S&T Committee's struggle with the term "metrological change," which is very technical. If the NCWM thinks additional work is warranted to better define the term, the Task Force thinks it should be addressed by the NTEP sectors.

3.b. To determine when is a device remanufactured?

Conclusion: Developed definitions to address this question.

3.c. To review, define and/or re-define the terms "remanufactured" and "repaired."

Current definitions approved by NCWM (NIST Handbook 130) were discussed.

> remanufactured device - A device to which an overhaul or replacement of parts has been performed so the device can be installed in a new location.
>
> repaired device - The maintenance or replacement of parts for a device to remain or return to service in the same location.

Comments Considered: It should be noted that if we develop or change definitions, an effort should be made to ensure that uniform definitions are eventually incorporated into other pertinent documents (i.e., NIST Handbook 130 and NCWM Publication 14).

The following definitions were suggested and discussed:

> repaired device. - A device to which enough work is performed to bring the device back into proper operating condition and meets appropriate specifications, tolerances, and user requirements of NIST Handbook 44.
>
> repaired element. - An element to which enough work is performed to bring the device back into proper operating condition and meets appropriate specifications, tolerances, and user requirements of NIST Handbook 44.
>
> remanufactured device. - A device that is disassembled, checked for wear, parts replaced or fixed, reassembled with new or repaired parts so that it will operate within the specification and design parameters the manufacturer sets for a new device of the same type.
>
> remanufactured element. - An element that is disassembled, checked for wear, parts replaced or fixed, reassembled with new or repaired parts so that it will operate within the specification and design parameters the manufacturer sets for a new device of the same type.

The SMA also found it necessary to put the following definitions into their production meets type standard:

> metrological element. A part, assembly, material, design, or procedure that has a direct influence on the performance or operation of a weighing device.
>
> metrological device. A device that is designed for an installation and operation which facilitates the accuracy and validity of a measurement.

Appendix A (Continued)

If indeed our concern is only for metrological devices and elements, we determined it would make sense to add the word "metrological" to the definitions. So we came up with alternate definitions for the "R" words as shown below:

> remanufactured metrological device. A device that is disassembled, checked for wear, parts replaced, or fixed, then reassembled and made to operate like a similar new device.
>
> remanufactured metrological element. An element that is disassembled, checked for wear, parts replaced, or fixed, then reassembled and made to operate like a similar new element.
>
> repaired metrological device. A device which is out of conformance to which enough work is performed to bring the device back into proper operating condition.
>
> repaired metrological element. An element which is out of conformance to which enough work is performed to bring the device back into proper operating condition.

Defining device and element? It was also suggested that the Task Force consider definitions for device and element. Without getting any further into Handbook 44 than the General Code, we will find the terms: system, device, element, and equipment used. Yet, none of these terms are defined in the definition section of Handbook 44. In trying to define the terms we must be careful or we could cause more "interpretation problems" than we may solve. The Task Force proposes that if it is deemed necessary to define these terms, it should be a task of the NCWM S&T Committee, not the Remanufactured Device Task Force.

Since the work of the Task Force has direct ties to NTEP evaluated equipment, it may best be stated that, when using the terms device and element, the Task Force used the principles established in NCWM, Publication 14, NTEP Administrative Procedures, Section C., Examples of Equipment To Be Submitted for Type Evaluation or for approval as shown in Table 1.

Table 1 Excerpts:

> Weighing Devices, Elements, and Systems: complete scales, indicating elements separate from the weighing element, weighing elements separate from the indicating element, load cells
>
> Liquid-Measuring Devices, Elements, and Systems: complete liquid-measuring devices and systems, indicating elements separate from the measuring elements (meter registers), measuring elements separate from the indicating elements (positive displacement meters, turbine meters), major elements of a measuring system (pressure sensors/transducers, temperature sensors/transducers, automatic temperature compensators)
>
> Both Weighing and Measuring Devices, Elements, and Systems: data processing systems that perform metrological functions, software that performs metrological functions

Conclusion: The Task Force carefully considered all proposed definitions. The Task Force also seriously looked at the definition for manufactured device currently in Handbook 44 and the current wording of G-S.1. Identification in conjunction with the remanufactured device definition developed on July 29, 2000 as addressing at least a portion of the issue. It was decided that the handbook definition needs to be amended.

After discussion it was apparent that the current definitions for repaired and remanufactured devices were not clear and considered inappropriate by many members. Additionally, the Task Force developed an amended definition for manufactured device. The following definitions were developed by the Task Force.

Proposal:

> **repaired device. A device to which enough work is performed to bring the device back into proper operating condition.**
>
> **repaired element. An element to which enough work is performed to bring the element back into proper operating condition.**

Appendix A (Continued)

remanufactured device. A device that is disassembled, checked for wear, parts replaced or fixed, reassembled and made to operate like a new device of the same type.

remanufactured element. An element that is disassembled, checked for wear, parts replaced or fixed, reassembled and made to operate like a new element of the same type.

manufactured device. Any new device or any other device that has been removed from service and substantially altered or rebuilt. Commercial weighing or measuring device shipped as new from the original equipment manufacturer.

3.d. Guide to proper interpretation and use of the definitions.

During the 2000 NCWM Interim Meeting, some S&T Committee members stated that the Task Force definitions were not clear enough. Instead of reworking the definitions, the Task Force agreed to develop real world examples to indicate proper interpretation of the definitions and help weights and measures jurisdictions in administering their programs. Those examples were printed as part of the Task Force report in NCWM Publication 15, 2001 Interim Meeting Agenda.

Editorial Note: During the January 2001 NCWM Interim Meeting, concern was stated pertaining to the remanufactured examples and the proposed markings in S&T Item 310-1B as applied to those examples. Many, both regulatory officials and industry representatives, stated it should not be required to mark a device remanufactured if routine elements are being replaced with like elements (e.g., dispenser nozzles, meters, registers, load cells). The Task Force agreed to reconsider the interpretation examples.

After reviewing the examples the Task Force decided to amend the examples and put the examples in table format, specifying: remanufactured device, remanufactured element, NTEP affect and marking applications. Many of the examples have been amended for clarification purposes. New examples have been added and some examples, previously considered remanufactured have moved to the repaired section. Obviously, if S&T Item 310-1B G-S.1. Identification is not adopted then the marking column should be deleted.

Appendix A
Section I – Examples of Repaired Devices / Repaired Elements (no metrological change)

Activity	Remanufactured Device	Remanufactured Element	Still Traceable To NTEP CC	Marking Required
I.A. Disassembly of a scale for the purpose of cleaning and repairing pivots and bearings.	No	No	Yes	No
I.B. Disassembly of a motor fuel dispenser for the purpose of replacing a meter gasket.	No	No	Yes	No
I.C. Any device in which the electronic components have been changed on site using original manufacturers factory parts or NTEP traceable replacement parts.	No	No	Yes	No
I.D. Any weighing or measuring element that is replaced on site with original manufacturers factory parts or NTEP traceable replacement parts.	No	No	Yes	No
I.E. Section adjustment (mechanical or electronic) on class III L scales with some disassembly required.	No	No	Yes	No
I.F. Adjustment of nose iron on mechanical scales with some disassembly required.	No	No	Yes	No
I.G. Replacement of nozzles on gasoline dispensers.	No	No	Yes	No
I.H. Replacement of LCD or non-metrological computers boards or chips.	No	No	Yes	No
I.I. Adjustment of ranger gears on meters (some disassembly required).	No	No	Yes	No
I.J. Replacement of pivots and bearings on mechanical scales. Note: Pivots and bearings would have to meet the original manufacturer's specifications for the scale to operate correctly.	No	No	Yes	No
I.K. A service firm replaces a meter that cannot be brought into the proper calibration with a used meter (at the service station) of the same model and the meter is recalibrated.	No	No	Yes	No
I.L. A used equipment dealer replaces a meter that cannot be brought into the proper calibration with a used meter (in their shop) of the same model taken from a used dispenser and the meter is recalibrated when installed and placed back in service.	No	No	Yes	No
I.M. A remanufacturer disassembles a dispenser to replace a meter that cannot be brought into the proper calibration with a used meter (in their plant) of the same model taken from a used dispenser and the meter is recalibrated when installed and placed back in service.	No	No	Yes	No
I.N. A service agency replaces 2 of 8 load cells with load cells identical (same manufacturer, make and model) to those removed.	No	No	Yes	No
I.O. A service agency partially disassembles a motor fuel dispenser, cleans the dispenser and replaces the meter with a meter identical (same manufacturer, make and model) to that removed.	No	No	Yes	No

Appendix A (Continued)
Section I – Examples of Repaired Devices / Repaired Elements (no metrological change)

I.P. Substitution of metrologically equivalent (n_{max}, v_{min}, etc.) load cells from a different manufacturer provided the cells are of the same basic type and can be replaced without modification to the basic design of the load cell mounting assembly.	No	No	Yes	No
I.Q. Replacement of all analog load cells in a scale system with approved and compatible digital load cells provided the cells can be replaced without any modification to the basic design of the load cell mounting assembly.	No	No	Yes	No

Section II. Examples of Remanufactured Devices / Remanufactured Elements (no metrological change)

Activity	Remanufactured Device	Remanufactured Element	Still Traceable To NTEP CC	Marking Required
II.A. Disassembly of a scale, checking for worn parts, cleaning the scale and replacing some of the device's 8 load cells with remanufactured load cells (remanufactured by the original manufacturer) identical to those removed.	No	Yes	Yes	No (original markings meet requirement)
II.B. Complete disassembly of a motor fuel dispenser, checking for worn parts, cleaning the dispenser and replacement of all badly worn parts with parts identical (same manufacturer, make and model) to that removed.	Yes	No	Yes	Yes
II.C. A service firm replaces a digital indicating element of a floor scale with the same model indicator remanufactured by a firm other than the original manufacturer of the scale. Note: The remanufacturer made no design change.	No	Yes	Yes	Yes (element only)
II.D. A company completely disassembles a counter computing scale in their shop, checks for worn parts and replaces all worn elements with remanufactured elements (not original manufacturer but no design change), replaces other parts as needed, cleans and reassembles the scale for sale.	Yes	Yes	Yes	Yes
II.E. A company completely disassembles a motor fuel dispenser in their shop, checks for worn parts and replaces all worn elements with remanufactured elements (not original manufacturer but no design change), cleans and reinstalls the dispenser.	Yes	Yes	Yes	Yes
II.F. A service firm replaces a meter that cannot be brought into the proper calibration in a dispenser (at the service station) with the same model meter remanufactured by a firm other than the original manufacturer of the dispenser. Note: The remanufacturer made no design change.	No	Yes	Yes	Yes (element only)
II.G. A dispenser remanufacturer completely disassembles a motor fuel dispenser, replaces a meter that cannot be brought into the proper calibration with the same model meter remanufactured by another firm, fixes and/or replaces all other parts as needed, reassembles the dispenser for sale as a remanufactured dispenser.	Yes	Yes	Yes	Yes

Appendix A (Continued)

Section II. Examples of Remanufactured Devices / Remanufactured Elements (no metrological change)

II.H. A service firm replaces a meter register with the same model register remanufactured by a firm other than the original manufacturer of the register. Note: The remanufacturer made no design change.	No	Yes	Yes	Yes (element only)
II.I. A weight classifier scale is sent back to the original equipment manufacturer. The device is disassembled, checked for wear, parts are replaced or fixed as necessary, and the device is reassembled as made to operate like a new scale of the same type.	Yes	No	Yes	No (original markings meet req.)
II.J. A weight classifier scale is sent to a scale company (not the original remanufacturer). The device is disassembled, checked for wear, parts are replaced with OEM parts or fixed as necessary, and the scale is reassembled and made to operate like a new scale of the same type.	Yes	No	Yes	Yes
II.K. A company brings a motor fuel dispenser in their shop, fixes any leaks, replaces any meter which does not calibrate with a remanufactured meter which calibrates (not original manufacturer but no design change), replaces other non functioning parts with new, used or repaired parts which function, cleans, installs new graphics and sends the dispenser out for installation. Note: The remanufacturer made no design change.	No	Yes	Yes	Yes (element only)

Section III. Examples of Remanufacturing / Repairs / Modifications That Constitute A Metrological Design Change or A Violation Of NTEP Policy

Activity	Still Traceable To NTEP CC	Marking Required
III.A. A company disassembles a scale, cleans the scale and checks for worn parts, then replaces hydraulic load cells with shear beam load cells. Note: Requires different mounting due to different type of cells.	No	NA
III.B. A metrological change to OEM design of a weighing or measuring piece of equipment.	No	NA
III.C. Structural modifications to weighbridges.	No	NA
III.D. Replacing a lever system with load cells.	No	NA
III.E. Substitution of a load cell or cells in a scale when the replacement cells were not repaired or remanufactured by the original manufacturer or authorized agent of the original manufacturer. (NTEP Policy, see NCWM Pub. 14)	No	NA
III.F. A dispenser remanufacturer adds temperature compensation to a dispenser, which was never approved for temperature compensation.	No	NA

Appendix A (Continued)

3.e. What is the longevity of the remanufacturing business?

Conclusion: Remanufacturing has been apart of the service station equipment business for a long time. Pump manufacturers and firms such as Veeder-Root set up clinics to teach firms how to remanufacture their equipment and the major components. This practice was especially prevalent when there were no efficient parcel delivery systems such as there are today. Most service station equipment distributors would do their own rebuilding. Most equipment distributors continue to do rebuilding, although on a limited scale compared to their other activities.

There are firms that specialize in certain areas of remanufacturing. For example, the PMP Corporation, founded in 1950, specializes primarily in remanufacturing components for service station dispensers. There are other firms that specialize in purchasing used dispensers and reselling them in a range of ways. It can be as simple as selling the device on an "as is" basis to selling a device which is fully stripped down to the bare frame and completely gone through A number of these firms have been in existence for decades.

The remanufacturing business is like most businesses. There are some firms that last a long time and there are some that come and go in a short time. There are several other component remanufacturers that have been in business for decades.

4. To investigate the impact of the requirement on Weights and Measures W&M field enforcement programs.

4.a. To determine what action should be taken when a jurisdiction encounters equipment which falls into the category of a remanufactured device that does not have the required label. (e.g., Should the device be tested? Should it be removed from service?)

Conclusion: If a remanufactured device does not meet all applicable requirements it is up to the weights and measures jurisdiction to enforce their own administrative procedures appropriately, just as they would to any other device.

4.b. In the case of 4.a., who should pursue getting a device marked the device owner, weights and measures official, or OEM?

Conclusion: The remanufacturer should be responsible for marking a device and/or element. However, it is ultimately the user's responsibility to insure a device complies with all applicable requirements.

If a device does not meet all applicable requirements it is up to the weights and measures jurisdiction to enforce their own administrative procedures appropriately.

5. To investigate the impact of the proposed requirement on NTEP.

Current NTEP policy was NCWM Board of Governors (now NCWM NTEP Committee) voting item in 1995.

1. If a company or individual makes changes to a device to the extent that the metrological characteristics are changed, that specific device is no longer traceable to the NTEP CC.
2. If a company or individual repairs or remanufactures a device, the company or individuals are obligated to repair or remanufacture the device consistent with the manufacture's original design; otherwise, that specific device is no longer traceable to the NTEP CC.
3. It is up to the weights and measures jurisdiction to report to NTEP when the design has been changed.

Conclusion: Existing NTEP policies state that companies and individuals repairing and remanufacturing devices must do so consistent with the original equipment manufacturer's design. The implication being that the device is still traceable to the original certificate if the company or individual lives up to the obligation. (Note: An exception, per NCWM Pub. 14, is load cells. This policy applies to the repair or remanufacture of load cells. The original Certificate of Conformance is no longer applicable to a repaired load cell if that load cell is repaired by other than the original manufacturer or authorized agent. The weights and measures jurisdiction has the authority and responsibility to ensure that the device complies with T.N.8.) Therefore, we can conclude that a remanufactured marking requirement will not affect NTEP. One stretch that might be made is that the remanufacturer marking could make enforcement easier if it is subsequently determined that the work was not consistent with the OEM's design. In this case, a jurisdiction with an NTEP requirement would require the device to either be removed from service or submitted for type evaluation with or without the presence of a remanufactured marking.

Appendix A (Continued)

5.a. Investigate the impact on NTEP if not adopted.

Conclusion: Existing NTEP policies state that companies and individuals repairing and remanufacturing devices must do so consistent with the original equipment manufacturer's design. The implication being that the device is still traceable to the original certificate if the company or individual lives up to the obligation. (Note: An exception, per NCWM Pub. 14, is load cells. (see conclusion in Item 5 above.) Therefore, again we can conclude that a remanufactured marking requirement will not affect NTEP.

5.b. To review the intent of NTEP in determining when the application of NTEP ends and when a device is no longer traceable to a Certificate of Conformance (CC).

Comments:

The application of NTEP ends when the OEM is no longer responsible for the certificate, meaning when changes are made which are not approved by the OEM.

It may be that when the guarantee expires, the mantle of NTEP also expires.

Most would argue that the manufacturer should not be responsible for equipment beyond its warranty period.

Members of the Scale Manufactures Association (SMA) have agreed that the NTEP Certificates of Conformance are the property of the manufacturer to whom they are issued and has adopted a "Manufacturers Bill of Rights" which states the following:

> "We the manufacturers of weighing devices reserve the right to declare a device metrologically different from that certified. As owner of the applicable Certificate we reserve the right to declare these devices no longer traceable to the Certificate."

SMA has stated the intent of their manufacturers is to monitor the repair and remanufacture of their respective devices that are covered under a CC and to implement the "Bill of Rights" whenever a metrologically significant change is made to the device. It is the opinion of the SMA that the NCWM Remanufactured Device Task Force needs to address defining remanufactured devices, repaired devices, and any others necessary to clearly identify what constitutes a metrologically significant change to ensure that devices in the field are "remanufactured and/or repaired to type."

This issue is also being studied by the NTEP Business Plan Work Group. Many believe that NTEP is responsible for the evaluation of the type and should not be involved beyond that point. Nonetheless, NTEP has the authority to withdraw CCs if it is determined production does not meet the type evaluated. Herein lies the question, how deep does NTEP dig into the initial field verification and subsequent verifications of that type? We can also ask how deep NTEP should or should not be involved in determining if a repaired or remanufactured device is traceable to the original CC? Does NTEP have the appropriate expertise to make these decisions?

Conclusion: This issue is being considered by, and should be addressed by, the NTEP Business Plan Work Group.

5.c. Does a remanufacturer and/or remanufactured device need a new CC?

Conclusion: Current NTEP policy states that a remanufactured device is traceable to the original CC if the device is remanufactured consistent with the manufacturer's original design.

If the repairs or parts replacements are in accordance with the OEM requirements a new CC would not be required. If they are not, that device is no longer be considered traceable to the original CC.

6. To investigate any possibility of legal liability for jurisdictions, the NCWM, and NTEP.

6.a. Determine what action is required by an NTEP state when encountering a remanufactured device to avoid any liability for restriction of trade.

Appendix A (Continued)

Conclusion: Weights and measures officials are faced with restriction of trade and issues related to impeding the right to do business every day. Laws and regulations (i.e., Handbook 44, state laws, local regulations) require devices, device owners, and device users to meet applicable requirements. If not, the device can be tagged "removed from use." If a device is not repaired properly it cannot be put back into service. The remanufactured device issues are the same type of issues and should not be treated differently.

Respectfully submitted,

Remanufactured Device Task Force

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Appendix A Continued (Item 310-1A and Item 310-1B)
Remanufactured Device Task Force Memorandum, Report, and Proposals

Remanufactured Device Task Force Proposals

310-1A Appendix D Definitions for Remanufactured and Repaired Devices and Elements

(At the recommendation of the Remanufactured Device Task Force S&T Agenda Item 310-1 was split into two parts 310-1A, Appendix D Definitions, and 310-1B, G-S.1. Identification to separately consider the merits of each proposal.)

Source: Remanufactured Device Task Force

Recommendation: Amend the current definition for manufactured device and add definitions for repaired device, repaired element, remanufactured device, and remanufactured element as follows:

> **manufactured device. Any ~~new device or any other device that has been removed from service and substantially altered or rebuilt~~ commercial weighing or measuring device shipped as new from the original equipment manufacturer.**
>
> **repaired device. A device to which work is performed that brings the device back into proper operating condition.**
>
> **repaired element. An element to which work is performed that brings the element back into proper operating condition.**
>
> **remanufactured device. A device that is disassembled, checked for wear, parts replaced or fixed, reassembled and made to operate like a new device of the same type.**
>
> **remanufactured element. An element that is disassembled, checked for wear, parts replaced or fixed, reassembled and made to operate like a new element of the same type.**

Discussion: After much discussion, the Remanufactured Device Task Force concluded that the current definitions for repaired and remanufactured devices (found in NIST Handbook 130 and National Type Evaluation Program (NTEP) publications) were not clear and were considered inappropriate by many members. The current definition for manufactured device found in Handbook 44 was also found to be inappropriate. The Task Force recommends all of the recommended definitions be added to the definition section of Handbook 44 and current definitions in Publication 14 and Handbook 130 be amended accordingly.

The Task Force also heard suggestions that it consider definitions for device and element. In the General Code, we will find the terms: system, device, element and equipment used. Yet, none of these terms are defined in the definition section of Handbook 44. In trying to define the terms care must be taken to avoid causing more "interpretation problems" than may be solved. The Task Force proposes that if it is deemed necessary to define these terms, it should be the task of the NCWM S&T Committee, not the Remanufactured Device Task Force.

Since the work of the Task Force has direct ties to NTEP evaluated equipment, when using the terms device and element, the Task Force used the principles established in NCWM Publication 14, NTEP Administrative Policy and Procedures, Section C., Devices To Be Submitted for Type Evaluation. Examples of equipment to be submitted for type evaluation or for approval are shown in Table 1 of the Administrative Policy and Procedures.

Table 1 Excerpts

> Weighing Devices, Elements, and Systems: complete scales, indicating elements separate from the weighing element, weighing elements separate from the indicating element, load cells
>
> Liquid-Measuring Devices, Elements, and Systems: complete liquid-measuring devices and systems, indicating elements separate from the measuring elements (meter registers), measuring elements separate from the indicating elements (positive displacement meters, turbine meters),

Appendix A (Continued)

> major elements of a measuring system (pressure sensors/transducers, temperature sensors/transducers, automatic temperature compensators)
>
> Both Weighing and Measuring Devices, Elements, and Systems: data processing systems that perform metrological functions, software that performs metrological functions

The Task Force realizes definitions can be interpreted differently but concluded that lengthy definitions attempting to address all enforcement questions would not be helpful. Therefore, the Task Force developed examples to indicate proper interpretation of the definitions and help weights and measures jurisdictions in administering their programs. The examples, printed in the report of the Task Force, are based upon current NTEP Policies.

Based on comments heard at the 2001 NCWM Interim Meeting, the Task Force agreed to reconsider the proposed definitions of "repaired device" and "repaired element." The Task Force members voted in favor of modifying the definitions as they appear in the recommendation above.

See the final report of the Remanufactured Device Task Force (Appendix A) for more information.

310-1B G-S.1. Identification; Remanufactured Devices and Main Elements

Source: Remanufactured Device Task Force

Recommendation: Add the following new paragraph G.S.1.1.:

> ***G-S.1.1. Remanufactured Devices and Main Elements. - All remanufactured devices and main elements shall be clearly and permanently marked for the purposes of identification with the following information:***
>
> > ***(a) the name, initials, or trademark of the last remanufacturer or distributor;***
> >
> > ***(b) the remanufacturer's or distributor's model designation if different than the original model designation.***
>
> ***[Nonretroactive as of January 1, 2002.]***

Discussion: The Remanufactured Device Task Force was informed by several NCWM members that the NCWM wanted the opportunity to vote on a marking requirement for remanufactured devices. The primary charge of the Task Force was to fully develop a marking requirement proposal for NCWM consideration.

The Task Force thoroughly discussed and considered remanufactured and repaired device issues. There are many pros and cons to the marking requirement. See the final Report of the Remanufactured Device Task Force for a thorough review. On one hand, in most cases it is difficult for weights and measures enforcement officials to determine if a device has been repaired or remanufactured, and even if it has, the official finds it difficult to determine what was done, or if a modification was made that affects the metrological integrity of the device, element, or system. So why mark the device? On the other hand, National Type Evaluation Program (NTEP) prohibits repair agencies and remanufacturers from changing a device to the extent that the metrological characteristics are changed, or that specific device is no longer traceable to the NTEP Certificate of Conformance (CC). Therefore, it is already a weights and measures enforcement issue and a remanufacturer marking would at least alert the official so the proper questions could be asked or directed to the appropriate parties.

Questions have been asked. Why are we considering a marking requirement? What problem are we trying to fix? The Task Force has come to the conclusion that original equipment manufacturers (OEMs) are concerned about their reputations and liability for the device when work is performed by a non-authorized agent or remanufacturer. Scale Manufacturers Association (SMA) members have gone on record to say, "We the manufacturers of weighing devices reserve the right to declare a device metrologically different from that certified. As the owner of the applicable Certificate we reserve the right to declare these devices no longer traceable to the Certificate."

Appendix A (Continued)

It is important to note that current NTEP policies do not require remanufactured devices to be submitted to NTEP if the devices are remanufactured consistent with the original manufacturer's design. Weights and measures officials should be aware that there is an exception to that policy in Publication 14 Load Cells Checklist, Section A Program Description, Paragraph 4. Repaired or Remanufactured Load Cells. The following policy applies to the repair or remanufacture of load cells. "The original Certificate of Conformance is no longer applicable to a repaired load cell if that load cell is repaired by other than the original manufacturer or authorized agent. The weights and measures jurisdiction has the authority and responsibility to ensure that the device complies with T.N.8...." Load cells are treated differently than other elements because of their susceptibility to influence factors (i.e., T.N.8. requirements).

The question often arises, "What constitutes a metrological change?" S&T Committees and National Type Evaluation Technical Committee (NTETC) Sectors have struggled with this question for many years. It is difficult to come up with one answer that satisfies all circumstances.

Handbook 44 definition:

> metrological integrity (of a device). The design, features, operation, installation, or use of a device or element that facilitates: (1) the accuracy and validity of a measurement or transaction, (2) compliance of the device or element with statutory requirements, and (3) the suitability of the device for a given application. [Page D-9]

NCWM Publication 14 discusses metrological parameters that can affect the measurement features that have a significant potential for fraud, and features or parameters whose range extends beyond what is appropriate for device compliance with Handbook 44 or the suitability of equipment. Publication 14, Administrative Policy and Procedures Section C, Table 1 also contains lists of features and parameters to be sealed, many of them metrologically significant. A note under those tables states, "This list may not be all inclusive, and there may be parameters other than those listed which affect the metrological performance of the device and must, therefore, be sealed. If listed parameters or other parameters which may affect the metrological function of the device are not sealed, the manufacturer must demonstrate that the parameter will not affect the metrological performance of the device (i.e., all settings comply with the most stringent requirements of Handbook 44 for the applications for which the device is to be used)."

The Task Force used the philosophy above when using the term "metrological change." We are also aware that NTEP handles most metrologically significant decisions on a case-by-case basis.

The Task Force understands the S&T Committee's struggle with the term "metrological change," which is very technical. If the NCWM thinks additional work is warranted to better define the term, the task force thinks it should be addressed by the NTETC sectors.

Appendix B (Item 360-4)
Developing Issues – General Code

Item 1 W G.X. Accessibility of Audit Trail Information

(This item was withdrawn from the Developing Issues to allow adequate time for NEWMA to address the effects of the proposal on current devices and Handbook 44 device codes.)

Source: Northeastern Weights and Measures Association (NEWMA)

Recommendation: Add new paragraph G.X. Accessibility of Audit Trail Information as follows:

> **G.X. Accessibility of Audit Trail Information. – All commercial devices manufactured incorporating audit trail event counters for calibration and configuration as their sealing mechanism, shall be accessed in a standardized manner using a simple universal Weights and Measures Code (or a one-button push) and supply a date and time stamp for the last event change at each event counter.**

Discussion: The Committee recognizes there are NTEP criteria that require the enforcement official to have "convenient" access to audit trail information and that some of the private sector is working on additional standards. The Committee heard that the jurisdiction submitting the proposal found problems accessing audit trails on weighing devices. The Scale Manufacturers Association (SMA) noted that it is developing a standard for accessing audit trails and hopes to address the concerns which generated the proposal. SMA plans to circulate any standards it develops to their international members to determine if there are any conflicts with existing standards.

Several meter manufacturers expressed concern about the proposal. Meter manufacturers indicated the proposal creates design specifications which might conflict with upcoming international requirements. They also noted there are devices which lack any buttons or keys that might be modified to incorporate the proposed access feature. The Gasoline Pump Manufacturers Association (GPMA) noted there is considerable expense to modifying Category 1 devices to include Category 3 parameters. GPMA recommended that the sealing section of Certificates of Conformance be used to provide sufficient information about how to access audit trail information.

The Committee recognized there might be some merit to a uniform means to access audit trail information; however, all current audit trail requirements in current Handbook 44 device codes must be reviewed along with the proposal. Not all codes recognize all three device categories and the specific sealing requirements for corresponding device categories vary in different code sections. For instance, the Belt-Conveyor Scale Systems code addresses only Category 1 and 3 devices. There was limited support for the proposal even as a voluntary standard since several manufacturers indicated existing devices do not have internal clocks. Consequently, at the January 2001 Interim Meeting the Committee agreed to withdraw this proposal until more jurisdictions indicate problems accessing audit trail information.

During its May 2001 Annual Meeting, NEWMA recommended that the S&T Committee re-introduce this item as a developing issue on the 2002 agenda after thorough review by the regional associations. NEWMA suggested the retail motor-fuel dispenser manufacturers consider a two-keystroke access as a starting point for future discussion.

The Committee acknowledged that withdrawing this item is somewhat premature because it has merit and did not receive full national exposure. The Committee agreed to reconsider the issue should a region rework the issue.

Background: NIST Handbook 44 provides for electronic forms of security in General Code paragraph G-S.8. Provisions for Sealing Electronic Adjustable Components. A number of the specific device codes in Handbook 44 include specifications for audit trail requirements; however, none of the codes contain specific language about how to access the audit trail information. There are several forms of audit trails that are categorized based on the ability to remotely configure a device's metrological features. The categories also have different criteria for sealing adjustable components that affect the metrological integrity of the device. Access to sealable parameters on Category 3 devices is sealed with an event logger that must include the date and time of changes to calibration and configuration parameters, whereas Category 2 devices, also capable of remote configuration, are sealed by a physical seal or an event counters. Category 1 devices with no capability for remote configuration are sealed by a physical seal or an event counter. The National Type Evaluation Program (NTEP) established criteria for metrological audit trails including the requirement that access to audit trail information for viewing and printing must be convenient.

NEWMA believes the access mode must be simplified to expedite inspections and Category 1 and 2 devices, like Category 3 devices, should provide the date and time that events are accessed. NEWMA recommended that access to audit trails on all commercial devices equipped with audit trails as their security mechanism be standardized using a simple universal weights and measures code (or a one-button push).

Appendix C (Item 360-4)
Developing Issues – Scales

Item 1 W Livestock Scales, Concentrated Load Capacity (CLC) Requirements

(This item was withdrawn from the Developing Issues based on input from the Weighing Sector that the issue became part of Agenda Item 320-4.)

Source: This item originated from the National Type Evaluation Technical Committee (NTETC) Weighing Sector and first appeared on the S&T Committee's 2000 agenda.

Recommendation: Modify Handbook 44 to address CLC requirements for livestock scales.

Background/Discussion: NIST Handbook 44 requires marking of scales with a CLC rating; however, the definition of CLC in Handbook 44 is based on the load applied by the axles of a vehicle. There is no correlation between the concentrated load created by the footprint of the tires of a vehicle and the concentrated load created by livestock.

The Committee agreed to withdraw this item because a corresponding proposal, Agenda Item 320-4, to modify paragraph N.1.3.4. Vehicle Scales, Axle-Load Scales, and Livestock Scales with More Than Two Sections, Table S.6.3.a. Marking Requirements and Table S.6.3.b. Notes clarifies the maximum load that can be applied to a livestock scale weighbridge based on the device's design. Agenda Item 320-4 also describes the loading pattern and required marking information for livestock scales.

Contact the Weighing Sector Chairman Nigel Mills (Hobart Corporation) by telephone at 937-332-3205 or Technical Advisor Steven Cook (NIST) by telephone at 301-975-4003 or e-mail at stevenc@nist.gov to provide input on this issue.

Item 2 W Items by Count; Indications and Recorded Representations

(This item was withdrawn from the Developing Issues based on input from the Weighing Sector that the issue is no longer on its agenda.)

Source: This item originated from the National Type Evaluation Technical Committee (NTETC) Weighing Sector and first appeared on the S&T Committee's 2000 agenda.

Recommendation: Modify Handbook 44 to prohibit indications and recorded representations of items by count in a decimal format.

Background/Discussion: The Weighing and Measuring Sector Technical Advisor reported to the NCWM S&T Committee that the Weighing Sector recommended removing any language permitting decimal indication of items by count, whereas the Measuring Sector decided the feature is acceptable.

The Publication 14 checklist for Electronic Cash Registers (ECRs) Interfaced with Retail Motor-Fuel Dispensers (paragraph 3.7 page 9-11) states that decimal expressions of items by count are acceptable; however, the ECR Scales checklist has no corresponding criteria.

The Committee heard that the Weighing and Measuring Sectors were unable to reach a consensus on whether it is appropriate to indicate and record items by count in decimal values. The Committee agreed with the Measuring Sector that this practice is acceptable only when there is mathematical agreement between the values. To date no specific proposal has been submitted to the S&T Committee to address the discrepancy between the two checklists. Consequently, the Committee is withdrawing the item from the S&T Agenda.

Contact the Weighing Sector Chairman Nigel Mills (Hobart Corporation) by telephone at 937-332-3205 or Technical Advisor Steven Cook (NIST) by telephone at 301-975-4003 or e-mail at stevenc@nist.gov to provide input on this issue.

Appendix D (Item 360-4)
Developing Issues – Belt-Conveyor Scale Systems

Item 1 D S.1.4. Recording Elements and Recorded Representations

Source: NIST-OWM and interested NTETC Belt-Conveyor Scale Sector Members. This item originated from the Western Weights and Measures Association (WWMA) and first appeared as Appendix C (Item 360-3) Developing Issues on the Committee's 2000 agenda.

Recommendation: Modify paragraph S.1.4. Recording Elements and Recorded Representations as follows:

> ***S.1.4. Recording Elements and Recorded Representations. - The value of the scale division of the recording element shall be the same as that of the indicating element. The belt-conveyor scale system shall record the initial indication and the final indication of the master weight totalizer*, the quantity delivered*, the unit of measurement (e.g., kilograms, tonnes, pounds, tons, etc.), the date, and time. A zero reference number shall be recorded before and after any complete weighing cycle **. This information shall be recorded for each delivery*.***
> ***[Nonretroactive as of January 1, 1986.]***
> ***[*Nonretroactive as of January 1, 1994.]***
> ***[**Nonretroactive as of January 1, 200X.]***

Background/Discussion: The proposed change is intended to ensure the buyer and seller are informed that a zero condition is established at both the start and end of each transaction. The NCWM S&T Committee discussed that there does not appear to be a mechanism to adequately address belt-conveyor scales systems where the zero change exceeds the allowable range of the zero setting mechanism. The Committee recognized there are accuracy issues when zero and span move concurrently, but wants industry's input about how widespread these inaccuracies are before supporting proposals to change Handbook 44.

During the 2001 NCWM Interim Meeting, NIST-OWM and a member of the NTETC Belt-Conveyor Scale Sector, who submitted the original proposal, provided the S&T Committee with an update on activities related to the Belt-Conveyor Scale Systems Developing Items on the Committee's agenda. They reported developing alternate language for the recommendation in Items 1 through 9 to better clarify the intent of the paragraph addressed in each item and asked that the Committee replace the existing recommendations with the revised language. The revised language shown above replaced the original proposal.

In May 2001, NIST-OWM hosted a Belt-Conveyor Scale Technical Seminar to address the developing belt-conveyor scale system issues. A summary of the Seminar findings were made available to the Sector, S&T Committee, and NTEP Committee Chairman and are also available on the NIST-OWM web site at http://www.nist.gov/owm. On the OWM home page, click on *General Information* and then click on *Publications Including Uniform Laws and Regulations*.

For more information or to provide input on this issue, contact the NTETC Belt-Conveyor Scale Sector Chairman Paul Chase (Chase Technology) by telephone at 612-427-2356 or Technical Advisor Steven Cook (NIST) by telephone at 301-975-4003 or e-mail at stevenc@nist.gov.

Item 2 D S.3.1. Design of Zero-Setting Mechanism

Source: NIST-OWM and interested NTETC Belt-Conveyor Scale Sector Members. This item originated from the Western Weights and Measures Association (WWMA) and first appeared as Appendix C (Item 360-3) Developing Issues on the Committee's 2000 agenda.

Recommendation: Modify paragraph S.3.1. Design of Zero-Setting Mechanism as follows:

> **S.3.1. Design of Zero-Setting Mechanism. - The range of the zero-setting mechanism shall not be greater than ∀ 2 percent *(∀ 5 percent **)* of the rated capacity of the scale without breaking the security means. Automatic ~~and semi-automatic~~ zero-setting mechanisms shall be so constructed that the resetting operation is carried out only after a whole number of belt revolutions and the completion of the setting or the whole operation is indicated.** ***An audio or***

visual signal shall be given when the automatic ~~and semiautomatic~~ zero-setting mechanisms reach the limit of adjustment of the zero-setting mechanism.*
[*Nonretroactive as of January 1,1990.]
[**Nonretroactive as of January 1, 200X.]

Background/Discussion: The proposal retroactively restricts a belt-conveyor scale system's zero-setting mechanism to only automatic means. Some companies have expressed concerns about conflicts with OIML requirements which permit a semiautomatic zero-setting mechanism. Several manufacturers indicated that there are devices in the marketplace equipped with only a semiautomatic zero-setting mechanism for adjusting zero.

During the 2001 NCWM Interim Meeting, NIST-OWM and a member of the NTETC Belt-Conveyor Scale Sector, who submitted the original proposal, provided the S&T Committee with an update on activities related to the Belt-Conveyor Scale Systems Developing Items on the Committee's agenda. They reported developing alternate language for the recommendation in Items 1 through 9 to better clarify the intent of the paragraph addressed in each item and asked that the Committee replace the existing recommendations with the revised language. The revised language shown above replaced the original proposal.

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For more information or to provide input on this issue, contact the NTETC Belt-Conveyor Scale Sector Chairman Paul Chase (Chase Technology) by telephone at 612-427-2356 or Technical Advisor Steven Cook (NIST) by telephone at 301-975-4003 or e-mail at stevenc@nist.gov.

Item 3 D S.3.2. Sensitivity at Zero Load (For Type Evaluation)

Source: NIST-OWM and interested NTETC Belt-Conveyor Scale Sector Members. This item originated from the Western Weights and Measures Association (WWMA) and first appeared as Appendix C (Item 360-3) Developing Issues on the Committee's 2000 agenda.

Recommendation: Modify paragraph S.3.2. - Sensitivity at Zero Load (For Type Evaluation) as follows:

Sensitivity at Zero Load (For Type Evaluation). - When a system is operated for a time period equal to the time required to deliver the minimum test load and with a test load calculated to indicate ~~two scale divisions~~ 0.12 percent of its rated capacity applied directly to the weighing element, the totalizer shall advance not less than ~~one~~ 0.06 percent of its rated capacity or more than ~~three scale divisions~~ 0.18 percent of its rated capacity. An alternative test of equivalent sensitivity, as specified by the manufacturer, shall also be acceptable.
[Nonretroactive as of January 1, 1986.]

Background/Discussion: The proposal is intended to specify tolerances as percentage values, rather than scale division values. The WWMA asked industry for comments about the proposed tolerances. The NCWM S&T Committee heard concern from an industry representative that there may be some confusion when the operator must determine percentages. The Committee briefly discussed the appropriateness of basing sensitivity tolerances on division size rather than the rated capacity of a dynamic system.

During the 2001 NCWM Interim Meeting, NIST-OWM and a member of the NTETC Belt-Conveyor Scale Sector, who submitted the original proposal, provided the S&T Committee with an update on activities related to the Belt-Conveyor Scale Systems Developing Items on the Committee's agenda. They reported developing alternate language for the recommendation in Items 1 through 9 to better clarify the intent of the paragraph addressed in each item and asked that the Committee replace the existing recommendations with the revised language. The revised language shown above replaced the original proposal.

In May 2001, NIST-OWM hosted a Belt-Conveyor Scale Technical Seminar to address the developing belt-conveyor scale system issues. A summary of the Seminar findings were made available to the Sector, S&T Committee, and NTEP Committee Chairman and are also available on the NIST-OWM web site at http://www.nist.gov/owm. On the OWM home page, click on *General Information* and then click on *Publications Including Uniform Laws and Regulations*.

For more information or to provide input on this issue, contact the NTETC Belt-Conveyor Scale Sector Chairman Paul Chase (Chase Technology) by telephone at 612-427-2356 or Technical Advisor Steven Cook (NIST) by telephone at 301-975-4003 or e-mail at stevenc@nist.gov.

Item 4 D N.3.1. Zero Load Tests

Source: NIST-OWM and interested NTETC Belt-Conveyor Scale Sector Members. This item originated from the Western Weights and Measures Association (WWMA) and first appeared as Appendix C (Item 360-3) Developing Issues on the Committee's 2000 agenda.

Recommendation: Modify paragraph N.3.1. Zero Load Tests as follows:

> **N.3.1. Zero Load Tests. – If a belt-conveyor scale system has been idle for a period of two hours or more, the system shall be run for not less than 30 minutes when the temperature is above 5 °C (41 °F). When the temperature is below 5 °C (41 °F), additional warm-up time, depending upon conditions, is required before beginning the zero-load tests. The variation between the beginning and ending indication of the master weight totalizer shall not exceed ~~be more than ±1 scale division~~ 0.06 percent of the rated capacity when the ~~instrument~~ automatic zero-setting mechanism is operated at no load for a period of time equivalent to that required to deliver the minimum totalized load of 1000 scale divisions.**
>
> **The zero-load test shall be conducted over a whole number of belt revolutions, but not less than three revolutions or 10 minutes operation, whichever is greater.**
>
> **During any portion of the zero-load test, ~~the~~ any change in the totalizer reading shall not ~~change more than three scale divisions~~ exceed a range of 0.18 percent of its rated capacity from its initial indication**
> **(Amended 1989)**

Background/Discussion: The proposal is intended to provide a better statistical method of determining a belt-conveyor scale system's sensitivity by expressing it as a percent of the rated capacity. The zero is established based on the automatic zero-setting mechanism, and that zero is adequately monitored.

During the 2001 NCWM Interim Meeting, NIST-OWM and a member of the NTETC Belt-Conveyor Scale Sector, who submitted the original proposal, provided the S&T Committee with an update on activities related to the Belt-Conveyor Scale Systems Developing Items on the Committee's agenda. They reported developing alternate language for the recommendation in Items 1 through 9 to better clarify the intent of the paragraph addressed in each item and asked that the Committee replace the existing recommendations with the revised language. The revised language shown above replaced the original proposal.

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For more information or to provide input on this issue, contact the NTETC Belt-Conveyor Scale Sector Chairman Paul Chase (Chase Technology) by telephone at 612-427-2356 or Technical Advisor Steven Cook (NIST) by telephone at 301-975-4003 or e-mail at stevenc@nist.gov.

Item 5 D N.3.2. Material Tests

Source: NIST-OWM and interested NTETC Belt-Conveyor Scale Sector Members. This item originated from the Western Weights and Measures Association (WWMA) and first appeared as Appendix C (Item 360-3) Developing Issues on the Committee's 2000 agenda.

Recommendation: Modify paragraph N.3.2. Material Tests as follows:

> **N.3.2. Material Tests.**

(g) On initial verification, at least three individual materials tests shall be conducted. On subsequent verifications, at least two individual materials tests shall be conducted. The performance of the equipment is not to be determined by averaging the results of the individual tests when one or more sources of material or top-size is used in the weighing process. The results of all these materials tests shall be within the tolerance limits.

Background/Discussion: The proposal is intended to require testing of a belt-conveyor scale "as used" when there is more than one source or size of material for the material test. The proposal clarifies that the material test results must not be averaged when there are multiple sources and sizes of material. In its review of the proposed changes, the WWMA commented that the repeated use of the term "material test" is unnecessary and that the term "top size" is confusing and needs to be defined. The WWMA believed that the proposal had merit; however, the item should remain developmental until these concerns are addressed. One industry representative defined top size as a dimensional measurement of a chunk of coal measured in inches compared to the size of the powder below the chunks of coal.

During the 2001 NCWM Interim Meeting, NIST-OWM and a member of the NTETC Belt-Conveyor Scale Sector, who submitted the original proposal, provided the S&T Committee with an update on activities related to the Belt-Conveyor Scale Systems Developing Items on the Committee's agenda. They reported developing alternate language for the recommendation in Items 1 through 9 to better clarify the intent of the paragraph addressed in each item and asked that the Committee replace the existing recommendations with the revised language. The revised language shown above replaced the original proposal.

In May 2001, NIST-OWM hosted a Belt-Conveyor Scale Technical Seminar to address the developing belt-conveyor scale system issues. A summary of the Seminar findings were made available to the Sector, S&T Committee, and NTEP Committee Chairman and are also available on the NIST-OWM web site at http://www.nist.gov/owm. On the OWM home page, click on *General Information* and then click on *Publications Including Uniform Laws and Regulations*.

For more information or to provide input on this issue, contact the NTETC Belt-Conveyor Scale Sector Chairman Paul Chase (Chase Technology) by telephone at 612-427-2356 or Technical Advisor Steven Cook (NIST) by telephone at 301-975-4003 or e-mail at stevenc@nist.gov.

Item 6 D T.1.2. Variation in Zero Reference Values

Source: NIST-OWM and interested NTETC Belt-Conveyor Scale Sector Members. This item originated from the Western Weights and Measures Association (WWMA) and first appeared as Appendix C (Item 360-3) Developing Issues on the Committee's 2000 agenda.

Recommendation: Add new paragraph T.1.2. Variation in Zero Reference Values to the Belt-Conveyor Scale Systems Code as follows:

T.1.2. Variation in Zero Reference Values. - Variation in a zero reference number on a conveyor system at no load shall not be greater than ±0.25 percent of the rated capacity of the scale when randomly monitored for 95 percent of the zero measurements in all normal operating conditions over an ambient temperature range of up to 12 ^{0}C (54 ^{0}F) in a 24 hour period. [Nonretroactive as of January 1, 2002.]

Background/Discussion: Environmental factors such as wind, moisture, dust, and temperature affect a belt-conveyor scale system's zero under no-load condition. The proposal is intended to establish acceptable variations in the zero value over specific temperature intervals.

At its September 2000 Meeting, the WWMA noted that the originally proposed range does not cover all environmental temperature conditions to which a belt-conveyor scale might be subjected. The WWMA recommended modifying the proposal to express a relationship between tolerances and temperature ranges; it made this item developmental to allow additional time for input on this modification. At the Southern Weights and Measures Association 2000 Annual Meeting, an industry representative questioned how often belt-conveyor scale operators verify zero at most installations.

During the 2001 NCWM Interim Meeting, NIST-OWM and a member of the NTETC Belt-Conveyor Scale Sector, who submitted the original proposal, provided the S&T Committee with an update on activities related to the Belt-Conveyor Scale Systems Developing Items on the Committee's agenda. They reported developing alternate language for the

recommendation in Items 1 through 9 to better clarify the intent of the paragraph addressed in each item and asked that the Committee replace the existing recommendations with the revised language. The revised language shown above replaced the original proposal.

In May 2001, NIST-OWM hosted a Belt-Conveyor Scale Technical Seminar to address the developing belt-conveyor scale system issues. A summary of the Seminar findings were made available to the Sector, S&T Committee, and NTEP Committee Chairman and are also available on the NIST-OWM web site at http://www.nist.gov/owm. On the OWM home page, click on *General Information* and then click on *Publications Including Uniform Laws and Regulations*.

For more information or to provide input on this issue, contact the NTETC Belt-Conveyor Scale Sector Chairman Paul Chase (Chase Technology) by telephone at 612-427-2356 or Technical Advisor Steven Cook (NIST) by telephone at 301-975-4003 or e-mail at stevenc@nist.gov.

Item 7 D UR.2.2. Conveyor Installation (a) and (b)

Source: NIST-OWM and interested NTETC Belt-Conveyor Scale Sector Members. This item originated from the Western Weights and Measures Association (WWMA) and first appeared as Appendix C (Item 360-3) Developing Issues on the Committee's 2000 agenda.

Recommendation: Modify paragraphs UR.2.2.(a) and (b) Conveyor Installation as follows:

> **UR.2.2. Conveyor Installation. - The design and installation of the conveyor leading to and from the belt-conveyor scale is critical with respect to scale performance. The conveyor may be horizontal or inclined but, if inclined, the angle shall be such that slippage of material along the belt does not occur. The belt-conveyor shall be protected from any precipitation. Installation shall be in accordance with the scale manufacturer's instructions and the following:**
>
> **(a) Installation - General. - A belt-conveyor scale structure shall be so installed that neither its performance nor operation will be adversely affected by any characteristic of the weighed material, foundation, supports, covers (when present), or any other equipment.**
>
> **(b) Live Portions of Scale. - All live portions of the conveyor scale structure shall be protected by appropriate guard devices. On incline belt-conveyors, scale structure and surrounding supports shall have a minimum clearance of 10 percent above the top-size of the material (but not to exceed 3 inches) to prevent accidental interference with the weighing operation.**

Background/Discussion: The proposal is intended to prevent belt-conveyor scales in a "no load" condition from indicating an incorrect zero when environmental or physical factors that adversely affect the system occur.

At its September 1999 Meeting, the WWMA recognized that pending 2000 NCWM action on S&T Agenda Item 321-2 UR.2.2. Conveyor Installation and UR.2.2.1 For Scales not Installed by the Manufacturer (1999 Carryover Item 321-2) could affect this proposal. Therefore, the WWMA recommended this proposal be given developmental status. At the October 1999 SWMA Annual Meeting, an industry representative expressed concern with the cost of protecting an entire belt from environmental factors.

During the 2001 NCWM Interim Meeting, NIST-OWM and a member of the NTETC Belt-Conveyor Scale Sector, who submitted the original proposal, provided the S&T Committee with an update on activities related to the Belt-Conveyor Scale Systems Developing Items on the Committee's agenda. They reported developing alternate language for the recommendation in Items 1 through 9 to better clarify the intent of the paragraph addressed in each item; however, Item 7 was not changed.

In May 2001, NIST-OWM hosted a Belt-Conveyor Scale Technical Seminar to address the developing belt-conveyor scale system issues. A summary of the Seminar findings were made available to the Sector, S&T Committee, and NTEP Committee Chairman and are also available on the NIST-OWM web site at http://www.nist.gov/owm. On the OWM home page, click on *General Information* and then click on *Publications Including Uniform Laws and Regulations*.

For more information or to provide input on this issue, contact the NTETC Belt-Conveyor Scale Sector Chairman Paul Chase (Chase Technology) by telephone at 612-427-2356 or Technical Advisor Steven Cook (NIST) by telephone at 301-975-4003 or e-mail at stevenc@nist.gov.

Item 8 D UR.3.2. (b) Maintenance

Source: NIST-OWM and interested NTETC Belt-Conveyor Scale Sector Members. This item originated from the Western Weights and Measures Association (WWMA) and first appeared as Appendix C (Item 360-3) Developing Issues on the Committee's 2000 agenda.

Recommendation: Add a new paragraph to paragraph UR.3.2. Maintenance (b) and modify paragraph UR.3.2.(b) as follows:

UR.3.2. Maintenance

(b) Simulated load tests or materials tests shall be conducted at periodic intervals between official ~~tests~~, certification, after the scale system runs under a no-load condition for at least (XX) minutes to provide reasonable assurance that the device is performing correctly.

A materials test may be performed under any environmental conditions and in any ambient temperature range.

The action to be taken as a result of materials test error is as follows:

Background/Discussion: The proposal is intended to prevent any party from benefiting from the zero bias of a belt-conveyor scale system.

The WWMA found merit in this proposal, but it recommended the proposal be given developmental status.

During the 2001 NCWM Interim Meeting, NIST-OWM and a member of the NTETC Belt-Conveyor Scale Sector, who submitted the original proposal, provided the S&T Committee with an update on activities related to the Belt-Conveyor Scale Systems Developing Items on the Committee's agenda. They reported developing alternate language for the recommendation in Items 1 through 9 to better clarify the intent of the paragraph addressed in each item and asked that the Committee replace the existing recommendations with the revised language. The revised language shown above replaced the original proposal.

In May 2001, NIST-OWM hosted a Belt-Conveyor Scale Technical Seminar to address the developing belt-conveyor scale system issues. A summary of the Seminar findings were made available to the Sector, S&T Committee, and NTEP Committee Chairman and are also available on the NIST-OWM web site at http://www.nist.gov/owm. On the OWM home page, click on *General Information* and then click on *Publications Including Uniform Laws and Regulations*.

For more information or to provide input on this issue, contact the NTETC Belt-Conveyor Scale Sector Chairman Paul Chase (Chase Technology) by telephone at 612-427-2356 or Technical Advisor Steven Cook (NIST) by telephone at 301-975-4003 or e-mail at stevenc@nist.gov.

Item 9 D UR.3.2. (e) Maintenance

Source: NIST-OWM and interested NTETC Belt-Conveyor Scale Sector Members. This item originated from the Western Weights and Measures Association (WWMA) and first appeared as Appendix C (Item 360-3) Developing Issues on the Committee's 2000 agenda.

Recommendation: Modify paragraph UR.3.2. Maintenance (e) as follows:

UR.3.2. Maintenance

(e) Records. - Records of calibration and maintenance, including conveyor alignment, chart recorder, auto-zero tracking and materials test data shall be maintained on site for at least ~~three~~ seven current years to develop a history of scale performance. Copies of any report as a result of a test or repair shall be mailed to the official with statutory authority

as required. The current date and correction factor(s) for simulated load equipment shall be recorded and maintained in the scale cabinet.
(Amended 1991)

Background/Discussion: The WWMA recognized that the chart recorder provides information about the feed rates and performs a separate function from other items already listed UR.3.2.(e). The WWMA asked for input from operators and customers about the necessity of maintaining data for the proposed period of 7 years rather than 3-year period currently required.

The WWMA recognized pending action on the 2000 NCWM S&T agenda item 321-5 UR.3.2.(c) Maintenance; Scale Alignment (1999 Carryover Item 321-4) might affect this proposal. Consequently, the WWMA recommended that this proposal be given developmental status pending the outcome of the NCWM's actions on 321-4 at the 2000 NCWM Annual Meeting. The NCWM modified paragraph UR.3.2.(b) (321-4) to recognize material tests in addition to simulated tests as a means to monitor scale performance. At the Southern Weights and Measures Association 2000 Annual Meeting, an industry representative questioned the relevance of data more that 30 days old and noted that a belt-conveyor scale system may be rebuilt in a period of seven years or less, which also makes data outdated.

During the 2001 NCWM Interim Meeting, NIST-OWM and a member of the NTETC Belt-Conveyor Scale Sector, who submitted the original proposal, provided the S&T Committee with an update on activities related to the Belt-Conveyor Scale Systems Developing Items on the Committee's agenda. They reported developing alternate language for the recommendation in Items 1 through 9 to better clarify the intent of the paragraph addressed in each item; however, Item 9 was not changed.

In May 2001, NIST-OWM hosted a Belt-Conveyor Scale Technical Seminar to address the developing belt-conveyor scale system issues. A summary of the Seminar findings were made available to the Sector, S&T Committee, and NTEP Committee Chairman and are also available on the NIST-OWM web site at http://www.nist.gov/owm. On the OWM home page, click on *General Information* and then click on *Publications Including Uniform Laws and Regulations*.

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Appendix E (Item 360-4)
Developing Issues – Taximeters

Item 1 W S.1.2. Advancement of Indicating Elements

(This item was withdrawn from the Developing Issues based on input from NEWMA that it developed an alternate proposal, Agenda Item 354-1.)

Source: (This item originated from the Northeastern Weights and Measures Association (NEWMA) and first appeared on the S&T Committee's 2000 agenda.)

Discussion: The Committee considered the following proposal to modify paragraph S.1.2. Advancement of Indicating Elements:

> **S.1.2. Advancement of Indicating Elements. - Except when a taximeter is being cleared, the primary indicating and recording elements shall be susceptible of advancement only by the movement of the vehicle or by the time mechanism. <u>The meter shall only recognize distance input from the designated distance-measuring element and shall be capable of operation within the prescribed tolerances when subjected to electromagnetic disturbances.</u>**
> **(Amended 1988)**

The Committee agreed that it is more appropriate to have a permissive requirement which allows for electronic taximeters with an anti-fraud mechanism to detect fraudulent distance registration rather than requiring such mechanisms. The Committee concurred with NEWMA that the alternate NEWMA proposal in Agenda Item 354-1 S.7. Anti-fraud Provisions, Electronic Taximeters should be supported instead of this proposal; the recommendation in Item 354-1 more adequately addresses how the anti-fraud mechanism must function, than the mandatory requirement in the recommendation above. Therefore, the Committee recommended Agenda Item 354-1 for a vote at the 2001 NCWM Annual Meeting and withdrew this item, Appendix E, Item 1, from its agenda.

Background: Taximeters are capable of defrauding customers through the use of external oscillator circuits, "zappers," that add distance pulses to the distance input line of the meter. These easily designed circuits can be built with parts available at any electronics supply store. This proposal was developed to establish a standard requiring taximeters to detect and ignore fraudulent signals.

After the 2000 Interim Meeting, the Committee received written comment on paragraph S.1.2. Advancement of Indicating Elements (Agenda Item 360-3 Developing Issues, Appendix D-Taximeters) from the New York City Taxi and Limousine Commission (TLC). The TLC supported action to adopt requirements for equipping taximeters with an "anti-zapper" feature.

In October 2000, NEWMA developed a corresponding proposal to include a new paragraph, S.7. Antifraud Provisions, Electronic Taximeters in the Taximeter Code. Unlike the recommendation above which prohibits taximeters from recognizing fraudulent distance signals, the alternate NEWMA proposal permits rather than requires taximeter manufacturers to incorporate anti-fraud or zapper detection technology into the design of taximeters. The alternate proposal provides guidelines about how the anti-fraud feature operates where it does not conflict with other taximeter requirements. The proposal in Agenda Item 354-1 is intended as a permissive design feature and the first step in promoting regulation that encourages detection of fraudulent devices.

Ross Andersen (New York) was the NEWMA contact for this item and could be reached by telephone at 518-457-3146, by fax at 518 457-5793, or by email at agmweigh@nysnet.net to comment on this proposal.

Appendix F (Item 360-4)
Developing Issues – Grain Moisture Meters

Item 1 D Recognize Indications and Recorded Representations of Test Weight per Bushel

Source: (This item originated from the National Type Evaluation Technical Committee (NTETC) Grain Moisture Meter (GMM) Sector and first appeared on the S&T Committee's 2000 agenda.)

Recommendation: Modify 5.56(a) Grain Moisture Meter Code Section in Handbook 44 to recognize indications and recorded representation in weight per bushel as follows:

Amend the following paragraphs:

A.1. – This code applies to grain moisture meters; that is, devices used to indicate directly the moisture content of cereal grain and oil seeds. The code consists of general requirements applicable to all moisture meters and specific requirements applicable only to certain types of moisture meters. Requirements cited for "test weight per bushel" indications or recorded representations are applicable only to devices incorporating an automatic test weight per bushel measuring feature.

S.1.1. Digital Indications and Recording Elements.

(c) Meters shall be equipped with a communication interface that permits interfacing with a recording element and transmitting the date, grain type, grain moisture results, test weight per bushel results and calibration version identification.

(d) A digital indicating element shall not display and a recording element shall not record any moisture content values or test weight per bushel values before the end of the measurement cycle.

(e) Moisture content results shall be displayed and recorded as percent moisture content, wet basis. Test weight per bushel results shall be displayed and recorded as pounds per bushel. Subdivisions of ~~this~~ these unit~~s~~ shall be in terms of decimal subdivisions (not fractions).

(f) A meter shall not display or record any moisture content or test weight per bushel values when the moisture content of the grain sample is beyond the operating range of the device, unless the moisture and test weight representation~~s~~ includes a clear error indication (and recorded error message with the recorded representation).

S.1.3. Operating range. – A meter shall automatically and clearly indicate when the operating range of the meter has been exceeded. The operating range shall specify the following:

(c) Moisture Range of the Grain or Seed
The moisture range for each grain or seed for which the meter is to be used shall be specified. ~~A moisture~~ Moisture and test weight per bushel value~~s~~ may be displayed when the moisture range is exceeded if accompanied by a clear indication that the moisture range has been exceeded.

S.1.4. Value of Smallest Unit. – The display shall permit ~~constituent~~ moisture value determination to both 0.01 percent and 0.1 percent solution. The 0.1 percent resolution is for commercial transactions; the 0.01 percent resolution is for type evaluation and calibration purposes only, not for commercial purposes. Test weight per bushel values shall be determined to the nearest 0.1 pound per bushel.

S.2.4.1. Calibration Version. – A meter must be capable of displaying either calibration constants, a unique calibration name, or a unique calibration version number for use in verifying that the latest version of the calibration is being used to make moisture content and test weight per bushel determinations.

S.2.6. Determination of Quantity and Temperature. – The moisture meter system shall not require the operator to judge the precise volume or weight and temperature needed to make an accurate moisture determination. External grinding, weighing, and temperature measurement operations are not permitted. In addition, if the meter is capable of measuring test weight per bushel, determination of sample volume and weight for this measurement shall be fully automatic and means shall be provided to ensure that measurements of test weight per bushel are not allowed to be displayed or printed when insufficient sample volume is available to provide an accurate measurement.

S.4. Operating Instructions and Use Limitations. – The manufacturer shall furnish operating instructions for the device and accessories that include complete information concerning the accuracy, sensitivity, and use of accessory equipment necessary in obtaining a moisture content. Operating instructions shall include the following information:

(d) the kind or classes of grain or seed for which the device is designed to measure moisture content and test weight per bushel;

N.1.1. Transfer Standards.[1] - Official grain samples shall be used as the official transfer standards with moisture content and test weight per bushel values assigned by the reference methods. The reference methods for moisture shall be the oven drying methods as specified by the USDA GIPSA. The test weight per bushel value assigned to a test weight transfer standard shall be the average of 10 test weight per bushel determinations using the quart kettle test weight per bushel apparatus as specified by the USDA GIPSA. Tolerances shall be applied to the average of at least three measurements on each official grain sample. Official grain samples shall be clean and naturally moist, but not tempered (i.e., water not added). (Amended 1992)

N.1.2. Minimum Test.[1] - A minimum test of a grain moisture meter shall consist of tests: (a)with samples (need not exceed three) of each grain or seed type (need not exceed three) for which the device is used, and for each grain or seed type shall include the following:

(a) tests of moisture indications, (b) with samples having at least two different moisture content values within the operating range of the device. , and if applicable,

(b) tests of test weight indications, with at least the lowest moisture samples used in (a) above.

(Amended 1986 and 1989)

T.2. Tolerance Values. – Maintenance and acceptance tolerances shall be as shown in Table T.2. Tolerances for moisture measurements are expressed as a fraction of the percent moisture content of the official grain sample, together with a minimum tolerance. Tolerances for test weight per bushel are (+) positive or (-) negative with respect to the value assigned to the official grain sample.

UR.1.1. Value of the Smallest Unit on Primary Indicating and Recording Elements. – The resolution of the moisture meter display shall be 0.1 percent moisture and 0.1 pounds per bushel test weight during commercial use.

UR.3.4. Printed Tickets

(b) The customer shall be given a printed ticket showing the date, grain type, grain moisture results, test weight per bushel and calibration version identification. The ticket shall be generated by the grain moisture meter system.

(Amended 1993 and 1995)

Modify Table T.2. Acceptance and Maintenance Tolerances for Grain Moisture Meters as follows:

Table T.2. Acceptance and Maintenance Tolerances for Grain Moisture Meters		
Moisture		
Type of Grain or Seed	**Acceptance and Maintenance Tolerance**	**Minimum Tolerance**
Corn, oats, rice, sorghum, sunflower	**0.05 of the percent moisture content**	**0.8 percent in moisture content**
All other cereal grains and oil seeds	**0.04 of the percent moisture content**	**0.7 percent in moisture content**
	Test Weight per Bushel	
Type of Grain or Seed	**Acceptance and Maintenance Tolerance**	
Corn, oats	**0.8 pounds per bushel**	
All wheat classes	**0.5 pounds per bushel**	
Soybeans, barley, rice, sunflower, sorghum	**0.7 pounds per bushel**	

Remove the following paragraph:

> ~~**T.3. For Test Weight Per Bushel Indications or Recorded Representations. – The maintenance and acceptance tolerances on test weight per bushel indications or recorded representations shall be 0.193 kg/hL or 0.15 lb/bu. The test methods used shall be those specified by the USDA GIPSA.**~~
> ~~**(Amended 1992)**~~

Discussion: At the 2001 NCWM Interim Meeting, the Committee heard an update from the Diane Lee, Grain Moisture Meter (GMM) Sector Technical Advisor, who reported that the Sector is working on proposed tolerances for weight per bushel indications and plans to update the NCWM on their work at the 2002 NCWM Interim Meeting.

Background: This proposal was developed to provide a broader approach to the tolerances for GMMs and to establish separate requirements covering automatic test weight per bushel (TW) devices with tolerances which address the specific grain types. The Sector heard that the USDA Grain Inspection, Packers and Stockyards Administration (GIPSA) is close to evaluating a prototype automatic TW apparatus which might have more stringent tolerance requirements than moisture meters. The Sector also noted that it would be much easier to add requirements to the GMM Code than to develop a separate code. If necessary, the Sector may later consider developing a separate code for stand-alone automatic TW apparatus.

During the Sector's August 2000 meeting, the Sector Test Weight Subcommittee reported that volume and mass are two parameters that must be determined in TW measurement. Moisture measurements are not significantly affected when sample sizes are not sufficient to fill the meter's measuring cell; however, TW measurement is affected when the cell is not filled. Therefore, meters capable of TW measurement should be equipped with a means to ensure TW measurements are not displayed or printed when supplied with insufficient sample volume. The Sector agreed to propose changes to further modify the Grain Moisture Meter Code Section as shown above to address the sample volume issue and clarify requirements necessary for TW measurement.

To provide input on this proposal, contact the Grain Moisture Meter Sector Chair Cassie Eigenmann (Dickey-john Corporation) by telephone at 217-438-3371 or by e-mail at ceigenmann@dickey-john.com; Technical Advisor John Barber (J.B. Associates, representing NIST on contract) by telephone at 217-483-4232; or Technical Advisor Diane Lee (NIST) by telephone at 301-975-4405 or by e-mail at gloria.lee@nist.gov.

For additional background information on this issue see the 2000 NCWM S&T Final Report.

Appendix G (Item 360-4)
Developing Issues – Other Items

Item 1 D Update NCWM Publication 3, National Conference on Weights and Measures Policy, Interpretations, and Guidelines

Source: Southern Weights and Measures Association (SWMA)

Recommendation: Add the following interpretation to NCWM Publication 3, Section 3 – Specifications, Tolerances, and Device Inspection, Subsection 5 – Linear Measuring and Other Devices:

3.5.X Taximeters vs. Odometers used for Transporting Fare Paying Passengers

Interpretation

Taximeters are required for use in transporting passengers and charging on a "distance traveled" basis. Vehicle odometers are not suitable equipment for such use. Odometers are suitable for use in charging "distance traveled" rates in rental vehicles in which customers pay on a "per-mile" basis for the right to operate the vehicle.

NIST Handbook requires that devices must be suitable for their application with regards to their operating abilities, including their capacity, smallest division size, readability, performance and design.

Handbook 44 General Code, which applies to all devices, requires in section *G-UR. 3.3. Position of Equipment* that a device or system "*used in direct sales shall be so positioned that its indications may be accurately read and the weighing or measuring operation may be observed from some reasonable "customer and operator position."* Reasonable customer positions in taxicabs or other vehicles in which a driver transports passengers includes all passenger seats in a vehicle, both front and back. A properly installed taximeter's indications are easily readable from any position in the vehicle, both in darkness and light. An odometer cannot be read accurately from most positions in a vehicle other than the drivers' seat.

Handbook 44 General Code also requires specific markings on devices including manufacturer's name or trademark, model designation, and a non-repetitive serial number. All markings must be located *so that it is readily observable without the necessity of the disassembly of a part requiring the use of any means separate from the device.* The code also requires electronic devices to have provisions for applying security seals that must be broken before any changes that affect the accuracy of the device can be made. While taximeters meet these requirements, most odometers do not.

Further supporting the requirement for taximeters over odometers are the tolerances for the two devices prescribed in Handbook 44. Transporting passengers for hire normally involves shorter distances at higher cost-per-distance charges than for rental vehicles. The tolerances for taximeters in the Taximeter Code are *1% for overregistration* (error in favor of the cab) and *4% for underregistration plus 100 feet* (in favor of the customer). The tolerances for odometers in the Odometer Code are *4% for overregistration and underregistration*, allowing 4 times as much error in favor of the operator. As taxi fares are usually much higher than rental car costs on a per mile basis, this allows for unreasonable and unacceptable errors that could be financially injurious to the customer.

It should be noted that no taximeter is required in cases where the charges are based on zones or flat rates, providing that such methods are in compliance with local ordinances and are conspicuously posted and understandable to customers. When taximeters are used, the rates for distances traveled and any extras must be posted as well.

Discussion: During the NCWM 2001 Interim Meeting, the Committee concurred with the SWMA that the odometer is not a suitable device for use to determine charges for transporting passengers. The Committee noted that the taxi fare

may involve complex rate structures based on time and distance intervals that are not easily understood or calculated by the ordinary passenger.

The Committee recognized the benefits in establishing uniform policies and guidelines for Handbook requirements. NCWM Publication 3 was a useful tool that provided interpretations and guidance on NCWM Administrative Procedures; NIST Handbooks 44, 130, and 133 requirements; and education issues. In 1991, the last year Publication 3 was updated, the policies and guidelines on uniform laws and regulations were published in a new section of Handbook 130 titled Interpretations and Guidelines.

The Committee is not aware of any current plans for updating NCWM Publication 3. The Committee recognized that the NCWM Administrative Procedures are now addressed by the NCWM Board of Directors. The Committee noted that one option might be to include Interpretations and Guidelines for devices in Handbook 44 similar to what occurred in Handbook 130, which includes interpretations and guidelines as part of the working document. Such an approach would eliminate the need for researching other publications. The Committee cautioned that any guidelines should receive an annual review to ensure the interpretations are consistent and relevant to current Handbook requirements.

NEWMA agreed that any vehicle used to transport passengers for hire, other than livery services, should base the transaction on distance calculated by an approved taximeter, not odometer indications. NEWMA opposed the use of electronic displays interfaced with the odometer to calculate a fare. NEWMA strongly supported the reintroduction of Publication 3 in an electronic format on the NIST or NCWM web site(s).

Background: The SWMA considered a proposal to modify NCWM Publication 3 "Policy, Interpretations, and Guidelines" to include an interpretation in Section 3, Subsection 5 specifying that odometers are not suitable equipment for use in transporting passengers and charging on a "distance traveled" basis.

The SWMA agreed that the charging of passengers based on an odometer reading is inappropriate and does not comply with paragraph G-UR.1.1. Suitability of Equipment. The SWMA recommends using paragraph G-UR.1.1. as a basis to prohibit odometers from being used to charge passengers for distance fares.

The SWMA believed the proposed draft interpretation would assist weights and measures officials in requiring taximeters to be used in charging passengers on a distance traveled basis when hiring a vehicle and driver to transport the passengers at a predetermined rate or rates.

Often, individuals or small taxi companies that operate in less populated or rural communities obtain all necessary operating permits and licenses from the local government and begin operations using vehicle odometers, rather than taximeters, to determine charges. Local law enforcement agencies that are involved in the permitting process but not the inspection of the measuring devices (e.g. local police or sheriff's departments) see no problem in using odometers if they are accurate, and demand something written specifically addressing the issue before they will offer assistance in obtaining compliance. The odometer and taximeter codes do not address this suitability issue directly; it must be explained through interpretations such as the one in this proposal. An NCWM endorsed interpretation would be of valuable assistance in obtaining compliance.

SWMA also noted that NCWM Publication 3 has not been published or updated since 1991, although there have been many changes to Handbook 44 that justify additional interpretations and policies. For example, the repeatability tolerances added to the various codes dealing with liquid measuring devices are not clear as to the correct application and calculation of the repeatability tolerances.

Currently, weights and measures officials must rely on and reference the NCWM Standing Committee Final Reports for help in interpreting many provisions found in the codes. NIST Handbook 130 now contains the interpretations, policies, and guidelines related to Laws and Regulations issues, which are presumably kept up to date with each new edition. Similar updating and publishing of S&T interpretations, policies and guidelines is needed.

The SWMA would like to see NCWM Publication 3 updated and re-published, especially the interpretations concerning Specifications and Tolerances issues found in Section 3.

Appendix H (Item 360-4)
Developing Issues – Liquid-Measuring Devices

Item 1 D S.4.X. Location of Marking Information

(During the 2001 Interim Meeting, NEWMA asked that this item become a replacement for Agenda Item 310-4 because it more adequately addresses NEWMA's concerns about marking information on retail motor-fuel dispensers. NEWMA indicated that its revised proposal should receive developing status. Therefore the Committee withdrew Agenda Item 310-4 and renumbered NEWMA's replacement proposal to Developing Agenda Item 360-4, Appendix H Item 1.)

Source: Northeastern Weights and Measures Association (NEWMA)

Recommendation: Add the following new paragraph S.4.X. Location of Marking Information to the Liquid-Measuring Devices Code:

S.4.X. Location of Marking Information; Retail Motor-Fuel Dispensers. – The required marking information in the General Code, Paragraph G-S.1. shall appear as follows:

(a) The information may appear on the outside area of the dispenser when placed above the midpoint of the dispenser;

(b) If the information appears below the midpoint of the dispenser, it shall be placed on the framework of the dispenser behind the lower access door or panel. The use of a dispenser key shall not be considered a tool separate from the device.

Discussion: The Committee considered the following proposal to modify General Code paragraph G-S.1.:

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

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

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

(c) the model designation shall be prefaced by the term "Model," "Type," or "Pattern." These terms may be followed by the term "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.)
[Nonretroactive as of January 1, 2003]

[Note: Prefix lettering may be initial capitals, all capitals, or all lower case.]

(d) except for equipment with no moving or electronic component parts, a nonrepetitive serial number;
[Nonretroactive as of January 1, 1968]

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

(f) the serial number shall be prefaced by the words "Serial Number" or an abbreviation of that term. Abbreviations for the word "Serial" shall, as a minimum, begin with the letter "S," and abbreviations for the word "Number" shall, as a minimum, begin with the letter "N," e.g., S/N, SN, Ser. No, and S No.).
[Nonretroactive as of January 1, 2001]

The required information shall be so located that it is readily and safely observable without the reader being required to assume an unsafe or unhealthy position and that the print be of such size as

> to provide readability from a standing position without the necessity of the disassembly of a part requiring the use of any means separate from the device.

The Committee recommended NEWMA review the following discussions as it continues its' work to fully develop the proposal. The Committee also asked NEWMA to provide a contact for this issue.

The Committee agreed that the proposal was intended to address problems field officials have in locating and viewing marking information on retail motor-fuel dispensers (RMFD). Therefore, the Committee agreed that an alternate NEWMA proposal for adding a marking requirement to the Liquid-Measuring Devices Code is more appropriate than modifying General Code paragraph G-S.1. The Committee believes the alternate proposal in the recommendation above needs input from manufacturers and weights and measures jurisdictions affected by the marking requirement. The Committee would also like to consider Canada's requirement for legible information that is reasonably accessible for the operator and customer under conditions of normal use. Consequently, the Committee made NEWMA's alternate proposal a developing item and renumbered the agenda item.

The Committee discussed the following options for solving the visibility problem of marking information after installation: (1) duplicate marking information; (2) marking both the indicator and meter as required for vehicle-tank meter systems when there are separate main elements; or (3) making the information available electronically in a manner that is similar to displaying software identification on a computer monitor. NEWMA did not intend to require duplicate marking information on RMFDs although Handbook 44 does not prohibit this practice.

The Committee discussed factors and practices that might affect the permanence of RMFD marking information. The Committee is uncertain whether the problem is normal wear from the environment or daily use of the device that affects the legibility of the marking information. Field officials already access and inspect the lower portion of many dispensers to dissipate product vapor, check for leaks and appropriate plumbing, and to seal the adjustment mechanism. Retail motor-fuel dispensers are presently considered an enclosed system that operates as a whole unit where the indicating element and measuring element are not required to have separate serial numbers. Manufacturers expressed concerns about including the marking information on other parts such as cabinet door panels since these are removable for maintenance and interchangeable on similar dispenser types.

The Committee considered concerns about the proposed language, the proposed enforcement date, and creating an exemption that accepts locating the information behind a key locked panel. The permissive language "may" in paragraph (a) contrasts with the mandatory requirement "shall" in paragraph (b), which might raise some question about the exact required location of the information. Marking information on RMFDs installed prior to the effective date may not comply with the proposed location for the markings.

The Committee discussed the difficulty in making the requirement a General Code requirement because the design of other devices such as scales do not always facilitate locating marking information behind a key locked panel. The S&T Committee made a concession when it allowed information behind a panel that does not require a key. Requiring a key adds one more level to accessing basic identification information that should be readily accessible. One alternate approach is to not make an exception for a key, which is a separate tool from the device, but to word the requirement to recognize that it is acceptable to locate the information behind a panel that requires the use of a dispenser key. The Committee asks for input from manufacturers and weights and measures officials affected by this proposal.

NEWMA plans to recommend this item for adoption by the NCWM at its Fall 2001 Interim Meeting and asks other regional associations and industry to review the item for input on the importance of this item as a safety issue.

Report of the Committee on Administration and Public Affairs

Jerry Flanders, Chairman
Georgia Department of Agriculture
Atlanta, Georgia

Reference
Key Number

400 Introduction

The Committee on Administration and Public Affairs (A&P Committee) submits its Annual Report for the 86th National Conference on Weights and Measures. This document consists of the Interim Report presented in NCWM Publication 16 "Committee Reports," as amended in the Addendum Sheets issued during the Annual Meeting. The Committee considered communications it received prior to and during the Annual Meeting in developing this report.

Table A identifies items contained in the report by Reference Key Number, Item Title, and Page Number. The item numbers are those assigned in the Interim Meeting Agenda. Voting items are indicated with a **"V"** after the item number. Items marked with an **"I"** after the reference key number are informational items. Table B lists the Appendices to the report, and Table C provides a summary of the results of the voting on the Committee's items and the report in its entirety.

Table A
Index to Reference Key Items

Table B
Appendices

Table C
Voting Results

Reference Key Number	House of State Representatives		House of Delegates		Results
	Yeas	Nays	Yeas	Nays	
400 (Report in Its Entirety) Voice Vote	All	No	All	No	Passed

Details of All Items

(In Order by Reference Key Number)

401 Regional Weights and Measures Association Activities

401-1 I Regional Reports

The A&P Committee reviewed the reports from the Regional Associations. Members of the NCWM A&P Committee agreed to be responsible for getting each region's report to the Technical Advisor.

402 Program Management

402-1 I Voluntary Program Assessment Working Group (VPAW)

This item was carried over from item 402-1 in the A&P Committee's Report to the 85th NCWM, 2000. At the 85th Annual Meeting, the NCWM adopted the concept of developing voluntary self-assessment checklists for various areas of weights and measures inspection. At a meeting on January 13, 2001, VPAW met with members of the A&P Committee and the Chief of the NIST Office of Weights and Measures, Henry Oppermann, to apprise the Committee of the working group's progress. The Working Group determined that the checklist for retail motor-fuel dispensers was complete and that a 2-person team would review any completed checklist submitted by a jurisdiction. As part of the pilot program, Ross Andersen and Mike Sikula agreed to review the completed retail motor-fuel checklist submitted by Sid Colbrook for the State of Illinois. The establishment of the review process is the first step in developing a voluntary self-assessment program, which may result in some form of recognition. The second step is to eventually have an on-site review to determine compliance in the field with the checklist. The third step in the development of the self-assessment program is for the jurisdiction to be recognized as having met the minimum criteria for a model program in a particular weights and measures discipline.

The Working Group stressed the importance of the A&P Committee promoting the voluntary self-assessment program on a national level. Jurisdictions need to realize the value to be gained from participating in the self-assessment program (e.g., possible additional budget allocations from State legislatures, increased personnel, and favorable economic impact

for their constituents). Henry Oppermann encouraged the Committee to collect data to assess weights and measures programs such as the number of devices each jurisdiction has, number of inspectors, compliance rates, and number of devices related to resources. Statistics can be put on web to provide jurisdictions valuable information when preparing budget requests to State legislatures.

At the Interim Meeting in January 2001, Mike Sikula (NY) volunteered to develop a draft checklist for small-capacity scales. That checklist, along with the checklist for vehicle scales, which was developed by Jack Kane (MT) and presented to the VPAW Committee at the 2000 Annual Meeting, was reviewed by the A&P Committee at the NCWM Annual Meeting in July 2001.

Volunteers Needed

The A&P Committee requests volunteers to field test future checklists and assist in finalizing them for possible NCWM adoption. Volunteers from both State and local jurisdictions are invited to participate in the field evaluation of the checklists to ensure that they meet the diverse needs of the weights and measures community. To volunteer, please contact Sid Colbrook by e-mail at scolbrook@agr.state.il.us, by telephone at 217-785-8301 or by fax at 217-524-7801.

At the Interim Meeting, the A&P Committee planned to proceed with the development of checklists for other weights and measures activities such as retail computing scales and vehicle-tank meters using the Retail Motor-Fuel Program Self-Assessment Checklist as a model. However, at the Annual Meeting, the Committee decided to delay the development of additional checklists until more experience is obtained using existing checklists. The Retail Motor-Fuel Program Self-Assessment Checklist is available in electronic format, and administrative and technical assistance is available from VPAW members.

Action of the A&P Committee

The A&P Committee discussed the progress of VPAW and ways to promote the voluntary self-assessment program concept at the national level. The Committee is enthusiastic about the program and the benefits of participation. The program is voluntary. The checklist can identify deficiencies that can easily be corrected. It also can enhance a jurisdiction's morale if the assessment process results in an affirmation that the jurisdiction is meeting or exceeding the basic criteria. The self-assessment process can be used to verify the need for additional funding from State legislatures. The advantages are many, and the purpose of the self-assessment program is to provide each jurisdiction the opportunity to achieve excellence.

Additionally, the review process is confidential. It is strictly between the jurisdiction submitting the evaluation and the review team. The review process gives the jurisdiction an opportunity to enhance its program or correct any deficiencies noted. A jurisdiction does not have to submit the checklist for review nor is it required to submit the documentation to the A&P Committee for recognition. This is a choice of the jurisdiction. Once the review process is completed and the review team determines that the jurisdiction meets the criteria for a model program, the review team will forward the information to the A&P Committee only with the jurisdiction's approval.

Three members of the Committee volunteered to participate in the Voluntary Self-Assessment Program using the checklist for retail motor-fuel dispensers. The jurisdictions of the City of San Francisco, the State of Illinois, and the State of Florida submitted evaluations before the Annual Meeting. The State of New York asked a municipality to complete the checklist. Other jurisdictions are encouraged to participate in the program. Once the checklists are completed, they will be reviewed. If a jurisdiction's evaluation and review are completed prior to the NCWM 2001 Annual Meeting, the jurisdiction has met the criteria in the checklist, and it chooses to be recognized by the NCWM, a recognition certificate will be presented to the jurisdiction at the Annual Meeting.

The A&P Committee requests that VPAW remain in existence and consider what the next steps or actions should be following the submittal, review, and completion of the checklists.

At the 2001 Annual Meeting the A&P Committee received checklists for small-capacity scales and vehicle scales. The Committee reviewed, revised, and approved those checklists, which are appended to the final report as Appendices A and B, respectively.

The following jurisdictions participated in the Voluntary Program Assessment checklists:

Town of Barnstable, Massachusetts – Retail Motor-Fuel Dispensers checklist
State of Florida, Bureau of Petroleum Inspection - Retail Motor-Fuel Dispensers checklist
State of Illinois - Retail Motor-Fuel Dispensers checklist
State of Nebraska - Retail Motor-Fuel Dispensers checklist
City/County of San Francisco – Small-Capacity Scales checklist

Certificates were awarded to these jurisdictions for participating in the program.

402-2 I Safety Information

Source: State and Local Jurisdictions Incident/Accident Report Forms

The A&P Committee has not received any Incident/Accident Reports for the last 3 years. The NCWM Incident/Accident Report Form is available on the Internet at http://www.nist.gov/ncwm. Each regional association has appointed a safety liaison to coordinate safety-related issues within each region and to work with the Committee's Safety Liaison, Charles Gardner. The Committee hopes that the regional liaisons will improve the distribution of safety information at the grassroots level.

The Regional Safety Liaisons are:

Western Weights and Measures Association:

Craig Leisy, Supervisor Weights and Measures
Seattle Licenses and Consumer Affairs
805 South Dearborn Street
Seattle, WA 98134
Tel: 206-386-1129
Fax: 312-386-1129
E-mail: craig.leisy@ci.seattle.wa.us

Northeastern Weights and Measures Association:

Michael J. Sikula, Assistant Director
New York Bureau of Weights and Measures
Building 7A State Campus
Albany, NY 12235
Tel: 518-457-3452
Fax: 518-457-2552
E-mail: mike.sikula@agmkt.state.ny.us

Central Weights and Measures Association:

Sherry R. Fowlkes, Inspector
Weights and Measures Department
1903 St. Mary's Avenue
Fort Wayne, IN 46808
Tel: 219-427-1157
Fax: 219-427-5789
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Southern Weights and Measures Association

Charles E. (Ed) Coleman, Standards Supervisor
Tennessee Department of Agriculture W&M
P.O. Box 40627 Melrose Station
Nashville, Tennessee 37204
Tel: 615-837-5109
Fax: 615-837-5015

Charles Gardner, Committee Safety Liaison, encourages the regional associations to include safety presentations at their meetings. The Committee believes that it is important to make safety information available to all Conference members and interested parties. The "*Report of the Task Force on Safety"* (1991) is on the Internet at www.nist.gov/owm under National Conference on Weights and Measures "*Publications and Programs."* This report and others are free and can be downloaded in Adobe Portable Document Format (PDF). This access will make it easier to distribute the accident report form throughout the weights and measures community.

As Conference Safety Liaison Contact, Charles Gardner also submitted a letter regarding aluminum pull carts that can be used for the inspection of retail motor-fuel dispensers. These carts are an excellent tool for weights and measures inspectors and contribute to the safety of the field officials. The purpose of the letter was to serve as an information source to emphasize the safety aspects in the use of the carts.

Committee Decision: The Committee reviewed the status of this agenda item and determined that the safety liaison contacts will be kept up to date. Any future safety information received by the Committee will be reviewed and appended to the Committee's report. The letter submitted by Mr. Gardner is appended to the Annual Report as Appendix F.

402-3 W Returning Product to Above-Ground Storage Tanks

Source: Northeast Weights and Measures Association

Recommended Policy: Weights and Measures officials should not climb ladders while carrying 5-gallon provers filled with petroleum products. Also petroleum products should only be returned via "fill ports" and under no circumstances should product be returned *via* "vent lines." This is not their intended use. It is NEWMA's recommendation that petroleum products used during testing should only be returned to above-ground storage tanks under any one of the following conditions:

1. The tank is equipped with a staircase and catwalk that is both sturdy and safe. The catwalk must provide adequate accessibility to an actual "fill port" on top of the tank.

2. There is a pumping unit available that meets all the applicable safety standards for pumping petroleum products. If this method is used, the product should be pumped back using the same inlet used during normal deliveries (e.g., if during normal deliveries the product is pumped in at grade level, then Weights and Measures should also pump back at grade level). The pumping unit will require some type of temporary storage tank.

3. The burden of returning the product should be placed on the station owner. The owner should be notified in writing and be given ample time to make arrangements (e.g., procuring one or more 55-gallon [208.2-liter] drums) in order to properly assist the Weights and Measures official.

Note: Weights and Measures equipment should be handled only by a Weights and Measures official. It is not appropriate to allow a station owner/employee to use an official's prover to return product to a storage tank.

Background: Above-ground storage tanks are becoming increasingly more common among retailers. They are cheaper to install and easier to monitor for leaks. At this time they are more commonly found at suburban gas stations, marinas, and municipal fleet garages.

The problem for the Weights and Measures official is how to return the product after the test. Commonly, the official will climb a ladder, either attached or unattached to the tank, and return the product through the vent line using a funnel. Several Weights and Measures officials as well as several industry representatives were consulted and the overwhelming consensus was that this practice "is not safe."

Committee Decision: The Committee reviewed this item at the Interim Meeting and determined that this item is covered under the User Requirements of the General Code of NIST Handbook 44 (see G-UR.2.3.); therefore, the Committee has withdrawn the item.

A sample letter that may be sent to owners of establishments with above-ground storage tanks will be appended to the Report of the Task Force on Safety available on the NIST/OWM Home page (National Conference on Weights and Measures bullet) at www.nist.gov/owm.

402-4 I NCWM Internet Home Page

The NCWM now has its own Internet Home Page, which may be accessed at www.ncwm.net.

Committee Recommendation: The A&P Committee requests that the following items be placed on the NCWM Home Page:

- ⊄# Voluntary Self-Assessment Checklists for Retail Motor-Fuel Dispensers, Vehicle Scales, and Small-Capacity Scales
- ⊄# Regional Safety Liaison Contacts
- ⊄# NCWM Safety Liaison Contact
- ⊄# NCWM Certified Trainers List

403 Education

403-1 I National Training Program

This item is carried over from item 403-1 in the A&P Committee's Report to the 85th NCWM, 2000. At the 85th Annual Meeting, the Committee met with the NCWM Board of Directors. The Board asked the Committee to re-focus its goals for the National Training Program.

Discussion: At the 2001 Interim Meeting, the Committee reviewed the charge given to it by the Board of Directors at the 2000 Annual Meeting in Richmond. The Committee asked for further clarification from Chairman Lou Straub and Past Chairman Wes Diggs. The Committee's directive was to develop the basic criteria needed for a field inspector to perform his/her inspection duties. The Board determined that the development of the training materials would be the responsibility of the person or jurisdiction administering the training. Henry Oppermann, Chief of the Office of Weights and Measures (OWM), also shared some goals from OWM's strategic plan.

Based on the directive of the Board, various methods of developing the criteria were discussed. Mike Sikula (NY) developed draft minimum criteria that inspectors should know to test small-capacity scales. The Committee reviewed the criteria at the 2001 Annual Meeting.

Committee Decision: The Committee requests that all jurisdictions submit to the Chairman of the A&P Committee any existing training forms, guidelines or checklists used to train their staff for field inspection of small-capacity scales. This information will aid the Committee in developing a uniform training checklist.

The A&P Committee received training materials from several jurisdictions and will review these materials for further development of uniform training checklists.

A summary of the National Training Program activity as of June 30, 2001, is included in the final report as Appendix C.

403-2 I Associate Membership Scholarship Fund

At the 85th Annual Meeting, the Committee was informed that no funds were available for scholarships for fiscal year 2001.

However, at the 2001 Interim Meeting, the Associate Membership Committee (AMC) told the A&P Committee that $10,500 was available for training purposes in 2001. The funds must be spent by September 30, 2001.

Committee Decision: After discussion, the Committee developed a cover letter and application to notify the jurisdictions regarding the distribution of these funds. The distribution of this letter was directed to all State Weights and Measures Directors, all Regional Chairmen, and all Regional A&P Chairmen. The letter requested that all State Directors forward this information to their local jurisdictions.

Committee Discussion: The Committee discussed how to handle unutilized funds, and re-allocation or re-direction of that money will be handled at the discretion of the Committee. A report of the distribution of the funds available for training by end of Fiscal Year 2001 is included in Appendix D of the final report.

403-3 I NCWM Certified Instructors

The Committee encourages each regional association to sponsor a Train-the-Trainer Class so that potential certification candidates can meet the first requirement for becoming an NCWM Certified Instructor. NCWM Certified Instructors are available to assist weights and measures jurisdictions in training. A list of the currently certified NTP Instructors and the courses they teach is included in Appendix E of this report. Please contact the instructors directly.

403-4 I Education Sessions – 2001 Conference

Source: A&P Committee

The A&P Committee discussed which technical sessions it will sponsor during the 86th NCWM Annual Meeting in 2001. It recommended that the State of Michigan give a presentation on "reasonable moisture loss."

The following technical sessions were presented at the 86th Annual Meeting:

- National Type Evaluation Program (NTEP) Administrative Policy, presented by Lou Straub, NCWM Chairman, Wes Diggs, NTEP Chairman, and Steve Patoray, NTEP Director;
- Determining Reasonable Moisture Loss in Enhanced Meat & Poultry Products, presented by Pat Mercer, MI Consumer Protection Section, and Mike Pinagel, MI Weights and Measures; and
- Impact of the Use of Quality Systems on Weights and Measures Regulatory Activities, Henry Oppermann, NIST Office of Weights and Measures

403-5 I Service Personnel Training

Source: Gas Pump Manufacturers Association (GPMA)

Background: This item is carried over from item 403-5 in the A&P Committee's Report to the 85th NCWM, 2000. The GPMA developed a course entitled "Service Technicians and Weights and Measures Requirements." Debbie Joines presented one class in Illinois. Based on the positive response from course participants, the GPMA has determined that no further pilot testing is needed. The course includes guidelines for organizing a class, background on legal and technical requirements, and test procedures. The course's format allows the instructor to customize the presentations to reflect local weights and measures requirements regarding equipment repair, recalibration, and notification. GPMA estimates that the complete 1-day course can be presented in 6 hours of classroom work.

At the 2001 Interim Meeting the Committee was apprised by GPMA that their goal was to have a final draft available for the A&P Committee's review at the Annual Meeting. Pending review, the course will be available to interested parties.

Committee Discussion: The Committee received the completed training materials from GPMA in both hard copy and electronic formats and will determine a method of distribution.

404 Public Affairs

404-1 I Weights and Measures Week

Weights and Measures Week 2001was March 1 to 7, and the theme was "E-Commerce: Does it Measure Up?" The A&P Committee believes that weights and measures officials and the NCWM need to promote the role they play in consumer awareness. All jurisdictions are encouraged to make their constituents aware that weights and measures regulations are protecting consumers in the "E-business" marketplace.

The theme for Weights and Measures Week 2002 has not been determined at this time, but the Committee will be working in conjunction with the Chairman-Elect to select a topic.

404-2 W National Consumer Protection Week 2001

National Consumer Protection Week was held February 5 to 11, 2001, and was designated to highlight national consumer protection and education efforts. The focus of this year's theme was on predatory lending. This topic includes car title pawns, pay-day loans, abusive mortgage lending, and other forms of high cost credit. For information on National Consumer Protection Week, refer to the Internet at http://www.nacaanet.org.

The National Association of Consumer Agency Administrators (NACAA) sponsors National Consumer Protection Week in conjunction with the Federal Trade Commission, the American Association of Retired Persons, the National Consumer League, the Consumer Federation of America, the U.S. Postal Inspection Service, and the National Association of Attorneys General. Kathleen Thuner, San Diego County, CA, and David Frieders, San Francisco City and County, CA, will serve as co-liaison representatives to NACAA from the NCWM.

Committee Discussion: The Committee discussed this agenda item and believes that there is no correlation with weights and measures at this time. Future information on National Consumer Protection Week that is received by the Committee will be placed in an appendix to the Committee's report.

404-3 W Change Dates of National Weights and Measures Week

Source: Western Weights and Measures Association (WWMA)

Proposal: Change the dates of National Weights and Measures Week to coincide with the dates of National Consumer Protection Week.

Background: The WWMA feels that there may be advantages to having the National Weights and Measures Week fall under the same umbrella as other consumer protection agencies.

Committee Action: To the best of the Committee's knowledge, it is not empowered to make or direct these changes.

404-4 W Promoting Weights and Measures in the United States

The A&P Committee encourages jurisdictions and regional associations to share information regarding weights and measures issues with the public at all times throughout the year. Such information may be disseminated periodically to local newspapers and radio and television stations making the public aware of the importance of a good weights and measures program in their area.

Committee Decision: The Committee believes that this does not need to be an agenda item. All jurisdictions should on an on-going basis promote weights and measures with a particular focus during Weights and Measures Week. The Committee requested that the Board of Directors provide display space and a video player at the 2001 Annual Meeting for the display of brochures, program manuals, safety information, or public service announcements (print or video) to be provided by jurisdictions.

404-5 W Publicity for the 86th NCWM Annual Meeting

If requested, the A&P Committee will provide assistance to the NCWM to publicize the 2001 NCWM Annual Meeting to be held July 22 to 26, 2001, at the Grand Hyatt Hotel in Washington, D.C.

Committee Discussion: Since publicity for the Annual Meetings is the responsibility of Management Solutions Plus, the Committee decided to withdraw this item from its agenda. The Committee will remain available to assist the Conference or the management company for any future requests.

404-6 I Participating in the NIST 100th Anniversary Celebration

In 2001, the National Institute of Standards and Technology (NIST) is celebrating its Centennial. The theme is "NIST – First Century of Service to the Nation." The 86th Annual Meeting of the NCWM was held in Washington, D.C., and the NCWM presented a commemorative 100th birthday plaque to Dr. Richard Kayser, Director, NIST Technology Services.

The A&P Committee will assist the Board in any capacity that is requested.

J. Flanders, Georgia, Chairman
B. Adams, Minnesota
D. Frieders, San Francisco County, California
S. Hadder, Florida
M. Sikula, New York

Associate Membership Committee Representative: R. Fuehne, Ralston Purina Company
C. Gardner, Suffolk County, New York, Safety Liaison

L. Sebring, NIST Technical Advisor

Committee on Administration and Public Affairs

Appendix A

NCWM Voluntary Program Assessment Work Group
Administrative Responsibilities Evaluation Checklist
Small Capacity (less than or = to 100 lb) Scale Inspection Programs

Jurisdiction: _____ Director Name: _____

Numbered items in normal text are the requirements. The standard to assess compliance with the standard is written immediately after the requirement in *italic type* in the form of questions. For each requirement, circle Yes or No, or NA if not applicable to answer the questions. The "NA" option may not be available for all questions. For each "No" circled, identify the requirement number and provide and explanation on a comment sheet. Also use the comment sheet to make other notes regarding your findings.

Items with an asterisk "*" after the number indicate non-critical program areas. A "No" or "NA" response for one of these items will not be considered a critical program deficiency.

1. Provide Legal and Financial Basis for Inspection Program *Are laws enacted or regulations promulgated pursuant to procedures of the jurisdiction in the following areas? Sections taken from, or based on, Handbook 130 for each item below may be used to document compliance. Jurisdictions may also have unique wording to meet special needs.*		
1.1	Law enacted specifying authority to inspect and test devices, authorizing access to premises, etc. *Do inspectors have legal power to enter commercial establishments and conduct inspections (See Handbook 130 and Weights and Measures Law Section 12)?*	Yes No
1.2	Law enacted specifying power to promulgate regulations to give full effect to the law. *Does the Director (or agency head) have authority to promulgate regulations (See Handbook 130 Weights and Measures Law Section 12)?*	Yes No
1.3	Law enacted specifying enforcement tools. *Do inspectors have authority to issue condemnation and stop-use orders?* *Does the Director have authority to cite penalties, prosecute violators, and/or employ other enforcement tools (See Handbook 130 Weights and Measures Law Section 13)?*	Yes No Yes No
1.4*	Regulations in place setting frequency of inspection for devices. *Is a regulation or are procedures in effect setting frequency of inspection for commercial devices?*	Yes No NA
1.5	Regulations in place promulgating current version of Handbook 44. *Is a regulation in effect adopting the current version of NIST Handbook 44?*	Yes No
1.6	Regulations in place requiring NTEP Certificate of Conformance for devices used or sold for use in commerce. *Is a regulation in effect that requires that a device be traceable to a Certificate of Conformance, or otherwise approved by the jurisdiction (See Handbook 130 National Type Evaluation Regulation)?*	Yes No
1.7*	Regulations in place to register service persons and define duties and responsibilities for service persons. *Is a regulation in effect authorizing the Director to register servicepersons?* *Does the regulation in effect define qualifications, duties and responsibilities of servicepersons (See Handbook 130 Voluntary Registrations of Servicepersons Regulation)?*	Yes NA Yes No NA (Use NA only if NA above)

2. Define Program Goals and Performance Standards *The jurisdiction may use a combination of documents (Law, Regulations, Quality Manual and/or other documents) to set goals and standards.*		
2.1	Management organizes the staff with defined areas of responsibility (both program areas and geographical territories or zones) and defined levels of supervision. *Is the jurisdiction organized as recorded on an organizational chart for inspection functions, including administration, support staff, and field inspection staff?*	Yes No
2.2*	Management maintains current job descriptions for each title/position. *Does the jurisdiction have written job descriptions describing duties and minimum qualifications for all positions?*	Yes No
2.3	Management defines program goals. *Are both general goals for the overall program as well as specific goals for individual projects defined in writing? Some goals will be defined in law and regulation, while most are administrative in nature.* *Can the Director identify examples and explain the process by which goals are set?*	Yes No Yes No
2.4*	Management maintains a performance evaluation program for all staff. *Are periodic performance evaluations conducted for each employee? Evaluations must include performance goals and standards, must identify training needs and must provide feedback to the employee?*	Yes No
2.5*	Management defines performance standards for registered serviceperson programs. *Are minimum performance standards established for registered servicepersons?* *Can management provide examples of how serviceperson performance is measured and describe how the program ensures that servicepersons are meeting their responsibilities? Management may use qualifying exams, follow-up inspections, etc.*	Yes NA Yes No NA (Use NA only if NA above)

3. Define Inspection and Test Procedures *The jurisdiction may use a combination of documents (Quality Manual, NCWM Publication 12, and/or other manuals to define procedures.*		
3.1	Management defines minimum inspection procedures in writing for each inspection discipline. *Are written procedures in place to set minimum inspection criteria (refers to specifications, user requirements, labeling or markings, etc)? Procedures may be in the form of NIST Handbooks, EPO's (NCWM Publication 12) or may be specific guidance documents.*	Yes No
3.2	Management defines minimum test procedures in writing for each inspection discipline. *Are written procedures in place to prescribe minimum tests (refers to examination of a device, package or practice for conformance with the tolerances and other applicable performance standards) to be applied to each device tested? Procedures may be in the form of NIST Handbooks, EPO's (NCWM Publication 12) or may be specific guidance documents.*	Yes No
3.3	Management defines procedures for use in complaint and/or undercover investigations. *Are written procedures in place to prescribe procedures and techniques for complaint and/or undercover investigations?*	Yes No

3.4	Management defines enforcement procedures. *Are written procedures in place for initiating enforcement actions?*	Yes No
	Do those procedures identify what actions are available and when they are to be used (stop-use and condemnation orders, warning letters, penalties, or prosecution)?	Yes No
	Do the procedures identify the forms used, the legal filing procedures, procedures for scheduling reinspections, etc?	Yes No
	Do the procedures include "Due Process" provisions?	Yes No

4. Provide Training for Each Inspector or Supervisor *Jurisdictions may use completion of the NTP courses as evidence of compliance in this area. For each item, can management provide documentation of training provided to each staff member?*		
4.1	Management provides training on law and regulations. *Was training provided?*	Yes No
4.2	Management provides training on organization and use of NIST Handbook 44. *Was training provided?*	Yes No
4.3	Management provides training on NTEP and use of Certificates of Conformance. *Was training provided?*	Yes No
4.4	Management provides training on safety. *Was training provided?*	Yes No
4.5	Management provides training on appropriate inspection and test procedures. *Was training provided?*	Yes No
4.6	Management provides training on use and care of standards. *Was training provided?*	Yes No
4.7	Management provides training on completion and processing of report forms. *Was training provided?*	Yes No
4.8	Management provides training on completion and processing of official orders. *Was training provided?*	Yes No
4.9	Management provides training on conduct of complaint and undercover investigations. *Was training provided?*	Yes No
4.10	Management keeps records of training provided to each inspector. *Are records of training maintained for each staff member, ranging from trainer logs, to attendance lists, to a database?*	Yes No
	Are records in a form that can be accessed to assist in identifying training needs?	Yes No

5. Provide Inspection Staff with Appropriate Reference Standards and Test Equipment *Is each inspector equipped with the necessary equipment and reference materials to conduct the inspections and tests specified for each inspection discipline?*		
5.1	Management provides current versions of Law and Regulations. *Are copies provided?*	Yes No
5.2	Management provides current version of Handbook 44. *Are copies provided?*	Yes No
5.3	Management provides current version of written procedures, Quality Manual, EPO's, program directives, etc. *Are copies provided?*	Yes No

5.4	Management provides inspectors with access to NTEP Certificates of Conformance. *Can each inspector get access to the information in the Certificate of Conformance for a device? Access may range from a copy of the certificate (NCWM Internet site) to contact with another person who has a copy.*	Yes No
5.5	Management provides necessary standards and test equipment. *Is each inspector provided with test weights and standards certified by a NIST traceable laboratory which are appropriate for the task?*	Yes No
5.6	Management provides necessary support equipment. *Is each inspector provided with additional support equipment to conduct proper tests (e.g., calculator, hand tools, etc.), seals, including security seals and approval seals, seal press, other equipment?*	Yes No
5.7	Management provides inspectors with current versions of inspection reports, worksheets, and other forms. *Is each inspector provided with current versions of inspection reports, worksheets, and other forms?*	Yes No

6. Provide a Safe Working Environment		
6.1	Jurisdiction has a written safety program or policy. *Does the jurisdiction have a policy, reflecting current federal and state laws, regarding worker safety? Documentation may be in the Quality Manual, or may be in other documents such as state worker safety rules or federal OSHA standards.*	Yes No
6.2	Management actively promotes safety in all activities. *Is "Safety first" thinking integrated in all management programs including training, supervision, performance evaluation, etc?* *Are safety issues presented in training for each inspection area?* *Are supervisors required to evaluate inspector implementation of safety policies?* *Does management include safe practices as standards in inspector performance evaluations?*	Yes No Yes No Yes No Yes No
6.3	Management issues personal protective equipment and other safety equipment to each inspector. *Has safety equipment been issued as necessary?*	Yes No NA

7. Provide Record Keeping Systems to Record and Evaluate Program Progress		
7.1	Management designs appropriate report forms to collect data to support the enforcement programs. (Check each box below as appropriate) *Does the form provide space to record the following general information?* ç *Form title, number and revision date.* ç *Agency name, address and phone number.* ç *Inspection number that uniquely identifies the inspection.* ç *Inspection date.* ç *Name, address and phone number of establishment inspected.* ç *Remarks area for official comments and summary of inspection and test results.* ç *Signature of inspector.* ç *Optional: Signature of establishment representative.* ç *Optional: Type of inspection, routine, reinspection, investigation, etc.* ç *Optional: Zone or territory where establishment is located.* ç *Optional: Classification of the establishment.* *Does the form provide space to record the following specific information for each device inspected?* ç *Manufacturer, model and serial number of the scale.* ç *Capacity and scale division size for the scale.* ç *Tolerance applied, acceptance or maintenance.* ç *Visual inspection. May be P/F or narrative.* ç *Load(s) and error(s) for increasing load test.* ç *Load and error for shift test.* ç *Other tests performed.* ç *Final compliance of the device. May be P/F or narrative.*	Yes No NA Yes No NA
7.2	Supervisors review and/or verify inspection reports of subordinates. *Do supervisors review inspection reports and/or conduct follow-up inspections to evaluate inspector performance and identify potential problems?* *Is this responsibility written in the performance evaluation program of each supervisor?*	Yes No Yes No
7.3	Management collects inspection reports at a central location(s) for electronic data entry and/or filing. *Is an organized filing system in place to retain official records?* *Is the filing system documented and can authorized staff find and retrieve records as needed?*	Yes No Yes No
7.4*	Management has an established record retention program and archiving procedure. *Are record retention periods established for each type of record and are archiving procedures documented in writing?*	Yes No

8. Take Action on Violative Inspection Results		
8.1	Agency takes appropriate enforcement actions against violators. *Does management have records of enforcement actions taken?*	Yes No
	Can management provide examples of how enforcement procedures were used at all levels (i.e. from field inspector issuing stop-use orders to management citing penalties, rescinding licenses, or initiating prosecutions)?	Yes No

9. Program Review and Improvement		
9.1	Management evaluates program effectiveness at all levels. *Does management have a documented review program to evaluate program effectiveness on a continuous and/or annual basis?*	Yes No
	Can management provide examples of the process and provide examples of changes that have been made to the laws or regulations, program goals and standards, inspection/test procedures, training program, inspection/test equipment, safety program, record keeping, and/or enforcement procedures?	Yes No
9.2*	Management reaches out to consumers and industry to promote the program and encourage compliance at all levels. *Can management describe examples of outreach programs directed at regulated parties?*	Yes No NA
	Can management describe examples of outreach programs directed at servicepersons?	Yes No NA
	Can management describe examples of outreach programs directed at consumers?	Yes No NA

Rater: _____ Date: _____

See attached comment sheet.

NCWM Voluntary Program Assessment Work Group
Administrative Responsibilities Evaluation Checklist
Small Capacity (less than or = to 100 lb) Scale Inspection Programs

Jurisdiction: _____ Director Name: _____

Administrative Responsibilities Comment Sheet

Requirement	Comment

Rater: _____ Date: _____

NCWM Voluntary Program Assessment Work Group
Inspector Responsibilities Evaluation Checklist
Small Capacity (less than or = to 100 lb) Scales

Jurisdiction: _____ Inspector Name: _____

Numbered items in normal text are the requirements. The standard to assess compliance with the standard is written immediately after the requirement in *italic type* in the form of questions. For each requirement, circle "Yes" or "No," or "NA" if not applicable to answer the questions. For each "No" circled, identify the requirement number and provide and explanation on a comment sheet. Also use the comment sheet to make other notes regarding your findings.

All items in this checklist indicate critical program areas. Any "No" response represents a critical program deficiency.

1. The Inspector is Trained. *Can each inspector cite references relating to the following areas and correctly answer questions (i.e. assessor may use review and exam questions from NTP courses) in each area?*		
1.1	The inspector has knowledge of program goals and objectives.	Yes No
1.2	The inspector has knowledge of the pertinent laws.	Yes No
1.3	The inspector has knowledge of the pertinent regulations.	Yes No
1.4	The inspector has knowledge of Handbook 44.	Yes No
1.5	The inspector has knowledge of NTEP and a Certificate of Conformance.	Yes No
1.6	The inspector has knowledge of the prescribed inspection and test procedures for the devices.	Yes No
1.7	The inspector has knowledge of safety issues and practices associated with the device tested.	Yes No
1.8	The inspector has knowledge of the proper use and care of the standards and equipment.	Yes No
1.9	The inspector has knowledge of the prescribed procedures for complaint and undercover investigations.	Yes No NA

2. The Inspector is Prepared to Perform Inspections. *Does the inspector have the following reference items at his/her disposal at the inspection site(s)?*		
2.1	The Inspector has appropriate credentials.	Yes No
2.2	The Inspector has copies of pertinent laws, regulations and reference books. *Does inspector have current copies of law, regulations, Handbook 44, etc?*	Yes No
2.3	The Inspector has NTEP Certificates or has access to them as needed. *Can the inspector get access to an NTEP Certificate when needed?*	Yes No
2.4	The Inspector has copies of testing procedures. *Does inspector have copies (NCWM Publication 12 and/or Jurisdiction Quality Manual)?*	Yes No
2.5	The Inspector has necessary report forms, worksheets, and official orders. *Does the inspector have copies?*	Yes No

3. The Inspector has Necessary Equipment to Perform Tests. *Does the inspector have the following test equipment and supplies at his/her disposal at the inspection site(s)?*		
3.1	Inspector has appropriate standards. *Are the test weights certified traceable to NIST and appropriate in capacity (HB 44 Table 4)?* *Are the test weights in good condition (i.e. clean and free of chips etc)?*	Yes No Yes No
3.2	Inspector has safety equipment. *Does the inspector have appropriate safety equipment (steel toe shoes, etc)?*	Yes No

4. Inspector Conducts Inspections and Tests.		
4.1	Preliminary steps. *Does the inspector identify him/herself to establishment manager and explain purpose of inspection (routine, complaint, etc, but not applicable for undercover investigations)?* *Does the inspector explain the manager's responsibilities (cease using scale during test, provide assistance during test, etc)?*	Yes No Yes No
4.2	Inspector inspects each scale. *Does the inspector:* ⊄# *Check suitability?* ⊄# *Check level condition and supports?* ⊄# *Check that device has valid NTEP Certificate of Conformance?* ⊄# *Check ability for customer to view indications?* ⊄# *Check for correct markings?* ⊄# *Check money value computations if applicable?* ⊄# *Check appropriateness of weighing platter?* ⊄# *Check provisions for sealing?* ⊄# *Check printer operation if applicable?*	 Yes No Yes No Yes No Yes No Yes No Yes No Yes No Yes No Yes No
4.3	Measurement Tests – General. *For each test load, does the inspector:* ⊄# *Check for a zero indication?* ⊄# *Place weights in the correct position?* ⊄# *Check for stability of indication?* ⊄# *Move weights in a safe manner?* ⊄# *Calculate tolerances correctly?*	 Yes No Yes No Yes No Yes No Yes No
4.4	Conducts Increasing Load Test(s) *Does the inspector conduct increasing load tests on each device as per HB44?*	Yes No
4.5	Conducts Decreasing Load Test(s) *Does the inspector conduct decreasing load tests as per HB44?*	Yes No
4.6	Conducts Shift Test(s) *Does the inspector conduct shift tests on each device as per HB44?*	Yes No
4.7	Conducts other tests as required (e.g. discrimination, RFI/EMI, over capacity etc…) *Does the inspector conduct other tests as required per HB44 and jurisdiction policy?*	Yes No
4.8	Inspector looks for unusual situations or potentially fraudulent practices while conducting inspections. *Does the inspector look for unusual situations and potentially fraudulent practices?* *Can the inspector describe the kinds of things he/she is looking for, or examples found in past inspections?*	Yes No Yes No

5. Inspector Completes Inspection		
5.1	Inspector completes the required reports documenting the inspection. *Does the inspector complete the inspection report(s) following jurisdiction guidelines?*	Yes No
	Are compliant devices passed and non-compliant devices failed following jurisdiction guidelines?	Yes No
5.2	Inspector issues the appropriate directions and orders to the device user. *Does the inspector take appropriate enforcement action as per jurisdiction guidelines with respect to failing devices (issuing repair or condemnation orders, etc)?*	Yes No
	Does the inspector explain the test results to establishment manager and explain any orders issued?	Yes No
	Does the inspector answer questions about the inspection, as needed, following jurisdiction guidelines?	Yes No
5.3	Inspector reports unusual situations to superiors and/or conducts further investigations. *If a situation arises, does the inspector report to supervisors and/or conduct investigations to verify whether operations are in conformance?*	Yes No
	Can the inspector describe what form investigations may take and when each would be applied?	Yes No
	Does the inspector prepare narrative reports of such findings?	Yes No

Rater: _____ Date: _____

Rater should document and explain each deficiency on a separate page along with general comments.

NCWM Voluntary Program Assessment Work Group
Inspector Responsibilities Evaluation Checklist
Small Capacity (less than or = to 100 lb) Scale

Jurisdiction: _____ Inspector Name: _____

Inspector Responsibilities Comment Sheet

Requirement	Comment

Rater: _____ Date: _____

Jurisdiction Name
Street Address
City, State, Zip Code
Phone Number

Form No./Rev. Date

Date	**Small Capacity (less than or = 100 lb) Scales**	Test #

Name	Phone	Zone
Address	City, State, Zip	
Establishment Type	Inspection Type	

1	Mfr.		Model	S/N	Cap x Div	Visual Inspection Pass Fail
	Increas. Load 500 d	Error	Tolerance	Shift Test Load	Error	Tolerance
	Increas. Load Full Cap.	Error	Tolerance	Other Tests ` Pass ` Fail		**Overall Compliance** Pass Fail
2	Mfr.		Model	S/N	Cap x Div	Visual Inspection Pass Fail
	Increas. Load 500 d	Error	Tolerance	Shift Test Load	Error	Tolerance
	Increas. Load Full Cap.	Error	Tolerance	Other Tests ` Pass ` Fail		**Overall Compliance** Pass Fail
3	Mfr.		Model	S/N	Cap x Div	Visual Inspection Pass Fail
	Increas. Load 500 d	Error	Tolerance	Shift Test Load	Error	Tolerance
	Increas. Load Full Cap.	Error	Tolerance	Other Tests ` Pass ` Fail		**Overall Compliance** Pass Fail
4	Mfr.		Model	S/N	Cap x Div	Visual Inspection Pass Fail
	Increas. Load 500 d	Error	Tolerance	Shift Test Load	Error	Tolerance
	Increas. Load Full Capacity	Error	Tolerance	Other Tests ` Pass ` Fail		**Overall Compliance** Pass Fail
5	Mfr.		Model	S/N	Cap x Div	Visual Inspection Pass Fail
	Increas. Load 500 d	Error	Tolerance	Shift Test Load	Error	Tolerance
	Increas. Load Full Capacity	Error	Tolerance	Other Tests ` Pass ` Fail		**Overall Compliance** Pass Fail
6	Mfr.		Model	S/N	Cap x Div	Visual Inspection Pass Fail
	Increas. Load 500 d	Error	Tolerance	Shift Test Load	Error	Tolerance
	Increas. Load Full Capacity	Error	Tolerance	Other Tests ` Pass ` Fail		**Overall Compliance** Pass Fail
7	Mfr.		Model	S/N	Cap x Div	Visual Inspection Pass Fail
	Increas. Load 500 d	Error	Tolerance	Shift Test Load	Error	Tolerance
	Increas. Load Full Capacity	Error	Tolerance	Other Tests ` Pass ` Fail		**Overall Compliance** Pass Fail
8	Mfr.		Model	S/N	Cap x Div	Visual Inspection Pass Fail
	Increas. Load 500 d	Error	Tolerance	Shift Test Load	Error	Tolerance
	Increas. Load Full Capacity	Error	Tolerance	Other Tests ` Pass ` Fail		**Overall Compliance** Pass Fail

Remarks:

Acknowledged by	Inspected by

Appendix B

NCWM Voluntary Program Assessment Work Group
Administrative Responsibilities Evaluation Checklist
Vehicle Scales

Jurisdiction: _____ Director Name:_____

Numbered items in normal text are the requirements. The standard to assess compliance with the standard is written immediately after the requirement in *italic type* in the form of questions. For each requirement, circle "Yes" or "No," or "NA" if not applicable to answer the questions. The "NA" option may not be available for all questions. For each "No" circled, identify the requirement number and provide and explanation on a comment sheet. Also use the comment sheet to make other notes regarding your findings.

Items with an asterisk "*" after the number indicate non-critical program areas. A "No" or "NA" response for one of these items will not be considered a critical program deficiency.

1. Provide Legal and Financial Basis for Inspection Program *Are laws enacted or regulations promulgated pursuant to procedures of the jurisdiction in the following areas? Sections taken from, or based on, Handbook 130 for each item below may be used to document compliance. Jurisdictions may also have unique wording to meet special needs.*		
1.1	Law enacted specifying authority to inspect and test devices, authorizing access to premises, etc. *Do inspectors have legal power to enter commercial establishments and conduct inspections (See Handbook 130 Weights and Measures Law Section 12)?*	Yes No
1.2	Law enacted specifying power to promulgate regulations to give full effect to the law. *Does the Director (or agency head) have authority to promulgate regulations (See Handbook 130 Weights and Measures Law Section 12)?*	Yes No
1.3	Law enacted specifying enforcement tools. *Do inspectors have authority to issue condemnation and stop-use orders?* *Does the Director have authority to cite penalties, prosecute violators, and/or employ other enforcement tools (See Handbook 130 Weights and Measures Law Section 13)?*	Yes No Yes No
1.4*	Regulations in place setting frequency of inspection for devices. *Is a regulation or are procedures in effect setting frequency of inspection for commercial devices?*	Yes No NA
1.5	Regulations in place promulgating current version of Handbook 44. *Is a regulation in effect adopting the current version of NIST Handbook 44?*	Yes No
1.6	Regulations in place requiring NTEP Certificate of Conformance for devices used or sold for use in commerce. *Is a regulation in effect that requires that a device be traceable to a Certificate of Conformance or otherwise approved by the jurisdiction (See Handbook 130 National Type Evaluation Regulation)?*	Yes No
1.7*	Regulations in place to register service persons and define duties and responsibilities for service persons. *Is a regulation in effect authorizing the Director to register servicepersons?* *Does the regulation in effect define qualifications, duties and responsibilities of servicepersons (See Handbook 130 Voluntary Registrations of Servicepersons Regulation)?*	Yes NA Yes No NA (Use NA only if NA above)

2. Define Program Goals and Performance Standards *The jurisdiction may use a combination of documents (Law, Regulations, Quality Manual and/or other documents) to set goals and standards.*		
2.1	Management organizes the staff with defined areas of responsibility (both program areas and geographical territories or zones) and defined levels of supervision. *Is the jurisdiction organized as recorded on an organizational chart for inspection functions, including administration, support staff, and field inspection staff?*	Yes No
2.2*	Management maintains current job descriptions for each title/position. *Does the jurisdiction have written job descriptions describing duties and minimum qualifications for all positions?*	Yes No
2.3	Management defines program goals. *Are both general goals for the overall program as well as specific goals for individual projects defined in writing? Some goals will be defined in law and regulation, while most are administrative in nature.* *Can the Director identify examples and explain the process by which goals are set?*	Yes No Yes No
2.4*	Management maintains a performance evaluation program for all staff. *Are periodic performance evaluations conducted for each employee? Evaluations must include performance goals and standards, must identify training needs and must provide feedback to the employee?*	Yes No
2.5*	Management defines performance standards for registered serviceperson programs. *Are minimum performance standards established for registered servicepersons?* *Can management provide examples of how serviceperson performance is measured and describe how the program ensures that servicepersons are meeting their responsibilities? Management may use qualifying exams, follow-up inspections, etc.*	Yes NA Yes No NA (Use NA only if NA above)

3. Define Inspection and Test Procedures *The jurisdiction may use a combination of documents (Quality Manual, NCWM Publication 12 EPO's, and/or other manuals to define procedures.*		
3.1	Management defines minimum inspection procedures in writing for each inspection discipline. *Are written procedures in place to set minimum inspection criteria (refers to specifications, user requirements, labeling or markings, etc) to be applied for each device inspected (See Section 3.2 for testing)? Procedures may be in the form of NIST Handbooks, EPO's (NCWM Publication 12) or may be specific guidance documents.*	Yes No
3.2	Management defines minimum test procedures in writing for each inspection discipline. *Are written procedures in place to prescribe minimum tests (refers to examination of a device, package or practice for conformance with the tolerances and other applicable performance standards) to be applied to each device tested? Procedures may be in the form of NIST Handbooks, EPO's (NCWM Publication 12) or may be specific guidance documents.*	Yes No
3.3	Management defines procedures for use in complaint and/or undercover investigations. *Are written procedures in place to prescribe procedures and techniques for complaint and/or undercover investigations?*	Yes No

3.4	Management defines enforcement procedures. *Are written procedures in place for initiating enforcement actions?*	Yes No
	Do those procedures identify what actions are available and when they are to be used (stop-use and condemnation orders, warning letters, penalties, or prosecution)?	Yes No
	Do the procedures identify the forms used, the legal filing procedures, procedures for scheduling reinspections, etc?	Yes No
	Do the procedures include "Due Process" provisions?	Yes No

4. Provide Training for Each Inspector or Supervisor *Jurisdictions may use completion of the NTP courses as evidence of compliance in this area. For each item, can management provide documentation of training provided to each staff member?*		
4.1	Management provides training on law and regulations. *Was training provided?*	Yes No
4.2	Management provides training on organization and use of NIST Handbook 44. *Was training provided?*	Yes No
4.3	Management provides training on NTEP and use of Certificates of Conformance. *Was training provided?*	Yes No
4.4	Management provides training on safety. *Was training provided?*	Yes No
4.5	Management provides training on appropriate inspection and test procedures. *Was training provided?*	Yes No
4.6	Management provides training on use and care of standards. *Was training provided?*	Yes No
4.7	Management provides training on completion and processing of report forms. *Was training provided?*	Yes No
4.8	Management provides training on completion and processing of official orders. *Was training provided?*	Yes No
4.9	Management provides training on conduct of complaint and undercover investigations. *Was training provided?*	Yes No
4.10	Management keeps records of training provided to each inspector. *Are records of training maintained for each staff member, ranging from trainer logs, to attendance lists, to a database?*	Yes No
	Are records in a form that can be accessed to assist in identifying training needs?	Yes No

5. Provide Inspection Staff with Appropriate Reference Standards and Test Equipment *Is each inspector equipped with the necessary equipment and reference materials to conduct the inspections and tests specified for each inspection discipline?*		
5.1	Management provides current versions of Law and Regulations. *Are copies provided?*	Yes No
5.2	Management provides current version of Handbook 44. *Are copies provided?*	Yes No
5.3	Management provides current version of written procedures, Quality Manual, EPO's, program directives, etc. *Are copies provided?*	Yes No

5.4	Management provides inspectors with access to NTEP Certificates of Conformance. *Can each inspector get access to the information in the Certificate of Conformance for a device? Access may range from a copy of the certificate (NCWM Internet site) to contact with another person who has a copy.*	Yes No
5.5	Management provides necessary standards and test equipment. *Is the inspector provided with test equipment and standards certified by a NIST traceable laboratory which are appropriate for the task?* *Is the inspector issued other associated test equipment appropriate for the task (e.g., correction weights for error testing, etc.)?*	Yes No Yes No NA
5.6	Management provides necessary support equipment. *Is the inspector provided with additional support equipment to conduct proper tests, such as seals, seal press, calculator, and other hand tools, etc.)?*	Yes No
5.7	Management provides inspectors with current versions of inspection reports, worksheets, and other forms. *Is each inspector provided with current versions of inspection reports, worksheets, and other forms?*	Yes No

6. Provide a Safe Working Environment		
6.1	Jurisdiction has a written safety program or policy. *Does the jurisdiction have a policy, reflecting current federal and state laws, regarding worker safety? Documentation may be in the Quality Manual, or may be in other documents such as state worker safety rules or federal OSHA standards.*	Yes No
6.2	Management actively promotes safety in all activities. *Is "Safety first" thinking integrated in all management programs including training, supervision, performance evaluation, etc?* *Are safety issues presented in training for each inspection area?* *Are supervisors required to evaluate inspector implementation of safety policies?* *Does management include safe practices as standards in inspector performance evaluations?*	Yes No Yes No Yes No Yes No
6.3	Management issues personal protective equipment and other safety equipment to each inspector. *Has safety equipment been issued as necessary for each inspection discipline (See standards and equipment section for each device type)?*	Yes No NA

7. Provide Record Keeping Systems to Record and Evaluate Program Progress		
7.1	Management designs appropriate report forms to collect data to support the enforcement programs. (Check each box below as appropriate) *Does the form provide space to record the following general information?* ç *Form title, number and revision date.* ç *Agency name, address and phone number.* ç *Inspection number that uniquely identifies the inspection.* ç *Manufacturer, model and serial number of the device inspected.* ç *Inspection date.* ç *Name, address and phone number of establishment inspected.* ç *Remarks area for official comments and summary of inspection and test results.* ç *Signature of inspector* ç *Optional: Results of other tests (e.g., discrimination, RFI, motion, etc.).* ç *Optional: Signature of establishment representative.* ç *Optional: Type of inspection, routine, reinspection, investigation, etc.* ç *Optional: Zone or territory where establishment is located.* ç *Optional: Classification of the establishment.* *Does the form provide space to record the following specific information for each device inspected?* ç *Capacity and scale division size for the scale, e.g., 120 000 lb x 20 lb* ç *Tolerance applied: acceptance or maintenance* ç *Visual inspection. May beP/F or narrative* ç *Load(s) and error(s) for increasing load tests* ç *Load and error(s) for shift test* ç *Other tests performed* ç *Final compliance of the device. May be P/F or narrative*	Yes No NA Yes No NA
7.2	Supervisors review and/or verify inspection reports of subordinates. *Do supervisors review inspection reports and/or conduct follow-up inspections to evaluate inspector performance and identify potential problems?* *Is this responsibility written in the performance evaluation program of each supervisor?*	Yes No Yes No
7.3	Management collects inspection reports at a central location(s) for electronic data entry and/or filing. *Is an organized filing system in place to retain official records?* *Is the filing system documented and can authorized staff find and retrieve records as needed?*	Yes No Yes No
7.4*	Management has an established record retention program and archiving procedure. *Are record retention periods established for each type of record and are archiving procedures documented in writing?*	Yes No

8. Take Action on Violative Inspection Results		
8.1	Agency takes appropriate enforcement actions against violators. *Does management have records of enforcement actions taken?*	Yes No
	Can management provide examples of how enforcement procedures were used at all levels (i.e., from field inspector issuing stop-use orders to management citing penalties, rescinding licenses, or initiating prosecutions)?	Yes No

9. Program Review and Improvement		
9.1	Management evaluates program effectiveness at all levels. *Does management have a documented review program to evaluate program effectiveness on a continuous and/or annual basis?*	Yes No
	Can management provide examples of the process and provide examples of changes that have been made to the laws or regulations, program goals and standards, inspection/test procedures, training program, inspection/test equipment, safety program, record keeping, and/or enforcement procedures?	Yes No
9.2*	Management reaches out to consumers and industry to promote the program and encourage compliance at all levels. *Can management describe examples of outreach programs directed at regulated parties?*	Yes No NA
	Can management describe examples of outreach programs directed at servicepersons?	Yes No NA
	Can management describe examples of outreach programs directed at consumers?	Yes No NA

Rater: _____ Date: _____

See attached comment sheet.

NCWM Voluntary Program Assessment Work Group
Administrative Responsibilities Evaluation Checklist
Vehicle Scales

Jurisdiction: _____ Director Name: _____

Administrative Responsibilities Comment Sheet

Requirement	Comment

Rater: _____ Date: _____

NCWM Voluntary Program Assessment Work Group
Inspector Responsibilities Evaluation Checklist
Vehicle Scales

Jurisdiction:_____ Inspector Name:_____

Numbered items in normal text are the requirements. The standard to assess compliance with the standard is written immediately after the requirement in *italic type* in the form of questions. For each requirement, circle "Yes" or "No," or "NA" if not applicable to answer the questions. For each "No" circled, identify the requirement number and provide and explanation on a comment sheet. Also use the comment sheet to make other notes regarding your findings.

All items in this checklist indicate critical program areas. Any "No" response represents a critical program deficiency.

1. The Inspector is Trained. *Can each inspector cite references relating to the following areas and correctly answer questions (i.e. assessor may use review and exam questions from NTP courses) in each area?*		
1.1	The inspector has knowledge of program goals and objectives.	Yes No
1.2	The inspector has knowledge of the pertinent laws.	Yes No
1.3	The inspector has knowledge of the pertinent regulations.	Yes No
1.4	The inspector has knowledge of Handbook 44.	Yes No
1.5	The inspector has knowledge of NTEP and a Certificate of Conformance.	Yes No
1.6	The inspector has knowledge of the prescribed inspection and test procedures for the devices.	Yes No
1.7	The inspector has knowledge of safety issues and practices associated with the device tested.	Yes No
1.8	The inspector has knowledge of the proper use and care of the standards and equipment.	Yes No
1.9	The inspector has knowledge of the prescribed procedures for complaint and undercover investigations.	Yes No NA

2. The Inspector is Prepared to Perform Inspections. *Does the inspector have the following reference items at his/her disposal at the inspection site(s)?*		
2.1	The Inspector has appropriate credentials.	Yes No
2.2	The Inspector has copies of pertinent laws, regulations and reference books. *Does inspector have current copies of law, regulations, Handbook 44, etc?*	Yes No
2.3	The Inspector has NTEP Certificates or has access to them as needed. *Can the inspector get access to an NTEP Certificate when needed?*	Yes No
2.4	The Inspector has copies of testing procedures. *Does inspector have copies of procedures (NCWM Publication 12 and/or Jurisdiction Quality Manual)?*	Yes No
2.5	The Inspector has necessary report forms, worksheets, and official orders. *Does the inspector have copies?*	Yes No

3. The Inspector has Necessary Equipment to Perform Tests. *Does the inspector have the following test equipment and supplies at his/her disposal at the inspection site(s)?*		
3.1	Inspector has appropriate standards. *Are the test weights certified traceable to NIST and appropriate in capacity (HB 44, Table 4)?* *Are the test weights in good condition (i.e., clean and free of chips, etc.)?* *Does the inspector have other necessary?*	Yes No Yes No Yes No N/A
3.2	Inspector has support equipment *(i.e., truck used to transport test equipment, generators, hoists, etc.) that is in good working condition and adequate for the intended use.*	Yes No
3.3	Inspector has safety equipment. *Does the inspector have appropriate safety equipment (protective eyewear, footwear, gloves, hardhat, etc.)?*	Yes No

4. Inspector Conducts Inspections and Tests.		
4.1	Preliminary steps. *Does the inspector identify him/herself to establishment manager and explain purpose of inspection, routine, complaint, etc, (but not applicable for undercover investigations)?* *Does the inspector explain the manager's responsibilities (Scale to be maintained in proper operating condition, accessibility for testing, properly constructed approaches etc.)?*	Yes No Yes No
4.2	Inspector Pre-Test Determinations. *Does the inspector:* ⋕ *Check suitability?* ⋕ *Check that device has valid NTEP Certificate of Conformance?* ⋕ *Check that device is properly installed (pit depth, approaches etc)?* ⋕ *Check for correct markings, (Class, Capacity, division size etc.)?* ⋕ *Check security seals/audit trails?* ⋕ *Determine correct tolerance (maintenance, acceptance)?*	 Yes No Yes No Yes No Yes No Yes No Yes No
4.3	Performance Tests – *Can the inspector correctly perform:* ⋕ *Sensitivity or Discrimination Test?* ⋕ *RFI Test?* ⋕ *Increasing Load Test?* ⋕ *Decreasing Load Test?* ⋕ *Shift Test?* ⋕ *Apply the minimum test weights & test loads as per Table 4, scales code?* ⋕ *Other test(s) as required by the jurisdiction?* *Does the inspector repeat tests, as required, to verify results?*	 Yes No Yes No Yes No Yes No Yes No Yes No Yes No Yes No
4.4	Inspector looks for unusual situations or potentially fraudulent practices while conducting inspections. *Does the inspector look for unusual situations and potentially fraudulent practices?* *Can the inspector describe the kinds of things he/she is looking for, or examples found in past inspections)?*	Yes No Yes No
4.5	Inspector conducts complaint or undercover investigations. *Does the inspector conduct assigned investigations as per jurisdictional guidelines and file appropriate reports?*	Yes No NA

5. Inspector Completes Inspection		
5.1	Inspector completes the required reports documenting the inspection. *Does the inspector complete the inspection report(s) following jurisdiction guidelines?*	Yes No
	Are compliant devices passed and non-compliant devices failed following jurisdiction guidelines?	Yes No
5.2	Inspector issues the appropriate directions and orders to the device user. *Does the inspector take appropriate enforcement action as per jurisdiction guidelines with respect to failing devices (issuing repair or condemnation orders, etc)?*	Yes No
	Does the inspector explain the test results to establishment manager and explain any orders issued?	Yes No
	Does the inspector answer questions about the inspection, as needed, following jurisdiction guidelines?	Yes No
5.3	Inspector reports unusual situations to superiors and/or conducts further investigations. *If a situation arises, does the inspector report to supervisors and/or conduct investigations to verify whether operations are in conformance?*	Yes No
	Can the inspector describe what form investigations may take and when each would be applied?	Yes No
	Does the inspector prepare narrative reports of such findings?	Yes No

Rater: _____ Date: _____

Rater should document and explain each deficiency on a separate page along with general comments.

NCWM Voluntary Program Assessment Work Group
Inspector Responsibilities Evaluation Checklist
Vehicle Scales

Jurisdiction: _____ Inspector Name: _____

Inspector Responsibilities Comment Sheet

Requirement	Comment

Rater: _____ Date: _____

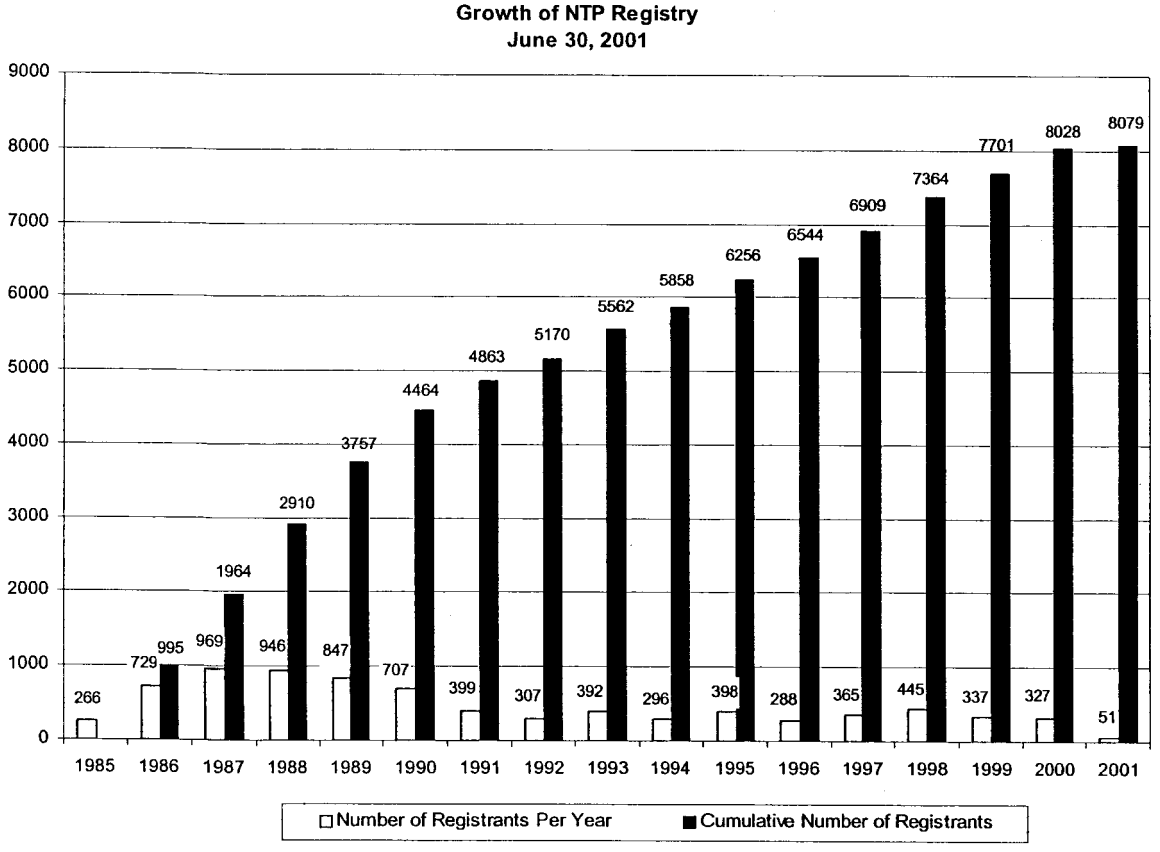
Appendix C
NTP Certification Summary
(As of June 30, 2001)

State	Total No. of Certif.	Total No. of People ***	NTP Course No.										
			Mod 1*	202 Mod 2	203 Mod 4	204 Mod 7	205 Mod 6	206 Mod 5	302 Mod 8	303 Mod 20	304 Mod 19	305 Mod 21	601 Mod 10
AL	43			14	12	5			12				
AK	23			7				1	10				5
AZ	29			28				1					
AR	129		20	19		9		10	41	16		2	12
CA	1							1					
CO	7					7							
CT	86			19	19			2	20	3	6	2	15
DE	5												5
DC	4								3		1		
FL	113		6	8	3	2		7	58	7	6		16
GA	29					4		8	17				
HI	104			11	12	11	11	11	12	12	12		12
IA	1					1							
ID	8								8				
IL	17			8				9					
IN	199	20		23		17		48	36	21			34
KS	29		7	7				5	1				9
LA	9					8							1
MD	70					6			27	33	4		
ME	3					2		1					
MA	1								1				
MI	48					12		9	6	14		7	
MN	15								15				
MO	48							4	25				19
MT	7					7							
NE	42			2		7		7	15				11
NV	13			1		1		1	9			1	
NH	32		6	5	5			2	6	8			
NM	38			9					14			15	
NC	39								20				19
ND	3								3				
OH	432	27		69	39	29		67	95	52		7	47
OR	56	1	16	15				5	11		1	1	6
PA	126			44	4	7		8	27	18			18
PR	91			33					33				25
SD	28				7			12	8				1
TN	41					6		6	29				
UT	83		16	17		6		6	15	10		2	11
VT	24		4		2	3		6	7		1		1
VI	11							6					5
VA	5					3						2	
WA	48	11		10					26			1	
WI	6	1						1				4	
Other													
GIPSA**	48					36	6	6					
Total	2194	60	75	349	103	189	17	250	610	194	31	44	272

* NTP Module 1 was incorporated in Module 2, now Course No. 202 (May 1994)

** USDA Grain Inspection/Packers and Stockyards Administration

*** Individuals Certified between 7/1/00 and 6/30/01. Because of implementation of new database, cumulative years cannot be verified.



These statistics reflect the current data in the NTP Access database.

NATIONAL TRAINING PROGRAM REGISTRY
SUMMARY OF ACTIVITY

(As of June 30, 2001)

Courses Listed in Registry:

Introductory: Level 100
101 Weights and Measures Regulation in the United States
102 Introduction to Handbook 44
103 Introduction to Electronic Weighing and Measuring Systems

Scales: Level 200
201 Introduction to Handbook 44 Scales Code (planned)
202 Retail Computing Scales
203 Medium-Capacity Scales
204 Livestock and Animal Scales
205 Meat Beams and Monorail Scales
206 Vehicle and Axle-Load Scales

Meters: Level 300
301 Introduction to Meters (planned)
302 Retail Motor-Fuel Dispensers and Consoles
303 Vehicle-Tank Meters
304 Loading-Rack Meters
305 Liquefied Petroleum Gas Liquid-Measuring Devices

Measures: Level 400

Other Devices: Level 500 (linear, taximeters, etc.)
502 National Type Evaluation Program (NTEP)

Commodities: Level 600
601 Checking the Net Contents of Packaged Goods
602 Commodity Regulations

Individuals Trained - by Course

	Course Number																
State	Module 1***	Course No. 101 Module 23	Course No.102 Module 24	Course No. 103 Module 27	Course No. 202 Module 2	Course No. 203 Module 4	Course No. 204 Module 7	Course No. 205 Module 6	Course No. 206 Module 5	Course No. 302 Module 8	Course No. 303 Module 20	Course No. 304 Module 19	Course No. 305 Module 21	Course No. 502 NTEP	Course No. 601 Module 10	Course No. 602 Module 22	Totals
AL			12	26	15	12	4		4	32							105
AK			6		7				1	16					12		42
AZ					51	1	30		1	23			25		17	1	149
AR	20		36		38		8		38	67	17		3		12		239
CA							1		1								2
CO							11			1					1		13
CT					31	20			2	28	6	12	2		18	26	145
DE						1	5				2				5		13
DC	4				4					3		1					12
FL	13		43	41	29	18	10		16	82	8	8			39		307

Individuals Trained - by Course

State	Course Number																Totals
	Module 1***	Course No. 101 Module 23	Course No.102 Module 24	Course No. 103 Module 27	Course No. 202 Module 2	Course No. 203 Module 4	Course No. 204 Module 7	Course No. 205 Module 6	Course No. 206 Module 5	Course No. 302 Module 8	Course No. 303 Module 20	Course No. 304 Module 19	Course No. 305 Module 21	Course No. 502 NTEP	Course No. 601 Module 10	Course No. 602 Module 22	
GA				7		11	4		9	47							78
HI				4	12	12	11	11	11	12	11	12			24	6	126
ID				8	9		11		46	21			12		11	10	128
IL					8	1	2	6	9	23			1		2	1	53
IN			48	48	74	46	20		66	104	44		2		37	27	516
IA					10		5	9	17	4					9	2	56
KS	9		3	8	10	14	6		6	18	2				32		108
KY	8				8	1			5	19					16		57
LA							8								1		9
ME				4		3	2		14	14			6				43
MD			6		29		6			28	33	4				4	110
MA				12	23	4			7	41	31	2	4		3	1	128
MI			94	53	50		21	2	39	8	22		23		29		341
MN							2			12		2	3			1	20
MS						2	3		3	2							10
MO		3	63	22		13	2		8	44					27		182
MT						5	8		11	6		1	1				32
NE		17	20	27	33	4	7	14	31	35			2	15	18		223
NV			11	8	1		1		1	12			1			15	50
NH	6			6	5	7			3	7	8		2				44
NJ				172	21	21				108	109						431
NM					20		13			32			24		25		114
NY					72								7		90		169
NC							2			18					19	16	57
ND				12				2		3		3	3				23
OH		63	89	129	145	99	45	4	115	178	64	11	10		83	12	1047
OK			17	2		2			4	5					22		52
OR	18		23	16	17		12		8	25	13	1	29		23	19	204
PA	34		27	82	163	51	8		14	152	25		1		58	19	634

Individuals Trained - by Course

State	Course Number																Totals
	Module 1***	Course No. 101 Module 23	Course No.102 Module 24	Course No. 103 Module 27	Course No. 202 Module 2	Course No. 203 Module 4	Course No. 204 Module 7	Course No. 205 Module 6	Course No. 206 Module 5	Course No. 302 Module 8	Course No. 303 Module 20	Course No. 304 Module 19	Course No. 305 Module 21	Course No. 502 NTEP	Course No. 601 Module 10	Course No. 602 Module 22	
PR			38	20	32					33					24		147
RI					1				1		1						3
SC					25		2			28							55
SD				10		7	10		12	8			1		10	10	68
TN				5	27		6		6	32							76
TX			5		25		8		12	24			4				78
UT	17	7	18	17	22	14	17		12	19	10		2		20		175
VT	6			5		3	3		9	11		1			1	2	41
VI		5							6	6			2		6		23
VA		39	10	43		24	5		16	26	25		4		38		230
WA	13		12	16	13		18		18	32			3		10	14	149
WV							3										3
WI	56		25	65	61		31		42	40	26		15		43		404
WY			11	3		11				20			19				64
Other																	
Asso-ciate Members			3				1		1	6		8	14		10		43
FGIS*				13													13
GIPSA**				3			36	11	5								55
Total Trained	204	134	620	887	1091	407	408	59	630	1515	457	66	225	15	795	186	7699
% of Total Certified[1]	37%	N/A	N/A	N/A	32%	25%	46%	29%	40%	40%	42%	47%	20%	N/A	34%	NA	37%

* USDA Federal Grain Inspection Service

** USDA Grain Inspection/Packers and Stockyards Administration

***Module 1 was incorporated in Course 202 in 1994.

SUMMARY OF NIST METROLOGY SEMINAR ACTIVITY

(As of June 30, 2001)

Courses Listed in the NTP Registry:

No. 201, Basic Metrology I
No. 202, Basic Metrology II
No. 203, Intermediate Metrology
No. 204, Advanced Metrology

Individuals Trained by Course					
	Course No.				
State	201	202	203	204	Totals
AL		1			2
AK	1	2	2		5
AZ	3	3	3	1	10
AR			1		1
CA	4	3	4	1	12
CO	2	2	1		5
CT			2		2
DE	1	1	2	1	5
FL	4	4		1	9
GA	3	3	2		8
HI	2	2			4
ID	1	1	1		3
IL	5	4	3		12
IN	1	1	2		4
IA	1	1	1		3
KS	2	2	2	1	7
KY	2	2			4
ME	5	5	1		11
MD	8	8	8		24
MA	1	1			2
MI	1	1	3		5
MN	2		4	1	7
MS	3	3	3		9
MO	3	3	1		7
NE			3		3
NV	2	2			4
NH	1	1	1		3
NJ	1	1	1		3
NM	1	1	1		3
NY	4	2	2	1	9

Individuals Trained by Course					
	Course No.				
State	201	202	203	204	Totals
NC	12	7	6	2	27
ND	2	2	2		6
OH	2	2	1		5
OK	1		2	2	5
OR	1	1		1	3
PA	1	1	2		4
PR	3	3	5		11
RI	1	3			4
SC	2	2	1		5
SD	1	1			2
TN	3	3	1		7
TX	3	3	3		9
UT		1			1
VT			1		1
VA	4	4	3		11
WA	1	1	2	1	5
WV	3	3	2		8
WI			2		2
Other	27		12		39
Canada			2		2
Associate Members	99	18	37	41	195
GIPSA	8	1			9
Totals	**238**	**116**	**139**	**54**	**547**

Appendix D

Associate Membership Committee Training Funds 2000 - 2001

	Requesting Jurisdiction	Purpose	Total $ Value
1	Central Weights & Measures Association (CWMA)		$ 275
2	Colorado	Belt Conveyor School for 6 persons	$ 500
3	Illinois	Training Session for 10 State inspectors & Host Regional Training	$ 650
4	Indiana	H-44 Training Seminar for 73 inspectors	$ 800
5	Louisiana	Price Verification Training for 44 inspectors	$ 800
6	Maryland		$ 225
7	Massachusetts	Materials and expenses for training over 230 local W&M officials	$ 800
8	Michigan	Package Checking Training for approximately 20 officials	$ 650
9	Montana	Belt Conveyor Scales training for 2 persons to attend in Wyoming	$ 600
10	New York	Training materials	$ 500
11	North Carolina	Publishing expenses for SWMA W&M Newsletter	$ 500
12	Ohio	Training materials	$ 400
13	Pennsylvania	Training classes for 47 county programs and 75 sealers	$ 650
14	South Dakota	LP & Safety Training	$ 400
15	Texas	Large Capacity Scales training for 10 inspectors	$ 650
16	Utah	Belt Conveyor Scales Training	$ 400
17	Virginia	Annual Training School	$ 650
18	Washington & City of Seattle	Medium Capacity Scales & Retail Motor-Fuel Dispensers Training	$ 1,050
	Total		$ **10,500**

Appendix E

NCWM Certified Trainers List

The following individuals have been certified under the NCWM's Trainer Certification Program as being qualified to teach the training modules published by the NCWM and have volunteered to make their services available to weights and measures jurisdictions:

Name and Address of Trainer	Telephone & FAX No.	Courses
Darryl L. Brown Chief Weights and Measures IA Dept of Agriculture H A Wallace Building Des Moines, IA 50319	T: 515-281-5716 F: 515-281-6800 Darryl.Brown@idals.state.ia.us	601 – Package Checking
Carlos J. D'Arcy Supervisor Weights & Measures FL Dept of Agr & Cons Services 12950 SW 187 Terrace Miami, FL 33177-3026	T: 305-238-2147 F: 850-922-6064	202 - Retail Computing Scales 601 - Package Checking 206 - Vehicle & Axle-Load Scales 203 - Medium-Capacity Scales
Kathryn M. Dresser 305 E. Lakeview Avenue Madison, WI 53716	T: 608-224-0940 F: 608-224-0940 myrina@juno.com	202 - Retail Computing Scales 204 - Livestock & Animal Scales 206 - Vehicle & Axle-Load Scales 302 - Retail Motor-Fuel Dispensers 305 - LPG Liquid-Measuring Devices 601 - Package Checking 605 - Price Verification
Frank W. Forrest Inspector Weights & Measures CT Dept of Consumer Protection 165 Capitol Avenue Rm G-17 Hartford, CT 06106	T: 860-566-4778 F: 860-566-7630 weights@hotmail.com	302 - Retail Motor-Fuel Dispensers 304 - Loading-Rack Meters
Paul Peterson Retired Chief USDA Packers & Stockyards Admin 303 South Horners Lane Rockville, MD 20850	T: 301-251-1170 petenan@earthlink	103 - Intro to Electronic W&M Systems 202 - Retail Computing Scales 203 – Medium Capacity Scales 204 - Livestock & Animal Scales 205 - Meat Beams & Monorail Scales 206 – Vehicle & Axle-Load Scales 207 – Automatic Weighing Systems

Name & Address of Trainer	Telephone & Fax No.	Modules Taught
Richard Philmon Program Coordinator Illinois Department of Agriculture Bureau of Weights & Measures 801 E Sangamon PO Box 19281 Springfield, IL 62794-9281	T: 217-782-3817 F: 217-524-7801 rphilmon@agr.state.il.us	202 - Retail Computing Scales 206 - Vehicle and Axle-Load Scales 302 - Retail Motor-Fuel Dispensers
Byron C. School USDA/GIPSA/FMD/PPB Railroad Track Scale Testing Program STOP 3632 Room 1653, South Bldg 1400 Independence Ave., SW Washington, DC 20250-3632	T: 202-720-0280 F: 202-690-3207 bschool@gipsadc.usda.gov	204 – Livestock & Animal Scales 205 – Meat Beams & Monorail Scales
Thomas M. Stabler Stabler Training Services, Inc. P.O. Box 105 Ostrander, OH 43061	T: 740-666-0603 F: 740-666-0603	102 - Intro to NIST Handbook 44 202 - Retail Computing Scales 203 - Medium-Capacity Scales 206 - Vehicle & Axle-Load Scales 302 - Retail Motor-Fuel Dispensers 303 - Vehicle-Tank Meters 304 - Loading-Rack Meters 601 - Package Checking
Richard C. Suiter Weight & Measures Coordinator NIST 100 Bureau Drive, STOP 2350 Gaithersburg, MD 20899-2350	T: 301-975-4406 F: 301-926-0647	103 - Intro to Electronic W&M Systems 202 - Retail Computing Scales 204 - Livestock & Animal Scales 205 - Meat Beams & Monorail Scales 207 - Automatic Weighing Systems 302 - Retail Motor-Fuel Dispensers 501 - National Type Approval Program 601 - Package Checking
José A. Torres Metrologist Puerto Rico Consumer Affairs P.O. Box 41059 San Juan, PR 00940-5153	T: 787-724-5151 F: 787-726-6570 jatorres@nist.gov	102 – Intro to NIST Handbook 44 103 - Intro to Electronic W&M Systems 202 - Retail Computing Scales 302 - Retail Motor-Fuel Dispenser 601 - Package Checking Metrology: Basic, Intermediate & Advanced
James A. Vanderwielen USDA, GIPSA, Packers & Stockyards Admin 210 Walnut Street, Room 317 Des Moines, IA 503094	T: 515-323-2584 F: 515-323-2590	204 - Livestock & Animal Scales 206 – Meat Beams & Monorail Scales

Name & Address of Trainer	Telephone & Fax No.	Modules Taught
Kenneth A. Wheeler Training Officer W&M OH Dept of Agriculture 8995 E Main St, Bldg 5 Reynoldsburg, OH 43068-3399	T: 614-728-6290 F: 614-728-6424 kwheeler@odant.agri.state.oh.us	101 – W&M Regulations in the US 102 – Intro to NIST Handbook 44 103 - Intro to Electronic W&M Systems 202 - Retail Computing Scales 203 - Medium-Capacity Scales 204 - Livestock & Animal Scales 205 - Meat Beams & Monorail Scales 206 - Vehicle & Axle-Load Scales 302 - Retail Motor-Fuel Dispensers 303 - Vehicle-Tank Meters 305 - LPG Liquid-Measuring Devices 601 - Package Checking 602 - Commodity Regulations

Appendix F

COUNTY OF SUFFOLK

ROBERT J. GAFFNEY
SUFFOLK COUNTY EXECUTIVE

CHARLES A. GARDNER, DIRECTOR

OFFICE OF CONSUMER AFFAIRS
BUREAU OF WEIGHTS & MEASURES

December 14, 2000

To: Members of the Administration & Public Affairs Committee

From: C. A Gardner, Safety Liaison

As Safety Liaison for the Conference, I bring to the attention of the Committee a device that has, in my opinion, proved to be an excellent tool for the weights and measures field inspector as well as gasoline pump service persons.

The acts of lifting and carrying 5-gallon test measures have long been a necessary part of the daily routine for many officials and service persons charged with testing, inspecting, installing and repairing gasoline dispensers. These acts have also been a safety concern for many of us. There are concerns about back strain; shoulder, arm and elbow stress; and spillage of product, just to mention a few.

Recently, in my jurisdiction and others that I am aware of, inspectors have started to use aluminum pull carts that are configured to hold two 5-gallon test measures. These carts are relatively inexpensive, have wide, soft tires and are lightweight. They fold up easily and quickly and can be stored in the back of most types of vehicles. The carts, even when the two test measures are full of product, are easily maneuverable. By using two caps inserted in the tops of the test measures, spillage is virtually eliminated. (It sure beats having to perfect the "raised right shoulder, lean-to-the-left" posture needed to carry the measures by hand!)

Locations such as marinas or stations that have remote fills which require a great deal of walking are especially well suited for these devices. I might point out that, even if a jurisdiction has mobile, truck-mounted test measures, these cannot be used in all places or even in all types of inspections. For instance, if you are returning to a station after a repair order, you might need to test only a minimum number of pumps, one or two perhaps. These carts are much more practicable in those cases than using truck-mounted test measures.

The response from those inspectors who have been using these carts has been overwhelmingly positive. They enjoy the benefits mentioned above and also feel that the use of these carts gives a more "professional" appearance to the job. Also, the cost of these carts is such that they should easily fit within the constraints of almost any budget.

Since one of the main responsibilities of the Safety Liaison is to serve as an information resource for members of the Conference, I strongly recommend that the Committee publicize information related to these carts, emphasizing the safety aspects of their use.

P.O. BOX 6100, HAUPPAUGE, NY 11788-0099 (631) 853-4620 FAX (631) 853-4578

Final Report of the National Type Evaluation Program (NTEP) Committee

G. Weston Diggs, Chairman
Supervisor
VA Products and Industry Standards

Reference
Key Number

500 Introduction

The NTEP Committee submits its Report for the 86th National Conference on Weights and Measures (NCWM). This consists of the Interim Report presented in NCWM Publication as amended in the Addendum Sheets issued during the Annual Meeting which was held July 22-26, 2001 in Washington, DC. The Committee considered communications received prior to and during the 86th Annual Meeting which are noted in this report.

Table A identifies all of the items contained in the report by Reference Key Number, Item Title, and Page Number. The item numbers are those assigned in the Committee's Interim Meeting Report. Voting items are indicated with a "V" or, if the item was part of the consent calendar, by the suffix "VC" after the item numbers. Items marked with an "I" after the reference key number are information items. An item marked with a "W" means that item has been withdrawn. Items marked with a "W" generally will be referred to the regional weights and measures associations or other groups because they either need additional development, analysis, and input, or they do not have sufficient Committee support to bring them before the NCWM. Table B lists the appendices to the report, and Table C provides a summary of the results of the voting on the Committee's items and the report in entirety.

The attached report may contain recommendations to revise or amend NCWM Publication 14, Administrative Procedures, Technical Policy, Checklists, and Test Procedures or other documents. Revisions proposed by Committee members are shown in **bold face print** by ~~crossing out~~ information to be deleted and underlining information to be added. New items proposed for addition to NCWM Publication 14 or other documents are designated as such and shown in **bold face print.**

Table A – Agenda Items

Table B
Appendices

Table C
Voting Results

Reference Key Number	House of State Representatives		House of Delegates		Results
	Yeas	Nays	Yeas	Nays	
500 (Report in Its Entirety) Voice Vote	All Yeas	No Nays	All Yeas	No Nays	Passed

Details of All Items
(In Order by Reference Key Number)

501-1 I OIML Certificate Project

Source: Carryover Item 501-2

Background/Discussion: This item is included on the Committee's agenda to provide an update on NTEP's work to issue OIML R 60 and R 76 Certificates of Conformity. Dr. Charles Ehrlich, NIST Technical Standards Activities Program reported that NIST has informed the International Bureau of Legal Metrology (BIML) that the NCWM NTEP program is now the issuing authority for OIML recommendations R 60, Load Cells and R 76, Non-Automatic Weighing Instruments. At the 2001 Interim and Annual Meetings, Steve Patoray, NTEP Director, updated the Committee on activities since November 2000. The status of these activities is outlined below.

OIML R 60, Load Cells: Since announcing R 60 test capability in April 1997, NTEP has received three applications for R 60 testing. The first OIML Certificate was issued to Mettler-Toledo, Inc. in early 1999, and the second to Revere Transducers, Inc. shortly thereafter. Following additional testing, a third R 60 Certificate was issued to expand the capacities listed on the original Revere Certificate. Since October 2000, NTEP has received one additional application for R 60.

OIML R 76, Non-Automatic Weighing Instruments: NTEP announced R 76 test capability in July 1998. Shortly prior to the 1999 Interim Meeting, NTEP received its first application for an R 76 test; a second application was received shortly thereafter. The first R 76 OIML Certificate was issued to Hobart Corporation in early 2000. Since October 2000, NTEP has received one additional application for R 76. This application, which was for a separate component of a weighing device, was subsequently withdrawn since the separate testing of components under R 76 is not presently recognized by OIML.

The two NTEP laboratories with R 76 testing capability have reviewed several trial software packages for recording and processing R 76 test reports; however, they are not satisfied with any of the packages. The decision to purchase software for the two NTEP R 76 laboratories will be reconsidered if and when the laboratories find a package that meets their needs.

During its review of this item at the 2001 Interim Meeting, the Committee also discussed information submitted from the Scale Manufacturers Association (SMA) concerning acceptance of a Mettler-Toledo NTEP-issued OIML R 60 Certificate by other countries. Darrell Flocken, Mettler-Toledo, made some corrections to the information he originally submitted to SMA describing Mettler's experiences in these countries; a revised version of this information appears in Appendix A.

At the 2001 Annual Meeting, the Committee discussed possible ways in which to increase the acceptance of NTEP-issued OIML Certificates by other countries. Among the approaches being considered by the Committee is the establishment of mutual acceptance agreements with other countries as described in Item 501-2.

501-2 I Test Data Exchange Arrangements

Source: Carryover Item 501-3

Background/Discussion: In April 1998, representatives of the NCWM, NIST-Technical Standards Activities Program (TSAP), NIST-Office of Weights and Measures (OWM), and other OIML countries met to discuss the development of arrangements for mutually accepting type evaluation test data among participating OIML countries. Under such an arrangement, manufacturers would be able to submit their equipment to any of the participating countries for testing to OIML recommended requirements. The resulting test data would be accepted by other participants as a basis for issuing their own countries' type approval certificates.

An OIML working group established to develop the framework for an arrangement has met a number of times since that initial April 1998 meeting and has developed seven successive drafts of a "Mutual Acceptance Arrangement (MAA)." In October 2000, the draft MAA was discussed at a roundtable discussion in conjunction with the Quadrennial International Conference on Legal Metrology. U.S. participants at that meeting included Jim Williamson, U.S. State Department; Ross Andersen, NY, representing NCWM; Richard Kayser, NIST Technology Services; Charles Ehrlich, NIST TSAP; Sam Chappell, Consultant, NIST TSAP; and Tina Butcher, NIST OWM. It was hoped that the framework of the arrangement would receive the support of OIML member states in attendance. However, there was a range of comments concerning the method(s) that should be used to establish mutual confidence in participants' laboratories. Some participants, including the United States, favored self-assessment and peer review, while others favored formal laboratory accreditation by a recognized accrediting body. As Secretariat for the Work Group, the United States requested that comments on the framework, particularly those related to laboratory recognition, be submitted in writing to the Secretariat.

The NTEP Committee heard comments at the 2001 Interim Meeting from Ross Andersen, NY, and Tina Butcher, NIST OWM, concerning the October 2000 roundtable discussion of this issue. Mr. Andersen provided a report to the Board in conjunction with BOD Item 101-8. Mr. Andersen and Mrs. Butcher reiterated that an area of concern on the part of some participants at that discussion was whether or not formal laboratory accreditation will be required for participants in the arrangement. Mr. Andersen noted that if NTEP is going to participate in mutual agreement activities in the future and have its test data accepted, its laboratories need to stay on top of the laboratory accreditation requirements and continue to work toward meeting them.

Dr. Charles Ehrlich and Dr. Sam Chappell have provided the NTEP Committee with regular updates on activities in this area. At the 2001 Interim Meeting, the NCWM Board of Directors (BOD) heard a report on the activities of the OIML Mutual Acceptance Arrangement Working Group from Dr. Ehrlich. Dr. Ehrlich again updated the Committee at the 2001 Annual Meeting noting that an 8th draft of the MAA has been prepared based upon comments received by interested parties. The NTEP Committee continues to closely follow the development of the draft and encourages interested parties to provide comments to the Secretariat.

At the 2001 Annual Meeting, the NTEP Committee also reported that Germany's Physickalisch-Technische Bundesanstalt (PTB) had approached NCWM with a proposal to establish a bilateral agreement between NTEP and PTB in the area of load cells and non-automatic weighing equipment. Dr. Manfreid Kochsiek met with the NCWM BOD and NTEP Committee following the BOD's agenda review session during the 2001 Annual Meeting, during which time the Committee briefly discussed possible approaches for establishing an agreement. The Committee agreed that additional work is needed to prepare a memorandum that would indicate the limits of the agreement. Work is also needed to identify the differences between the OIML requirements and the Handbook 44 requirements for these device types. During discussions with Dr. Kochsiek, the NCWM also raised the question of whether or not PTB might provide training to the NTEP labs on the OIML requirements. The Committee reported that this work is still in the very early stages of development and that no decisions have been reached by the BOD or PTB. The NCWM has asked Dr. Charles Ehrlich, NIST-TSAP to continue his role as liaison between PTB and NCWM for these activities.

501-3 I Adoption of Uniform Regulation for National Type Evaluation by States

Source: Carryover Item 501-4

Background/Discussion: At the 2001 NCWM Interim and Annual Meetings Daryl Tonini, Scale Manufacturers Association (SMA), updated the NTEP Committee on the status of SMA's drive to assist States to adopt the Uniform Regulation for National Type Evaluation (URNTE) and the Uniform Regulation for the Voluntary Registration of Servicepersons and Service Agencies (VRR). Mr. Tonini reported that New Mexico and Texas continue to express their intentions to adopt. He also reported that Vermont is now interested in pursuing adoption of NTEP. NTEP Committee members Lou Straub and Ross Andersen recently visited Vermont along with Charles Carroll, MA, and Dave Quinn, Fairbanks Scales/SMA to discuss ways in which the NCWM and industry might help to facilitate Vermont's adoption of the URNTE. Mr. Tonini provided the Committee with copies of an updated map showing the adoption of NTEP by State Weights and Measures jurisdictions. A copy of this map is included in Appendix B. No changes in adoption status have been made since June 2000; consequently the map bears a date of June 2000.

Mr. Tonini also reported on the NTEP State Directors' breakfasts which have been sponsored by SMA since 1997. These breakfasts were designed to enable jurisdictions to share information about adopting NTEP in their respective jurisdictions. They help to encourage non-NTEP jurisdictions to adopt the regulation and allow current NTEP jurisdictions to share ideas on how to make enforcement more effective and uniform among the States. The breakfasts also provide NTEP management with information relative to areas in which the operation and implementation of the program can be improved. Mr. Tonini reported that the breakfasts continue to be successful and well received and noted that the results of all NTEP breakfasts from 1997 to 2000 are posted on SMA's web site at http://www.scalemanufacturers.org.

At the 2001 Interim Meeting, the NTEP Committee asked SMA to provide training on NTEP implementation during the four regional weights and measures associations. At the 2001 Annual Meeting, Mr. Tonini reported holding sessions at the Spring 2001 meetings of the Central Weights and Measures Association and the Northeastern Weights and Measures Association. During these sessions, participants discussed NTEP's purpose in device regulation and some of the problems that NTEP is trying to resolve. Mr. Tonini noted that the sessions were well received by participants and generated some good discussion.

Mr. Tonini also provided some general comments from SMA concerning the implementation of NTEP in the U.S. Areas cited as positive factors include: the success of NIST NTEP Instructor Training sessions; the increase in the number of states with NTEP laboratories; increased work at the regional associations to improve uniformity of NTEP implementation; and the use of technology to make Certificates of Conformance more readily available to the weights and measures community. Areas of concern include the attrition of experienced evaluators among the various NTEP labs and evidence of continued non-uniformity at the field level.

The Committee expressed its appreciation for SMA's continued efforts to encourage the adoption and uniform implementation of NTEP.

501-4 I NTEP Policy: Challenges to a Certificate of Conformance and Verification that Production Meets Type

Source: Carryover Item 501-5

Background/Discussion: In 1998, the NTEP Business Plan Work Group drafted procedures to: 1) address the issue of assuring that weighing and measuring devices produced for the marketplace are the same as the model or type of the device that was approved by NTEP; and 2) resolve challenges to NTEP Certificates of Conformance. The procedures were intended to ultimately become part of National Conference on Weights and Measures (NCWM) Publication 14, NTEP Administrative Procedures, Technical Policy, Checklists, and Test Procedures. Since 1998, the Work Group published several revised drafts of the procedures based on comments received from interested parties and provided a comprehensive report to the NTEP Committee in July 1999.

At the 2000 Interim Meeting, the NTEP Committee reported that NCWM, Inc., hired a consultant, Mr. Pete Perino, to provide technical guidance in resolving challenges and in assisting the Committee to develop a framework for adding a conformity assessment component to NTEP. Mr. Perino briefly described the work done by the Committee and the approaches the Committee considered. Mr. Perino noted that the Committee would continue to refine the proposed procedures and welcomes comments on the proposed approach. The Committee also explained that these procedures were developed as part of efforts to expeditiously resolve challenges involving a specific device type, namely, a load cell. The Committee emphasized that this work was in no way intended to supplant the Business Plan Work Group's activities; rather, the Committee presented its proposed approach as an alternative for the Work Group to consider along with other possible approaches.

The Committee heard comments from Dave Quinn, Chairman of the SMA Business Practices Work Group, who described work being done by this SMA work group on this issue. The Committee received comments from a number of industry members expressing support for the work done by the NTEP Business Plan Work Group and the NTEP Committee regarding the general issue of conformity assessment. Other industry members expressed concern that the proposed approach for addressing conformity assessment by examining the manufacturer's production processes might not be adequate to address the challenges before the NTEP Committee at the time. The Committee also heard a suggestion that the Committee and the NTEP Business Plan Work Group re-examine the existing criteria in the Administrative Policy section of Publication 14 to determine if the criteria might be slightly modified to form the basis of the conformity assessment criteria.

At the 2000 NCWM Annual Meeting, NTEP Committee Chairman Aves Thompson reported that the NTEP Committee had successfully resolved two challenges since the 2000 Interim Meeting. During discussion of this item at the 2000 Annual Meeting, the Committee discussed the need to refine the process for lodging appeals and challenges with NTEP. Based on the recommendations of the NTEP Business Plan Work Group, the Committee will be reviewing the current process outlined in Appendix B, Section O, "Appeals Process," of the 1990 NCWM Executive Committee report and proposing revisions as appropriate.

Note: See 1998-2000 final NTEP Committee reports for additional details and proposals considered on this issue.

At the 2001 Interim Meeting, the NTEP Committee reported that the BOD continues its work on the development of a conformity assessment program and indicated that NTEP Director, Steve Patoray, will manage this program as part of NTEP. Ross Andersen, Director, NY, Chairman of the NTEP Business Plan Work Group, noted that the Work Group's activities have been put on hold during the process of the transition of management of NTEP to NCWM. The BOD, as part of its work in addressing revisions to the administrative structure of NTEP, has taken over much of the Work Group's activities during the past year. During its development of the 2001 Draft NTEP Administrative Policies and Procedures, the BOD discussed restructuring the Work Group to be more of an advisory group that would meet when needed to provide an outside perspective to the Board on selected issues related to the administration of NTEP and to provide general feedback on NTEP operation. The BOD anticipated that the issue of conformity assessment would move out of the responsibilities of the Work Group and under the direction of NTEP Director, Steve Patoray. The BOD anticipated that the Advisory Committee would include representation from industry as well as weights and measures officials. The BOD plans to address the specific composition and charges of the NTEP Advisory Committee and expects that the Committee will conduct most of its business through mail and electronic correspondence.

Also at the 2001 Interim Meeting, the Committee heard comments from Daryl Tonini, SMA, who reported that SMA continues to work on its own conformity assessment program. Mr. Tonini reported that three companies have volunteered

to serve as beta test sites for this work, Mettler-Toledo in Ohio, A&D Engineering in Japan (to demonstrate offshore operation of the program), and WeighTronix in Minnesota.

At the 2001 Annual Meeting, the Committee reported that the revised NCWM Publication 14 Administrative Policy and Procedures now provide the framework for conformity assessment. Additional work on conformity assessment will build on this framework. The Committee also noted that NTEP conformity assessment is based on evaluating the manufacturer's quality system and on statistical sampling. The Committee also received copies of a document describing SMA's Conformity Assessment Program. NTEP Director Steve Patoray reported that the SMA provided him with the opportunity to observe a beta site audit for their conformity assessment program.

501-5 I NTEP Participating Laboratories and Evaluations Reports

Source: Carryover Item 501-6

Background/Discussion: On October 1, 2000, NIST-OWM discontinued its management of NTEP. At that time, the NCWM assumed responsibility for management of the program. Included in Appendix C is a report of NTEP Laboratory Activities up to October 1, which was prepared by Lynn Sebring, NIST-OWM.

The NTEP Weighing Laboratories met following the September 2000 Weighing Sector Meeting in Columbus, OH. The NTEP Measuring Laboratories met prior to the October 2000 Measuring Sector in Austin, TX. A joint laboratory meeting, including representatives from Measurement Canada was held in June 2001 in Annapolis, MD.

At the 2001 Interim and Annual Meetings, NTEP Director, Steve Patoray provided the following update to the Committee on NTEP laboratory and administrative activities since October 1, 2000.

NTEP Application Statistics 9/1/2001 – 6/26/01:

Applications processed:	162
Applications completed:	57
New Certificates issued:	142
Certificates distributed to State Directors:	105

Lab Assignments:

California	24	North Carolina	4	Kansas	1
Montana	0	NIST FG	3	Nebraska	5
New York	12	Maryland	18	Ohio	41
GIPSA-DC	2	GIPSA-KC	5	Oregon	2
Alabama	0				

NTEP Director 40

The Committee has asked that future reports include information on the percentage of devices which fail initial type evaluation testing.

501-6 I NTETC Sectors Reports

Source: Carryover Item 501-7

Background/Discussion: At the 2001 Interim Meeting, Tina Butcher, NIST-OWM updated the Committee on the activities of the National Type Evaluation Technical Committee Sectors since the July 2000 NCWM Annual Meeting. During her review, Mrs. Butcher reported that Steven Cook, formerly with the California Division of Measurement Standards, joined OWM's Device Technology Group in November 2000. Steve has assumed the role of technical advisor for the NTETC Belt-Conveyor Scale and Weighing Sectors. Richard Suiter continues to serve as technical advisor to the Measuring Sector and has also assumed new duties as technical advisor to the NCWM Specifications and Tolerances Committee along with Juana Williams. Diane Lee continues to serve as technical advisor to the Grain Moisture Meters and NIR-Protein Analyzer Sectors. NTEP Director Steve Patoray further updated the Committee on Sector activities at the 2001 Annual Meeting. A summary of Sector activities is outlined below.

At the 2001 Interim Meeting, NTEP Committee Chairman, Wes Diggs noted that as a related issue, the Board of Directors was reviewing a number of administrative policies related to the operation of the Sectors as part of its review of the NTEP Administrative Policies and Procedures. Among the proposed changes being considered were revisions to Sector membership criteria and registration fees for non-Sector member participants. Also under discussion by the BOD was the question of how the Sectors should be organized with respect to the technical issues under their purview. For example, the Belt-Conveyor Sector might be considered a sub-Sector of the Weighing Sector. Copies of the January 2001 draft NTEP Administrative Policies and Procedures were made available upon request from the NCWM and through the NCWM's web site at http://www.ncwm.net. The BOD encouraged comments on the draft from interested parties.

At the 2001 Annual Meeting, Mr. Diggs reported that the NCWM Board of Directors has completed revisions to the NTEP Administrative Policy and Procedures. Among the revisions to the Administrative Policy and Procedures are revisions to Sector membership and operation. Mr. Diggs also reported that the practice of holding separate sector meetings will be continued this year, although the BOD may revisit this issue in the future. The revised Administrative Policy and Procedures will be available for purchase from NCWM approximately two weeks following the July 2001 NCWM Annual Meeting.

Summary of Sector Activities:

Belt-Conveyor Scale Sector: The NTETC Belt-Conveyor Scale Sector last met in October 1998. A request for agenda items was distributed to the Sector in July 2000. Sector members were again polled in April 2001 during a NIST-OWM Technical Session on belt-conveyor scales. As was the case in 1999, insufficient items were received to warrant a 2000 or a 2001 meeting. For questions on the current status of Sector work or to propose items for a future meeting, please contact the Sector Technical Advisor, Steven Cook, NIST OWM. Mr. Cook can be reached by telephone at 301-975-4003, by fax at 301-926-0647, by e-mail at stevenc@nist.gov, or in writing at NIST, 100 Bureau Drive – Stop 2350, Gaithersburg, MD, 20899-2350.

Grain Moisture Meter and NIR Protein Analyzer Sectors: The Grain Moisture Meter and NIR Protein Analyzer Sectors held a joint meeting in Kansas City, MO, in September 2000. The summaries of these Sector meetings were distributed at the beginning of January 2001. A copy of these meeting summaries were presented to NTEP Committee members at the 2001 Interim Meeting and appear in Appendices D and E of the Committee's report. The next joint meeting of the Sectors is scheduled for August 22-24, 2001, in Kansas City, MO. For questions on the current status of Sector work or to propose items for a future meeting, please contact the Sector Technical Advisors, Ms. Diane Lee, NIST OWM, or Mr. Jack Barber, J.B. Associates. Ms. Lee can be reached by telephone at 301-975-4405, by fax at 301-926-0647, by e-mail at diane.lee@nist.gov, or in writing at NIST, 100 Bureau Drive – Stop 2350, Gaithersburg, MD, 20899-2350. Mr. Barber can be reached by telephone at 217-483-4232, by fax at 217-483-3712, by e-mail at jbarber@cityscape.net, or in writing at J.B. Associates, 10349 Old Indian Trail, Glenarm, IL, 62536.

Measuring Sector: The NTETC Measuring Sector met on October 6-7, 2000 in Austin, TX. The summary of that meeting was distributed in November 2000. A copy of the meeting summary was presented to NTEP Committee members at the 2001 Interim Meeting and appears in Appendix F of the Committee's report. The next meeting of the Sector is scheduled for September 28-29, 2001, in Lexington, KY. For questions on the current status of Sector work or to propose items for a future meeting, please contact the Sector Technical Advisor, Richard Suiter, NIST OWM. Mr. Suiter can be reached by telephone at 301-975-4406, by fax at 301-926-0647, by e-mail at rsuiter@nist.gov, or in writing at NIST, 100 Bureau Drive – Stop 2350, Gaithersburg, MD, 20899-2350.

Weighing Sector: The Weighing Sector met September 10-11, 2000, in Columbus, OH. A summary of the Weighing Sector's recommendations was distributed to Sector members in October 2000 and a complete meeting summary was distributed to Sector members the week prior to the 2001 Interim Meeting. A copy of the meeting summary was presented to the NTEP Committee and appears in Appendix G of the Committee's report. The next meeting of the Sector is scheduled for October 14-16, 2001, in Albany, NY. For questions on the current status of Sector work or to propose items for a future meeting, please contact the Sector Technical Advisor, Steven Cook, NIST OWM. Mr. Cook can be reached by telephone at 301-975-4003, by fax at 301-926-0647, by e-mail at stevenc@nist.gov, or in writing at NIST, 100 Bureau Drive – Stop 2350, Gaithersburg, MD, 20899-2350.

501-7 I Remanufactured Device Task Force - Definitions for "Remanufactured Device," "Remanufactured Element," "Repaired Device," and "Repaired Element"

Source: NCWM Task Force on Remanufactured Devices

Background/Discussion: Item 310-1A of the 2001 Agenda of the NCWM Specifications and Tolerances (S&T) Committee proposes that definitions for "Remanufactured Device," "Remanufactured Element," "Repaired Device," and "Repaired Element" be added to NIST Handbook 44. The proposed definitions may affect NCWM Publication 14 and NIST Handbook 130 since the proposed definitions for repaired and remanufactured devices are different from those currently included in Publication 14 and Handbook 130.

The purpose of this item is to notify interested parties that the Task Force has asked that the NCWM allow the S&T Committee to take the lead on the issue of remanufactured equipment and to include these proposals in the S&T Committee report for NCWM consideration. The Task Force believes it is not appropriate to have definitions in Handbook 44 that are different from those in Publication 14 and Handbook 130. Therefore, interested parties are advised that if the proposed definitions are adopted as part of the S&T Committee report, the existing definitions for repaired and remanufactured devices in Publication 14 and Handbook 130 will be modified accordingly. Additionally, new definitions for repaired and remanufactured elements will be added consistent with the definitions adopted by the NCWM.

At the 2001 Interim Meeting, the Committee did not receive any comments on this issue during its open hearings. However, at the closing joint committee session, the Committee heard concerns over the method for introducing specific changes into NCWM Publication 14. While there did not appear, in principle, to be opposition to accepting changes adopted as part of the S&T Committee's report, some members felt that specific language outlining the changes to Publication 14 should be presented to the NCWM as part of the voting process. In its discussion of these comments following the Interim Meeting, the Committee noted that revisions to the Administrative Policy and Procedures Section of Publication 14 are presently under review by the NCWM Board of Directors. (See Item 101-17 of the Board's Report.) The Board is confident that the issue will get full discussion as part of the S&T agenda item. The Conference vote on that item will set NCWM policy. Both the Board and the Laws and Regulations Committee will then make respective editorial changes to the publications under their charge to ensure that all are consistent with the S&T item resolution.

At the 2001 Annual Meeting, the Committee again referred interested parties to the S&T Committee's agenda for discussion of this issue.

G. W. Diggs, VA, Chairman

L. Straub, Maryland, NCWM Chairman
R. Murdock, North Carolina, NCWM Chairman-Elect
T. Geiler, Barnstable, Massachusetts, NCWM Treasurer
R. Andersen, New York
D. Brown, Iowa
M. Gray, Florida
G. Shefcheck, Oregon

NIST Technical Advisor: T. Butcher

National Type Evaluation Program Committee

Appendix A
OIML Certificate Scenario

Darrell Flocken, Mettler-Toledo, presented the following scenario to the Scale Manufacturers Association and the NCWM NTEP Committee. The scenario describes Mettler-Toledo's experiences submitting NTEP-issued OIML Certificates to other countries.

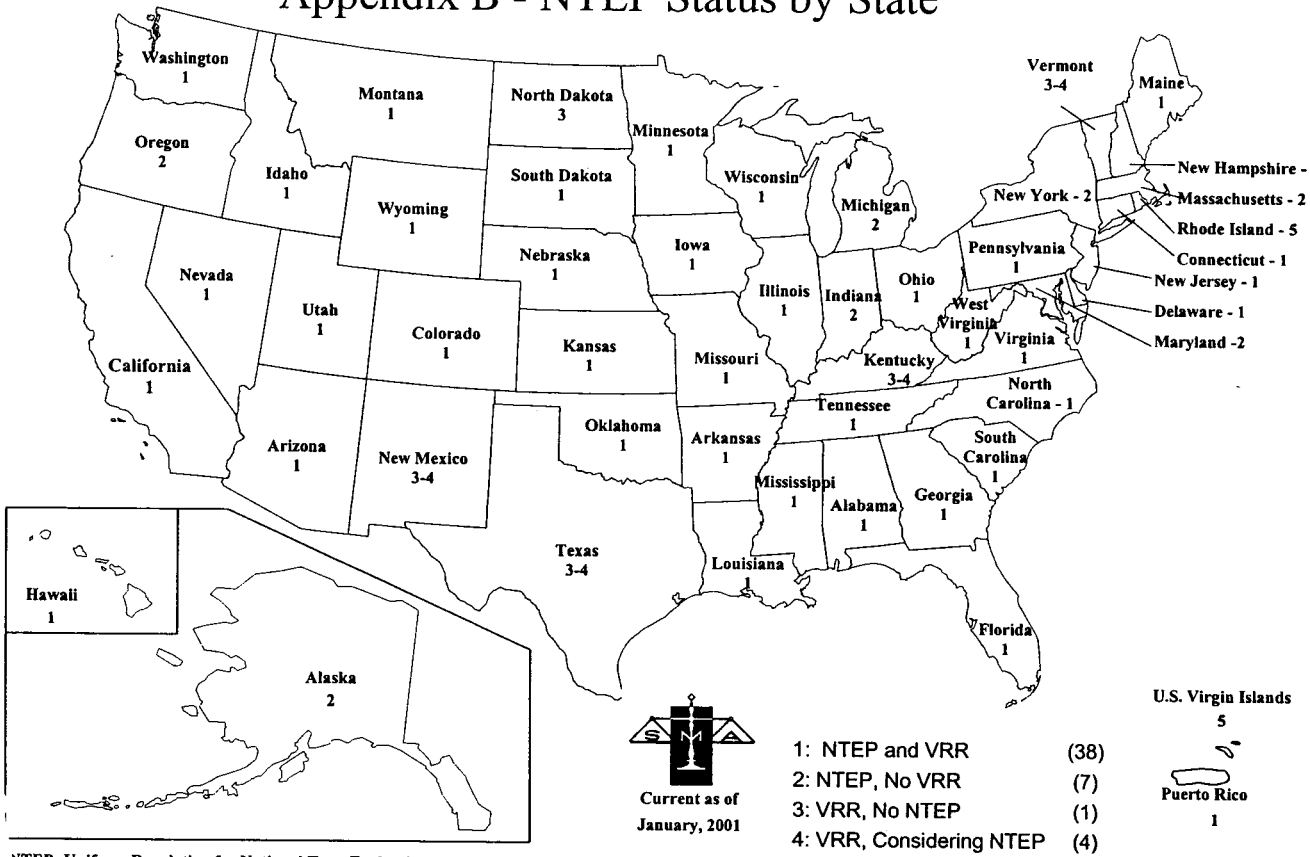
Mettler-Toledo applied for and received an OIML certificate for the model 745A load cell. The certificate was issued by NIST to the R60 standard. Upon receiving the certificate, Mettler-Toledo sent a letter to the NMi in the European Union, NSC in Australia, INMETRO in Brazil and China asking for acceptance of the certificate to permit the use of this load cell in approved and verified applications.

Three of the four agencies replied denying the request. China did not reply. In two of the three replies, Australia and Europe, the reason for the denied acceptance was the same; 'the certificate was not issued by an agency or laboratory recognized by the national weights and measures authority and therefore is not acceptable for use within the country.' Upon receiving this answer Mettler-Toledo applied for the issuance of a national certificate on the basis of the test data received from NIST. This request was also denied based on confidence levels of the laboratory performing the test. For the time being Mettler-Toledo has abandoned this effort in Australia. However, Mettler-Toledo has taken this request to a higher level within the European Union. At this time an official reply has not been received. The third agency that replied, Brazil, indicated that R60 was not an adopted standard at this time.

In addition to the above scenario, the OIML certificate has been accepted in India and South Africa where Mettler-Toledo has used this load cell in instruments installed in approved applications. While these countries have a developed field verification program they do not have a developed type approval process. It has been Mettler-Toledo's experience that these countries have accepted certificates issued by other national approval agencies (i.e., a CC from NIST and a type approval certificate from the EU).

In fairness to the U.S. system, Mettler-Toledo has received this same reply when asking for national acceptance or approval using OIML certificates issued by other countries. There have been a few exceptions to this statement when using an OIML certificate issued by a European Notified Body such as the NMi, PTB or NWML.

Appendix B - NTEP Status by State



NTEP: Uniform Regulation for National Type Evaluation

VRR: Uniform Regulation for Voluntary Registration of Service Persons and Service Agents

Appendix C – NIST-OWM Participating Laboratories and Evaluations Report *
As of September 30, 2000

Activity	1996**	1997	1998	1999	2000 as of 9/30/00
Number of Applications Received[1]	386	387	321	335	242
Number of Mutual Recognition Applications Received	38	68	68	61	57
Number of Type Evaluations Performed[2]	300	316	311	250	197
Number of Activities Assigned[3]	574	652	598	528	382
Number of CCs that became EFFECTIVE	310	299	253	338	207
Number of CCs ISSUED	322	279	260	345	322
Number of Requests WITHDRAWN	80	81	52	86	38
Average Time (weeks) to Perform Activities for Successful[4] Type Evaluations					
"Date Assigned" to "Equipment Received"	10	8	11	8	8
"Equipment Received" to "Type Evaluation Complete"	7	6	7	7	6
Type Evaluation Complete" to "CC Effective"	5	2	4	8	5
"CC Effective" to "To NIST"	16	14	9	12	13
"To NIST" to "CC Issued"	7	9	8	6	5
"Date Assigned" to "CC Issued"	43	44	36	47	38

* This report is designed to show the amount of activity in all the labs involved in the National Type Evaluation Program. In July 1998 a new database was put into operation. While all information from the old database was converted into the new database, some old records may be incomplete.

** 1996 figures may be inflated due to government furlough in 1995.

[1] 3 OIML Applications received in 1999; 1 OIML Application received in 2000

[2] If a device fails a type evaluation (i.e., an actual lab or field test), a re-test is considered a new type evaluation.

[3] Many type evaluations and applications require the assignment of multiple labs in order to accomplish *one* evaluation. In past years, one request was recorded as one laboratory doing the work regardless of how many labs were involved in the evaluation. Additionally, multiple tests may need to be performed in order to accomplish one evaluation. For example, the range of capacities of a load cell family may include testing one capacity in California, one by the Force Group at NIST, and the CC may be drafted by someone in the Office of Weights and Measures at NIST. Thus, three (3) activities were necessary for this particular load cell family to get a CC. Additionally, if a device failed type evaluation one (1) time and had to be re-tested, two (2) activities were necessary to result in one CC.

[4] An evaluation in which the device does not fail at any point. The average times do **not** include applications for Grain Moisture Meters because of their unique testing and Phase II calibration process.

Participating Laboratories Evaluations

Activity	CA	MD	NY	OH	FG	NIST	OTHER	TOTAL
Number of Applications Received								
1996[1]	75	29	29	68	17	138	30	386[1]
1997	62	36	27	100	30	103	29	387
1998	52	25	32	74	21	78	28	321
1999	44	28	18	56	11	149	29	335
2000 as of 9/30/00	37	32	12	63	12	58	28	242
Number of Type Evaluations[2] Performed								
1996	62	85	31	80	9	1	32	300
1997**	72	56	46	93	21	--	28	316
1998	71	51	38	100	24	3	24	311
1999	52	45	28	77	23	6	19	250
2000 as of 9/30/00	33	40	24	69	4	1	26	197
Number of Paper Updates[3] Issued								
1996	2	--	1	1		90	--	94
1997	11	2	3	3		76	--	95
1998	5	--	2	12		59	1	79
1999	12	1	1	2		133	--	149
2000 as of 9/30/00	5	2	--	8		135	--	150
Number of Effective Certificates								
1996	49	22	13	49	18	124	35	310
1997	51	15	18	66	17	111	21	299
1998	31	13	10	82	17	76	24	253
1999	53	23	12	52	17	158	23	338
2000 as of 9/30/00	31	19	10	47	6	73	21	207
Number of Certificates Issued								
1996	59	18	18	73	22	110	22	322
1997	42	23	19	66	10	86	33	279
1998	37	14	10	79	18	73	29	260
1999	56	10	13	57	24	162	23	345
2000 as of 9/30/00	43	29	11	63	9	136	31	322

[1] Number may be inflated due to government furlough in December 1995.
[2] Type Evaluation indicates an actual lab or field test.
[3] A paper update includes any activity that does not require testing, i.e., private labeling requests, error corrections, non-metrological changes to CC, etc.
**There was a discrepancy in the manner in which the participating labs recorded data; the results, therefore, may be skewed.

Appendix D
National Type Evaluation Technical Committee
Grain Moisture Meter Sector
August 23-25, 2000 Kansas City, MO
Meeting Summary

Agenda Items

1. **Proposed Test Weight per Bushel Criteria for Section 5.56(a) of Handbook 44**
   a) **Tolerances**
   b) **Field Evaluation of Proposed Tolerances**
   c) **Proposed Additions to Publication 14 Test Procedures**
   d) **Additional Test Weight per Bushel Criteria for Section 5.56(a) of Handbook 44:**
      Moisture Limits
      Grain Level Sensing
2. a) **Review of Final Draft of Evaluation Procedure Outlines (EPO's) and Test Procedures for the Field Evaluation of GMM Devices**
   b) **Proposed Changes to Handbook 44 - Addition of Tolerances for Meter to Like-Meter Testing and Removal of Footnote 1.**
3. **Update on NTEP Type Evaluation and OCP (Phase II) Testing**
4. **Proposed Change to Publication 14 - GMM Check List Paragraph 4.5.2, Calibration Transfer**
5. **Status of NTEP Meters in the Field - Review of Data from State Inspections**
6. **Inspection Problems Arising from "Cross-Utilized" (Federal/Commercial) Moisture Meters**
7. **Intercomparison of Air Oven Moistures between GIPSA, the States, and Manufacturers**
* 8. **Criteria for Like Type**
* 9. **Update on NTEP Transition Activities and NIST/OWM Personnel Changes**
* 10. **Report on the 2000 NCWM Interim and Annual Meetings**
* 11. **Time and Place for Next Meeting**

*Note: Because of common interest, items marked with an asterisk (*) were considered in joint session of the NIR Grain Analyzer and the Grain Moisture Meter Sectors.

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1. Proposed Test Weight per Bushel Criteria for Section 5.56(a) of Handbook 44

Background: There are at least two NTEP Grain Moisture Meters which have the capability to automatically provide an indication and recorded representation of test weight per bushel. Because of the unrealistic tolerances in the existing GMM Code, however, the test weight indications of these devices are typically not allowed to be used for commercial transactions. The Sector first considered this issue at its March 1996 meeting. In 1997 at its September meeting, the Sector agreed that priority should be given to drafting changes to the Grain Moisture Code to specify field test methods and reasonable tolerances. A draft of proposed changes to the Code was reviewed by the Sector at its March 1998 meeting. Action to forward the draft to the Committee on Specifications and Tolerances (S&T) was deferred pending receipt of feedback from the grain trade on the acceptability of the proposed tolerances and feedback from Weights and Measures (W&M) members on a sampling of field test results applying those tolerances. Committee Ballot 84-03 to add the proposed changes to NIST Handbook 44, Section 5.56(a), was issued on August 18, 1998, with ballots due for return by September 10, 1998. Most of the Sector members agreed with the need for criteria but were not in agreement with the tolerances proposed at that time.

1.(a) Tolerances

At the Sector's September 1999 meeting, tolerances of ±0.8 pounds per bushel for corn and oats; ±0.5 pounds per bushel for all classes of wheat; and ±0.7 for soybeans, barley, rice, sunflower, and sorghum were proposed for further study. Although several members opposed adopting the proposed tolerances and groupings for the following reasons: 1) difficult to meet the proposed tolerance for wheat; 2) difficult to obtain samples for field test; and 3) not discriminating enough for corn, they agreed to consider them for further study. The Sector concluded that it was premature to recommend that the National Conference adopt the proposed changes as part of the GMM code. However, the Sector considered the matter of sufficient importance to recommend that it be submitted to the Central Weights and Measures Meeting and the Southern Weights and

Measures Meeting for consideration as an item for development so it could appear on the National Conference on Weights and Measures (NCWM) Interim Agenda. Diane Lee, NIST, reported that the proposal was published as a developing issue in the Committee Reports for the 85th Annual Meeting under the process established by the NCWM to disseminate information about emerging issues which have merit and are of national interest. Developing issues have not received sufficient review by all parties affected by the proposals or may be insufficiently developed and are not ready for review by the S&T Committee.

1.(b) Field Evaluation of Proposed Tolerances

To further evaluate the proposed tolerances and test methods, several state metrology representatives have agreed to participate in a field evaluation. States that have agreed to participate include:

Arkansas	North Carolina
Illinois	Maryland
Nebraska	Missouri

Dr. Charles Hurburgh, Jr., ISU Agricultural Extension Service, will contact Darryl Brown of the Iowa Department of Agriculture, Department of Weights and Measures to solicit Iowa's participation, also.

Discussion: The Sector reviewed a conceptual outline of a laboratory and field evaluation protocol drafted by Dr. Hurburgh. The first draft of the protocol is shown below:

Protocol for State Inspections of
Test Weight Devices
Dr. Charles R. Hurburgh, Jr.

Basic Assumptions

1. Because there is no NTEP program for test weight, state laboratory data will have to be pooled to make a fundamental evaluation of devices.
2. A state could do either lab evaluation or field evaluation or both depending on its resources and equipment availability.
3. The reference for test weight for a given state will be the lab quart bucket method, standardized against the GIPSA system master apparatus.

Laboratory Evaluations

If a state has devices, then the samples collected for the moisture program could be used to generate calibration data on test weight.

a. The state should standardize its laboratory quart apparatus to GIPSA by the same process as used for official service points.
b. Each comparison sample should be run three times in the apparatus and three times in the device.
c. The same sample condition (cleanliness, etc.) requirements as used for moisture apply to test weight.
d. Device evaluation would be by bias and standard deviation of differences relative to reference.
e. Data would be pooled by grain by device across labs to make an overall evaluation. Manufactureres would have the responsibility of assuring uniformity of devices. Non-uniformity would increase SDD and thus harm approval chances. Either NIST or the NTEP lab or another lab could be responsible for compiling the data.
f. This data would evaluate the fundamental ability of the device. The first collection would be for information rather than regulatory purposes.

Field Evaluations

If a state has a moisture program, one sample there of (preferably dry) could be used to monitor performance of fielded instruments.

a. The chosen sample should be clean, dry (<14 % moisture) and pre-screened to be a good predictor on lab units.

b. The reference value would be the average of 10 replicates on the standardized lab apparatus.
c. The inspector portion of this sample will be at least 1000g . This allows testing of fielded apparatus and rechecking of the reference when the inspector returns to the lab for periodic moisture updates.
d. Comparison will be made on the average of three replicates made by the inspector in the field device to the pre-established reference value. These would likely be the same drops as used for moisture.
e. Test weight increases if samples lose moisture. The test weight sample should be at a low, stable moisture; until more data is available the adjustment of the reference value based on a device (as is sometimes done for moisture) is not recommended.
f. Data would be compiled at some central location, NIST, NTEP lab or another lab. The first year of data would be used for information purposes.

Decision: The Field Evaluation of Tolerances project will be conducted in two phases:

Phase 1. Standardization of Quart Kettle Test Weight Apparatus
To initiate the study, the USDA/Grain Inspection Packers and Stockyards Administration (GIPSA) will send one portion of a hard red winter wheat (HRW) standardizing sample to each of the participating State Laboratories. Participating laboratories are to verify that the quart kettle used in the standard test weight per bushel apparatus meets the requirements spelled out in GIPSA's volume test. They are also to verify that the apparatus is set up according to GIPSA standards before testing the HRW standardizing samples. Test results on standardizing samples are to be returned to GIPSA no later than 5 days after the HRW samples are received by the participating laboratory.

After GIPSA has verified standardization among the participating laboratories on the HRW sample, Dr. Hurburgh will supply GIPSA with corn and soybean samples that will be split and tested by GIPSA on their standard quart kettle test weight per bushel apparatus before they are sent to the participating laboratories. Participating laboratory test results on the corn and soybean samples are to be returned to GIPSA no later than 5 days after the samples arrive at the participating laboratories. The target date for completion of Phase 1 is October 1, 2000.

Phase 2. Field Tests of Test Weight per Bushel Capability
Participating laboratories will be responsible for obtaining their own samples for this test. Samples must be stable and dry. The participating laboratory will make an initial determination of the test weight per bushel of each sample portion with the standard quart kettle apparatus before sending it to the field. The surface condition of these samples will have an effect on the TW measurements. To minimize surface effects, the following was recommended: 1) do NOT refrigerate samples, and 2) test no more than 20 instruments with each sample portion. Tests should be run on both the facility's grain moisture meter and on the kettle test weight apparatus used at that facility. The kettle test should be performed by the operator who normally makes test weight per bushel determinations at that location. No instruction should be given to the operator on how to perform the test. The participating laboratory will make a final determination of test weight per bushel when the sample is returned to the lab. Data is to be collected on as many meters as possible in the designated time period. Field test data is to be returned to Diane Lee at NIST no later than January 8, 2001. Periodic submission of data is encouraged so all the data won't arrive on the last day! It is imperative that this date be met if compiled data is to be available for review prior to the NCWM Interim meeting later in January.

1.(c) Proposed Additions to Publication 14 Test Procedures

Discussion: To give manufactureres a better idea how the proposed code might be applied in type approval, a subcommittee was formed to draft additions to the test procedures and checklist of NCWM Publication 14 for the evaluation of GMMs incorporating test weight per bushel (TW) capability. In arriving at the draft presented to Sector, the subcommittee considered the following:

1. To minimize the cost of type evaluation testing and provide an existing database for manufacturers to use in evaluating the proposed procedures, the subcommittee initially considered structuring tests to parallel the tests already established for GMMs. While this approach was determined to be feasible for most of the basic instrument tests, the subcommittee felt that test procedures and sample set selection should be modified for some tests to place the emphasis on test weight effects rather than on moisture effects. This was a particular concern for the accuracy, precision, and reproducibility tests in Phase I.

A related concern is that Phase II samples are the primary source of Phase I accuracy samples. By the time air oven portions (200 g) have been cut out of the samples, only one-half to two-thirds of the samples are large enough to obtain a test weight reference value for Phase I tests using the procedures specified by the standard quart kettle method [*note: the standard method requires a 1000 g to 1050 g sample for all grains except oats and sunflower seed*]. Also, the TW values currently being supplied to participants in the GMM Phase II ongoing calibration review (OCR), cannot be considered "official" test weight results. Some of these TW values are obtained using samples just large enough to fill the TW kettle with very little overflow. Sample packing and TW results are typically reduced for these samples.

Because TW readings are influenced by test conditions that affect grain surface characteristics, for some tests it is not desirable to use the same procedures for GMM and TW evaluations. For example, it seems desirable to reduce the number of repetitions per sample to avoid "polishing" grain samples. Also, it may be necessary to conduct all TW testing in an environmental chamber in which relative humidity can be controlled.

For the above reasons (and for the reasons given in item 3, below), TW evaluations were not incorporated into the existing Phase I GMM tests; instead, addition of a new subsection containing only TW test procedures and tolerances was proposed.

2. The subcommittee proposed that display and printout of TW be confined to moisture measurements within the 6 % minimum NTEP required moisture range specified in the Application for NTEP testing for the following reasons: 1) measurement of TW beyond the upper limit of the 6 % range is going to be of questionable accuracy/precision; 2) the moisture region of greatest importance for TW is at or near normal moistures associated with storage or no-dockage-for-moisture levels which are included in the minimum NTEP required moisture range. The subcommittee's decision to limit TW to the "standard" 6 % moisture ranges was not unanimous. Tom Runyon, Seedburo, favored using the same moisture range for both TW measurements and moisture measurements, because grains coming into the initial receiving stations at harvest exhibit moistures that are at the upper levels of the approved moisture ranges. When there is an issue of low test weight due to poor weather conditions or stress during maturation stages, grain elevators need to identify a Low Test Weight condition at first receipt, not just after the grain has been dried to the lower moisture levels.

3. The matter of sample selection for TW was given serious consideration. Samples currently selected for moisture testing may not be suitable for TW testing. Because of existing criteria for selecting samples for Phase I moisture accuracy tests, it is already difficult to assemble a set of test samples. Imposing additional selection criteria for TW may make it impossible. The following criteria were included in the initial draft proposal submitted to the Sector:
   a) A total of 12 samples will be used per grain type.
   b) No less than 8 samples should come from the lowest two-thirds of the 6 % moisture range.
   c) No less than 2 samples should come from the highest one-third of the 6 % moisture range.
   d) Samples should represent a distribution of TWs (ranges to be determined).
   e) For the entire population of 12 samples, the correlation (R^2) between moisture and reference TW is to be less than 0.20.

4. The reference value for TW will be the average of 3 replicates on GIPSA's quart kettle apparatus. Samples will be dropped three times through each of two meters. The average of the initial and final reference values shall be used as the reference value in calculations of meter performance.

5. To have a sufficient number of measurements to determine TW accuracy, the subcommittee proposes that bias and Standard Deviation of the Differences (SDD) be calculated for each instrument using the entire sample set of 12 samples. In addition, a tolerance will be applied to the slope between measured TW (the average of the 3 TW measurements of a sample) and the reference TW (the average of 3 determinations as described above). Slope limits between 0.99 and 1.01 were proposed.

6. TW accuracy, repeatability, and reproducibility tests should be performed on all NTEP grains.

In addition to reviewing the performance tests and tolerances in the Subcommittee's draft proposal, the Sector considered the following questions:

1. What TW range should be specified for Hard Red Winter Wheat samples used in the instrument stability and instrument temperature sensitivity tests?
2. What TW range should be specified for samples used in accuracy, precision, and reproducibility tests?
3. Should the moisture range for TW measurements be restricted to a 6 % range? If not, how should the moisture range be determined, and should tolerances be different at higher moistures?
4. Should Phase II testing be required for TW? If so, how should tolerances be applied and over what range of moistures?

The questions related to limiting moisture ranges for TW measurements were the subject of lengthy discussion. The Sector acknowledged that for practical reasons samples used in NTEP testing would have to be of a restricted moisture range. Sample stability and availability were the major limitations to expanding the moisture range of samples used in Phase I testing. On the other hand, it seemed equally impractical to have different upper limits on grain moisture for TW and moisture measurements, because grains coming into the initial receiving stations at harvest exhibit moistures that are at the upper levels of the approved moisture ranges. When there is an issue of low test weight due to poor weather conditions or stress during maturation stages, grain elevators need to identify a Low Test Weight condition at first receipt, not just after the grain has been dried to the lower moisture levels. In addition, restricting the display and printout of TW information at higher moistures would unnecessarily prevent measurement of TW for operational use (such as binning and drying) as opposed to commercial use.

The suggestion to allow display and printout of TW beyond the 6 % moisture interval, provided the device gave a clear warning that the TW was "outside limits," was deemed impractical by device manufacturers who indicated that major firmware changes would be required to apply different moisture limits to moisture measurements and TW measurements for different grains. Other members expressed the opinion that different moisture limits would be confusing to producers and grain handlers alike.

One Sector member suggested that the issue should be viewed from the perspective of how TW affects the money paid for grain:

Corn - TW becomes important only if TW is very low. Low TW occurs only infrequently. In years when it does, it is typically common to an entire growing region. There is a big difference between typical TW and unusually low TW. Even if accuracy and precision of the TW measurement is reduced at higher moistures, it is still possible to identify a low TW condition.

Wheat - TW is important on wheat every day, but the proposed 10 % to 16 % moisture range is where most wheat is harvested.

Soybeans - TW is somewhat important, but the proposed 6 % moisture range includes normally harvested moistures.

He concluded that allowing display of TW beyond the proposed limits was not a problem as there was no significant economic impact on TW accuracy beyond the proposed limits. Another member disagreed, citing the common harvesting of double cropped soft red winter wheat in his area at moistures above 16 %. He questioned how field testing should be handled if TW results are allowed to be displayed on higher moisture grains. Would the same tolerances apply to TW at higher moistures? If so, should a device be failed if it passes tests using samples within the 6 % interval but is out of tolerance on higher moisture samples? It was suggested that field testing should be limited to moistures within the 6 % range. Refrigeration of TW transfer samples is not recommended, and the ability to maintain the integrity of test samples at higher moistures without refrigeration is questionable. Also, the precision of the device under test and the precision of the standard method begin to suffer at higher moistures. The Sector concluded that field testing at higher moistures did not seem practical.

Decision: To satisfy both the need to limit moistures for NTEP Phase I testing and the need to provide TW indications at moistures beyond those used in Phase I tests, it was decided that grain moisture meters would be allowed to use the same moisture range for both TW measurements and moisture measurements. On CCs, TW calibrations would be shown as "approved" over a 6 % moisture range and "pending" over the remainder of the meter's moisture range. Participation in the Grain Moisture Meter Phase II calibration monitoring program would be required to verify performance over the TW

"pending" range. Although the TW data available from the Phase II program may not be suitable for use in the basic instrument tests of Phase I, it was thought that the data would be acceptable for determining the degree to which TW measurements are a function of moisture over the device's operating moisture range. The Sector unanimously recommended that the following criteria be included in the check list to address this concern:

- The slope of TW error with respect to TW shall not be significant at a 95 % confidence level over the 6% moisture range.
- The slope of TW error with respect to percent moisture content shall not be significant at a 95 % confidence level over the approved and pending moisture range of the device.

For all the proposed Publication 14 tests, the Sector was in full agreement that the range of sample TWs should be no less than the range that is grade determining. For example, for yellow dent corn the minimum test weight per bushel is: 56 pounds per bushel for grade #1; 54 pounds per bushel for grade #2; and 52 pounds per bushel for grade #3; thus, the minimum range specified for corn will be 52 pounds to 56 pounds per bushel. The Sector did not specifically address the cases of rice for which TW is not a grade factor, and sunflower which uses a single minimum TW (25 pounds per bushel) for all three grades.

The draft below reflects changes made by the Sector to the subcommittee's proposed addition to the GMM Check List of Publication 14. Several items remain unresolved or in question:

1) Sample Volume test - the angle of repose of wet corn (22 %) is different than that of dry hard red winter wheat. If the device uses a sensor in the hopper to detect adequate sample size, it could conceivably pass the test on wheat but not detect insufficient volume when used with wet corn. Naturally moist wet corn may not be available at the time of year when a device is submitted for testing. It hasn't been determined that artificially moistened corn could be used for this test. Due to time constraints, the Sector could not decide how the test should be modified. This test appears below as originally proposed by the subcommittee.

2) It was suggested that tolerances on some of the basic instrument tests were too tight. The subcommittee acknowledged that they were based on preliminary data and suggested that manufacturers be given the opportunity to see if they are appropriate. These limits remain in the draft as originally proposed.

3) What TW ranges should be specified for rice and sunflowers?

DRAFT - Proposed Addition to NCWM Publication 14, §2, Chapter 6, Checklist for Grain Moisture Meters
[Note: The following is an addition to the existing Test Procedures and Tolerances portion of the GMM check list. To enhance readability, the text has not been underlined to signify an addition.]

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

A. Basic Instrument Tests:
Basic instrument tests will be conducted using a stable moisture (12 % to 14 %) HRW wheat sample to check the effect of sample volume variations, power supply fluctuations, storage temperature, leveling, and warm-up time. Instrument stability tests will be conducted using HRW wheat samples selected from all three 2 % moisture intervals in the 10 % to 16 % moisture range. All instrument tests will be conducted on each of the two instruments submitted by a manufacturer. For purposes of these tests, room temperature will be defined as 22 °C ± 2 °C.

Sample Volume. A single HRW wheat sample with a moisture content between 12 % and 14 % will be used for this test. A quantity of 500 grams (or the maximum amount that can be loaded into the instrument's sample hopper) will be measured 3 times. This quantity will be reduced by 10 grams and then measured 3 times. The sample will continue to be reduced by 10 grams for each set of 3 measurements until the instrument no longer displays and records a test weight per bushel result. The average of each set of 3 measurements will be calculated.

The maximum difference between any of the calculated averages shall not exceed 0.30 pounds per bushel.

Initial Precision. A single HRW wheat sample with a moisture content between 12 % and 14 % will be analyzed 10 times at room temperature and nominal line voltage.

Precision will be checked.

The maximum allowable standard deviation of 10 analyses (precision) is 0.20 pounds per bushel.

Power Supply. (Note: This test may be waived for instruments that have met the grain moisture meter test requirements provided that the instruments use the same volume and weight determining means for both moisture and test weight per bushel measurements.) A single HRW wheat sample with a moisture content between 12 percent and 14 percent will be analyzed 10 times with the meter operating at a nominal voltage of 100 V. The voltage will be adjusted to 117 V, and after 30 minutes, the HRW sample will be analyzed 10 times. The voltage level will then be increased to 130 V, and after 30 minutes, the sample will be analyzed 10 more times.

Changes in bias and precision will be checked. Bias is defined as the change in the average test weight per bushel for 10 analyses made at both the reference and the respective test voltages.

The maximum allowable bias change from the reference is ± 0.20 pounds per bushel. The maximum allowable standard deviation of 10 analyses (precision), at any of the three voltage levels, is 0.20 pounds per bushel.

Storage Temperature. A single HRW wheat sample (12 % to 14 % moisture content) is analyzed 10 times at room temperature prior to temperature cycling. The instrument is then powered down and placed in the environmental chamber. The chamber temperature is then increased to 55 °C over a 1 hour period, and maintained at that temperature for 3 hours. Chamber temperature is then decreased to -20 °C over a 1 hour period, and maintained at that temperature for 3 hours. Repeat the temperature cycle. After letting the instrument equilibrate to room temperature for at least 12 hours, the instrument is turned on for the specified warm-up period and the test sample analyzed 10 more times.

The maximum bias shift allowed for the average of 10 drops before and after temperature cycling is ± 0.20 pounds per bushel.

Leveling. (Note: This test will be waived for instruments that have met the grain moisture meter test requirements provided that the instruments are equipped with leveling indicators and use the same volume and weight determining means for both moisture and test weight per bushel measurements.) Tests for leveling will be conducted using a single HRW wheat sample (12 % to 14 % moisture content). The leveling test will be conducted for a minimum of 2 orientations, front-to-back and left-to-right, at a tilt of 5 %. Additional orientations will be tested as deemed appropriate.

The maximum allowable bias shift is ± 0.20 pounds per bushel for the average of 5 readings.

Warm-up Time. (Note: This test will be waived for instruments that have met the grain moisture meter test requirements, provided that the instruments use the same volume and weight determining means for both moisture and test weight per bushel measurements.) The following test procedures will be used to check warm-up times recommended by the manufacturer. If no warm-up time is recommended by the manufacturer, it will be assumed that accurate results will be provided immediately upon having the instrument powered on.

The instrument will be powered off and stabilized at room temperature. The instrument will be powered on and after waiting the specified warm-up time a single wheat sample (12 % to 14 % moisture content) will be analyzed 5 times. After waiting for a period of time equal to two times the manufacturer suggested warm-up time, the sample will again be analyzed 5 times. The minimum waiting period before retesting the sample is one hour. Thus, for an instrument where no warm-up time is specified, the sample would be tested immediately upon the instrument being powered up and then again after 1 hour.

The maximum allowable bias shift is 0.20 pounds per bushel for the average of 5 readings.

Instrument Stability. HRW wheat samples will be used to test instrument stability over a minimum 4 to 6 week period. A set of three samples, representative of the test weight per bushel range of 56 lb to 61 lb per bushel, will be selected for testing. These samples may be a subset of the HRW test set for accuracy, repeatability, and reproducibility tests. Each of

the 3 samples will be dropped 5 times through each of the two meters prior to running any other type evaluation tests, particularly before running the storage temperature test. The average test weight per bushel obtained for the 15 observations (3 samples x 5 replicates) will be recorded. The 3 samples will be retested once all other type evaluation testing has been completed (within 4 to 6 weeks).

The maximum allowable bias shift over the 4 to 6 week period is 0.20 pounds per bushel.

B. Accuracy, Precision, And Reproducibility Requirements:

The automatic test weight per bushel measuring feature of grain moisture meters will be tested for accuracy, repeatability (precision), and reproducibility with 12 samples of each grain type for which the meter has a pending or higher moisture calibration. Samples will be chosen to represent the moistures and test weights per bushel shown in the following table. The reference method for test weight per bushel is the quart kettle test weight per bushel apparatus as specified by the USDA GIPSA. The reference value will be the average of 3 replicates. Samples will be dropped three times through each of two meters. The reference value will be re-checked after the meters have been tested. The average of the initial and final reference values shall be used as the reference value in calculations of meter performance.

Three replicates will be run on each instrument for each sample, resulting in a total of 72 observations of test weight per bushel per grain type (2 instruments x 12 samples x 3 replicates) .

Type of Grain	Moisture Range	Minimum Test Weight per Bushel Range	Criteria for Sample Selection
Corn	12-18 %	52 - 56	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 %	52 - 56	
Hard Red Winter Wheat	10-16 %	56 - 60	
Durum Wheat	10-16 %	56 - 60	
Soft White Wheat (except White Club)	10-16 %	56 - 60	
Hard Red Spring Wheat (and White Club)	10-16 %	55 - 58	
Soft Red Winter Wheat	10-16 %	56 - 60	
Hard White Wheat	10-16 %	56 - 60	
Two-Row Barley	10-16 %	43 - 47	
Six-Row Barley	10-16 %	43 - 47	
Oats	10-16 %	30 - 36	
Sunflower Seed	6-12 %	t.b.d.	
Long Grain Rough Rice	10-16 %	t.b.d.	
Medium Grain Rough Rice	10-16 %	t.b.d.	
Grain Sorghum or Milo	10-16 %	53 - 57	

Accuracy. The two tests for accuracy are bias (meter versus the standard reference method) and the Standard Deviation of the Differences (SDD) between the meter and the standard reference method. Each instrument will be tested individually.

$$Bias = \frac{\sum_{i=1}^{n} (x_i - r_i)}{n}$$

where,

x_i = average predicted test weight per bushel for sample i (3 replicates)

r_i = average reference test weight per bushel for sample i

n = number of samples (n=12)

$$SDD = \sqrt{\frac{\sum_{i=1}^{n} (y_i - y)^2}{n - 1}}$$

where

y_i = $x_i - r_i$ (see above)

y = average of the y_i

n = number of samples (n=12)

Tolerances for bias and SDD tests are one-half the absolute value of the Handbook 44 acceptance tolerance. Specific tolerances are:

Grain Type	Tolerance
Corn, oats	0.4 pounds per bushel
All wheat classes	0.25 pounds per bushel
Soybeans, barley, rice, sunflower, sorghum	0.35 pounds per bushel

The manufacturer may adjust the calibration bias to compensate for differences from the type evaluation laboratory in reference methods or sample sets.

Repeatability. The Standard Deviation (SD) of the three test weight per bushel replicates will be calculated for each sample and pooled across samples. Each instrument will be tested individually. The equation used to calculate SD is:

$$SD = \sqrt{\frac{\sum_{i=1}^{n}\sum_{j=1}^{3}(P_{ij} - P_i)^2}{2n}}$$

where,

P_{ij}= predicted test weight per bushel for sample i and replicate j

P_i = average of the three predicted test weight per bushel values for sample i

n = number of samples (n=12)

Tolerances for repeatability are 0.4 x the absolute value of the Handbook 44 acceptance tolerance. Specific tolerances are:

Grain Type	Tolerance
Corn, oats	0.32 pounds per bushel
All wheat classes	0.20 pounds per bushel
Soybeans, barley, rice, sunflower, sorghum	0.28 pounds per bushel

Reproducibility. The results for each of the three test weight per bushel replicates will be averaged for each instrument, and the Standard Deviation of the Differences (SDD) between instruments will be calculated using the following equation:

$$SDD = \sqrt{\frac{\sum_{i=1}^{n}(d_i - d)^2}{n-1}}$$

where,

d_i = $P_{1i} - P_{2i}$

P_{1i}= average of three replicates for sample i on instrument 1

P_{2i}= average of three replicates for sample i on instrument 2

d = average of the d_i

n = number of samples (n=12)

Tolerances for reproducibility are 0.5 x the absolute value of the Handbook 44 acceptance tolerance. Specific tolerances are:

Grain Type	Tolerance
Corn, oats	0.40 pounds per bushel
All wheat classes	0.25 pounds per bushel
Soybeans, barley, rice, sunflower, sorghum	0.35 pounds per bushel

C. Tolerances for Test Weight per Bushel Calibration Performance:

Test weight per bushel 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 for all grain types for which the meter has (or will have) a moisture calibration with a pending or higher status (accuracy test discussed earlier).

3. Review of on-going test weight per bushel calibration data collected as part of the national moisture calibration program.

Calibrations will be approved based upon type evaluation testing over the moisture and test weight per bushel ranges specified in §VII.B.

Tolerances used to require a change in calibrations will include the application of a 95 percent confidence interval to the maximum tolerance. 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 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 will be smaller 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.

The status of all test weight per bushel calibrations will be listed on the certificate of conformance. The categories are (1) approved, (2) pending, and (3) not available. The categories are described as follows:

Approved: This category applies only to test weight per bushel measurements in the 6 % moisture ranges specified in §VII.B. Calibrations will be approved based upon the tests specified in §VII. Continued approval requires acceptable performance as part of the ongoing national calibration effort (i.e., none of the average differences between predicted and reference values for the 6 % moisture interval and the test weight per bushel range specified in §VII.B. exceeds one-half the Handbook 44 acceptance tolerance plus a 95 % confidence interval, and the slope of test weight per bushel error with respect to the reference values for test weight per bushel shall not be significant at a 95 % confidence level over the 6 % moisture range).

Pending: This category applies to test weight per bushel measurements outside the 6 % moisture ranges specified in §VII.B, but within the moisture range for which the meter has a pending or higher moisture calibration category (typically the operating moisture range of the device). To maintain a pending test weight per bushel classification range, the calibrations must meet the requirements stated above for approval in the 6 % ranges of §VII.B, and the slope of test weight per bushel error with respect to percent moisture content shall not be significant at a 95 % confidence level over the approved and pending moisture range of the device. Pending test weight per bushel calibrations may be used on NTEP devices.

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

1.(d) Additional Test Weight per Bushel Criteria for Section 5.56(a) of Handbook 44

Discussion: It was brought to the attention of the Publication 14 TW Subcommittee that although moisture measurements are not significantly affected when samples are not of sufficient size to completely fill the measuring cell of the meters, the TW measurement is greatly affected when the cell is not filled. Measurement of TW requires determination of two parameters: volume and mass. Meters measuring TW should provide some means to ensure that measurements of TW are not allowed to be displayed or printed when insufficient sample volume has been supplied.

Decision: The Sector agreed to change or amend the following paragraphs of the developmental GMM Code to address this and other TW issues. [Note: Additions associated with this issue are indicated by double underline to differentiate them from the additions originally proposed. Deletions to the existing code and the previously proposed developmental code are both indicated by a strikeout line.]

A.1. This code applies to grain moisture meters; that is, devices used to indicate directly the moisture content of cereal grain and oil seeds. The code consists of general requirements applicable to all moisture meters and specific requirements applicable only to certain types of moisture meters. Requirements cited for "test weight per bushel" indications or recorded representations are applicable only to moisture meters incorporating an optional automatic test weight per bushel measuring feature.

S.1.1. Digital Indications and Recording Elements.

(c) Meters shall be equipped with a communication interface that permits interfacing with a recording element and transmitting the date, grain type, grain moisture results, test weight per bushel results and calibration version identification.

(d) A digital indicating element shall not display, and a recording element shall not record, any moisture content values or test weight per bushel values before the end of the measurement cycle.

(e) Moisture content results shall be displayed and recorded as percent moisture content, wet basis. Test weight per bushel results shall be displayed and recorded as pounds per bushel. Subdivisions of ~~this~~ these units shall be in terms of decimal subdivisions (not fractions).

(f) A meter shall not display or record any moisture content or test weight per bushel values when the moisture content ~~or test weight per bushel~~ of the grain sample is beyond the operating range of the device, unless the moisture and test weight representations includes a clear error indication (and recorded error message with the recorded representation).

S.1.3. Operating Range. - A meter shall automatically and clearly indicate when the operating range of the meter has been exceeded. The operating range shall specify the following:

(c) Moisture Range of the Grain or Seed
The moisture range for each grain or seed for which the meter is to be used shall be specified. ~~A moisture~~ Moisture and test weight per bushel values may be displayed when the moisture range is exceeded if accompanied by a clear indication that the moisture range has been exceeded.

~~(c) Test Weight per Bushel Range of the Grain or Seed~~
~~The test weight per bushel range for each grain or seed for which the meter is to be used shall be specified. A test weight per bushel value may be displayed when the test weight per bushel range is exceeded if accompanied by a clear indication that the test weight per bushel range has been exceeded.~~

S.1.4. Value of Smallest Unit. - The display shall permit ~~constituent~~ moisture value determination to both 0.01 percent and 0.1 percent resolution. The 0.1 percent resolution is for commercial transactions; the 0.01 percent resolution is for type

evaluation and calibration purposes only, not for commercial purposes. Test weight per bushel values shall be determined to the nearest 0.1 pound per bushel.

S.2.4.1. Calibration Version. - A meter must be capable of displaying either calibration constants, a unique calibration name, or a unique calibration version number for use in verifying that the latest version of the calibration is being used to make moisture content and test weight per bushel determinations.
(Added 1993)(Amended 1995)

S.2.6. Determination of Quantity and Temperature. - The moisture meter system shall not require the operator to judge the precise volume or weight and temperature needed to make an accurate moisture determination. External grinding, weighing, and temperature measurement operations are not permitted. In addition, if the meter is capable of measuring test weight per bushel, determination of sample volume and weight for this measurement shall be fully automatic, and means shall be provided to ensure that measurements of test weight per bushel are not allowed to be displayed or printed when insufficient sample volume is available to provided an accurate measurement.
(Added 1994)(Amended 1995, 2000)

S.4. Operating Instructions and Use Limitations. - The manufacturer shall furnish operating instructions for the device and accessories that include complete information concerning the accuracy, sensitivity, and use of accessory equipment necessary in obtaining a moisture content. Operating instructions shall include the following information:

(d) the kind or classes of grain or seed for which the device is designed to measure moisture content and test weight per bushel;

(e) the limitations of use, including but not confined to the moisture measurement range, ~~the moisture range applicable to~~ test weight per bushel measurements, ~~test weight per bushel range~~, grain or seed temperature, maximum allowable temperature difference between grain sample and meter, kind or class of grain or seed, moisture meter temperature, voltage and frequency ranges, electromagnetic interferences, and necessary accessory equipment.

(Added 1984)

N.1.1. Transfer Standards.[1] - Official grain samples shall be used as the official transfer standards with moisture content and test weight per bushel values assigned by the reference methods. The reference methods for moisture shall be the oven drying methods as specified by the USDA GIPSA. The test weight per bushel value assigned to a test weight transfer standard shall be the average of 10 test weight per bushel determinations using the quart kettle test weight per bushel apparatus as specified by the USDA GIPSA. Tolerances shall be applied to the average of at least three measurements on each official grain sample. Official grain samples shall be clean and naturally moist, but not tempered (i.e., water not added).
(Amended 1992)

N.1.2. Minimum Test.[1]- A minimum test of a grain moisture meter shall consist of tests with samples of each grain or seed type (need not exceed three) for which the device is used, and for each grain or seed type shall include the following:

(a) tests of moisture indications, with samples having at least two different moisture content values within the operating range of the device, and if applicable,
(b) tests of test weight indications, with at least the lowest moisture samples used in (a) above.

(Amended 1986 and 1989)

T.2. Tolerance Values. - Maintenance and acceptance tolerances shall be as shown in Table T.2. Tolerances for moisture measurements are expressed as a fraction of the percent moisture content of the official grain sample, together with a minimum tolerance. Tolerances for test weight per bushel are (+) positive or (-) negative with respect to the value assigned to the official grain sample.

~~**T.3. For Test Weight Per Bushel Indications or Recorded Representations.** - The maintenance and acceptance tolerances on test weight per bushel indications or recorded representations shall be 0.193 kg/hL or 0.15 lb/bu. The test methods used shall be those specified by the USDA GIPSA.~~
~~(Amended 1992)~~

Table T.2. Acceptance and Maintenance Tolerances for Grain Moisture Meters		
Moisture		
Type of Grain or Seed	**Acceptance and Maintenance Tolerance**	**Minimum Tolerance**
Corn, oats, rice, sorghum, sunflower	0.05 of the percent moisture content	0.8 percent in moisture content
All other cereal grains and oil seeds	0.04 of the percent moisture content	0.7 percent in moisture content
Test Weight per Bushel		
Type of Grain or Seed	Acceptance and Maintenance Tolerance	
Corn, oats	0.8 pounds per bushel	
All wheat classes	0.5 pounds per bushel	
Soybeans, barley, ~~oats,~~ rice, sunflower, sorghum	0.7 pounds per bushel	

UR.1.1. Value of the Smallest Unit on Primary Indicating and Recording Elements. - The resolution of the moisture meter display shall be 0.1 percent moisture and 0.1 pounds per bushel test weight during commercial use.

UR.3.4. Printed Tickets.

(b) The customer shall be given a printed ticket showing the date, grain type, grain moisture results, test weight per bushel, and calibration version identification. The ticket shall be generated by the grain moisture meter system. (Amended 1993 and 1995)

UR.3.10. Posting of Meter Operating Range. - The operating range of the grain moisture meter shall be clearly and conspicuously posted in the place of business such that the information is readily visible from a reasonable customer position. The posted information shall include the following:

(b) The moisture range ~~and test weight per bushel range~~ for each grain or seed for which the meter is to be used.

2. Review of EPO's and Test Procedures for the field evaluation of GMM devices

Background: At the March 1998 GMM/NIR Sector meetings three working groups were established to develop Examination Procedure Outlines (EPO's) and Field Evaluation Test Procedures for GMM and NIR devices to provide guidance to States on implementing NIST HB 44 as it applies to these devices. The groups were assigned the following development tasks:

Group 1- EPO XXX for Grain Moisture Meters and NIST HB 44 Recommended Field Evaluation Test Procedures for Grain Moisture Meters, Whole Grain Sample Method.

Group 2 - EPO XXX for Near Infrared Grain Analyzers and Appendix A of EPO XXX, NIST HB 44 Recommended Field Evaluation Test Procedures for Near Infrared Analyzers.

Group 3 - Appendix B, Alternative Field Evaluation Test Procedures for Grain Moisture Meters, Meter to Meter Method.

Templates were developed to assist the working groups with their assignments in documenting the EPO's and field evaluation test procedures. The output of the working groups was reviewed at the Sector's September 1999 meeting.

Regarding the EPO's, the Sector noted:

1. Several of the items in the check list are specifications which can be verified only during NTEP conformance testing.
2. The organization of items is confusing. It was suggested that items common to both Sec. 5.56.(a) and Sec.5.56.(b) of the code be placed in a section listing requirements applicable to all GMMs regardless of date of manufacture. Also, some of the items listed from the General Code are covered in detail in the GMM Code. In these cases, the GMM Code takes precedence, and the General Code need not be repeated.
3. Reference is made to NTEP and non-NTEP meters, but the requirement that the "NTEP" requirements are applicable to any GMM manufactured or placed in service after January 1, 1998.
4. The Scope section should be expanded to include what is being evaluated when using the Test Procedures of Appendix A vs. Appendix B (e.g., Appendix B, Meter to Like Meter - hardware check).

Regarding the Test Procedures, the Sector noted:

1. Editing is needed to achieve consistency between the procedures.
2. If alternative procedures are available, the Scope section of each procedure should describe the situation that would lead to the choice of that particular procedure.
3. Equipment lists should contain only those items necessary to perform the field test described by the procedure.
4. The subtitle of Appendix A, "Whole Grain Sample Method" is not sufficiently descriptive (Appendix B also uses "whole grain samples"). Alternate suggestions: "Oven Reference Method Using Grain Samples as Transfer Standards" or, simply, "Oven Reference Method."

Discussion: Revised drafts of the Grain Moisture Meter (GMM) Field Evaluation Test Procedures for the air oven reference method and the meter to meter method were distributed for review. The latest draft of the GMM EPO was not available at the meeting. It will be distributed with the Sector's Meeting Summary. Because of time limitations, only the meter to meter method was reviewed in detail. Don Onwiler, Nebraska Dept. of Agriculture, Weights & Measures Division, requested that the Scope be modified to also address non-NTEP meter to meter testing. The Sector acknowledged that States electing to use the meter to like-meter method for field testing for NTEP meters would be unlikely to use a different method for non-NTEP meters. Because meter to like-meter testing verifies only device function, it was pointed out that the State would have to have to establish the validity of calibrations on non-NTEP meters. There was concern that States would not be able to utilize a large enough set of samples to adequately establish calibration validity or uniformity with NTEP meters over the full range of moistures.

Decision: To address meter to like-meter testing of non-NTEP meters, the Sector agreed to modify paragraph 1.1. of the Draft Test Procedure:

> 1.1 This procedure is applicable to the field evaluation of commercial grain moisture meters by means of standard meters of like type calibrated to factory specifications. Use of this procedure will provide information that the meter is functioning properly (functioning similarly to the like-meter that is used as the standard meter) and verification that the correct calibrations are in use. This procedure is an alternate procedure applicable to meters of the same types as those in the NTEP Phase II Ongoing Calibration Maintenance Program where the accuracy of moisture calibrations have been verified with a National Sample Set traceable to the official air oven reference method. <u>States wishing to apply this test procedure to non-NTEP meters of like type must establish the validity of the calibrations over the full range of moistures.</u>

In addition to a number of editorial revisions, the Sector also approved the following significant changes to the draft:

- Change title to read:
  Field Evaluation and Laboratory Test Procedures for Grain Moisture Meters (GMM)
  Meter to Meter Method
- Remove all references to "one pint" as the sample quantity.
- Change the storage temperature range in paragraph 4.1 from "1 ° to 3 ° Celsius" to "2 ° to 7 °Celsius."
- Re-write/re-organize paragraphs 5.4.1 and 5.4.2 to stress that the comparison is between lab standard meters and field standard meters of like type. Don Onwiler is to provide Diane Lee with details of these steps.
- In Table B.2., change the minimum number of drops for all other cereal grains and oil seeds from 2 to 3.

2. b) Proposed Changes to Handbook 44 - Addition of Tolerances for Meter to Like-Meter Testing and Removal of Footnote 1.

Background/Discussion: During the discussion of the Field Test Procedure for the meter to like-meter method, Don Onwiler proposed that the tolerances for the meter to like-meter method be added to both §5.56(a) [applicable to NTEP meters] and §5.56(b) [applicable to non-NTEP meters] of Handbook 44. He also proposed that footnote 1(to paragraphs N.1.1. Transfer Standards and N.1.2. Minimum Test) describing the GIPSA meter to meter method be removed from those sections of the code. Although Sector members were in agreement to the removal of footnote 1, most voiced strong objections to adding the meter to like-meter tolerance to part (b) of the code. It was pointed out that mandatory participation of NTEP meters in the ongoing calibration review program assured that calibrations used on NTEP meters (including the GIPSA official meter) would be validated annually against the air oven using the same sample set, thus assuring uniformity between meters of different make and manufacture. With this program in place to prove the validity of calibrations and uniformity across models, meter to like-meter comparison is a legitimate and effective method of determining in the field if meters are functioning properly. The safeguard of on-going calibration review on a very large national sample set is not present with non-NTEP meters, thus uniformity across models cannot be assured.

Decision: The Sector was unanimous in recommending that footnote 1 be removed from both §5.56(a) [applicable to NTEP meters] and §5.56(b) [applicable to non-NTEP meters] of Handbook 44. By a vote of 9 to 3 the Sector rejected the proposal to add tolerances for meter to like-meter testing to both sections of the code. Subsequently, the Sector agreed unanimously to recommended that language be developed to add the meter to like-meter testing method to §5.56(a) with the tolerances shown below.

Note 1: The specific language for amending §5.56(a) to include the meter to like-meter testing method was not available for Sector review at this meeting. The specific language will be the subject of a letter ballot which will be sent to Sector members in early October so responses will be received in time to forward the proposal to the S&T Committee for placement on the NCWM Interim Meeting Agenda.

Table T.2.2. Acceptance and Maintenance Tolerances
Meter to Like-Type Meter Method

Sample Reference Moisture	Tolerance
Up to 22 %	0.5 percent in moisture content

Note 2: Don Onwiler informed the Sector that he intended to submit a proposal to the Central Weights and Measures Association (CWMA) recommending that both §5.56(a) [applicable to NTEP meters] and §5.56(b) [applicable to non-NTEP meters] of Handbook 44 be amended to include the meter to like-meter testing method. At their interim meeting, held September 11-14, 2000, in Bettendorf, IA, the CWMA agreed to forward the proposal to the S&T Committee for inclusion on the NCWM Meeting Agenda.

3. Update on Type Evaluation and Phase II Testing

Background/Discussion: Rich Pierce of the Grain Inspection, Processors and Stockyards Administration (GIPSA, formerly FGIS), the NTEP Participating Laboratory for Grain Moisture Meters, reported on the progress of Type Evaluations and the collection and analysis of OCP (Phase II) data on the 1999 crop. The program is now beginning its sixth year. Certificates based on 1999 data have been drafted and sent to manufacturers for review. Six models participated in the ongoing

calibration review program (Phase II) for 1999. Although Foss has chosen not to re-enroll the GrainSpec A in the program, the addition of the Foss Infratec 1241, as a new type, means that there will still be six models in the program for the 2000 harvest year. The cost to manufacturers will be $5,250 per type. Models enrolled for the 2000 harvest include:

DICKEY-john	GAC-2000NTEP Version/GAC-2100/GAC 2100a
Foss	Infratec 1227/ Infratec 1229
Foss	*Infratec 1241*
Motomco	919E/919ES
Seedburo	GMA-128
Steinlite	SL95

4. Proposed Change to Publication 14 - GMM Check List, Calibration Integrity, Paragraph 4.5.2

Background/Discussion : At its March 1997 meeting, the Sector proposed revisions to paragraph S.2.4.3 of Grain Moisture Meter Code 5.56(a) to make it clear that calibrations must be transferable between instruments of like type **without** requiring user slope or bias adjustments. The proposed revisions were also intended to clarify the difference between standardization adjustments (or parameters) and grain calibration coefficients. These recommendations were adopted by the by the NCWM at their 1998 Annual meeting and were made nonretroactive and effective as of of January 1, 1999. Through an oversight, the GMM checklist in Publication 14 was not updated to reflect adoption by the Conference of the Sector's recommendation.

Decision: To reflect the above change to Handbook 44, revise paragraph 4.5.2 of the GMM Check List in Publication 14 as shown below:

4.5.2. The instrument hardware/software design and calibration procedures permit calibration development and ~~mathematical~~ transfer of calibrations between instruments of like models without requiring user slope or bias adjustments. **Yes ☐ No ☐ NA ☐**

5. Status of NTEP Meters in the Field - Review of Data from State Inspections

Background: At previous Sector meetings, the issues of: 1) the States becoming more involved with NTEP, and 2) obtaining objective evidence that NTEP and the OCP are working, have been discussed. To address these issues, several States have offered to provide summaries of their field inspection data from the inspection of NTEP Grain Moisture Meters (both dielectric and near infrared technology) to NIST. At the September 1999 Sector meeting, Diane Lee, NIST, reported on results received from Arkansas, Maryland, Illinois, and North Carolina. The Sector was encouraged by the results which show significant improvement compared to baseline data collected several years ago (see chart below).

Moisture Interval % moisture	Average Difference Between NTEP Meters and Air Oven All Data from Field Inspections Prior to 1999 Harvest in AR, MD, IL, & NC (% moisture content / SDD)									
	n	CORN	n	SOYBEAN	n	SOFT RED WINTER	n	SORGHUM	n	BARLEY
10 - 12	0	no data	8	-0.20 / 0.22	0	no data	0	no data	0	no data
12 - 14	2	0.59 / 0.01	40	-0.03 / 0.19	36	-0.31 / 0.33	0	no data	0	no data
14 - 16	50	0.07 / 0.34	49	-0.10 / 0.22	31	-0.21 / 0.24	4	-0.26 / 0.09	12	0.20 / 0.15
16 - 18	52	-0.09 / 0.27	12	-0.35 / 0.29	40	0.05 / 0.27	0	no data	0	no data
18 - 20	51	-0.16/0.33	0	no data	0	no data	0	no data	0	no data

n = number of meters

Update: A request for data obtained from annual field inspections for the 2000 harvest season was sent May 8, 2000, to all state labs with grain moisture programs. As of the Sector meeting, data had been received from only three states: Illinois, Missouri, and Maryland. Data will be tabulated when reports have been received from additional states.

6. Inspection Problems Arising from "Cross-Utilized" (Federal/Commercial) Moisture Meters

Background/Discussion: GIPSA has initiated a program whereby elevator or official agency owned instruments can be "cross-utilized" between official inspection and commercial applications. Problems have arisen when such meters fail State inspections (against air oven) after recently being tested and passed by GIPSA (using a meter-to-like meter check test). This problem first arose in Illinois. GIPSA and Illinois W&M officials have developed procedures for addressing problems caused by overlap in their two field examination procedures. Dave Funk, GIPSA, reviewed the procedures for the Sector. Key steps include: The state was provided with a list of meters which were being cross-utilized (and their locations.) When a cross-utilized meter is tested and approved by GIPSA in accordance with procedures in the GIPSA Moisture Handbook, that meter is approved for inspection. If it subsequently fails the state test, it will be re-tested using a different set of grain samples. If the second test passes, the meter will receive a state approval sticker. If it fails the second test, the state will contact GIPSA and both agencies will share and review pertinent information. GIPSA will then perform a second check test. If the meter fails the second GIPSA check test, it will be sent for repair. If the meter passes the second check test, GIPSA will request from the state agency the samples used in the state's second test. To be acceptable for testing cross-utilized meters, the magnitude of the difference between the average of the standard meters and the air oven result should be no greater that the state tolerance minus 0.2 % moisture. If the samples do not meet this criteria, the state will repeat the test using valid samples. If the samples are found to be valid, the meter is returned to the manufacturer. If the meter is found to be out of tolerance, it will be repaired. If in tolerance, the state, GIPSA, and the manufacturer will jointly investigate the discrepancy. The meter will be re-inspected by both agencies after the situation is resolved.

7. Intercomparison of Air Oven Moistures Between GIPSA, the States, and Manufacturers

Background: Under the NTEP program for grain moisture meters, calibrations are based on USDA/GIPSA air ovens while field inspection is based on state air ovens. For the program to be effective, procedures must be in place to assure that State oven results (and manufacturers' oven results) agree with the USDA/GIPSA air oven which is considered the standard. NIST-OWM's laboratory measurement traceability program requires that laboratories participate in interlaboratory and other collaborative experiments. This requirement has been met by one of two methods: 1) individual laboratories independently send samples to GIPSA for air oven analysis, and subsequently compare their results to those obtained by GIPSA; or 2) a structured collaborative study where every lab, including GIPSA, measure the same sample. A structured collaborative air oven study was last conducted following the 1995 harvest. Results of that study were reported at the March 1996 Sector meeting. In that study, three corn samples, three soybean samples, and two wheat samples were sent to each of 37 participants (the NTEP laboratory, Iowa State University, 13 state metrology laboratories, 7 manufacturers, and 15 Iowa NIR Network Elevators.) Participants were asked to measure these samples on whatever moisture meters were available at their location, and if they had oven capability to also make oven moisture determinations on the samples. The NTEP laboratory (GIPSA) reported air oven results for all three grains while 21 labs reported oven results for corn, and 17 labs reported oven results for soybeans and wheat.

Discussion: A structured collaborative study has at least two advantages over independent submission of samples to GIPSA by individual laboratories: 1) in addition to a check against the "standard," it provides information on how individual labs compare with each other; 2) it allows GIPSA to plan for a known work load. On the other hand, sample preparation and distribution are more costly for a collaborative study. The Sector is asked to consider the following:

- Should the another collaborative air-oven study be conducted?
- If so, when should it be conducted?
- How many grain types should be involved?
- Who will provide the samples and act as "pivot" lab?
- Who will act as referee?
- What is the projected cost of a collaborative study?
- Who will pay for the study?
- How often should collaborative studies be conducted?

Decision: Because of time limitations, this item was not discussed. It will be carried over to the Sector's next meeting.

8. Criteria for Like Type

Background: A National Type Evaluation Program (NTEP) Certificate of Conformance (CC) represents conformance of a designated model (or models) to a single type or pattern. NCWM Publication 14 defines "Type" as:

> A model or models of a particular measurement system, instrument, element or a field standard that positively identifies the design. A specific type may vary in its measurement ranges, size, performance, and operating characteristics as specified in the Certificate of Conformance.

When a manufacturer introduces a new model which is similar to a type for which a CC has been issued, a decision must be made as to whether the new device is subject to a full evaluation, or whether it can be considered as a "like type" to the existing unit and thus eligible to be added to the existing CC without testing. Publication 14, offers the following guidelines for making this decision:

> 1. Superficial Differences Between Devices
> Types that are identical in design, materials, and components used, and measurement ranges, but that differ superficially in their enclosures, detailed size, color, or location of non-metrological appointments (function lights, display location, operational key locations, etc.) will usually be submitted to a single evaluation.
>
> 2. Component Variations
> Types produced by the same manufacturer with nominally identical components or materials procured from different suppliers can usually be regarded as the same type. They will be covered by a single evaluation if the different components or materials are not likely to affect the regulated metrological characteristics, reliability, or life of the types.
>
> If changes in components or materials are likely to affect the performance or operational characteristics of a device, separate evaluations will generally be required. A type is considered MODIFIED if a change alters a metrological or technical characteristic.

Discussion: Dr. Charles Hurburgh, Jr., Iowa State University - Agricultural Extension Service, has requested a discussion of the following questions:

- What constitutes like type (the criteria for being like type) for NTEP CC purposes?
- If data from non-like type devices (or non-approved and approved devices) is combined into a new calibration, how would GIPSA, NTEP, and State Weights and Measures officials treat the new calibration? (E.g., Is the new calibration permissible if it passes the tests?)
- Is the Official GIPSA system bound by the same definitions of like type as NTEP? (E.g., Will the Official system consider instruments equal and interchangeable even if NTEP has separate CCs because they were judged not to be of like type?)

He reports that these questions arise from the recent introduction of modifications to NIR instruments that may make them not of like type, even though they use the same calibrations or use a calibration derived from a database containing data from both original and modified instruments. The trend to worldwide neural networks and local regression databases may result in the development of calibrations based on data from instruments that are not of like type. He cited the new 1241 Infratec, submitted as a separate unit from the Infratec 1227 and 1229 units (which have been issued a separate CC) as a case in point. He is of the belief that a policy is needed here that is protective but not restrictive of technology.

Decision: Because of time limitations, this item was not discussed. It will be carried over to the Sector's next meeting.

9. Update on NTEP Transition Activities and NIST/OWM Personnel Changes

Background/Discussion: The NCWM was incorporated in August 1997 to protect them from liability in various NCWM activities. NCWM, Inc., is now assuming many of the NCWM business and administrative functions previously performed by NIST. By October 1, 2000, all administrative duties associated with NTEP are scheduled to be turned over to NCWM, Inc. Diane Lee, NIST, reported that OWM and NCWM had established the following schedule for specific activities related to processing Certificates of Conformance (CCs) during the transition period: All type-evaluated devices that meet NIST Handbook 44 requirements will ultimately receive NTEP CCs. NTEP CCs issued prior to October 1 will be issued as NIST NTEP CCs. CCs issued on or after October 1 will be issued as NCWM NTEP CCs. Until October 1, NIST will continue to issue CC numbers for devices that have been evaluated and found to comply with the NTEP criteria to allow the NTEP CCs to become effective. NCWM will continue this practice after October 1. However, many of the CCs for devices for which NIST issues CC numbers will be issued as NCWM CCs since these CCs may not be finalized prior to October 1. Draft CCs and applications for paper updates received at NIST before August 1 will result in CCs issued by NIST. Draft CCs and applications for paper updates received at NIST between August 1 and August 31 may not be finalized by October 1 and may be issued as NCWM NTEP CCs. NIST will process as many CCs as possible prior to October 1. Applications for devices requiring testing received at NIST prior to September 1 will be processed by NIST. CCs for these devices may not be finalized prior to October 1 in which case they will be issued as NCWM NTEP CCs. 3. Beginning September 1, all NTEP applications should be sent to NCWM Headquarters at:

National Conference on Weights and Measures
15245 Shady Grove Road - Suite 130
Rockville, Maryland 20850-3222
Telephone: (240) 632-9454
Fax: (301) 990-9771

The application fee charged by NCWM will be the same as that currently charged by NIST ($690). NCWM accepts payment by check (made out to NCWM, Inc.) or payment with Visa, MasterCard, and American Express credit cards. NCWM does not accept purchase order numbers. Applications received at NIST on or after September 1 will be returned to the company for re-submission directly to NCWM.

NTEP CCs resulting from these applications will receive NCWM CCs. On and after October 1, All CCs will be issued by NCWM as NCWM NTEP CCs. All current, open applications will be transferred to NCWM for final processing on September 29 (October 1 falls on a Sunday). Necessary steps will be taken to protect proprietary information. Applications for which testing is still in process as of October 1 will continue through the already established NTEP process under the management of NCWM. CCs resulting from successful testing of these devices will be issued as NCWM NTEP CCs.

Regarding NIST/OWM Personnel Changes, Ms. Lee reported that Gil Ugiansky, formerly Chief of the Office of Weights and Measures (OWM), has been promoted to the position of Deputy Director, Office of Management Services. Henry Oppermann has replaced him as Chief of OWM. Long time Sector members will remember that Henry was an active participant in the Sector's early days. The Sector welcomes Henry back to OWM. Ms. Lee also reported that Stephen Patoray has been hired by NCWM to serve as NTEP Director. He will be attending future Sector meetings as the NCWM/NTEP representative.

10. Report on the 2000 NCWM Interim and Annual Meetings

Background/Discussion: The 2000 NCWM Interim meeting was held January 18-23 in Bethesda, MD. The annual meeting was held July 16-20 in Richmond, VA. Diane Lee reported on action taken at these meetings on issues of interest to the Sector.

- **S&T Item 360-3 (App. E)** - The GMM Sector's proposal to **Modify the Grain Moisture Meters Code to Recognize Indications and Recorded Representations in Weight per Bushel** was accepted by the S&T Committee as a developing issue. Developing issues have not received sufficient review by all parties affected by the proposals or may be insufficiently developed, they are not ready for review by the NCWM S&T Committee. They are published to disseminate information about emerging issues which have merit and are of national interest.

11. Time and Place for Next Meeting

The next meeting is tentatively planned for the week of August 20, 2001 in the Kansas City, MO area. Meetings will be held in the either the conference facility at the GIPSA Tech Center or in one of the meeting rooms at the NOAA Weather Training Center. A tentative schedule is shown below.

Wednesday, August 22	1:00 p.m.	-	5:00 p.m.	GMM Sector Meeting
Thursday, August 23	8:00 a.m.	-	3:00 p.m.	GMM Sector Meeting
Thursday, August 23	3:00 p.m.	-	5:00 p.m.	Joint session GMM & NIR Analyzer
Friday, August 24	8:00 a.m.	-	12:00 noon	NIR Grain Analyzer Sector Meeting

The above schedule is subject to change pending confirmation of funding availability and determination of final agenda issues. Sector members and interested parties are asked to try to keep that week open until firm dates have been set.

Attendance List
Grain Moisture Meter & NIR Protein Analyzer Sector Meetings
August 23-25, 2000, Kansas City, MO

Name & Affiliation	Address	Phone, Fax, E-Mail	August		
			23	24	25
Jack Barber JB Associates	10349 Old Indian Trail Glenarm, IL 62536	Phone: 217-483-4232 Fax: 217-483-3712 E-mail: jbarber@cityscape.net	x	x	x
Connie Brown DICKEY-john Corp.	5200 DICKEY-john Road P.O. Box 10 Auburn, IL 62615	Phone: 217-438-3371 Fax: 217-438-6157 E-mail: CBrown@dickey-john.com	x	x	x
Randy Burns Arkansas Bureau of Standards	4608 West 61st Street Little Rock, AR 72209	Phone: 501-570-1153 Fax: 501-562-7605 E-mail: BurnsR@aspb.state.ar.us	x	x	x
Marty Clements Steinlite Corporation	121 N. 4th Street Atchison, KS 66002	Phone: 913-367-3945 Fax: 913-367-4523 E-mail: clements@steinlite.com	x	x	
Cassie Eigenmann Pierson DICKEY-john Corp.	5200 DICKEY-john Road P.O. Box 10 Auburn, IL 62615	Phone: 217-438-3371 Fax: 217-438-6157 E-mail: ceigenmann@dickey-john.com	x	x	x
Arnold Eilert Bran+Luebbe	1025 Busch Parkway Buffalo Grove, IL 60089-4516	Phone: 847-520-0700 Fax: 847-520-0855 E-mail: eilert@branluebbe.com	x	x	x
Andrew Gell Foss North America	11 Edvac Drive - Unit #10 Brampton, Ontario L6S 5W5 Canada	Phone: 905-793-6440 Fax: 905-793-6719 E-mail: agell@fossnorthamerica.com	x	x	x
Rich Flaugh GSF Inc.	5225 NW Beaver Drive Johnston, IA 50131	Phone: 515-727-1419 Fax: 515-727-1423 E-mail: richf@gsfinc.com	x	x	
David Funk GIPSA	10383 N. Executive Hills Blvd. Kansas City, MO 64153-1394	Phone: 816-891-0430 Fax: 816-891-8070 E-mail: dfunk@gipsakc.usda.gov	x	x	x
Charles Hurburgh, Jr. Iowa State University Agricultural Engineering Dept.	1541 Food Sciences Building Ames, IA 50011-1061	Phone: 515-294-8629 Fax: 515-294-6383 E-mail: tatry@iastate.edu	x	x	x
David Krejci Grain Elevator & Processing Society	P.O. Box 15026 Minneapolis, MN 55415-0026	Phone: 612-339-4625 Fax: 612-339-4644 E-mail: david@geaps.com	x	x	x

Attendance List
Grain Moisture Meter & NIR Protein Analyzer Sector Meetings
August 23-25, 2000, Kansas City, MO

Name & Affiliation	Address	Phone, Fax, E-Mail	August		
			23	24	25
G. Diane Lee Natl. Institute of Stds. & Technology, Office of Weights and Measures	100 Bureau Drive, Stop 2350 Gaithersburg, MD 20899-2350	Phone: 301-975-4405 Fax: 301-926-0647 E-mail: diane.lee@nist.gov	x	x	x
Tom O'Connor National Grain & Feed Association	1250 I St. NW Suite 1003 Washington, DC 20005	Phone: 202-289-0873 Fax: 202-289-5388 E-mail: toconnor@ngfa.org	x	x	x
Don Onwiler Nebraska Dept. of Agriculture, Weights & Measures Division	301 Centennial Mall South P.O. Box 94757 Lincoln, NE 68509	Phone: 402-471-4292 Fax:: 402-471-2759 E-mail: donlo@agr.state.ne.us	x	x	x
Richard Pierce Grain Inspection, Packers and Stockyards Administration	10383 N. Executive Hills Blvd. Kansas City, MO 64153-1394	Phone: 816-891-0449 Fax: 816-891-8070 E-mail: rpierce@gipsakc.usda.gov	x	x	x
James Rampton Grain Inspection, Packers and Stockyards Administration	10383 N. Executive Hills Blvd. Kansas City, MO 64153-1394	Phone: 816-891-0450 Fax: 816-891-8070 E-mail: jrampton@gipsakc.usda.gov	x	x	
Joe Rothleder California Department of Food & Agriculture	8500 Fruitridge Road Sacramento, CA 95826	Phone: 916-229-3022 Fax: 916-229-3026 E-mail: JRothleder@cdfa.ca.gov	x	x	x
Tom Runyon Seedburo Equipment Co.	1022 West Jackson Chicago, IL 60607-2990	Phone: 312-738-3700 Fax: 312-738-3544 E-mail: trunyon@seedburo.com	x	x	
Cheryl Tew North Carolina Dept. of Agriculture & Consumer Services, Stds Division	NCDA, Standards Division PO Box 27647 Raleigh, NC 27611	Phone: 919-733-4411 Fax: 919-733-8804 E-mail: Cheryl.Tew@ncmail.net	x	x	x
Robert Wittenberger Missouri Dept. of Agriculture Div. of Weights & Measures	P.O. Box 630 Jefferson City, MO 65102	Phone: 573-751-3440 Fax: 573-751-0281 E-mail: bob_wittenberger @mail.mda.state.mo.us	x	x	x
Will Wotthlie Maryland Department of Agriculture Weights & Measures Section	50 Harry S. Truman Parkway Annapolis, MD 21401	Phone: 410-841-5790 Fax: 410-841-2765 E-mail: wotthlrw@mda.state.md.us	x	x	x

Appendix E
National Type Evaluation Technical Committee
Near Infrared Protein Analyzer Sector
August 25, 2000, Kansas City, MO
Meeting Summary

Agenda Items

- ***1. Criteria for Like Type**
- ***2. Update on NTEP Transition Activities and NIST/OWM Personnel Changes**
- ***3. Report on the 2000 NCWM Interim and Annual Meetings**
- ***4. Time and Place for Next Meeting**
- **5. NIR Tentative Code Study - Review of Additional Data**
- **6. NIR Tentative Code - Indication of Additional Constituent Values**
- **7. Review of Evaluation Procedure Outlines (EPO's) and Test Procedures for the Field Evaluation of Near Infrared Grain Analyzers**

* Note: Because of common interest, items marked with an asterisk (*) were considered in joint session of the NIR Protein Analyzer and the Grain Moisture Meter Sectors.

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1. Criteria for Like Type

Background: A National Type Evaluation Program (NTEP) Certificate of Conformance (CC) represents conformance of a designated model (or models) to a single type or pattern. NCWM Publication 14 defines "Type" as:

> A model or models of a particular measurement system, instrument, element or a field standard that positively identifies the design. A specific type may vary in its measurement ranges, size, performance, and operating characteristics as specified In the Certificate of Conformance.

When a manufacturer introduces a new model which is similar to a type for which a CC has been issued, a decision must be made as to whether the new device is subject to a full evaluation, or whether it can be considered as a "like type" to the existing unit and thus eligible to be added to the existing CC without testing. Publication 14, offers the following guidelines for making this decision:

1. Superficial Differences Between Devices

Types that are identical in design, materials, and components used, and measurement ranges, but that differ superficially in their enclosures, detailed size, color, or location of non-metrological appointments (function lights, display location, operational key locations, etc.) will usually be submitted to a single evaluation.

2. Component Variations

Types produced by the same manufacturer with nominally identical components or materials procured from different suppliers can usually be regarded as the same type. They will be covered by a single evaluation if the different components or materials are not likely to affect the regulated metrological characteristics, reliability, or life of the types.

If changes in components or materials are likely to affect the performance or operational characteristics of a device, separate evaluations will generally be required. A type is considered MODIFIED if a change alters a metrological or technical characteristic.

Discussion: Dr. Charles Hurburgh, Jr., Iowa State University - Agricultural Extension Service, has requested a discussion of the following questions:

- What constitutes like type (the criteria for being like type) for NTEP CC purposes?
- If data from non-like type devices (or non-approved and approved devices) is combined into a new calibration, how would GIPSA, NTEP, and State Weights and Measures officials treat the new calibration? (E.g., Is the new calibration permissible if it passes the tests?)
- Is the Official GIPSA system bound by the same definitions of like type as NTEP? (E.g., Will the Official system consider instruments equal and interchangeable even if NTEP has separate Certificates of Conformance because they were judged not to be of like type?)

He reports that these questions arise from the recent introduction of modifications to NIR instruments that may make them not of like type, even though they use the same calibrations or use a calibration derived from a database containing data from both original and modified instruments. The trend to worldwide neural networks and local regression databases may result in the development of calibrations based on data from non-like type instruments. He cited the new 1241 Infratec, submitted as a separate unit from the Infratec 1227 and 1229 units (which have been issued a separate CC) as a case in point. He is of the belief that a policy is needed here that is protective but not restrictive of technology.

Conclusion: Because of time limitations, this item was not discussed. It will be carried over to the Sector's next meeting.

2. Update on NTEP Transition Activities and NIST/OWM Personnel Changes

Background/Discussion: The NCWM was incorporated in August 1997 to protect them from liability in various NCWM activities. NCWM, Inc., is now assuming many of the NCWM business and administrative functions previously performed by NIST. By October 1, 2000, all administrative duties associated with NTEP are scheduled to be turned over to NCWM, Inc. Diane Lee, NIST, reported that OWM and NCWM had established the following schedule for specific activities related to processing Certificates of Conformance (CCs) during the transition period: All type-evaluated devices that meet NIST Handbook 44 requirements will ultimately receive NTEP CCs. NTEP CCs issued prior to October 1 will be issued as NIST NTEP CCs. CCs issued on or after October 1 will be issued as NCWM NTEP CCs. Until October 1, NIST will continue to issue CC numbers for devices that have been evaluated and found to comply with the NTEP criteria to allow the NTEP CCs to become effective. NCWM will continue this practice after October 1. However, many of the CCs for devices for which NIST issues CC numbers will be issued as NCWM CCs since these CCs may not be finalized prior to October 1. Draft CCs and applications for paper updates received at NIST before August 1 will result in CCs issued by NIST. Draft CCs and applications for paper updates received at NIST between August 1 and August 31 may not be finalized by October 1 and may be issued as NCWM NTEP CCs. NIST will process as many CCs as possible prior to October 1. Applications for devices requiring testing received at NIST prior to September 1 will be processed by NIST. CCs for these devices may not be finalized prior to October 1 in which case they will be issued as NCWM NTEP CCs. 3. Beginning September 1, all NTEP applications should be sent to NCWM Headquarters at:

National Conference on Weights and Measures
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Rockville, Maryland 20850-3222
Telephone: (240) 632-9454
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The application fee charged by NCWM will be the same as that currently charged by NIST ($690). NCWM accepts payment by check (made out to NCWM, Inc.) or payment with Visa, MasterCard, and American Express credit cards. NCWM does not accept purchase order numbers. Applications received at NIST on or after September 1 will be returned to the company for re-submission directly to NCWM. NTEP CCs resulting from these applications will receive NCWM CCs. On and after October 1, All CCs will be issued by NCWM as NCWM NTEP CCs. All current, open applications will be transferred to NCWM for final processing on September 29 (October 1 falls on a Sunday). Necessary steps will be taken to protect proprietary information. Applications for which testing is still in process as of October 1 will continue through the already established NTEP process under the management of NCWM. CCs resulting from successful testing of these devices will be issued as NCWM NTEP CCs.

Regarding NIST/OWM Personnel Changes, Ms. Lee reported that Gil Ugiansky, formerly Chief of the Office of Weights and Measures (OWM), had been promoted to the position of Deputy Director, Office of Management Services. Henry Oppermann has replaced him as Chief of OWM. Long time Sector members will remember that Henry was an active

participant in the Sector's early days. The Sector welcomes Henry back to the OWM. Ms. Lee also reported that Stephen Patoray had been hired by NCWM to serve as NTEP Director. He will be attending future Sector meetings as the NCWM/NTEP representative.

3. Report on the 2000 NCWM Interim and Annual Meetings

Background/Discussion: The 2000 NCWM Interim meeting was held January 18-23 in Bethesda, MD. The NCWM annual meeting was held July 16-20 in Richmond, VA. Diane Lee reported on action taken at these meetings on issues of interest to the Sector.

- **S&T Item 357-1** - The NIR Protein Analyzer Sector's proposal to modify the NIR Grain Analyzer Tentative Code to include **Indication of Additional Constituent Values** was reviewed by the S&T Committee and was given informational status while the Sector develops appropriate language to address the moisture basis issue for new constituents.

4. Time and Place for Next Meeting

The next meeting is tentatively planned for the week of August 20, 2001, in the Kansas City, MO, area. Meetings will be held in the either the conference facility at the GIPSA Tech Center or in one of the meeting rooms at the NOAA Weather Training Center. A tentative schedule is shown below.

Wednesday, August 22	1:00 p.m.	-	5:00 p.m.	GMM Sector Meeting
Thursday, August 23	8:00 a.m.	-	3:00 p.m.	GMM Sector Meeting
Thursday, August 23	3:00 p.m.	-	5:00 p.m.	Joint Session GMM & NIR Analyzer
Friday, August 24	8:00 a.m.	-	12:00 noon	NIR Protein Analyzer Sector Meeting

The above schedule is subject to change pending confirmation of funding availability and determination of final agenda issues. Sector members and interested parties are asked to try to keep that week open until firm dates have been set.

5. NIR Tentative Code Study - Review of Additional Data

Background: At its March 1998 meeting the Sector recognized that feedback on the practical experience of using the tentative code (and its proposed modification to include corn, soybeans, and barley) in field inspections would be required before the Sector could recommend making the tentative code permanent. To obtain this feedback, State W&M Officials were asked to participate in a study of the Code with the following objectives:

- To gain information on whether or not modifications need to be made to the NIR Tentative Code before recommending that it be upgraded to permanent code.
- To gain information on the proposed modifications to the NIR Tentative Code (adding test for corn (protein, oil, starch), barley (protein), and soybeans (protein, oil))
- To gain information on the current status of commercial NIR devices.
- To gain information on mechanisms for establishing State NIR inspection programs.

At the time of the Sector's September 1999 meeting, results had been received from five states: Arkansas, Iowa, Illinois, Nebraska and North Carolina.

Discussion: Diane Lee, NIST, reported that a memo had been sent to earlier participants requesting information on the moisture basis on which results had been reported for the instruments tested. Information received to date did not materially change the results.

6. NIR Tentative Code - Indication of Additional Constituent Values

Background: At the Sector's March 1998 meeting, State Weights and Measures representatives reported that they were seeing an increasing number of NIR Analyzers in their jurisdictions. It was also reported that much of the increase in commercial usage of NIR devices was for corn and soybeans. Protein has been a price determining feature for Barley for a number of years. In recognition of these facts, the Sector proposed modifications to the NIR Grain Analyzer Tentative Code

to include tests for corn (protein, oil, and starch), barley (protein), and soybeans (protein, oil). In comments submitted by Grain Industry representatives on the Sector's proposed addition of corn, soybeans, and barley to the Tentative Code, the industry expressed the belief that it was premature to establish a specific moisture basis in the NIR code for products other than the 12 % basis for wheat, because the marketplace is currently unsettled on an appropriate moisture basis for many of the commodities, such as high oil corn. It was their belief that establishing specific moisture bases for these products could create confusion and potential market disruption if W&M officials enforce the proposed moisture bases for corn and soybeans when commercial contracts call for different bases. The Grain Industry prefers flexibility in setting a moisture basis for a specific product because of the wide differences in moisture bases used when buying or selling grains with unique characteristics.

Reviewing data obtained in the field study of the tentative code (including the indication of additional constituent values) at its September 1999 meeting, the Sector noted that a significant number of rejects may have been due to a misunderstanding on the part of some device operators as to what moisture basis the device had been calibrated for, or confusion about how to handle the conversion between the device's reading and a different moisture basis. In the ensuing discussion, it became apparent that the practical problems associated with maintaining uniformity between devices in the field seemed to mandate that inspections, tolerances, and regulatory samples used in inspection be based on specified fixed moisture bases. On the other hand, the Sector recognized that the Grain Industry requires the flexibility to use different moisture bases.

Present day commercial devices handle the conversion to different moisture bases in a variety of ways. Assessing the suitability of many NIR instruments for operating in a regulatory environment, the Sector recognized the following problems:

- Constituent results were frequently displayed/recorded with no clear indication of moisture basis.
- There was no way for field inspectors to reliably determine the moisture bases on which calibrations were derived.

Pending resolution of the moisture basis issue, the proposal to modify the Tentative Code to include additional grains and additional constituents remains an informational item on the National Conference on Weights and Measures (NCWM) Annual Meeting agenda (Item 357-1).

Discussion: The Sector was in general agreement that the criteria listed below address the issues of enforcement and user flexibility where market conditions might require that constituent concentrations be reported on different moisture bases. It was mentioned that converting constituent values [to different moisture bases] for type evaluations might be expensive. Possible solutions to this issue and a discussion of whether the National Type Evaluation Program (NTEP) Certificate of Conformance (CC) should indicate the moisture range over which constituent calibrations were developed were postponed until the next Sector meeting.

Criteria for addressing issues related to using different moisture bases:
[Note: included in square brackets following each bulleted item are paragraph/table numbers of the Tentative Code which have been added or changed to address the bulleted item.]

- Inspections, tolerances, and regulatory samples used in inspection will be based on specified fixed moisture bases. Those moisture bases shall be the same as those used by GIPSA. [Table S.1.1.(e), T.1., N.1.]

- The moisture basis of constituent concentration measurements shall be displayed and recorded (printed). Whole grain instruments which produce results on an "as is" basis without displaying or recording a moisture value shall clearly indicate and record that the result is expressed on an "as is" moisture basis. In this case, Inspectors will convert the "as is" constituent concentration measurements of test samples to the standard moisture bases for inspection and enforcement using moisture values determined with the facility's moisture meter (which must be approved for commercial use.) Ground grain instruments must always display and record a moisture measurement for "as is" results. [S.1.1.(c), S.1.1.(e), N.1.1.]

- If an NIR instrument permits user entry of the moisture value for an "as is" constituent measurement, that moisture value must have been obtained on the same sample and must have been measured on a moisture meter approved for commercial use. [UR.2.5.]

- If a whole grain NIR instrument displays a moisture, the instrument shall be type approved as a moisture meter in

addition to its type approval as an NIR grain analyzer (See Table below). [A.3.1.]

- If an NIR instrument uses a self-generated moisture measurement internally but does NOT display or record a moisture value, the moisture calibration shall be considered to be a part of the constituent calibration. For such calibrations, the CC shall note, "Includes non-displayed moisture calibration." Changes to any part of such calibrations shall require changes to the CC. [A.3.2.]

- Moisture measurements made by an NIR instrument, whether displayed and recorded or not, shall be concurrent with the measurement of other constituents. [S.1.1.(g)]

- If constituent concentrations are converted to a user entered moisture basis, the "native" concentration and the "native" moisture basis must appear on the printout in addition to the converted concentration and the user entered moisture basis. The information presented on the printout shall be arranged in a consistent and unambiguous manner. [UR.2.3.]

- If an instrument has the capability, the user is permitted to select the moisture basis to be used on any measurement. [UR.2.1.]

- The CC shall indicate the native moisture basis of each calibration. A "native" moisture basis is typically the moisture basis on which the calibration was derived. More generally, it is the default moisture basis of the sealable calibration (or calibration pair when a non-displayed moisture calibration is also involved). [A.3.2.]

- The CC shall indicate the instrument settings which are appropriate for the each calibration. These settings shall be considered "metrologically significant" and shall be sealable. [S.2.5.2]

The Sector considered a number of possible ways to handle the proposed changes including:

- Incorporate the changes to informational item 357-1 and keep it informational.
- Recommend that the original Tentative Code be made permanent and separately propose that the changes be incorporated in the new permanent Codes.
- Incorporate only the changes relating to moisture basis in the original Tentative Code for NIR wheat protein analyzers and recommend that it be made permanent. Keep the issue of additional grains/constituents an informational item.
- Sector Technical Advisor to make all the changes to the informational item, then sent it out for ballot. If agreement is obtained, send changes to S&T committee with recommendation that they be incorporated into the Tentative Code as a voting item. In August 2000 review for a permanent code.

Conclusion: By a vote of 13 to 2, the Sector agreed on the following course of action:

1. The Sector's Technical Advisor will develop appropriate language for all the proposed additions and changes to the Tentative Code.
2. The proposed additions will be submitted to the Sector in the form of a letter ballot.
3. If the response to the letter ballot is favorable, a recommendation that the changes be incorporated into the Tentative Code will be forwarded to the Specifications and Tolerances Committee. At the August 2001 meeting the Sector will again review the Tentative Code with the intent of forwarding a recommendation that the Tentative Code be made permanent.

Subsequent to the Sector's August 2000 meeting the Sector's Technical Advisor developed the following language covering all the changes to be included in the letter ballot:

A.3. Type Evaluation. - The National Type Evaluation Program will accept for type evaluation only those devices that comply with the nonretroactive requirements scheduled to take effect on January 1, 2002. State enforcement will be based upon the effective dates identified with each requirement when specific dates are shown.

A.3.1. Dual Type Approval. - In addition to meeting the requirements of this code, a device that displays a measured moisture value must also comply with the requirements of the Grain Moisture Meter Code and be type approved as a

grain moisture meter.

A.3.2 **Calibrations.** - The National Type Evaluation Certificate of Conformance (CC) shall indicate the native moisture basis of each calibration. The "native" moisture basis is the default moisture basis of the sealable constituent calibration (or constituent calibration pair when a non-displayed moisture calibration is also involved.) If an NIR analyzer uses a self-generated moisture measurement internally but does NOT display or record a moisture value, the moisture calibration shall be considered to be a part of the constituent calibration. For such calibrations, the CC shall note, "Includes non-displayed moisture calibration." Changes to any part of such calibrations shall require changes to the CC.

A.4. - See also Sec. 1.10; General Code requirements.

S. Specifications

S.1. Design of Indicating, Recording, and Measuring Elements.

S.1.1. Digital Indications and Recording Elements.

(a) Analyzers shall be equipped with a digital indicating element.

(b) The minimum height for the digits used to display constituent values shall be 10 mm.

(c) Analyzers shall be equipped with a communication interface that permits interfacing with a recording element and transmitting the date, grain type or class, constituent values, the moisture basis for each constituent value (except moisture), and calibration version identification.

(d) A digital indicating element shall not display, and a recording element shall not record, any constituent value before the end of the measurement cycle.

(e) ~~Wheat protein content shall be recorded and displayed as percent protein reported on a constant moisture basis of 12 percent wet basis.~~ Constituent content shall be recorded and displayed as percent of total mass. The moisture basis shall also be recorded and displayed for each constituent content result (except moisture). If a whole grain analyzer that is calibrated to display results on an "as is" moisture basis does NOT display or record a moisture value, it must clearly indicate that results are expressed on an "as is" moisture basis. Ground grain analyzers must ALWAYS display and record a moisture measurement for "as is" content results (except moisture).

(f) An analyzer shall not display or record any constituent value that is beyond the operating range of the device unless the constituent value representation includes a clear error indication (and recorded error message with the recorded representation).

(g) If an NIR analyzer is used to determine a moisture value, either to determine the moisture of an "as is" constituent content measurement, or to convert from one moisture basis to another, the moisture measurement must be concurrent with the measurement of other constituents.

[Nonretroactive and effective as of January 1, 2002]

Table S.1.1.(e) Constant Moisture Basis for Type Evaluation and Field Inspection		
Grain Type or Class	*Constituent(s)*	*Moisture Basis*
Durum Wheat, Hard Red Spring Wheat, Hard Red Winter Wheat, Hard White Wheat, Soft Red Winter Wheat, Soft White Wheat	*protein*	*12 percent*
Soybeans	*protein* *oil*	*13 percent*
Two-rowed Barley *Six-rowed Barley*	*protein*	*0 percent (dry basis)*
Corn	*protein* *oil* *starch*	*0 percent (dry basis)*

S.1.2. Selecting Grain Class and Constituent. *- Provision shall be made for selecting and recording the type or class of grain and the constituent(s) to be measured. The means to select the grain type or class and constituent(s) shall be readily visible, and the type or class of grain and constituent(s) selected shall be clearly and definitely identified in letters (such as HRWW, HRSW, etc., or PROT, etc.). A symbol to identify the display of the type or class of grain and constituent(s) selected is permitted provided that it is clearly defined adjacent to the display. Minimum acceptable abbreviations are listed in Table S.1.2. Meters shall have the capability (i.e., display capacity) of indicating the grain type using a minimum of four characters in order to accommodate the abbreviations listed in Table S.1.2.*

Table S.1.2. Grain Types Considered for Type Evaluation and Calibration and Minimum Acceptable Abbreviations	
Grain Type	*Minimum Acceptable Abbreviation*
Durum Wheat	*DURW*
Hard Red Spring Wheat	*HRSW*
Hard Red Winter Wheat	*HRWW*
Hard White Wheat	*HDWW*
Soft Red Winter Wheat	*SRWW*
Soft White Wheat	*SWW*
Soybeans	*SOYB*
Two-rowed Barley	*TRB*
Six-rowed Barley	*SRB*
Corn	*CORN*

[Nonretroactive and effective as of January 1, 2002]

S.1.3. Operating Range. *- An analyzer shall automatically and clearly indicate when the operating range of the device has been exceeded. The statement of the operating range shall be specified in the operator's manual and shall operate as follows:*

(a) The ambient temperature range over which the analyzer may be used and still comply with the applicable requirements shall be specified. The minimum temperature range shall be 10 °C to 30 °C. No constituent value may be displayed when the temperature range is exceeded. An appropriate error message shall be displayed when the temperature of the analyzer is outside its specified operating range.

(b) The constituent range at the moisture basis specified in Table S.1.1.(e) shall be specified for each grain or seed for which the analyzer is to be used. A constituent value may be displayed when the constituent range is exceeded if accompanied by a clear indication that the constituent range has been exceeded.

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S.2.5. Calibration Transfer and Verification.

S.2.5.1. Calibration Transfer. *- The instrument hardware/software design and calibration procedures shall permit calibration development and the mathematical transfer of calibrations between instruments of like models.*

Note: *Only the manufacturer or the manufacturer's designated service agency may make calibration transfer or slope adjustments on near-infrared grain analyzers and, except for instrument failure and repair, only during a prescribed period of time during the year. This does not preclude the possibility of the operator installing the manufacturer-specified calibration constants or standardization parameters under the instructions of the manufacturer or the manufacturer's designated service agency. Nor does it preclude operator bias adjustments when made under the conditions specified in UR.2.8.*
[Nonretroactive and effective as of January 1, 2002.]
(Note added 1995) (Amended 1995)

S.2.5.2. Calibration Version. *- An instrument must be capable of displaying either calibration constants, a unique calibration name, or a unique calibration version number for use in verifying that the latest version of the calibration is being used to make constituent determinations, and that the appropriate instrument settings have been made for the calibration being used.*
[Nonretroactive and effective as of January 1, 2002].

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N.1. Testing Procedures.

N.1.1. Field Inspection. *- Whole grain samples shall be used as the official field inspection standards. Five samples per grain type or class shall be used to check instrument performance. Each sample will be analyzed once. One of the samples will be analyzed an additional four times to test instrument repeatability. For ground grain instruments, the ground sample will be re-packed four times. A new grind is not required. Test results must be converted to the standard moisture bases shown in Table S.1.1.(e) before applying the tolerances of Table T.2. Test results on whole grain analyzers that produce results on an "as is" basis without displaying or recording a moisture value shall be converted to the standard moisture bases shown in Table S.1.1.(e) using sample moisture values determined with the facility's moisture meter (which must be approved for commercial use.)*

~~*Wheat protein*~~ *Constituent values shall be assigned to test samples by the Grain Inspection, Packers and Stockyards Administration (GIPSA). Tolerances shall be applied to individual sample measurements, the average of individual measurements on each of the five test samples, and the maximum difference (range) in results for five analyses on one of the test samples.*

N.1.2. Standard Reference Samples, ~~Wheat.~~ *- 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 ~~wheat protein~~ constituent values obtained using the GIPSA standard reference method and an official GIPSA NIR ~~wheat protein~~ grain analyzer does not exceed ~~0.3~~ one-half of the acceptance tolerance shown in Table T.2. for individual test samples or ~~0.15~~ 0.375 times the acceptance tolerance shown for the average of five samples.*

T. Tolerances

T.1. To Underregistration and to Overregistration. - The tolerances hereinafter prescribed shall be applied to errors of underregistration and errors of overregistration and shall be based on constituent values expressed at the moisture bases shown in Table S.1.1.(e).

T.2. Tolerance Values. - Acceptance and maintenance tolerances shall be equal. Tolerances for individual samples and the average for five samples are as shown in Table T.2.

Table T.2. Acceptance and Maintenance Tolerances for NIR ~~Wheat Protein~~ Grain Analyzers

Type of Grain	Constituent	Individual Samples (percent)	Average for Five Samples (percent)	Range for Five Retests (percent)
Durum Wheat, Hard Red Spring Wheat, Hard Red Winter Wheat, Hard White Wheat, Soft Red Winter Wheat, Soft White Wheat	protein	0.60	0.40	0.40
Soybeans	*protein*	*0.80*	*0.60*	*0.60*
	oil	*0.70*	*0.50*	*0.50*
Two-rowed Barley Six-rowed Barley	*protein*	*0.70*	*0.50*	*0.50*
Corn	*protein*	*0.80*	*0.60*	*0.60*
	oil	*0.70*	*0.50*	*0.50*
	starch	*1.00*	*0.80*	*0.80*

UR. User Requirements

***UR.1. Installation Requirements.** - The NIR analyzer shall be installed in an environment within the range of temperature and/or other environmental factors specified in the operating manual.*

UR.2. User Requirements.

***UR.2.1. Operating Instructions.** - The operating instructions for the NIR analyzer shall be readily available to the user, service technician, and weights and measures official at the place of installation. It shall include a list of accessory equipment if any are required to obtain constituent values, and the type or class of grain to be measured with the NIR analyzer. If an NIR analyzer has the capability, the user is permitted to select the moisture basis to be used on any measurement.*

***UR.2.2. Other Devices not used for Commercial Measurement.** - If there are other NIR analyzers on the premises not used for trade or determining other charges for services, these devices shall be clearly and conspicuously marked "Not for Use in Trade or Commerce."*

UR.2.3. Printed Tickets. -

(a) Printed tickets shall be free from any previous indication of constituent or grain type selected. The printed ticket shall indicate constituent values ~~reported on a constant~~ and the moisture basis associated with each constituent value (except moisture). If the analyzer is calibrated to display results on an "as is" moisture basis and does NOT display or record a moisture value, the ticket must clearly indicate that results are expressed on an "as is" moisture basis.

(b) The customer shall be given a printed ticket showing the date, grain type or class, constituent results, and calibration version identification. If the analyzer converts constituent results to a manually entered moisture basis,

the "native" concentration and the "native" moisture basis must appear on the printed ticket in addition to the converted results and the manually entered moisture basis. If the manually entered moisture basis is intended to be the moisture value for an "as is" constituent concentration measurement, that moisture value must have been obtained on the same sample and must have been measured on a moisture meter approved for commercial use. The information presented on the ticket shall be arranged in a consistent and unambiguous manner. The ticket shall be generated by the near-infrared grain analyzer system.

[Nonretroactive and effective as of January 1, 2002]

***UR.2.4. Grinders.** - Place grinders in a separate room from the NIR analyzer to avoid instrument contamination. If a separate room is not available, the grinder may be in the same room with the NIR analyzer provided the grinder is not placed within 1 meter of the air intake on the NIR.*

***UR.2.5. Sampling.** - Samples shall be obtained by following appropriate sampling methods and equipment. These include, but are not limited to, grain probes of appropriate length used at random locations in the bulk, the use of a pelican sampler, or other techniques and equipment giving equivalent results. The sample shall be taken such that it is representative of the lot. If an NIR analyzer permits user entry of the moisture value for an "as is" constituent measurement, that moisture value must have been obtained on the same sample and must have been measured on a moisture meter approved for commercial use.*

7. Review of EPO's and Test Procedures for the field evaluation of Near Infrared Grain Analyzers

Background: At the March 1998 GMM/NIR Sector meetings three working groups were established to develop Examination Procedure Outlines (EPO's) and Field Evaluation Test Procedures for GMM and NIR devices to provide guidance to States on implementing H44 as it applies to these devices. The groups were assigned the following development tasks:

Group 1-	EPO XXX for Grain Moisture Meters and NIST HB 44 Recommended Field Evaluation Test Procedures for Grain Moisture Meters, Whole Grain Sample Method.
Group 2 -	EPO XXX for Near Infrared Grain Analyzers and Appendix A of EPO XXX, NIST HB 44 Recommended Field Evaluation Test Procedures for Near Infrared Analyzers.
Group 3 -	Appendix B, Alternative Field Evaluation Test Procedures for Grain Moisture Meters, Meter to Meter Method.

Templates were developed to assist the working groups with their assignments in documenting the EPO's and field evaluation test procedures. The output of the working groups was reviewed at the Sector's September 1999 meeting.

Commenting on the Draft EPO for NIR Grain Analyzers, the Sector noted:

1. Several of the items in the check list are specifications which can be verified only during NTEP conformance testing.
2. The retroactive dates have been removed from the Tentative Code. It would be helpful if the EPO provided some suggestions on which portions of the code should be applied to pre-NTEP devices.

The Test Procedure was not available for review, but the Sector noted:

1. The test protocol developed for the NIR Tentative Code Study (see Item 6, this Summary) contains the essential information needed for the Test Procedure.
2. When the Test Procedure is developed, it should be edited to be consistent with the Test Procedures for GMMs.

Because of time limitations, and recognizing that major editing might be involved in a line-by-line review of each EPO and Test Procedure, the NIST representative was asked to edit the EPOs and Test Procedures to incorporate the Sector's suggestions. Revised EPO's and Test Procedures will be available for review at the August 2000 Sector meeting.

Conclusion: This item was not discussed because of time limitations. The latest draft of the NIR EPO was not available at the meeting. It will be distributed with the Sector's Meeting Summary. Development of the NIR Field Evaluation Test Procedure has been tabled pending the outcome of the changes which have been proposed to the NIR analyzer tentative code.

Appendix F
National Type Evaluation Technical Committee
Measuring Sector
Meeting Summary
October 6-7, 2000, Austin, Texas

Agenda Items

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

Background: The 85th National Conference on Weights and Measures (NCWM) adopted the following items that will be reflected in the 2001 Edition of NIST Handbook 44 and NCWM Publication 14. These items are part of the agenda to inform the Measuring Sector of changes that immediately affect National Type Evaluation Program (NTEP) policy and procedures.

A) G.S.1. Identification; Model Number

Handbook 44 Changes:

> **G-S.1. Identification. – All equipment, except weights and separate parts necessary to the measurement process but not having any metrological effect, shall be clearly and permanently marked for the purposes of identification with the following information:**
>
> **(a) the name, initials, or trademark of the manufacturer or distributor;**
>
> **(b) a model designation that positively identifies the pattern or design of the device;**
>
> ***(c) the model designation shall be prefaced by the term "Model," "Type," or "Pattern." These terms may be followed by the term "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.);***
> ***[Nonretroactive January 1, 2003]***

(d) ***except for equipment with no moving or electronic component parts, a nonrepetitive serial number;***
[Nonretroactive as of January 1, 1968]

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

(e f) ***the serial number shall be prefaced by the words "Serial Number" or an abbreviation of that term. Abbreviations for the word "Serial" shall, as a minimum, begin with the letter "S," and abbreviations for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., S/N, SN, Ser. No, and S No.).***
[Nonretroactive as of January 1, 2001]

The required information shall be so located that it is readily observable without the necessity of the disassembly of a part requiring the use of any means separate from the device.
(Amended 1985, 1991, and 1999)

Corresponding Changes to Publication 14:

Modify the Liquid-Measuring Devices Checklist by inserting a new paragraph 1.1.2. as follows and renumber successive paragraphs:

1.1.2. ~~**A unique serial number.**~~ **The model designation shall be prefaced by the term Model," "Type," or "Pattern." These terms may be followed by the term Number" or an abbreviation of that word. The abbreviation for the word Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.)**

1.1.3. A unique serial number.

1.1.4. The serial number shall……

Modify the Electronic Cash Registers Interfaced with Retail Motor-Fuel Dispensers Checklist by inserting a new paragraph 1.3. as follows and renumber successive paragraphs:

1.3. ~~**Except for equipment with no moving parts, or electronic component parts, a nonrepetitive serial number.**~~

The model designation shall be prefaced by the term "Model," "Type," or Pattern." These terms may be followed by the term "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, as a minimum, begin with the Letter "N" (e.g., No or No.)

1.4. Except for equipment with no moving……

1.5. The serial number shall be prefaced by words, an abbreviation …….

1.6. The serial number shall be prefaced by the words "Serial Number" …….

1.7. The required information shall be so located that is readily ……

The marking must be visible after installation.

1.8. The device must be marked with a unique serial number to identify ……..

1.9. The serial number shall be prefaced by the words "Serial Number" or ……..

1.10. Equipment is to be marked on a surface that is an integral part of ……

1.11. The marking must be permanent. It may be a metal or plastic plate ……..

A) Discussion: At their October 6 2000 meeting, the NTEP Measuring Laboratories discussed the changes to G-S.1. above. The laboratories agreed that abbreviations of the term "model" should be permitted. The laboratories felt that, to ensure uniform application of the requirement, permissible abbreviations should be specified in G-S.1. Consequently, the laboratories agreed to provide the following proposal to modify Handbook 44, G-S.1. (c) for consideration by the Measuring Sector.

(c) the model designation shall be prefaced by the term "Model," "Type," or "Pattern." These terms may be followed by the term "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.) *The abbreviation for the word Model shall be "Mod."**

**[Nonretroactive January 1, 2003]*

The Sector discussed the NTEP Laboratories' proposal to specify an abbreviation for the term "Model." One laboratory noted that, for devices that have the required markings shown on the display screen, there is a desire to minimize the space required. The Sector discussed the possibility of allowing abbreviations for the terms "Type" and "Pattern"; however, the NTEP Laboratories and the Sector had a concern that abbreviating these other terms might create confusion. For example, "Pat. No." used to abbreviate "Pattern number" could be misinterpreted to mean "patent number." The Sector agreed that allowing an abbreviation for "Model" resolves the problem for manufacturers as it is the term commonly used for devices distributed in the United States.

Conclusion: The Sector agreed to forward the proposal to the NCWM Specifications and Tolerances (S&T) Committee for consideration.

B) S.1.5.3. (a) Width; Indicator Index

Handbook 44 Changes:

S.1.5.3. Width.

(a) The index of an indicator shall not be wider than the width of the ~~widest~~ narrowest graduation. [Nonretroactive as of January 1, 2002.]

(b) If the index of an indicator extends over the entire length of a graduation, it shall be of uniform width throughout the portion that coincides with the graduation.

B) Discussion: There was no discussion on this item.

2. Changes to NCWM Publication 14 Liquid Measuring Devices Technical Policy

Source: NIST/OWM

Background: During NISTs recent review and revisions to Publication 14, to reflect the 1999 Sector decisions, a number of inconsistencies were identified in the technical policy for Liquid Measuring Devices. Extensive changes have been made to **t**he NTEP Technical Policy for Liquid-Measuring Devices to correct these inconsistencies to be consistent with Sector decisions and to reorganize the format for clarity of application. Members are asked to review the technical policy section in Appendix "A" prior to the meeting. At the meeting, the Sector will determine if all changes were appropriate and in agreement with previous Sector decisions. (See Appendix "A")

Discussion: At their October 6, 2000, meeting NTEP Measuring Laboratories agreed to recommend to the Sector that requirement Number 1 be removed from Publication 14, NTEP Technical Policy for Liquid-Measuring Devices, Section "O," and the remaining requirements be renumbered accordingly. One of the laboratories questioned why the requirement was initially added. Handbook 44 does not require that loading rack meters be equipped with a printer. Loading rack meter controllers typically are not connected to a printer at the rack. At many fuel terminals, the only printed record is the bill of lading, which may be printed by an auxiliary system. Sequential blending systems may not be able to record the amount of each product in the blend. The only way to verify the accuracy of the blend ratio is through laboratory analysis of the final blended product. The members generally agreed with the laboratory recommendation.

The members generally agreed that a complete review of Section "O" is needed. During the review of the NTEP Technical Policy, several members recommended that footnote "1" be removed from the Product Families for Positive Displacement Meters Table. The formula in the footnote is not sufficiently explained and is not needed.

Conclusion: (1) The Sector agreed with the laboratory recommendation for removing item "1" from Section "O" and renumbering the remaining requirements as follows:

O. Loading Rack Meter Controllers with Blending Capabilities

In addition to the Common and General Code Criteria and applicable sections of the Wholesale and Loading Rack Meters and other Checklists, the following applies to tests of Loading Rack Meter Controllers with Blending Capabilities:

~~1.~~ ~~For NTEP testing, the printed record must show quantity delivered for each product in the blend.~~

~~2.~~1. For NTEP testing, it is acceptable for the sum of the total quantity printed/displayed for each component of the blend to be different from the total quantity delivered due to intermediate rounding of each component. For example, if the quantity for each component has a higher internal resolution than that displayed, the displayed/printed quantity will be a rounded value. If each component of the blend is rounded in this way, the sum of the components may be different (due to rounding) than the actual quantity delivered by the system.

~~3.~~2. No mathematical correction is permitted to account for growth or shrinkage due to blending of product.

(2) The Sector also agreed that footnote "1" should be removed from the Product Families for Positive Displacement Meters Table (see agenda item 4).

(3) The Sector also agreed that the entire Section "O" should be reviewed. Section "O" was added to Publication 14, as a result of discussions, at the October 1994, Measuring Sector Meeting. At the 1994 Measuring Sector Meeting, some members were concerned with the capability of sequential blending being able to meet all of the requirements in Section "O,". The Sector was also concerned that during an NTEP evaluation the actual blend ratio may not be verified. The actual blend can only be determined through laboratory analysis of the final product. Some members felt that, these concerns still need to be resolved. The Sector agreed that the Technical Advisor, Dick Suiter should work with volunteers to review the checklist and identify proposed changes for consideration by the Sector at its next meeting. Those interested in participating in this review should contact Dick Suiter by March 1, 2001.

3. Product Families for Positive Displacement and Mass Flow Meters

Source: Maurice J. Forkert (Tuthill Transfer Systems)

Background: Since the original publication of the product family requirements for positive displacement meters in Publication 14, new materials have become available for use in manufacturing metering devices. This has resulted in manufacturing companies making fewer models to meter a larger variety of liquids. The product Subgroups in the current product family table are requiring a meter to be evaluated several times for approval of virtually the same liquid. For example, a meter tested and approved for Jet Fuel requires additional testing and certification to be used for Kerosene.

The submitter has recomposed Paragraph C and the associated chart of Product Families and Product Subgroups. The proposed revisions are based on the premise that viscosity and lubricity affect a meter's accuracy; corrosiveness, lubricity and solids affect a meter's life; and terms such as "red metal" not permitted with Jet Fuel is not a metrology requirement. We have also removed the trade names from the list of typical products and replaced them with general product names.

Recommendation: Modify Publication 14, Liquid-measuring Devices Checklist Technical Policy, as follows:

- Modify Paragraph C as shown below
- Replace the product family table on page 10-14 with the table shown below
- Delete paragraph D. and the accompanying table on page 10-16:

C. Product Families for Positive Displacement Meters and Mass Flow Meters

When submitting a positive displacement meter or a mass flow meter for evaluation, the manufacturer must specify the product family and subgroup(s) for which the meter is being submitted. ~~From the list of liquids constituting a product family and subgroup, at least two liquids representative of the high and low key characteristics of that group~~ Two liquids in one Product Family, one representative of the high viscosity and one representative of the low viscosity of the viscosity range desired for approval are to be selected for use in the test. If the meter successfully completes all accuracy and permanence tests with these ~~products~~ two liquids, the resulting Certificate of Conformance will cover the ~~entire subgroup of the product family~~ the viscosity range from the tested high viscosity to the tested low viscosity of that Product Family. If only one product is tested, then only that viscosity will be covered in that Product Family, except for Chemicals, Water, and Liquefied Compressed Gasses which require only one liquid to be tested in these Product Family.

The product family and ~~the specific product subgroup~~ viscosity range covered by the Certificate are to be identified on page 1 of the Certificate of Conformance. More detailed information, including the typical product types found in the ~~subgroup~~ family is to be included in the Application section of the Certificate.

Product Family	Typical Products	Typical Viscosity	Specific Gravity	% Solids (Abrasive)
Petroleum Products, Alcohols, Glycols, Solvents & Water mixes Thereof	Diesel Fuel, Distillate, Gasoline, Fuel Oil, AV gas, Kerosene, Jet fuel, Light Oil, Spindle Oil, SAE Grades, Bunker Oil, Crude Oil, Asphalt, Ethanol, Methanol, Butanol, Isopropyl, Isobutyl, Ethylene glycol, Propylene glycol, etc. Acetates, Acetone, Esters, Ethylacetate, Hexane, MEK, Naphtha, Toluene, Xylene, Carbon Tetra-Chloride, Methylene-Chloride, Perchloro-Ethylene, Trichloro-Ethylene	2 to 10,000 SSU	0.6 to 1.6	None
Agricultural Flowable Clear Liquids - Fertilizers, Herbicides, Liquid Feeds	N-P-K, Aqua-Ammonia, Nitrogen Solutions, Urea Ammonia Nitrate, Linuron, EPTC, Simazine, Metribuzin, Butylate, Trifluralin, Glyphosate Isopropylamine Salt, Cyanazine, Atrazine, Molasses	30 to 250,000 SSU	0.9 to 1.35	None
Agricultural Suspension Liquids - Fertilizers, Liquid Feeds	N-P, N-P-K, N-P-K-S, Molasses with Additives	100 to 250,000 SSU	0.9 to 1.65	4%
Chemicals	Sulfuric Acid, Hydrochloric Acid, Phosphoric Acid	75 SSU	1.1 to 1.85	None

Water	Tap Water, Deionized, Demineralized, Potable	0.5 SSU	1.0	None
Liquefied Compressed Gasses,	Propane, Butane, Freon, Anhydrous Ammonia	0.5 to 3 SSU	0.5 to 0.68	None

Discussion: Maurice Forkert (Tuthill Transfer Systems) explained his reasons for suggesting the replacement of the current tables with the one outlined in the recommendation above. In the current table, refined fuels and aviation fuels are in separate product subgroups. Although some of the products in each group have the same physical characteristics, they would require testing with products from both subgroups to be included on the same Certificate of Conformance (CC). For example, kerosene and jet fuel must both be tested to be on the same CC, although they have the same physical characteristics. Maurice stated that the original reason for separating aviation fuels from refined petroleum products was not because of differences in the product characteristics, but because meters used for aviation fuels were not allowed to contain any components made from "red metals," such as brass bearings, which were normally used in positive displacement meters designed to measure refined petroleum products. The meters designed to measured aviation fuels were made with special carbon bearings, which were expensive and difficult to produce. The materials used in meter manufacturing today have changed. The bearings may be made of a plastic material and may be the same regardless of the product being measured.

Several problems with the proposed replacement table were addressed by Sector members. Liquefied Compressed Gasses could include Cryogenic Liquids although they are not specifically listed as typical products, nor is the listed specific gravity range broad enough to cover them. At the present time, there are no positive displacement (PD) meters with a CC for cryogenic liquids. One mass flow meter manufacturer stated that while specific gravity has an affect on the performance of both "coriolis principle" mass flow meters and positive displacement meters, viscosity of the product may only affect the performance of a positive displacement meter. The original table for PD meters was developed by PD meter manufacturers based on the principles of PD metering technology. The mass flow meter manufactures followed a similar process to develop the current table for mass flow meters based on the principles of mass flow metering technology.

Charles Nelson (California, NTEP Laboratory) discussed an alternate proposal that he is developing for the Family Products Table. His approach proposes six product groups that are further defined by specific gravity, viscosity, temperature, and pressure ranges of products. Specific gravity, viscosity, temperature, and pressure are subdivided into ranges A, B, and C. Depending on the criteria evaluated a CC may cover only one range of specific gravity, viscosity, temperature, and pressure for only one product family. If sufficient tests are conducted to cover additional products or ranges, they can be included on the resulting CC. For example; if the evaluation of a meter includes a "normal liquids" with a specific gravity within range A and a "normal liquids" with a specific gravity within range C the resulting CC will include entire range of specific gravity for "normal liquids." If a meter were tested with, only a normal liquid having a specific gravity of 1.1 only range B for normal liquids would be covered. The following is what Charles has developed thus far.

	Specific Gravity Range			Viscosity Range centipoise			Temperature Range degrees C			Pressure Range psi		
	A	B	C	A	B	C	A	B	C	A	B	C
Normal Liquids	.6 to .7	.8 to 1.5	1.6 to 2.5	<8	9 to 999	>1000		-40 to 120			0 to 150	
Compressed Liquids	.3 to .5	.6 to .8	.9 to 1.5					-40 to 50			<350	
Compressed Gasses	.6 to .7	.8 to .9	1 to 2					-40 to 50		<125	>125 to <3000	>3000
Cryogenic Liquids	.07 to .4	.5 to .8	.9 to 1.4				<-200	>-169	<-152		<350	
Heated Liquids	0.8	.9 to 1	1.1	<30	30 to 2400	>2400		>50				
Special Liquids												

Conclusion: The Sector felt that Mr. Forkert did not present sufficient data and justification for replacing the current product families tables for PD Meters and Mass flow Meters with the single table in his proposal above. The Sector, however, did agree that the current table of Product Families for Positive Displacement Meters should be reviewed and updated, if required. A small working group consisting of Sector Chairman, Richard Tucker (Tokhiem Corporation), Robert Traettino (Liquid Controls), Charles Nelson (California NTEP Laboratory), Melvin Hankel (MCH Engineering Associates Inc.), Rodney Cooper (Schlumberger Industries), and Technical Advisor, Dick Suiter (NIST) was appointed to review the table and provide recommended changes for consideration by the Sector at its next meeting. Robert Traettino (Liquid Controls) agreed to chair or coordinate the effort. No formal meetings of the group are planned. The group will try to handle its work by telephone, fax, and e-mail or will meet in conjunction with other meetings where members are present.

4. Changes to Existing Product Family Tables

Source: NIST/OWM

A) Add a Footnote to Product Families for Positive Displacement and Mass Flow Meters

Background: When the product families were developed, the list of typical products was not intended to be all-inclusive. Additionally, the Sector did not intend to limit the application of a meter only to certain products provided a given product not listed as typical fell within the family and subgroup for which the meter was evaluated. Someone looking at the tables, but not familiar with how they were developed may not understand that a CC does not necessarily list all products or product trade names that may fall within a family or subgroup.

Recommendation: Add a footnote to the tables as follows:

Product Families for Positive Displacement Meters

Product Family	Product Subgroup	Typical Products	Viscosity (Centipoise)[1]	Specific Gravity[2]	% Abrasive Solids
Petroleum Products	Refined Petroleum Products	Diesel Fuel, Distillate, Gasoline, Fuel Oil, Kerosene, Light Oil, Spindle Oil, etc.	0.3 to 150	0.68 to 1.1	None
	Aviation Fuels	AVgas, Jet A, Jet A-1, Jet B, JP4, JP5, JP7, JP8, etc.	0.4 to 3.6	0.68 to 0.85	None
	Lubricating Oils	SAE Grades	28 to 2150	0.75 to 1.0	None
	Heated Products	Bunker Oil, 6 Oil, Crude Oil, Asphalt	25 to 2420	0.8 to 1.1	None
Solvents	Solvents General	Acetates, Acetone, Esters, Ethylacetate, Hexane, MEK, Naphtha, Toluene, Xylene, etc.	0.3 to 7	0.6 to 1.6	None
	Solvents Chlorinated	Carbon Tetra-Chloride, Methylene-Chloride, Perchloro-Ethylene, Trichloro-Ethylene, Etc.	0.3 to 7	0.6 to 1.6	None
Alcohols & Glycols	Alcohols, Glycols, & Water Mixes Thereof	Ethanol, Methanol, Butanol, Isopropyl, Isobutyl, Ethylene glycol, Propylene glycol, etc.	0.3 to 7	0.6 to 1.6	None
Compressed Gases, Liquefied	LPG[3]	Propane, Butane, Ethane, Freon 11, Freon 12, Freon 22, etc.	0.1 to 0.5	0.3 to 0.65	None
	NH_3[3]	Anhydrous Ammonia	0.1	0.56 to 0.68	None
Water	Water	Tap Water, Deionized, Demineralized, Potable	1.0	1.0	None
Agricultural Liquids – Fertilizers	Fertilizers, Clear Liquid N-P-K	10-34-0; 4-10-10; 9-18-9; etc.	10 to 30	1.0 to 1.3	None
	Fertilizers, Nitrogen Solutions	20% Aqua-Ammonia; 28%, 30% or 32% Nitrogen Solution; Urea; Ammonia Nitrate; etc.	10 to 30	1.0 to 1.35	None
	Fertilizer, Suspensions	3-10-30; 4-4-27; etc.	20 to 200	1.0 to 1.65	4%

Agricultural Liquids – Herbicides	Herbicides, Thin Liquids	Eradicane, Lorox, Princep, Round-up, Sencor, Sutan, Sutazine, Treflon, etc.	18 to 65	0.9 to 1.2	Nil
	Herbicides, Viscous Liquids	Dual, etc.	26 to 144	0.9 to 1.2	Nil
	Herbicides, Flowables	Atrex, Atraxine, Bicep, Bladex, etc.	106 to 912	0.9 to 1.2	3%
Agricultural Liquids – Liquid Feeds	Liquid Feeds	Liquid Molasses; Molasses plus Phos Acid and/or Urea; etc.	10 to 50 000	1.2 to 1.5	4%
Chemicals	Chemicals	Sulfuric Acid, Hydrochloric Acid, Phosphoric Acid, etc.	1.0 to 296	1.1 to 1.85	None

[1] ~~centipoise (cP) - unit of dynamic viscosity. 1 N-s/m^2 = 1 kg/m.s= 1000 (cP) - 10 P~~
Note: The Typical Products listed in this table are not limiting or all- inclusive; there may be other products and product trade names, which would fall into a product family and product subgroup.

[2] The specific gravity of a liquid is the ratio of its density to that of water at standard conditions, usually 4 C (or 20 C) and 1 atm. The destiny of water at standard conditions is approximately 1000 kg/m^3 (or 998 kg/m^3).

Source for some of the viscosity value information is in the Industry Canada - Measurement Canada Liquid Products Group, Bulletin V-16-E (rpv. 1), August 3, 1999.

Product Families for Mass Flow Meters

Direct Mass Flow Product Group Table			
Product Groups	Typical Products*	Specific Gravity	Minimum Test Requirements to Cover Entire Subgroup *
Normal Liquids	Water; Alcohols; Glycols; Water Mixes thereof; Agricultural Liquids, Fertilizers, Seeds, and Herbicides; Chemicals; Petroleum Products; Solvents; Suspensions	0.7 to 2.5	Test with one liquid having a specific gravity of 0.7 Test with one liquid having a specific gravity of 2.5
Compressed Liquids	Propane, Butane, Ethane, Freon 11, Freon 12, Freon 22, NH_3, etc.	0.3 to 0.68	Test with one product having a specific gravity at any point within the range 0.3 to 0.68
Compressed Gases	CNG	0.6 to 0.8	Test with one product having a specific gravity at any point within the range 0.6 to 0.8
Cryogenic Liquids (BP 152 °C) and Liquified Natural Gas	Liquefied Oxygen, Nitrogen, etc.	0.07 to 1.4	Test with one liquid having a specific gravity at any point within the range 0.07 to 1.4.
Heated Products (above 50 °C)**	Bunker C, Asphalt, etc.	0.8 to 1.2	Test with one liquid having a specific gravity of 0.8 Test with one liquid having a specific gravity of 1.2

**Note: The Typical Products listed in this table are not limiting or all- inclusive; There may be other products and product trade names which would fall into a product group.*

Discussion/Conclusion: The Sector agreed that the intent of the "Typical Products" listing was not to limit the products covered in the table, but rather to give examples of products commonly found in the Product Group. Consequently, the Sector agreed to the addition of the footnote to the tables of Product Families for Positive Displacement and Mass Flow Meters. During the discussion of item 2 the Sector agreed that the formula presented in the current footnote 1 should be removed. The members felt that without an explanation of the terms, the formula is not clear and the formula is not used during an evaluation. Therefore, footnote 1 in the product families table for PD meters will be changed and the note will be added to the Direct Mass Flow Product Group Table as shown above.

B) Additional Product Groups for Product Families Tables

Background: There are some product groups such as food products that are routinely measured with both positive displacement and mass flow meters. When the tables were developed, only those products, which were typically submitted for NTEP evaluation, were addressed. As discussed in Item 4A above, the Sector did not intend to preclude the addition of other families or subgroups. NTEP is periodically asked to evaluate meters used to measure food products such as fructose and liquid yeast; however, the table does not presently include categories for these products.

Recommendation: A group of volunteers should be formed to review the product family tables and to develop and propose appropriate changes and additions for the Sector to consider at its next meeting.

Discussion: The mass flow meter manufacturers represented at this meeting did not believe there was a need to expand the product groups for mass flow meters at this time. Representatives for the PD meter manufacturers suggested that the group formed to address agenda item 3 also address the need for additional product families in their discussion. One of the NTEP Laboratories suggested removing the double asterisk from the "Heated Products" Product Group in the Direct Mass Flow Products Group Table and the accompanying note stating, "NTEP does not presently evaluate heated products." NTEP has evaluated meters for use with heated products (asphalt above 50 °C) and fructose in the range of 90 °F to 130 °F. At the present time, there are no criteria in Publication 14 for determining when a product is to be considered a "heated product." The only product that has any reference to temperature in Handbook 44 is asphalt above and below 50 °C. Mike Keilty (Micro Motion), agreed to research the typical temperature ranges used by fructose manufacturers for metering and delivering their product and to provide information for the development of a criteria for "heated products" for the agenda at the next Measuring Sector Meeting.

Conclusion: The Sector agreed that the group formed to discuss the Product Families for Positive Displacement Meters should include the consideration of additional products in their discussions and recommendations. The Sector further agreed that no changes are needed to the Direct Mass Flow Product Group Table at this time. The Sector also agreed to remove the double asterisk and the accompanying footnote relating to the testing of heated products from the Direct Mass Flow Product Group Table in the Technical Policy for Liquid Measuring Devices in Publication 14.

C) New Product Family Table for Turbine Meters

Background: When the current product family tables for positive displacement meters and mass flow meters were developed, turbine meters were not included because performance data for that technology was not provided to the Sector which would suggest appropriate families and subgroups of products.

Recommendation: A group of volunteers including manufactures of turbine meters should be formed to develop a product family criteria (table) similar to those for positive displacement and mass flow meters. The table will be reviewed by this Sector for prior to inclusion in Publication 14.

Discussion/Conclusion: No representative of turbine meter manufacturers attended this Sector meeting. The Sector agreed if manufacturers of turbine meters are interested in having product family criteria for turbine meters they should form their own group and develop a proposal for consideration at a future Measuring Sector meeting.

5. Adding Gasoline Oxygenated Blends to the Product Families Table for Positive Displacement (PD) Meters

Source: NIST/OWM

Background: The products families table for PD meters in the Technical Policy Section of the Liquid-Measuring Device Checklist include gasoline and alcohol in different families. Testing with both products is required when a manufacturer applies for a CC that includes applications for both petroleum products and alcohols. If a Certificate of Conformance for a meter is issued for a meter tested with only refined petroleum products, questions have been raised concerning whether or not the Certificate can cover applications for gasoline/ethanol blends, gasoline/methanol blends, or other oxygenated gasoline blends without additional testing. If the meters are acceptable for blended products is there any limitation on the percentage of blended product, before additional testing is required? The Sector is asked to discuss whether or not the table should be modified to add gasoline/oxygenate blends to the refined petroleum products subgroup. The Sector is also asked to identify whether or not a limit should be placed on the percentage of various oxygenates.

Recommendation: Amend the Product Families Table for Positive Displacement Meters as follows:

Product Family	Product Subgroup	Typical Products	Viscosity (Centipoise)[1]	Specific Gravity[2]	% Abrasive Solids
Petroleum Products	Refined Petroleum Products	Diesel Fuel, Distillate, Gasoline, Fuel Oil, Kerosene, Light Oil, Spindle Oil, etc. Gasoline/Ethanol up to xx % Gasoline/Methanol up to xx % Gasoline/MTBE,TAME, or ETBE up to xx %	0.3 to 150	0.68 to 1.1	None
	Aviation Fuels	AVgas, Jet A, Jet A-1, Jet B, JP4, JP5, JP7, JP8, etc.	0.4 to 3.6	0.68 to 0.85	None
	Lubricating Oils	SAE Grades	28 to 2150	0.75 to 1.0	None
	Heated Products	Bunker Oil, 6 Oil, Crude Oil, Asphalt	25 to 2420	0.8 to 1.1	None
…	…	…	…	…	…

Discussion: The Sector members generally agreed that, while in order for a CC to included applications for pure alcohols the meter must be evaluated with those products, the blending of oxygenates such as ethanol, methanol, or MTBE, in the amount typically found in oxygenated fuels does not effect the performance or calibration of a meter. The measurement of oxygenated fuels should be covered by the Certificate of Conformance for a meter tested and approved for measuring gasoline. One member was opposed to stating a percentage limit for various oxygenates since at present there is no uniform standard for those amounts. The amount allowed or required may vary from state to state. The Sector agreed that providing a percentage limit was not necessary and that adding a footnote recognizing oxygenated blends of gasoline would be preferable.

Conclusion: The Sector agreed to add a footnote 3 to the Product Families for PD Meters table as follows:

Product Families for Positive Displacement Meters

Product Family	Product Subgroup	Typical Products	Viscosity (Centipoise)[1]	Specific Gravity[2]	% Abrasive Solids
Petroleum Products	Refined Petroleum Products	Diesel Fuel, Distillate, Gasoline[3], Fuel Oil, Kerosene, Light Oil, Spindle Oil, etc.	0.3 to 150	0.68 to 1.1	None
	Aviation Fuels	AVgas, Jet A, Jet A-1, Jet B, JP4, JP5, JP7, JP8, etc.	0.4 to 3.6	0.68 to 0.85	None
	Lubricating Oils	SAE Grades	28 to 2150	0.75 to 1.0	None
	Heated Products	Bunker Oil, 6 Oil, Crude Oil, Asphalt	25 to 2420	0.8 to 1.1	None
Solvents	Solvents General	Acetates, Acetone, Esters, Ethylacetate, Hexane, MEK, Naphtha, Toluene, Xylene, etc.	0.3 to 7	0.6 to 1.6	None
	Solvents Chlorinated	Carbon Tetra-Chloride, Methylene-Chloride, Perchloro-Ethylene, Trichloro-Ethylene, Etc.	0.3 to 7	0.6 to 1.6	None
Alcohols & Glycols	Alcohols, Glycols, & Water Mixes Thereof	Ethanol, Methanol, Butanol, Isopropyl, Isobutyl, Ethylene glycol, Propylene glycol, etc.	0.3 to 7	0.6 to 1.6	None
Compressed Gases, Liquefied	LPG[3]	Propane, Butane, Ethane, Freon 11, Freon 12, Freon 22, etc.	0.1 to 0.5	0.3 to 0.65	None
	NH_3[3]	Anhydrous Ammonia	0.1	0.56 to 0.68	None
Water	Water	Tap Water, Deionized, Demineralized, Potable	1.0	1.0	None
Agricultural Liquids – Fertilizers	Fertilizers, Clear Liquid N-P-K	10-34-0; 4-10-10; 9-18-9; etc.	10 to 30	1.0 to 1.3	None
	Fertilizers, Nitrogen Solutions	20% Aqua-Ammonia; 28%, 30% or 32% Nitrogen Solution; Urea; Ammonia Nitrate; etc.	10 to 30	1.0 to 1.35	None
	Fertilizer, Suspensions	3-10-30; 4-4-27; etc.	20 to 200	1.0 to 1.65	4%

Agricultural Liquids – Herbicides	Herbicides, Thin Liquids	Eradicane, Lorox, Princep, Round-up, Sencor, Sutan, Sutazine, Treflon, etc.	18 to 65	0.9 to 1.2	Nil
	Herbicides, Viscous Liquids	Dual, etc.	26 to 144	0.9 to 1.2	Nil
	Herbicides, Flowables	Atrex, Atraxine, Bicep, Bladex, etc.	106 to 912	0.9 to 1.2	3%
Agricultural Liquids – Liquid Feeds	Liquid Feeds	Liquid Molasses; Molasses plus Phos Acid and/or Urea; etc.	10 to 50 000	1.2 to 1.5	4%
Chemicals	Chemicals	Sulfuric Acid, Hydrochloric Acid, Phosphoric Acid, etc.	1.0 to 296	1.1 to 1.85	None

[1] centipoise (cP) - unit of dynamic viscosity. 1 N-s/m^2 = 1 kg/m.s= 1000 (cP) - 10 P

[2]The specific gravity of a liquid is the ratio of its density to that of water at standard conditions, usually 4 °C (or 20 °C) and 1 atm. The density of water at standard conditions is approximately 1000 kg/m^3 (or 998 kg/m^3).

[3]*Gasoline includes oxygenated fuel blends.*

The source for some of the viscosity value information is in the Industry Canada – Measurement Canada Liquid Products Group, Bulletin V-16-E (rpv. 1), August 3, 1999.

6. Width of the Index of the Indicator - Update all LMD Codes as Appropriate

Source: NIST/OWM

Background: At its 2000 Annual Meeting, the NCWM voted to amend Handbook 44, 3.30. Liquid-Measuring Devices as follows:

S.1.5.3. Width.

#

 # (a) The index of an indicator shall not be wider than the width of the ~~widest~~ narrowest
 # graduation*.
[*Nonretroactive as of January 1, 2002.] (Amended 2000)

(b) If the index of an indicator extends over the entire length of a graduation, it shall be of uniform width throughout the portion that coincides with the graduation.

During its discussion of this item, the NCWM noted that there are other Handbook 44 Codes that have the same language as the original S.1.5.3. The fact that all the affected codes were not addressed by the proposal to amend S.1.5.3. was an oversight. The S&T Committee indicated it would be receptive to a proposal to amend the remaining codes to agree with the above revision to Handbook 44, Section 3.30. Liquid-Measuring Devices, Paragraph S.1.5.3.

Recommendation: Submit a proposal to the NCWM S&T Committee to amend Handbook 44 Paragraphs S.1.3.3. (a) in Sections 3.31. Vehicle-Tank Meters, 3.32. LPG and Anhydrous Ammonia Liquid Measuring Devices, 3.33. Hydrocarbon Gas Vapor-Measuring Devices, 3.34. Cryogenic Liquid-Measuring Devices, 3.35. Milk Meters, and 3.36. Water Meters as follows:

S.1.3.3. Width.

(a) The index of an indicator shall not be wider than the width of the ~~widest~~ *narrowest graduation*.*

(b) If the index of an indicator extends over the entire length of a graduation, it shall be of uniform width throughout the portion that coincides with the graduation.
[*Nonretroactive as of January 1, 200X.]

Discussion and Conclusion: One member voiced a concern that not all manufacturers of devices, which could be affected by this change, were represented at this Sector meeting. None of the manufacturers represented at this meeting had a problem with the proposed changes to Handbook 44; however, the Sector chose to take no official position on this item. The Sector felt that if any manufacturer was opposed to the proposed changes to Handbook 44 they should direct their comments directly to the S&T Committee.

7. Administrative Policy and Procedures for Publication 14

Source: NCWM

Background: The NCWM assumed responsibility for administering NTEP as of October 1, 2000. The NCWM is in the process of revising the Administrative Policy and Procedures of Publication 14 to reflect the NCWM's administrative structure for NTEP. Wes Diggs will update the Sector on the status of that project.

Discussion/Conclusion: Wes Diggs was not able to attend the 2000 Sector Meeting. In his place NTEP Director, Steve Patoray, provided an update of the progress on the revisions to the Publication 14, Administrative Policies and Procedures. The work on the Administrative Policies and Procedures is progressing. The NCWM intends to have a draft ready for presentation at the 2001 NCWM Interim Meeting. This issue was provided only as an information item for Sector members, therefore, no decision was required by the Sector.

8. Recorded Representation of Count Items on ECR Systems

Source: Carry-over from 1999 Sector Agenda, Originally Submitted by the Maryland NTEP Laboratory

Background: At the May 1999 NTEP Laboratory meeting Will Wotthlie (Maryland) reported finding ECR receipts with items by count expressed in a decimal format with as many as three digits to the right of the decimal point. Several other NTEP Laboratories also reported finding similar problems with receipts. Publication 14, ECRs/Retail Motor Fuel Dispensers Checklist paragraph 3.7 Recording Representations, page 9-11, states that decimal expressions of count are acceptable provided that "fractions of a whole unit can not be expressed." It was not clear to the laboratories why it is necessary for any device to print trailing zeros after the decimal point for items sold by count. At its 1999 meeting, the Measuring Sector questioned the need to display the trailing zeros on a receipt for items that are sold by count; however, several manufacturers wanted to consult with their software division to determine the ramifications of prohibiting the trailing zeros. To date there have been no reports of conflict.

At is September 2000 meeting, the NTETC Weighing Sector was also asked to discuss this issue. Dennis Krueger (NCR) expressed concern that there are many software-based systems that have already been accepted. He was concerned that it would be impossible to modify all the existing software. Weighing Sector members did not support proposing changes to Handbook 44 to prohibit trailing zeros in the expression of items by count. The NTEP Laboratories presently discourage the use of trailing zeros; however, if a manufacture points out that the checklist for ECRs interfaced with retail motor fuel dispensers permits trailing zeroes, the laboratories are put in a position of having to allow it. The Weighing Sector agreed that, if the checklist for ECRs interfaced with retail motor-fuel dispensers did not have a specific allowance for trailing zeros, the NTEP laboratories would be in a better position to discourage a manufacturer from having a weighing system that will print items of count with trailing zeros after a decimal point.

Recommendation: Modify Publication 14, ECRs/Retail Motor-Fuel Dispensers, 3.7. as follows:

3.7. The quantity representation of an item sold by count must be expressed in whole units. ~~An expression of count with a decimal point and trailing zeros, (e.g., 2.00 items) is acceptable provided that fractions of a whole unit can not be expressed.~~

Discussion: One member recalled that originally the Sector agreed to allow trailing zeros to accommodate the software of ECRs interfaced with retail motor-fuel dispensers in convenience stores. The three decimal places were necessary for printing the quantity of fuel dispensed. When the sale of other items was recorded the technology available at the time required that the trailing zeros also be printed for those transactions. Several Sector members felt the average consumer would recognize that "3.000 items" represented a count of three items without being confused. Some manufactures stated that, while the software in the systems they manufacture allows printing receipts without trailing zeros for items sold by count that might or may not be true for all software suppliers.

Conclusion: The Sector opposed removing the sentence relating to trailing zeros by a vote of 12 to 2.

9. Repeatability Tolerances for LMD, VTM, and Mass Flow Meters

Source: Steve Malone (NE Weights and Measures), Mike Keilty (Micro Motion Inc.)

Background: Steve Malone and Mike Keilty submitted the following proposal for consideration at the 2000 Measuring Sector Meeting.

Proposal/justification: There is clearly a need to clarify the meaning of "applicable tolerance." It is easy to read "applicable tolerance" and interpret it to be the "absolute value of the tolerance" being applied when, in fact, the intent is to apply the entire *range* of the basic tolerance; both underregistration and overregistration values. Since "absolute value" and "basic tolerance" are both defined in Handbook 44, applicable tolerance can only be assumed as something different than the absolute value of the tolerance. Additional language is needed to more clearly distinguish the term "applicable" tolerance.

The tolerance for repeatability also needs to clarify that each test draft size must be similar. The draft size at a given flow rate determines the length of operation for the device for that draft. The meter errors introduced during the ramp-up to the desired flow rate and the ramp-down near the end of the test draft play a part in the overall assessment of meter performance. As the size of the draft changes, the percentage of meter inaccuracy attributable to start-up and shutdown effects also changes. If draft sizes are different, then the conditions of operation have not been repeated and the comparison of the test results should not be evaluated for repeatability. Flow rate is also an important condition that must be considered when evaluating multiple tests. While the repeatability tolerance paragraphs specify that multiple tests are to be conducted at the same *flow rate*, these paragraphs do not clearly indicate that the draft size should be the same.

The Sector is asked to consider the following proposed amendments to Handbook 44 to address the concerns outlined above. If the Sector agrees, the proposal will be forwarded to the NCWM S&T Committee for consideration.

Recommendation: Amend NIST Handbook 44 Section 3.30. Liquid-Measuring Devices T.2.3.4. Repeatability, Section 3.31. Vehicle Tank Meters T.4. Repeatability and Section 3.37. Mass Flow Meters T.3. Repeatability as follows:

3.30. Liquid-Measuring Devices
T.2.3.4. Repeatability. - When multiple tests are conducted at approximately the same flow rate and similar draft sizes, the range of the test results for the flow rate shall not exceed 40 percent of the applicable basic tolerance (underregistration and overregistration). The tolerance does not apply to the test of the automatic temperature compensating system.

3.31. Vehicle Tank Meters
T.4. Repeatability. - When multiple tests are conducted at approximately the same flow rate and similar draft sizes, the range of the test results for the flow rate shall not exceed 40 percent of the applicable basic tolerance (underregistration and overregistration).

3.37. Mass Flow Meters
T.3. Repeatability. - When multiple tests are conducted at approximately the same flow rate and similar draft sizes, the range of the test results for the flow rate shall not exceed:

(a) 0.2 percent for retail liquid motor fuel devices; and

(b) 40 percent of the applicable basic tolerance (underregistration and overregistration) for all other devices listed in Table T.2.

Discussion: Mike Keilty (Micro Motion) explained the reason for the proposal. Frequently officials interpret "applicable tolerance" to be the value of the tolerance as an absolute value and not a range of tolerance with the value applied in both a positive and negative direction. The Technical Advisor reviewed the 1992, 1994, and 1997 Final Reports of the NCWM S&T Committee with the Sector to clarify that the intent of Committee was to apply "applicable" tolerance to include a range of both the positive and negative value of the tolerance value. Some Sector members suggested that the a repeatability tolerance of 40 percent of the absolute value of the maintenance tolerance as required in the Handbook 44 LMD Code for retail devices is much easier to understand and apply. The members generally agreed that the repeatability tolerance criteria should be the same regardless of the device technology. The Ted Kingsbury (Measurement Canada) reported that Measurement Canada applies the same repeatability tolerance to all device technologies. During the discussion an alternate proposal was developed to change the repeatability criteria in all Handbook 44 Section 3.30 Codes using 40 percent of maintenance tolerance as the range of allowable variation for multiple test conducted at approximately the same flow rate and draft size.

Conclusion: (The Sector voted on the original proposal with 2 members in favor and 11 opposed.) The Sector then voted on the following alternate proposal developed during the meeting and by a vote of 12 in favor to 1 opposed agreed to submit it to the S&T Committee for consideration.

Proposal: Amend all Handbook 44 Section 3 Codes, specifically, 3.30. Liquid-Measuring Devices, 3.31 Vehicle-Tank Meters, 3.32. LPG and Anhydrous Ammonia Liquid-Measuring Devices, 3.33 Hydrocarbon Gas Vapor-Metering Devices, 3.34. Cryogenic Liquid-Measuring Devices, 3.35. Milk Meters, 3.36. Water Meters, 3.37. Mass Flow Meters, and 3.38. Carbon Dioxide Liquid-Measuring Devices – Tentative Code as follows.

3.30. Liquid-Measuring Devices

T.2. Tolerance Values.

T.2.1. Retail Devices Except Slow-Flow Meters.

T.2.1.3. Repeatability. - When multiple tests are conducted at approximately the same flow rate *and draft size*, the range of the test results for the flow rate shall not exceed 40 percent of the absolute value of the maintenance tolerance *and the results of each test shall be within applicable tolerance*.
(Added 1992)

T.2.3. Wholesale Devices.

T.2.3.4. Repeatability. - When multiple tests are conducted at approximately the same flow rate *and draft size*, the range of the test results for the flow rate shall not exceed 40 percent of the ~~applicable tolerance~~ *absolute value of the maintenance tolerance and the results of each test shall be within the* applicable tolerance. This tolerance does not apply to the test of the automatic temperature compensating system.
(Added 1992)

3.31. Vehicle-Tank Meters

T.4. Repeatability. - When multiple tests are conducted at approximately the same flow rate *and draft size*, the range of the test results for the flow rate shall not exceed 40 percent of the ~~applicable tolerance~~ *absolute value of the maintenance tolerance and the results of each test shall be within the* applicable tolerance.
(Added 1992)

3.32. LPG and Anhydrous Ammonia Liquid-Measuring Devices

T.3. Repeatability. -When multiple tests are conducted at approximately the same flow rate *and draft size*, the range of the test results for the flow rate shall not exceed 40 percent of the absolute value of the maintenance tolerance and the results of each test shall be within applicable tolerance. This tolerance does not apply to the test of the automatic temperature compensating system.
(Added 1992) (Amended 1997)

3.33. Hydrocarbon Gas Vapor-Measuring Devices

T.2. Repeatability. *- When multiple tests are conducted at approximately the same flow rate and draft size, the range of the test results for the flow rate shall not exceed 40 percent of the absolute value of the maintenance tolerance and the results of each test shall be within the applicable tolerance.*

3.34. Cryogenic Liquid-Measuring Devices

T.2.3. Repeatability. *- When multiple tests are conducted at approximately the same flow rate and draft size, the range of the test results for the flow rate shall not exceed 40 percent of the absolute value of the maintenance tolerance and the results of each test shall be within the applicable tolerance.*

3.35. Milk Meters

T.3. Repeatability. *- When multiple tests are conducted at approximately the same flow rate and draft size, the range of the test results for the flow rate shall not exceed 40 percent of the absolute value of the maintenance tolerance and the results of each test shall be within the applicable tolerance.*

3.36. Water Meters

T.2. Repeatability. *- When multiple tests are conducted at approximately the same flow rate and draft size, the range of the test results for the flow rate shall not exceed 40 percent of the absolute value of the maintenance tolerance and the results of each test shall be within the applicable tolerance.*

3.37. Mass Flow Meters

T.3. Repeatability. - When multiple tests are conducted at approximately the same flow rate *and draft size*, the range of the test results for the flow rate shall not exceed~~:~~

~~(a) 0.2 percent for retail liquid motor fuel devices; and~~

~~(b)~~ 40 percent of ~~applicable~~ *the absolute value of the maintenance* tolerance ~~for all other devices listed in Table T.2~~ *and the results of each test shall be within the applicable tolerance.*
(Amended 1992, 1994)

3.38. Carbon Dioxide Liquid-Measuring Devices

T.2.3. Repeatability. *- When multiple tests are conducted at approximately the same flow rate and draft size, the range of the test results for the flow rate shall not exceed 40 percent of the absolute value of the maintenance tolerance and the results of each test shall be within the applicable tolerance.*

10. Repeatability Requirements for Meters Measuring Liquefied Petroleum Gas (LPG) and Anhydrous Ammonia (NH_3)

Source: Carry-over from 1999 Sector Agenda, Originally Submitted by the Maryland NTEP Laboratory

Background: The NTEP Measuring Laboratories had discussed this item at their May 1999 meeting, and agreed that minor changes in the flow rate significantly affect the results of the repeatability test. The laboratories agreed that other factors such as temperature and pressure can have an effect on the test results. The laboratories also agreed to ask the Measuring Sector to consider the issue at its 1999 meeting. At its September 1999 meeting, the Sector was asked to review existing Publication 14 LPG/NH_3 test criteria to determine whether or not the laboratories should consider pressure and temperature differences when they perform the repeatability test on an LPG/NH_3 meter. Publication 14 checklist test criteria only specify maintaining the approximate same flow rate during a repeatability test. The Sector discussed the influence that pressure and temperature have on the repeatability of test results on meters used to measure LPG/NH_3. The Sector acknowledged that during a repeatability test factors such as temperature and pressure might significantly change. Ross Andersen (New York NTEP Laboratory) commented that steps could be taken to shield test equipment and product from the temperature effects of the sun such as using an umbrella or positioning the prover in a shaded location. Representatives from Measurement Canada noted that they have incorporated guidelines for variances in

their test procedures. In 1999, the Sector agreed to add the following note to Publication 14 paragraph H, Repeatability on LPG to NH_3 Meters on page 10-89, to alert the laboratories that variances in temperature and pressure affect repeatability test results on LPG meter as follows:

I. Repeatability on LPG to NH3 Meters: (Note Section "I" changed to "H" in Publication 14 7th Edition – June 2000)

When multiple tests are conducted at approximately the same flow rate, the range of the test results for the flow rate shall not exceed 40 percent of the absolute value of the maintenance tolerance and the results of each test shall be within acceptance tolerance. This tolerance does not apply to the test of the automatic temperature compensating system.

***Note*: Stable temperature and pressure indications are necessary during the entire repeatability test to achieve good test results**

The NTEP laboratories agreed to review the note further, compare it with Canada's test procedures, and develop recommendations for the 2000 Sector meeting.

Recommendation: At its March 2000 meeting, the NTEP Laboratories agreed that the following proposal should be forwarded to the Measuring Sector for review at this meeting.

Proposal: Add the following to Publication 14, Liquid-Measuring devices, Permanence Test Procedures For Meters, Section H. Repeatability on LPG & NH_3 Meters (Code Reference T.3.);

> When multiple tests are conducted at approximately the same flow rate, the range of the test results for the flow rate shall not exceed 40 percent of the absolute value of the maintenance tolerance and the results of each test shall be within acceptance tolerance. This tolerance does not apply to the test of the automatic temperature compensating system.
>
> ***Note:*** Stable temperature and pressure indications are necessary during the entire repeatability test to achieve good test results. *For multiple drafts to determine repeatability the following conditions shall be maintained;*
>
> 1. *The range of flow rates shall not exceed 4 GPM.*
> 2. *The range of temperature shall not exceed 1 °C (2 °F).*
> 3. *The range of pressure shall not exceed 68.95 Kpa or 10 PSI.*
> 4. *The temperature difference between the meter and the prover shall not exceed 1 °C (2 °F).*

Discussion: Several manufacturers expressed concern over holding the range of flow rates on large capacity meters to 4 GPM. One member noted that a 4 GPM range is a large allowance on a retail motor-fuel dispenser with a normal flow rate of 10 GPM. There was general consensus that the allowable range of flow rates should be express as a percentage of the flow rate of the first test rather than a fixed GPM value. The Sector agreed that 5 percent is a reasonable variation in flow rate when repeatability tests are conducted. Example: If the first test draft of a repeatability test is conducted at a flow rate of 80 GPM any subsequent test drafts would be required to have a flow rate between 76 GPM and 84 GPM to be considered suitable for a repeatability test.

Conclusion: The Sector agreed to adopt the proposal as modified below.

> ***Note:*** Stable temperature and pressure indications are necessary during the entire repeatability test to achieve good test results. *For multiple drafts to determine repeatability the following conditions shall be maintained;*
>
> 1. *The range of flow rates shall not exceed 5 percent of the first test draft.*
> 2. *The range of temperature at the meter shall not exceed 1 °C (2 °F).*
> 3. *The range of pressure shall not exceed 68.95 Kpa or 10 PSI.*
> 4. *The temperature difference between the meter and the prover shall not exceed 1 °C (2 °F).*
>
> *If these conditions cannot be met, repeatability tolerances shall not be applied. Repeatability tests must include at least three consecutive test drafts.*

11. Repeatability Tolerances for Cryogenic Meters

Source: NIST/OWM

Background: The Cryogenic Liquid-Measuring Devices Code does not include specific repeatability requirements. The Liquid-Measuring Devices (LMD) Code includes repeatability tolerances for Wholesale Devices under T.2.3.4. Repeatability. The Vehicle-Tank Meters (VTM) Code includes identical tolerances under T.4. Repeatability. These two paragraphs state:

> "When multiple tests are conducted at approximately the same flow rate, the range of the test results for the flow rate shall not exceed 40 percent of the applicable tolerance."

Note that this is different from the tolerances for retail devices in the LMD Code, which states 40 percent of the *absolute value of maintenance tolerance*.

While the redundancy among codes should eventually be eliminated with the work being done reorganize H44, in the meantime, it would be beneficial to clearly state the repeatability tolerances that would apply to a cryogenic liquid-measuring device.

Recommendation: The Sector is asked to consider the following proposed addition to the Cryogenic LMD Code. If the Sector supports the proposal, it will be forwarded to the NCWM S&T Committee for consideration.

Add the following new paragraph (consistent with LMD Code paragraph T.2.3.4. and VTM Code paragraph T.4.) to the Cryogenic Liquid-Measuring Devices Code:

> *T.X. Repeatability. - When multiple tests are conducted at approximately the same flow rate, the range of the test results for the flow rate shall not exceed 40 percent of the applicable tolerance.*

Discussion/Conclusion: This item was resolved by the discussion and decision on agenda item 9.

12. Return Mass to Units of Measure in Handbook 44 3.34 Cryogenic Liquid-Measuring Devices

Source: NIST/OWN

Background: In accordance with the 1994 decision on item 337-4A of the NCWM S&T Committee agenda, the allowance for units of mass was removed from Handbook 44, Section 3.34. Cryogenic Liquid-Measuring Devices, Paragraph S.1.1.2. Units in 1998. Since that time it has been determined that, the industry standard for displayed units of measurement continues to be in terms of mass. Placing mass units back into the cryogenics code as an approved measurement unit may be appropriate; however, if that is done there should be a standard reference value associated with the expression of mass units. Since products covered by the cryogenic code are pure products, the reference density at 70 °F may be appropriate. Another option would be to reference the density at the Normal Boiling Point for a product. The Sector is asked to discuss this issue and determine if additional work should be done on this issue to develop a proposal for consideration by the NCWM S&T Committee. This work would need to include input from device manufacturers and the Compressed Gas Association.

Discussion: California reported that liquefied nitrogen, argon, and oxygen is being measured in cubic feet and gallons. However, liquefied natural gas is being sold in units of mass. The Technical Advisor reported that a major manufacturer of devices used to measure cryogenic liquids indicated that sale in units of mass is a common industry practice. That manufacturer did not have a representative at this meeting. The Compressed Gas Association also was not represented.

Conclusion: The Sector agreed to carry this item forward to the agenda of the next Sector meeting, provided industry supplies information to the Technical Advisor demonstrating a need for returning mass units to the Cryogenic Code. If no information is supplied, the item will be dropped from the agenda.

13. Testing of the Reference Scale for NTEP Tests of Mass Flow Meters

Source: NIST/OWM, NTEP Laboratories

Background: OWM periodically receives inquiries from the laboratories and manufacturers about the procedures to be used during the testing of a mass flow meter. Questions have been raised concerning whether or not all laboratories are testing the reference scale during mass flow meter evaluations and, if so, whether or not they are following the same test procedure. At their April 2000 meeting, the NTEP Laboratories agreed to forward the following proposal to the Measuring Sector for consideration.

Recommendation: Add the following criteria for testing a reference scale to be used for the evaluation of a mass flow meter to Publication 14, Liquid-Measuring Devices, Section L. Permanence Test for Mass Flow Meters, Gravimetric Standard.

Gravimetric Standard. The combined error of the standard used for testing measuring instruments shall not exceed 20 percent of the maximum permissible error to be applied. Using known weight (field test standards), determine the error present in the weighing instrument over the weighing range that will be used in the test. The inherent error, if present, is to be factored out of the measurement. The scale will then be used as a transfer standard. The reference scale used in the gravimetric test must be tested immediately prior to testing the mass flow meter. The test should be conducted no earlier than one day prior to the test of the mass flow meter. For example, the laboratory may arrive at the site and conduct the test of the reference scale on the first day and then return the second day to begin testing of the mass flow meter. If possible, the reference scale should not be used for other purposes during the testing of the mass flow meter. However, it is recognized that this is not always practical since the scale will often be used at the site for other purposes. If the evaluating laboratory has reason to believe that scale performance has changed (e.g., erratic readings, observed abuse of the scale, etc.) during the conduct of the mass flow meter test, testing of the reference scale should be repeated. If scale performance has changed, any meter tests that have already been performed must be repeated.

If practical, the reference scale should also be tested after the test of the mass flow meter is completed; this includes testing after completing the series of initial tests in the permanence test and also after completing the series of subsequent tests in a permanence test.

Under no circumstances is the laboratory to accept test results from a prior scale inspection or test. The evaluating laboratory must witness the test of the reference scale, and the test must be conducted at the same time as the testing of the mass flow meter. Accuracy tests of the scale must be conducted with certified, traceable test weights. On the subsequent test of a meter after the permanence period, the reference scale must be re-tested; scale test results obtained during the initial test of the meter are not sufficient.

Remember that the reference scale serves as your test standard for the mass flow meter test, and you are to make error corrections to your mass flow meter test results based upon the test you perform on the reference scale. Therefore, it is essential to ensure that the standard is correct at all times during the test and to determine the exact errors in the scale in the range of weights where the mass flow meter will be tested.

The sequence of testing is to occur as follows:

1. Test the reference scale and note the errors in the weight ranges where the meter test will be conducted.
   Perform initial tests of the mass flow meter.
2. Test the reference scale to determine that scale performance has not significantly changed.
   Subject the meter to throughput during the permanence test.
3. Test the reference scale and note errors in the weight ranges where the meter test will be conducted.
   Perform the subsequent tests of the mass flow meter.
4. Test the reference scale to determine that scale performance has not significantly changed.
   It is preferable to have a scale dedicated to only NTEP weighing during the evaluation of a meter.
   The maximum time between the initial test and the subsequent permanence test should not exceed 5 days.

Additional Considerations:

1. The reference scale should be adjusted to have errors as close to zero as practicable.

2. When weighing individual test drafts, the beginning weight (tare) and ending weight (gross) must both be corrected for scale error at that load range in order to determine the correct net weight for the run.

3. All scale readings should be made using error weights to 0.1 d or using expanded resolution if available. The scale should repeat successive readings of the same load within 0.5 scale divisions.

4. If reasonably stable readings using error weights cannot be achieved due to wind or other environmental factors, testing should be suspended until such time that stable readings can be achieved.

5. You may consider setting the scale up and calibrating with a smaller division or using an expanded resolution mode if available. If the scale is set up and calibrated with a smaller division and the resulting total number of divisions for the scale exceeds the n_{max} allowed for the device, the use of the scale will be restricted to the NTEP weighings only.

7. When using a vehicle scale and tank truck(s) to conduct the mass flow meter test, care should be taken to position the vehicle completely on the scale and in the same position for all weighments.

8. When "semi" tractor/trailer tankers are used, the maximum gross load can be reduced by uncoupling the tractor and weighing only the trailer.

9. The driver should be out of the truck and the engine off whenever weighments are made.

10. The scale must be within 5 miles of the meter evaluation site unless it is possible to determine fuel consumption and make appropriate corrections for the fuel consumed.

Note: Measurement Canada requires that the minimum scale division not exceed one fifth of the limit of error for the test draft.

[Note: Test criteria are being developed for an abbreviated follow-up test.}

Discussion: The Sector reviewed the proposed criteria for reference scales used for NTEP evaluations. The members generally agreed that a complete retest of the reference scale at the completion of meter testing is not always necessary. There also was general agreement that it is appropriate to *require* a retest if the scale is used for anything other than NTEP testing between the initial test and the follow-up permanence test or if the time between the initial and follow-up tests exceeds five days. One NTEP Laboratory stated that a reference scale should not be required to be an NTEP approved scale. It was noted that not all scales used for NTEP evaluations are vehicle scales. Additionally tank trucks are not the only type of receiving vessels used during an NTEP evaluation. Consequently, the Sector agreed that the language should not specify the type of scale or the type of receiving vessel to be used during an NTEP evaluation.

Conclusion: The Sector agreed to the proposal with the following modifications.

Gravimetric Standard. The combined error of the standard used for testing measuring instruments shall not exceed 20 percent of the maximum permissible error to be applied. Using known weight (field test standards), determine the error present in the weighing instrument over the weighing range that will be used in the test. The inherent error, if present, is to be factored out of the measurement. The scale will then be used as a transfer standard. The reference scale used in the gravimetric test must be tested immediately prior to testing the mass flow meter. The test should be conducted no earlier than one day prior to the test of the mass flow meter. For example, the laboratory may arrive at the site and conduct the test of the reference scale on the first day and then return the second day to begin testing of the mass flow meter. If possible, the reference scale should not be used for other purposes during the testing of the mass flow meter. However, it is recognized that this is not always practical since the scale will often be used at the site for other purposes. If the evaluating laboratory has reason to believe that scale performance has changed (e.g., erratic readings, observed abuse of the scale, etc.) during the conduct of the mass flow meter test, testing of the reference scale should be repeated. If scale performance has changed, any meter tests that have already been performed must be repeated.

If ~~practical~~ *necessary*, the reference scale should also be tested after the test of the mass flow meter is completed; this includes testing after completing the series of initial tests in the permanence test and also after completing the series of subsequent tests in a permanence test.

Under no circumstances is the laboratory to accept test results from a prior scale inspection or test. The evaluating laboratory must witness the test of the reference scale, and the test must be conducted at the same time as the testing of the mass flow meter. Accuracy tests of the scale must be conducted with certified, traceable test weights. On the subsequent test of a meter after the permanence period, the reference scale must be re-tested; scale test results obtained during the initial test of the meter are not sufficient.

Remember that the reference scale serves as your test standard for the mass flow meter test, and you are to make error corrections to your mass flow meter test results based upon the test you perform on the reference scale. Therefore, it is essential to ensure that the standard is correct at all times during the test and to determine the exact errors in the scale in the range of weights where the mass flow meter will be tested.

The sequence of testing is to occur as follows:

1. Test the reference scale and note the errors in the weight ranges where the meter test will be conducted. Perform initial tests of the mass flow meter.
2. *If necessary* ~~T~~test the reference scale to determine that scale performance has not significantly changed. Subject the meter to throughput during the permanence test.
3. Test the reference scale and note errors in the weight ranges where the meter test will be conducted. Perform the subsequent tests of the mass flow meter.
4. *If necessary* ~~T~~test the reference scale to determine that scale performance has not significantly changed. It is preferable to have a scale dedicated to only NTEP weighing during the evaluation of a meter. The *scale shall be reverified if it is used for other than type evaluation weighing, or if the* maximum time between the initial test and the subsequent permanence test ~~should not~~ exceed*s* 5 days.

Additional Considerations:

1. The reference scale should be adjusted to have errors as close to zero as practicable.

2. When weighing individual test drafts, the beginning weight (tare) and ending weight (gross) must both be corrected for scale error at that load range in order to determine the correct net weight for the run.

3. All scale readings should be made using error weights to 0.1 d or using expanded resolution if available. The scale should repeat successive readings of the same load within 0.5 scale divisions. *An NTEP approved scale is not required.*

4. If reasonably stable readings using error weights cannot be achieved due to wind or other environmental factors, testing should be suspended until such time that stable readings can be achieved.

5. ~~You~~ The NTEP Laboratory and the applicant* may consider setting the scale up and calibrating with a smaller division or using an expanded resolution mode, if available. If the scale is set up and calibrated with a smaller division and the resulting total number of divisions for the scale exceeds the n_{max} allowed for the device, the use of the scale will be restricted to the ~~NTEP~~ *type evaluation* weighings only. [*Technical advisor's editorial change]

6. ~~When using a vehicle scale and tank trucks *t*~~*To* conduct the mass flow meter test*s*, ~~care should be taken to~~ position the ~~vehicle~~ *test vessel* completely on the scale and in the same position for all weighments.

7. When "semi" tractor/trailer tankers are used, the maximum gross load can be reduced by uncoupling the tractor and weighing only the trailer.

8. The driver should be out of the truck and the engine off whenever weighments are made.

9. The scale ~~must~~ *shall* be within 5 miles of the meter evaluation site unless it is possible to determine fuel consumption and make appropriate corrections for the fuel consumed.

Note: Measurement Canada requires that the minimum scale division not exceed one fifth of the limit of error for the test draft.

[Note: Test criteria are being developed for an abbreviated ~~follow-up test~~ reverification of the reference scale.]

14. Vehicle-Mounted and Stationary Applications of the Same Meter

Source: NIST/OWM, NTEP Laboratories

Background: Publication 14 presently includes no technical policy to address the use of a meter in both vehicle-mounted and stationary applications. At their April 2000 meeting, the NTEP Laboratories agreed that the vehicle-mounted application is the worst case of the two scenarios. The labs agreed that, if a meter is successfully tested in a vehicle-mounted application, the resulting CC could cover both vehicle-mounted and stationary applications without additional testing in a stationary application. The Laboratories agreed to forward to the Measuring Sector the following proposal to add a new paragraph to the Technical Policy for Liquid-Measuring Devices in Publication 14.

R. Vehicle-Mounted and Stationary Applications of a Meter

If a meter is successfully tested in a vehicle-mounted application, both vehicle-mounted and stationary applications can be covered on the resulting Certificate of Conformance without additional testing in a stationary application. If a meter has only been tested in a stationary application, testing must also be conducted on the meter in a vehicle-mounted application in order to cover both applications on the CC.

In preparing this item for presentation to the Sector NIST-OWM determined that other issues pertinent to this item are not addressed by the proposal, including the following: (1) In order to cover a range of sizes on a CC for a vehicle-mounted application, do all sizes of meters submitted for evaluation need to be tested in a vehicle-mounted application?; and (2) In order to cover different products on a CC for a vehicle-mounted application, do all products submitted for evaluation need to be tested in a vehicle-mounted application?

Recommendation: A group of volunteers should be formed to address these questions and any other related issues the Sector may identify. The group will be asked to address these issues, expand the present proposal, and present it for consideration at the next Sector meeting.

Discussion/Conclusion: The Sector generally agreed with the proposal as written. Rather than forming a separate work group, the Sector asked that the NTEP Laboratories address the questions relating to the range of sizes and different products being covered on a CC for both vehicle and stationary applications. The laboratories are asked to discuss the issue at the 2001 NTEP Laboratory meeting and provide input for consideration at the next Measuring Sector Meeting.

15. Testing of Single-Compartment vs. Split-Compartment Vehicle-Tank Meters

Source: Carry-over, Maryland NTEP Laboratory

Background: At its September 1999 meeting, the Sector was asked to determine if there are applications where it is appropriate to eliminate the split-compartment test (sometimes referred to as the product depletion test) for vehicle-tank meters. Will Wotthlie (MD) questioned whether or not vehicle mounted mass flow meters must go through a split-compartment test if the manufacturer intends that the meter be used on vehicles with a single compartment. One Coriolis mass flow meter manufacturer stated that Coriolis mass flow meters, unlike other device technologies, can track the density of the product in the meter. If the system is correctly configured, when air enters the meter the mass flow meter transmitter will recognize the density drop and send a signal to stop pumping and registering product.

The Sector agreed that even a single-compartment vehicle tank could run dry and introduce air into the supply lines, resulting in overregistration. The only way to conclusively determine that a system is effectively preventing vapor and air from passing through the meter and resulting in erroneous indications is to conduct a product depletion test. Consequently, the Sector agreed that, before vehicle-mounted applications are listed on an NTEP Certificate of Conformance, *all* vehicle-mounted meters must be subjected to and must pass a split compartment test. The Sector agreed that specific test procedures are needed and asked the NTEP labs to develop these procedures. In the meantime, testing was to be conducted using the same *ad hoc* procedures as used in past evaluations. The Sector agreed that this policy will apply to all meter technologies (e.g., Coriolis mass flow meters, turbine meters, positive displacement meters) even if the meter will never be installed on trucks with more than a single compartment. The Sector agreed that both the

initial test and the permanence test still apply, including the required throughput and with a duration of at least 20 days. The Sector agreed that, ideally, this test would be performed with a multiple-compartment vehicle; however, if a multiple-compartment vehicle is unavailable, a single-compartment vehicle may be used to simulate the split-compartment test by running the tank empty.

At their April 2000 meeting, the NTEP Laboratories agreed to develop a procedure for review by the Measuring Sector at its next meeting.

Discussion/Conclusion: The draft procedure was not completed as of the Sector's October 2000 meeting. Consequently, **t**his item will be carried over to the agendas of the 2001 NTEP Laboratory and Measuring Sector Meeting.

16. Meeting Location for 2001 NTETC Measuring Sector Meeting

Background: The Sector is asked to discuss times and locations for its 2001meeting. The NCWM Board of Directors is considering a joint meeting next year of the Measuring Sector, Weighing Sector, and Belt-Conveyor Scale Sector. A possible meeting schedule is printed below for discussion.

Sample Joint Sector Agenda

	Sunday	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**
8:30 – 12:00	--	Belt Conveyor Scale Sector	Weighing Sector	Weighing Sector	Measuring Sector	Measuring Sector
12:00 – 1:00	--	Lunch	Lunch	Lunch	Lunch	Lunch
1:00 – 5:00	Weighing Laboratories Meeting	Belt Conveyor Scale Sector	Weighing Sector	Joint Sector Session for General Issues*	Measuring Sector	Measuring Laboratories Meeting

* Examples of "Joint Issues":
Administrative Issues
- Changes in administrative policies and procedures, Sector membership and operation criteria, etc.

Common General Technical Issues
General Code issues such as marking requirements, permanence of markings, etc.
Items of general impact on range of device types such as evaluation of software, audit trails, remanufactured equipment, etc.

Discussion/Conclusion: The Sector discussed the Board of Directors proposal to hold a joint Sector meeting. Several members indicated that a joint meeting would result in additional travel time and cost for them. Many of the members presently already attend the regional meetings. By having the Sector meetings held in conjunction with one of those meetings, the only additional costs are meals and lodging. To provide feedback to the Board of Directors on this proposal, the Sector polled members present at the meeting. The Sector voted in opposition to a joint meeting with a vote of 13 opposed and zero in favor. The Sector members generally agreed that the present approach of having the Measuring Sector Meeting held in conjunction with a regional meeting (preferably the Southern Weights and Measures Association [SWMA]) works well and should be continued. The Sector voted to have the next meeting immediately prior to the 2001 SWMA meeting in Lexington, Kentucky, which is scheduled for September 30 through October 3. The result of the vote was 11 members in support and 1 opposed. The Sector acknowledged that the joint Sector meeting approach might be used for the 2001 Sector meetings and that the tentative time frame and location discussed by the Sector may vary accordingly.

Attendance List - NTETC Weighing Sector October 6-7, 2000 -- Austin, TX			
Name	**Company/Agency & Address**	**Telephone No.**	**E-Mail Address**
Mike Belue	Belue Associates 1319 Knight Drive Murfreesboro, TN 37128	615-867-1010	bassoc@aol.com
David Biedermann	Wayne Div Dresser Equip Group Inc 3814 Jarrett Way Austin, TX 78728	512-388-8321	daveb@wayne.com
Randy Byrtus	Measurement Canada Standards Building Ottawa, Ontario CD KIA009	613-952-0631	byrtus.randy@ic.gc.ca
Rodney Cooper	Schlumberger Measurement Div 1310 Emerald Road Greenwood, SC 29646	864-942-2226	rcooper@greenwood.rms.slb.com
Maurice Forkert	Tuthill Transfer Systems 8825 Aviation Drive Fort Wayne, IN 46809	219-747-7529	mforkert@tuthill.com
Steve Hadder	State of Florida Bureau of Petro.Insp. 3125 Conner Blvd Tallahassee, FL 32399-1650	850-487-2634	hadders@doacs.state.fl.us
Gordon Johnson	Marconi Commerce Sys. 7300 W Friendly Aveue Greensboro, NC	336-547-5375	gordon.johnson@marconi.com
Michael Keilty	Micro Motion Inc 7070 Winchester Circle Boulder, CO 80301	303-530-8231	mikek@micromotion.con
Ted Kingsbury	Measurement Canada Standards Building Ottawa, Ontario CD KIA009	613-941-8919	kingsbury.ted@ic.gc.ca
Ronald Murdock	NCDA Standards Division Box 27647 Raleigh, NC 27611	919-733-3313	ron.murdock@ncmail.net
Charlie Nelson	Measurement Standards CA 8500 Fruitridge Road Sacramento, CA 95826	916-229-3052	cnelson@cdfa.ca.gov
Steve Patoray	NTEP 1239 Carolina Drive Tryon, NC 28782	828-859-6178	spatoray@mgmtsol.com
Dan Reiswig	Measurement Standards CA 8500 Fruitridge Road Sacramento, CA 95826	916-229-3023	dreiswig@cdfa.ca.gov
Keith Ridenour	Endress & Hauser Inc 2350 Endress Place Greenwood, IN 46143	317-535-1468	Keith.ridenour@us.endress.com
Wayne Stiefel	NIST/TSAP 100 Bureau Drive, Stop 2150 Gaithersburg, MD 20899	301-975-4011	stiefel@nist.gov
Richard Suiter	NIST/OWM 100 Bureau Drive, Stop 2350 Gaithersburg, MD 20899	301-975-4406	rsuiter@nist.gov
Robert Traettino	Liquid Controls 105 Albrecht Dr. Lake Bluff, IL 60044	847-295-1050	btraettino@lcmeter.com
William D. West	Ohio Department of Agriculture 8995 E Main St Reynoldsburg OH 43068	614-728-6290	west@odant.agri.state.oh.us
Juana Williams	NIST/OWM 100 Bureau Drive, Stop 2350 Gaithersburg, MD 20899	301-975-3989	Juana.williams@nist.gov
Richard Wotthlie	Maryland W&M 50 Harry S. Truman Drive Annapolis, MD 21401	410-841-5790	wotthl.rw@mda.state/md.us

Action Items Measuring Sector October 6-7, 2000 Meeting, Austin, TX			
Agenda Item	**Task**	**Responsible Party**	**Due Date**
1 – Update to NCWM Publication 14	Forward a proposal to S&T Committee to allow MOD. as an abbreviation for Model.	Sector Technical Advisor	11/1/00
2 - Changes to NCWM Publication 14 LMD Technical Policy	Remove Footnote "1" from Product Family Table for PD meters	Sector Technical Advisor	1/15/01
	Review Section "O" of LMD Technical Policy (with volunteers from Sector.)	Sector Technical Advisor	9/1/01
	Volunteers to contact Technical Advisor.	Sector Members	3/1/01
3 - Product Families for Positive Displacement (PD) and Mass Flow Meters	Review and update Product Family Table for PD meters and recommend updates if required.	Work Group formed at Sector meeting	9/1/01
4 - Changes to Existing Product Family Tables	(A) Add a Footnote to Product Families for Positive Displacement and Mass Flow Meters Remove current Footnote "1"	Sector Technical Advisor	1/15/01
	(B) Additional Product Groups for Family Product Tables	WorkGroup formed at Sector meeting	9/1/01
	(C) New Product Family Table for Turbine Meters (Sector Members to supply names to Tech Advisor for work group	Sector Technical Advisor & WorkGroup to be formed	9/1/01
5 - Adding Gasoline Oxygenated Blends to Family Products Table	Add Footnote3 to Product Families Table for PD meters	Sector Technical Advisor	1/15/01
9 - Repeatability Tolerances for LMD, VTM, and Mass Flow Meters	Forward proposal developed during Sector Meeting to the S&T Committee	Sector Technical Advisor	11/1/00
10 - Repeatability Requirements for Meters Measuring LPG/NH_3	Add the adopted proposal to Publication 14, Section H	Sector Technical Advisor	1/15/00
12 - Return Mass to Units of Measure in Handbook 44 3.34 Cryogenic Liquid-Measuring Devices	Technical Advisor to contact an industry representative making them aware of this item.	Sector Technical Advisor	1/15/00
	Industry to provide feedback for inclusion on the agenda for the 2001 Measuring Sector Meeting	Industry to provide feedback	9/1/00
13 - Testing of the Reference Scale for NTEP Tests of Mass Flow Meters	Add proposal to Publication 14, Section L	Sector Technical Advisor	1/1/5/00
14 - Vehicle-Mounted and Stationary Applications of the Same Meter	Add proposal as written to Publication 14, Technical Policy	Sector Technical Advisor	1/1/5/00
	Review meter sizes and products to be evaluate and provide proposal for 2001 Measuring Sector Meeting	NTEP Laboratories	9/1/00
15 - Testing of Single Compartment vs. Split Compartment Vehicle Tank Meters	Draft procedure for Sector review at 2001 meeting	NTEP Laboratories	9/1/00
16 - Meeting Location for 2001 NTETC Measuring Sector Meeting	Forward Sector feedback to NCWM Board of Directors	Sector Technical Advisor	1/1/5/00

Appendix G
National Type Evaluation Technical Committee
Weighing Sector
Meeting Summary
September 10-12, 2000, Columbus, Ohio

Agenda Items

Carry-Over Items

1. **Double Wide and Narrow Decks**
2. **Minimum Test Load for Combination Vehicle/Railway Track Scales**
3. **Weighing Elements and Indicators Not Permanently Attached Definition**
4. **POS Receipt Format**
   (a)Examples of ECR Receipt Formats
   (b)Column Delineation on ECR Receipts
5. **Calibration Period for Test Weights used for NTEP Evaluations**
6. **Modular Scale Section Connection Points**
7. **Load Cell Placement in Modular Scales**
8. **Ranges Covered on the CC for a Railway Track Scale Based on the Device Evaluated**
9. **Application of Modular Criteria to Combination Vehicle/Railway Track Scales**
10. **CLC on Livestock Scales**
11. **Standard Features and Options to be Listed on a CC**
12. **Shift Test Pattern for Scales Based on Number of Load Cells**
13. **Recorded Representation of Count Items on ECR Systems**

New Items

14. **Power Voltage Variation Tests for Automatic Weighing Systems (AWS)**
15. **N_{max} for CC Based on Device Evaluated**
16. **Families of Scale with Capacities Above and Below 30 000 lb**
17. **Load Cell CC Limited to Six Wire Design**
18. **Replacement of Load Cell Mount with Design Other than that Evaluated in Complete Scale**
19. **What is to be Submitted for a Family of Load Cells of Models of Different Metals**
20. **NTEP Technical Policy for Scales, Part D. Substitution of Load Cells in Scales, Add Hydraulic Load Cells to Replacement of all Cells in a System**
21. **Replacing Non-NTEP Load Cells with NTEP Cells in a Complete Device**
22. **NTEP Technical Policy Publication 14 Section B.5.b. Change Platform Area to Length and Width**
23. **Modify Handbook 44 2.20 Scales Table 7a.**
24. **Policy for initial test only vs. full evaluation when a modification is made which requires testing**
25. **Publication 14 Administrative Procedures**
26. **Manual Weight Entries as a Sealable Parameter**
27. **Reference to Other Requirements in the ECR Checklist**

Additional Items Added at the Meeting

28. **Proposed Change to Tolerance Applied to Dynamic Monorail Scales During Type Evaluation**
29. **Location for Next Meeting**

Carry-Over Items

1. Double-Wide and Narrow Decks

Background: At its October 1998 meeting, the Weighing Sector agreed that the NTEP Laboratories should use the test procedure presented at that meeting on an *ad hoc* basis. The Sector asked the laboratories to make recommendations for changes to the procedure. In early 1999 the Ohio laboratory conducted an evaluation using the *ad hoc* procedure and made recommendations for modifications to the procedure. Dave Quinn (Fairbanks Scale) also provided input on this topic. At its October 1999 meeting, the Sector discussed the proposed changes and asked the SMA Technical Committee to review the present Handbook 44 definition of CLC and, if necessary, submit a proposal that addresses the loading patterns on double-wide scales. The Technical Committee was also asked to propose appropriate NTEP test procedures for the loading patterns on double-wide scales. The Sector also agreed that NTEP should continue to use *ad hoc* procedures for any applications received for an NTEP evaluation of a double-wide scale. At their spring 2000 meeting, the NTEP Laboratories formed a work group to develop test procedures for scale platform widths greater than 12 feet. The Sector is asked to review input from both groups and decide how to proceed.

In August 2000, SMA submitted the following analysis and recommendation to address the issue:

Double-Wide Scales and Narrow Decks:
The Weighing Sector is trying to define a test procedure for these types of scales using terminology and test procedures established for standard vehicle scales and those terminologies and test procedures that are not applicable.

Vehicle Configuration
The standard vehicle scale presently addressed in Handbook 44 is designed for weighing vehicles legal for use on U.S. highways. The definition of Concentrated Load Capacity is derived from the Federal Bridge Gross Weight regulation (Dual Tandem Axle with 4-foot centers and width of 8 feet.) The maximum span load (r factor table) is derived from the Table B of the Federal Bridge Gross Weight formula for multi-axle vehicles legally configured for the Federal highway system. These vehicles are a maximum of 8.5 feet wide and have a minimum axle spacing of 42 inches on center. The inside-to-inside dimension on dual tandem axle is approximately 5 feet. The footprint of a tire is about 12 inches long and 8 inches wide. The gross load of the vehicle is controlled by axle weight; in general, the maximum gross weight is directly proportional to the number of axles. As a result, vehicles with high gross loads tend to get longer as the weight increases and are not concentrated on a single span.

On the other hand, double-wide vehicle scales are designed for vehicles which are not legally configured for the Federal highway system. These special vehicles are primarily designed for moving large amounts of material over rough terrain and each is designed to specific application. The axle configuration has no resemblance to an over-the-highway vehicle. These vehicles are normally two-axle vehicles with a single tire on each side of the steering axle and dual tires on each side of the rear axle. The rear axle normally carries about 70 % of the maximum gross weight. The maximum gross weight is a function of vehicle size, not the number of axles. The centerline between front and rear axles is relatively short and the entire vehicle will easily fit on a single span.

Examples:

1. The Euclid R-35 axles are 12 feet 3 inches center-to-center and 12 feet 1inch wide. Inside-to-inside dimension on dual tandem axle is approximately 7 feet. Gross load weight is 150 000 pounds. Tire footprints are 19 inches long and 13 inches wide.

2. The Euclid R-90 axles are 15 feet 2 inches center-to-center and 16 feet 9 inches wide. Inside-to-inside dimension on dual tandem axle is approximately 7 feet. Gross load weight is 350 000 pounds. Tire footprints are 19 inches long and 20 inches wide.

3. The Caterpillar 777B axles are 15 feet center-to-center and 17 feet 11inches wide. Inside-to-inside dimension on dual tandem axle is approximately 8 feet. Gross load weight is 350 000 pounds. Tire footprints are 19 inches long and 20 inches wide.

The dimensions and maximum gross weight above are typical of the model but will vary based on the application.

Structural Design
The conventional vehicle scale is designed, per the definition of CLC as found in Handbook 44, as the maximum weight concentration on two axles on 4-foot centers with an 8-foot width. Every scale is designed to the maximum load, as defined by the manufacturer, on these axle dimensions. The "r factor" table then stipulates the maximum legal highway load on a span. The designer can build a computer model for finite element analysis and simply increase the weight on the two axles on 4-foot centers when increasing the CLC.

The double-wide scale is designed for a specific vehicle, which has varying axle dimensions, varying tire footprint dimensions, and high gross weight on a single span. Without a standard axle configuration, a finite element analysis would require a computer model of each type of vehicle.

SMA's Conclusions
When testing a conventional vehicle scale, a test pattern of 4 feet x 10 feet or the width of the platform, whichever is less, should be used to simulate the loading pattern that would be created by two axles on 4-foot centers 8 feet wide. In other words, simulate the manufacturers declared CLC.

To test the scale for use with the off-highway vehicles, SMA recommends placing two 4-foot x 4-foot patterns of test weights on the longitudinal centerline of each side-by-side deck of a double-wide scale. This test load would be 50 % of the CLC of a single deck. This recommendation assumes that all double-wide scales are side-by-side platforms. The fact is, this is not true of most of the scales used to weigh these off-highway vehicles. The decks are single decks 14 to 20 feet wide. If the design is, in fact, a side-by-side scale, the weight concentration on the longitudinal centerline could be a valid method of testing such a scale. But even in this case the test weight pattern should simulate the vehicle to be weighed and should not be referred to as a "CLC", which is based on two axles on 4-foot centers 8 feet wide. Using the example of the Euclid R-90 above two test pattern placed 17 feet apart would be used, each 15 feet to 16 feet long (as much as possible on a single span) and 4 feet wide. Each test pattern would contain 140 000 pounds of weight for a total of 280 000 pounds (80% of the maximum gross weight of 375 000). This loading pattern would simulate the actual usage of the scale when weighing a Euclid R-90 and also simulate a CAT 777B and can be conducted on side-by-side or single-wide decks. To test this scale to 12.5 % of capacity would require 47 000 pounds of test weights each time the scale was tested. To conduct such a test would create an economic hardship on all parties - users, manufacturers and regulators - and is simply not practical.

SMA'S Recommendations
- Do not try to apply the CLC definition to any scales other than those designed to weigh vehicles, which are legal for travel on federal highways. Change the test pattern to simulate the CLC definition to 4 feet x 10 feet, or the width of the platform, whichever is less.

- For vehicle scales designed to weigh off-highway vehicles, test the scale in the field "as used," to the satisfaction of the local jurisdiction. In order to satisfy the requirement for NTEP, the "one of a kind" applies regardless of number of units in the marketplace.

The NTEP Laboratories submitted the following recommendation for consideration:

Modify Publication 14, Section 64.3. as follows:

64.3.1. At least two complete sets of shift tests shall be completed over each section to at least 90 percent of the concentrated load capacity (CLC) of the scale. This is to determine the repeatability of the scale. During each shift test, the ~~The~~ scale error should be determined at a minimum of five equally spaced test loads. Scale errors may be determined at more points if desired. If two weight carts are used, they should travel along the paths the wheels of a vehicle would take when moving across the scale. Decreasing load tests are to be avoided when testing a section. A truck may not be backed onto the scale in order to place weights on the inner sections. Decreasing load tests shall be conducted after the

sections have been tested to their maximum load and the weights are being removed from the scale. Do not exceed the CLC capacity. The load is to be distributed across the section.

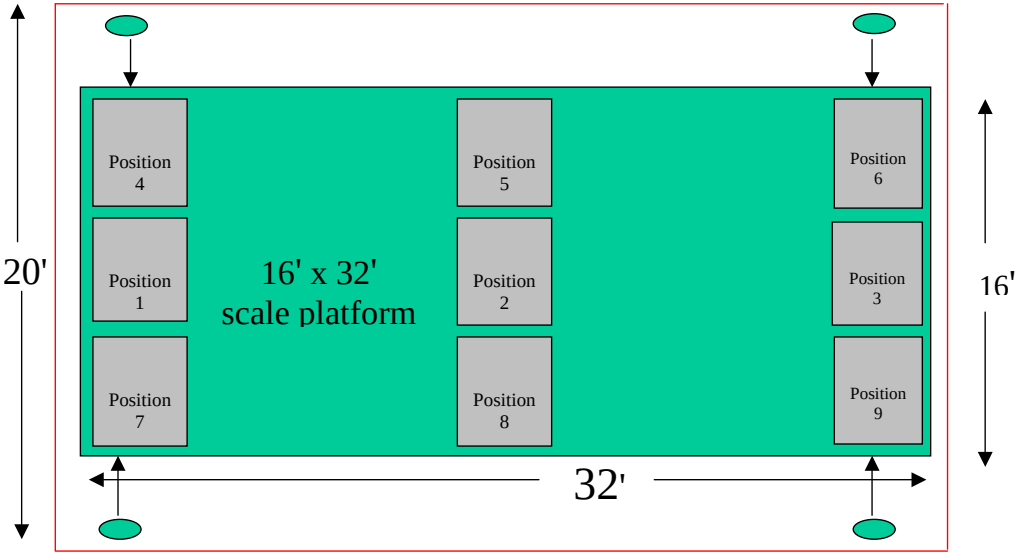
64.3.2. At least one set of shift tests to at least 90 percent of the CLC shall be conducted at midspan between sections.

64.3.3. If a scale consists of modules that are connected together to comprise the weighbridge, shift tests shall be conducted by placing the load so that it straddles the connection between modules. Later, at least one shift test is to be conducted on the scale with the test load ~~is~~ placed first on one side of the connection line ~~off~~ of the module, then on the other side of the connection line.

64.3.4. When conducting shift tests for scales wider than 12 feet, a test load of 90 percent of the CLC shall be moved across the scale to the left of center, right of center, and in the center of the width of the deck as outlined below. The test load should be placed so that its width is no more than one half the width of the deck.

~~64.3.4~~ 64.3.5. The results of shift tests are required to agree within the absolute value of the applicable maintenance tolerances and must be within acceptance tolerances.

Example:



= Load Bearing Points for Levers or load cells

= 16' x 32' scale platform and pit walls

= Concentrated test load in an area 4' X 10' in nine positions

Discussion: The Sector reviewed the recommendation from the SMA Technical Committee and the recommended test procedure submitted by the NTEP Laboratories. Dave Quinn (Fairbanks Scales) stated that off-highway vehicles do not apply a load to a scale platform in the same manner as highway vehicles. The definition for CLC is based on the loading pattern of the dual tandem axle of a highway vehicle. Off-highway vehicles, such as the Euclid R-35 and R-90 and the Caterpillar 777B, have a relatively short wheelbase. The entire off-highway vehicle may fit on one section of the scale. Double-wide scales designed to weigh off-highway vehicles should be treated as "one-of-a-kind" regardless of the number installed. Several members stated that the "one-of-a-kind" criteria does not apply if more than one of the same device is manufactured. Some of the double-wide scales installed in various jurisdictions are being used to weigh both off-highway and highway vehicles. Some installations for weighing off-highway vehicles are being used for commercial

purposes. The double-wide scales used to weigh highway vehicles or off-highway vehicles for commercial transactions must have an NTEP Certificate of Conformance (CC).

One member asked if Handbook 44 allowed the side-by-side installation of two of the same vehicle scales that have a CC. Handbook 44 does not specifically prohibit such an installation; however, the Sector reaffirmed its position that the CC for a vehicle scale is not valid for a side-by-side installation unless the device has been tested in this configuration and the configuration is included on the CC. The members generally agreed that if a manufacturer applies for a CC for a double-wide scale which is created using two vehicle scales with a CC placed side-by-side, the CLC listed on the resulting CC should not be based on doubling the CLC of the individual scales.

Conclusion: The Sector agreed that the following definition for concentrated load capacity (CLC) (which was developed by the Scale Manufacturers Association) should be forwarded to the NCWM S&T Committee for consideration as an addition to Handbook 44.

> **concentrated load capacity (CLC)**. A capacity rating of a vehicle~~, axle load or live stock scale,~~ or *axle load scale*, specified by the manufacturer, defining the maximum load ~~concentration~~ *applied by a group of two axles with a centerline spaced 4 feet apart and an axle width of 8 feet* for which the weighbridge is designed. ~~In the case of vehicle and axle load scales, it is the maximum axle load concentration (for a group of two axles with a centerline spaced 4 feet apart and an axle width of 8 feet) for which the weighbridge is designed as specified by the manufacturer.~~ The concentrated load capacity rating is for both test and use [2.20] (Added 1998)(Amended 1991, 1994, *200X*)

The Sector also asked the NTEP Laboratories to develop an *ad hoc* loading pattern for vehicle scales wider than 12 feet, at its September 12, 2000, meeting. The laboratories were also asked to discuss safety concerns when testing to 90 percent of the rated CLC with the required test load placed in a 4-foot x 10-foot area on the scale platform. The SMA Technical Committee was asked to develop test methods/criteria for larger CLC ratings, perhaps similar to the American Association of Railroads (AAR) methods of engineering analysis of the design of a scale submitted for NTEP testing.

The Sector also asked that the *ad hoc* procedure for testing vehicle scales wider than 12 feet be distributed to Sector members within six months for review. Sector members will be asked to review the proposed procedure in preparation for discussion at the next Sector meeting. The Sector also agreed that when two vehicle scales, which have an NTEP CC for installation as a single platform are placed side-by-side, the CLC rating of the resulting scale should not be double that of one platform. The CLC for the system will be the CLC listed on the original CC for the individual scale platforms used. The maximum capacity for the system will be determined by the capacity of the load cells and the number of sections in the installation.

2. Minimum Test Load for Combination Vehicle/Railway Track Scales

Background: At its October 1998 meeting, the Weighing Sector asked the Scale Manufacturers Association (SMA) to review the minimum amount of known test standards required in Publication 14 for the NTEP evaluation of a railway track scale. The Sector noted that manufacturers are requesting NTEP evaluations of railway track scales with very large capacities (e.g., 700 000 lb); however, NTEP test criteria do not specify minimum test loads relative to the scale capacities. At its October 1999 meeting, the Sector agreed to adopt the SMA recommendation for a 90 000 lb minimum test weight load for evaluating CLC's on combination vehicle/railway track scales. The Sector asked Lou Cerny (American Association of Railroads [AAR]), with the assistance of AAR members, railway track scale manufacturers, and the USDA Grain Inspection Packers and Stockyards Administration (GIPSA) to develop a recommendation for minimum strain load testing requirements. Lou Cerny will update the Sector on the status of his efforts.

Discussion: Lou Cerny (AAR) reviewed the discussion he had with Dick Phorr (GIPSA) on this issue. GIPSA is attempting to get another test car, which could be dedicated to NTEP evaluations. Bill Bates (GIPSA) reported that the purchase of another test car is dependent on the availability of additional funding.

Several members suggested that there should be a capacity limit for railway track scales. One suggestion was that the limit could be based on criteria similar to the criteria in the AAR handbook, which for full electronic scales uses the section capacity of the scale, based on the capacity of the individual load cells, to determine the maximum capacity for the scale. The AAR handbook states that the nominal capacity of a scale with more than two sections shall not exceed twice the rated section capacity. For two-section scales the nominal capacity shall not exceed the rated section capacity.

One of the problems of current NTEP criteria for Railway track scales is that it does not specify a minimum weight for the strain load test. An additional consideration during NTEP evaluations is the limited ability to apply an appropriate amount of strain load weight to a two-section railway track scale because of the limited length of the scale platform.

Conclusion: The Sector agreed to modify the technical policy in Publication 14 to establish a minimum strain load criteria of 200 000 lb for single-platform scales with a length of 35 feet or greater and for multiple-platform scale systems designed to weigh railroad cars in a single draft. The Sector discussed the issue of placing a limit on the capacity for railway track scale; however, the Sector did not reach a conclusion on this issue. The Sector encourages GIPSA to obtain a larger test car with sufficient test weight to test to a higher capacity on railway track scales.

3. Weighing Elements and Indicators "Not Permanently Attached" Definition

Background: At its October 1998 meeting, the Weighing Sector discussed marking requirements for elements that are "not permanently attached." The Sector recognized a need to clarify or define what is considered to be "not permanently attached." The Sector asked the SMA Technical Committee and the NTEP Laboratories to develop a recommendation for its 1999 meeting. At its October 1999 meeting, the Sector reviewed the recommendations and agreed to forward the following proposal to the S&T Committee to consider:

Modify Handbook 44 Scales Code Table S.6.3.a. as follows:

Table S.6.3.a. Marking Requirements

Weighing Equipment To be Marked With	Weighing, load-receiving, and Indicating element in same housing	Indicating element not in same housing or not permanently attached to weighing and load receiving Element[1]	Weighing and load-receiving element not in same housing or not permanently attached to indicating element[1]	Load cell with CC (11)	Other equipment or device (10)
Section Capacity (14)(20)		X	X		

[1] "permanently attached" may be hard wired or secured together with a physical or electronic seal.

At the 2000 NCWM interim meeting the S&T Committee received comments that the recommendation would not benefit non-NTEP States. The S&T Committee also reviewed an alternate proposal submitted by SMA (see Item 320-2, Publication 16 April 2000.) The S&T Committee felt the SMA proposal had some merit and gave the item informational status asking for additional input and comment. At its 2000 Spring Meeting the SMA revised its proposal and submitted the changes to the S&T Committee. At the NCWM 2000 Annual Meeting the S&T Committee agreed with the SMA proposed changes, but agreed to that the item remain informational (see the report of the 85th NCWM, NIST Special Publication 957, 2000.)

At their 2000 spring meeting the NTEP Laboratories felt that their original recommendation still had merit, but decided that the addition of a definition for "electronic seal" would be beneficial. The following wording was proposed.

> **electronic seal.** An electronic link between the weighing/load receiving element and indicating element where one recognizes the other and neither can be replaced without calibration.

If the Sector agrees, the laboratories propose that the definition for electronic seal be forwarded to the S&T Committee.

Discussion: One member raised a concern that the proposal as presented would require the connection between all indicators and weighing elements to be sealed. That was not the original intent of the proposal. The footnote was

intended to apply only to the 2nd column, not the 3rd and 4th columns. Another member suggested that the term "components" in the footnote be changed to "elements."

Conclusion: The Sector agreed to forward the following proposed revisions to Scales Code Table S.6.3.a. and definition to the S&T Committee for consideration:

Table S.6.3.a. Marking Requirements

Weighing Equipment ***To Be Marked With***	***Weighing, load-receiving, and indicating element in the same housing or covered on the same CC[1]***	***Indicating element not permanently attached to weighing and load-receiving element or covered by a separate CC***	***Weighing and load-receiving element not permanently attached to indicating element or covered by a separate CC***	***Load cell with CC (11)***	***Other equipment or device (10)***
…					
Section Capacity (14)(20)		***X***	***X***		

[1]Weighing/load receiving elements and indicators which are in the same housing or which are permanently attached will generally appear on the same CC. If not in the same housing, elements shall be hard wired together or sealed with a physical or an electronic security seal.

Proposed Footnote/Definition:

Electronic security seal. An electronic link between the weighing/load receiving element and indicating element where one recognizes the other and neither can be replaced without calibration.

4. POS Receipt Format

(a) Examples of ECR Receipt Formats

Background: At its 1998 meeting, the Weighing Sector briefly discussed formats for POS receipts. The Sector reviewed the format of several examples of supermarket receipts. That review resulted in the opinion that Publication 14 should contain some guidelines for formatting ECR receipts to insure consistent interpretation among the laboratories. The Sector agreed to review the checklist to determine what, if any, changes are needed in Publication 14 to give the laboratories and manufacturers clear requirements for printed receipts. If needed, the Sector agreed to add examples to the checklist. Dennis Krueger (NCR) agreed to contact the Food Marketing Institute (FMI) to ask for assistance developing criteria for receipts. Mr. Krueger thought that the FMI might form a work group to develop a recommendation.

At the 1999 Sector meeting Dennis Krueger informed the Sector that he was unable to work on this issue, but he had recently contacted FMI. FMI is interested in working with the Sector to develop recommendations for a receipt format for POS systems. Some members of the Sector expressed an opinion that this issue belongs with the L&R Committee. Most format issues are related to providing information to the consumer that is clear, complete, and does not facilitate fraud. It was pointed out that even if some of the issues are the L&R Committee's responsibility, this Sector and the S&T Committee should discuss and resolve any device related issues.

Mr. Krueger volunteered to continue to work on this issue. He agreed to provide a proposal by April 1, 2000, for the entire Sector to consider. The Sector also agreed it is appropriate for the technical advisor to inform the L&R technical advisor of the discussions and provide input to the L&R Committee on technical issues if the L&R Committee begins to develop a proposal for a receipt format. Mr. Krueger will provide an update on the progress made.

Discussion: At its September 2000 meeting, the Sector reviewed a number of examples which were submitted by Dennis Krueger for discussion.

(b) Column Delineation on ECR Receipts

Background: At the last meeting of the NTEP Laboratories one of the Laboratories asked for clarification of 10.5.4.2. and 10.5.4.4. of the ECR Checklist for Scales. Does a $ sign without spaces on either side provide column delineation?

Recommendation: Amend 10.5.4.2. as follows.

10.5.4.2. At least the total price shall be distinguished by some column delineation from other sales data. *The column delineation may be either at least two character spaces or a $ sign. A combination of a $ sign and spaces is acceptable.*

Discussion: Dennis Krueger (NCR) informed the Sector that the examples provided are intended to be examples of acceptable receipt formats that can be added to ECR checklist in Publication 14. Several members expressed a concern with the use of the number sign (#) to indicate pound. One suggestion was that a proposal to eliminate, on a non-retroactive basis, the allowance of the symbol "#" as a representation of "pound" in Handbook 44.

Conclusion: The Sector agreed to include the examples of POS receipt formats outlined in the meeting agenda, with corrections to read as shown in the following. The Sector also agreed to include a note that these examples are not limiting and other examples may be acceptable.

The Sector agreed that the following statement will be inserted into Publication 14 concerning the use of the "#" to identify the "pound" unit:

The use of the symbol "#" is discouraged.

The Sector also agreed to forward the following proposal to the S&T Committee to modify footnote 1 to Handbook 44 Scales Code paragraph S.1.8.4., which presently recognizes the use of the "#" symbol for Recorded Representations for Point-of-Sale Systems:

"Weight values shall be identified by kilogram, kg, grams, g, ounces, oz, pound, or lb~~, or the sign "#"~~. The use of the symbol "#" is discouraged."

Format Examples:

1. A dollar sign shall appear with total price if the column separation between the total price and weight or unit price information is less than two character spaces. Examples of acceptable formats are shown below. Other examples may be acceptable. (Pub 14, 10.5.4.4.)

   2 apple @ 5/.85$.34

   2 apple @ 5/.85 $.34

   2 apple @ 5/.85 .34

   2.00 lb apple @ 5 lb/.85$.34

   2.00 lb apple @ 5 lb/.85 $.34

   2.00 lb apple @ 5 lb/.85 .34

2. The unit price shall be clearly designated. Acceptable methods of designating the unit price include the use of the following:

   (a) The "@" symbol preceding the unit price. It may appear at the end of the line preceding the unit price or on the same line and preceding the unit price.

   (b) Clear column headings in close proximity to the unit price information.

(c) Other clear means to designate the unit price information.

Examples of acceptable formats are shown below. Other examples may be acceptable. (Pub. 14, 10.5.4.3.)

2.00 lb apple @ 2 lb/.85 .85

2 apple @
5/.85 .34

Net Wt/Ct	Unit Price	Total Price
BANANAS		
5.00 lb	$ 0.39/lb	$1.95
ICE CREAM		$1.49
Miscellaneous By Weight		
5.00 lb	$ 3.21/lb	$16.05
ICE CREAM		$1.49
Miscellaneous By Count		
3	$ 0.83	$2.49
Total Items	5	

Itemized Total

$23.47

3. At least the total price shall be distinguished by some column delineation from other sales data. Examples of acceptable formats are shown below. Other examples may be acceptable. (Pub. 14, 10.5.4.2.)

```
2 apple  @  5/.85        .34
1 corn                   .75
1 ham                  11.75
```

```
                        TOTAL
2 apple  @  5/.85         .34
1 corn                    .75
1 ham                   11.75
```

4. The placement of symbols, such as the weight unit and "@" symbol, with respect to numerical values, shall be correct when reading from left to right. Examples of acceptable formats are shown below. Other examples may be acceptable. (Pub. 14, 10.5.4.1.)

```
2 apple  @  5/.85              .34
```

```
2.00 lb apple  @  2 lb/.85    1.70
```

5. The sales receipt format must be clear and understandable. It is recommended that the receipt have three basic columns similar to the following. Examples of acceptable formats are shown below. Other examples may be acceptable.

```
2          @  5/.85     .34 apple
```
Center column contains unit price preceded by @ symbol (Pub 14, 10.5.3.)

```
2  apple   @  5/.85     .34  grape
```
Left column contains weight information, product name or code number (Pub 14, 10.5.2. & 10.3.)

```
2.00 lb    @ 2 lb/.85   .85  apple
```
Right column contains total price, product, or dept. code (Pub 14, 10.5.1.)

```
2.00 lb    @ 2 lb/.85   .85  35v6
```

```
2.00 lb    @  .85/lb   1.70  peach
```

```
2.00 lb
           @ .85/lb
                       1.70  peach
```

```
peach                  1.70
2.00 lb   @ .85/lb
```

6. The weight unit or symbol shall be recorded with each weight value. Examples of acceptable formats are shown below. Other examples may be acceptable. (Pub 14, 10.4.)

```
5.02 lb   OR   5.02#   OR   5.02 pound
```

Sample Receipts:

General

Franks Super Mart
1236 Green Cabbage Drive
Ham & Egg, MN 66666

corn @ 3/1.00	.34
napkins	1.39
2.00 lb apple @ 2 lb/.85	.85
2 apple @ 5/.85	.34
corn @ 3/1.00	.66
Sub Total	3.58
Tax 6%	.21
TOTAL	$ 3.79

Franks Super Mart
1236 Green Cabbage Drive
Ham & Egg, MN 66666

ITEM	UNIT PRICE	TOTAL PRICE
corn @ 3/1.00		.34
napkins		1.39
2.00 lb apple @ 2 lb/.85		.85
2 apple @ 5/.85		.34
corn @ 3/1.00		.66
Sub Total		3.58
Tax 6%		.21
TOTAL		$ 3.79

Deposit

Franks Super Mart
1237 Green Cabbage Drive
Ham & Egg, MN 66666

corn @ 3/1.00	.34
coke	1.39
(includes .50 deposit)	
2.00 lb apple @ 2 lb/.85	.85
2 apple @ 5/.85	.34
corn @ 3/1.00	.66
Sub Total	3.58
Tax 6%	.21
TOTAL	$ 3.79

Club Member

Franks Super Mart
1238 Green Cabbage Drive
Ham & Egg, MN 66666

corn @ 3/1.00	.34
napkins	1.39
(includes club discount)	
2.00 lb apple @ 2 lb/.85	.85
2 apple @ 5/.85	.34
corn @ 3/1.00	.66
Sub Total	3.58
Tax 6%	.21
TOTAL	$ 3.79

5. Calibration Period for Test Weights used for NTEP Evaluations

Background: The required calibration period for "Certified Test Weights" differs among the various States. The NTEP Laboratories are sometimes uncertain if the test weights available for NTEP field evaluations have a "calibration certificate" that is consistent with local requirements or if calibration is overdue. There are also questions concerning what is considered to be an acceptable time period between calibrations. At its 1998 meeting, the Sector asked the NTEP Laboratories to develop a proposal for calibration requirements for test weights used during an NTEP evaluation.

At the 1999 Sector meeting Sector Technical Advisor, Dick Suiter (NIST) updated the group on work that Georgia Harris (NIST) is doing with the state metrology laboratories to develop standards for calibration periods. Some jurisdictions use an annual calibration requirement. Some jurisdictions require two- and three-year intervals. At least two jurisdictions set calibration intervals for each standard based on a history developed for that standard. The Sector agreed that consistent requirements are needed for use during NTEP evaluations. The Sector also agreed that, until a calibration interval recommendation is presented by Georgia Harris and the state metrology laboratories, the NTEP laboratories should continue to apply the requirements of the jurisdiction where an evaluation is being conducted.

To date a recommendation for calibration interval has not been developed, and according to Georgia Harris (NIST) the work, while still continuing, is not high priority. This item will be brought back for discussion by the Sector when a recommendation is ready for review.

Discussion/Conclusion: The Sector briefly discussed this issue at its September 2000 meeting. The Sector Technical Advisor, Dick Suiter, advised the Sector that the NCWM Metrology Subcommittee is currently looking at criteria for the calibration period of test weights. The Sector agreed that no further action should be taken by the Sector until the work of the Subcommittee is completed.

6. Modular Scale Section Connection Points

Background: NTEP was asked if there is a metrological or structural difference between devices with modules that are welded together and modules that are bolted together. Specifically, NTEP was asked, “if a device was evaluated with welded joints and received a CC, could the same device with bolted joints be covered by the same CC?” The question was referred to the Weighing Sector for discussion at its 1999 meeting. The Sector agreed that the SMA Technical Committee should be asked to review this item and propose a definition for “modular designs.” The Technical Committee is also asked to provide guidance about the metrological significance of the types of connections. At its September 2000 meeting, the Sector was asked to consider the following SMA analysis and recommendation.

SMA Recommendation:

Modular Scale Section Connection Points

SMA noted that a number of load receivers that have NTEP approval as modular are no more than “I” beams bolted together and placed on top of weighing elements and a single-piece concrete deck poured the length of the scale. This type of device cannot be taken apart without destroying the concrete deck. SMA does not believe that the definition “modular” was intended to include this type of design.

a. Proposed Modular Scale Definition: A vehicle, railroad, or livestock scale made up of individual load receiving elements of like design which can be joined together to form a larger integral load receiving element and can be separated at any time without structurally changing the individual load receiving elements.

b. The issue of welded vs. bolted connections on modular scales is an interesting point. SMA discussed several questions: Can a modular scale be designed so the “modules” have to be welded together, which basically creates a single load receiver that cannot readily be taken apart? If NTEP tested the device as a welded design, should a bolted design be approved without testing? Does a bolted design have to have torque ratings for the bolt connections?

   Precedence exists for additional NTEP testing of different designs, such as steel deck and concrete deck,

changes to load cell mounts, etc. The position that field-testing is adequate to evaluate such design changes could apply to Class IIIL scales across the board and would suggest that NTEP evaluation be limited to the laboratory only. For uniformity, SMA recommends that separate type evaluations be made to demonstrate that a manufacturer can build either welded or bolted designs to meet Handbook 44.

Discussion: At its September 2000 Meeting, several Sector members expressed the opinion that multiple-section vehicle scales with a continuous concrete platform that is poured on site should not be considered a modular design, even if the supporting steel structure is bolted or welded together on site.

Conclusion: The Sector voted to add the following SMA-developed definition of modular design to NCWM Publication 14 with 8 members in support and 2 members opposed.

> **modular scale.** A vehicle, railroad, or livestock scale made up of individual load receiving elements of like design which can be joined together to form a larger integral load receiving element and can be separated at any time without structurally changing the individual load receiving elements.

The Sector agreed that the definition would be applied non-retroactively for the purposes of NTEP evaluations. The definitions will apply to new applications for NTEP evaluations. The definition will not be applied to devices already covered on existing Certificates; however, they will apply to requests to add new devices to existing Certificates.

The Sector also agreed that, when modular designs with welded, bolted, or other types of connection points are submitted for evaluation, any future change from the original design to a different connection type is a modification of type and requires full evaluation. A manufacturer may submit a hybrid design including more than one type of connection point for evaluation and have the resulting CC cover all types submitted if the evaluation is successful.

7. Load Cell Placement in Modular Scales

Background: NTEP was asked if the placement of load cells under the connection point for modules is metrologically or structurally significant. Some designs have the cells placed directly under the joint. Other designs have the cells displaced to one side of the joint. The question was referred to the Weighing Sector for discussion at its 1999 meeting. The Sector agreed to ask the SMA Technical Committee to address this item along with the issue dealing with the metrological significance of different types of connections (welded vs. bolted) for modular scales (see 2000 Sector Agenda Item 6.) The Technical Committee was also asked to consider if the position of the load cells relative to the module connection point is metrologically significant. At its September 2000 meeting, the Sector considered the following SMA analysis and recommendation.

SMA Recommendation:

Load Cell Placement in a Modular Scale

Publication 14 would appear to already deal with this issue by clearly stating that changing the load cell mounting requires a re-evaluation of the device. This criterion applies to all scales, not just modular vehicle scales. It would seem that changing the location of a load cell from a location under a module to a location between two modules is significant enough to require a re-evaluation.

Discussion: The Sector generally agreed with the SMA recommendation. One NTEP Laboratory stated that it would help NTEP if manufacturers were required to send complete drawings of the device being submitted with the application for NTEP evaluation. The drawings should be maintained in the evaluation file for future reference.

Conclusion: The Sector agreed with the addition of the following language to Section E. Modification of Type:

> Changing the location of a load cell from a location under a module to a location between two modules or vice versa is significant and requires full re-evaluation in order for this variation to be included on the CC.

The Sector also agrees that drawings of large capacity scales should be submitted with the NTEP application.

8. Ranges Covered on the CC for a Railway Track Scale Based on the Device Evaluated

Background: Section B.5. of Pub 14, Digital Electronic Scales, gives a range of parameters which can be covered on a CC for weighing elements greater than 30 000 lb capacity based on the model evaluated. If a vehicle scale with a nominal capacity of 160 000 lb is evaluated, the manufacturer may request the CC include capacities up to 216 000 lb. In the case of railway track scales, 135 percent of the capacity evaluated may be a substantial change. For example, a scale submitted with a capacity of 400 000 lb could be used to cover devices with a capacity up to 540 000 lb. At its October 1999 meeting, the Sector considered whether applying this criteria to railway track scales or placing a limit on the allowable amount of increase is appropriate. The Sector agreed to re-address this issue when the minimum strain load requirement for NTEP evaluation of a railway track scale is resolved and consider any information provided for that issue (see 2000 Sector Agenda Item 2.)

Discussion: One NTEP Laboratory indicated a concern over applying the 135 percent allowance to a railway track scale when the manufacturer is presently only required to have the device evaluated to 100 000 lb. A vehicle scale is required to be tested to at least 80 percent of capacity for the device submitted; however, there is no similar criterion for railway track scales. Lou Cerny (AAR) expressed concern that testing to a higher requirement would place a hardship on the device users and the servicing railroads. One manufacturer stated that the capacity is specified by the manufacturer applying for a CC, and that manufacturer is responsible for providing the equipment necessary to conduct an adequate NTEP evaluation. It was suggested that the capacity listed on the CC be limited to 100 percent of the capacity of the device submitted for evaluation.

Conclusion: By a vote of 11 in favor and 1 opposed the Sector agreed that the nominal capacity range criteria of Publication 14, Digital Electronic Scales, Sections 6.a. and 7.2.a. should not apply to railway track scales. The capacity listed on the CC for a railway track scale or combination vehicle railway track scale will be limited to the capacity of the device submitted for evaluation.

9. Application of Modular Criteria to Combination Vehicle/Railway Track Scales

Background: Section B.5. of Pub 14, Digital Electronic Scales, gives a range of parameters which can be covered on a CC for weighing elements greater than 30 000 lb capacity based on the model evaluated. If a vehicle scale with a nominal capacity of 160 000 lb is evaluated, the manufacturer may request the CC include capacities up to 216 000 lb. In the case of railway track scales, 135 percent of the capacity evaluated may be a substantial change. For example, a scale submitted with a capacity of 400 000 lb could be used to cover devices with a capacity up to 540 000 lb. At its October 1999 meeting, the Sector discussed the appropriateness of applying modular criteria to railway track scales and generally agreed that the definition of modular designs (as outlined in 2000 Sector Agenda Items 7 and 8) should be resolved before this item is decided. The Sector agreed to revisit this item at its next meeting after the SMA Technical Committee submits a proposal to clarify the definition of a modular scale. (See 2000 Sector Agenda Item 6.)

Discussion: Dave Quinn (Fairbanks Scales) stated that the AAR Handbook limits the capacity of railway track scales with more than two sections to twice the rated section capacity. Dave thinks that Handbook 44 should have a similar limitation. One member stated that the Publication 14 modular criteria apply only to vehicle scales and include references to CLC. The Sector generally agreed that in principal the modular concept could be applied to railway track scales; however, criteria for application need to be developed and reviewed at the next Sector meeting.

Conclusion: The Sector requested that the NTEP laboratories review the modular criteria for vehicle scales to determine if changes might be made to enable these criteria to apply to railway track scales. The laboratories are asked to bring proposed changes back to the Sector for consideration at its next meeting. The Sector agreed to forward the following proposed changes to Handbook 44 to the S&T Committee for consideration:

> **S.6.4. Railway Track Scales. –** A railway track scale shall be marked with the maximum capacity of each section of the load-receiving element of the scale. Such marking shall be accurately and conspicuously presented on, or adjacent to, the identification of nomenclature plate that is attached to the indicating element of the scale. <u>The nominal capacity of a scale with more than two sections shall not exceed twice the rated sectional capacity. The nominal capacity of a two-section scale shall not exceed the rated sectional capacity.</u>

Add the following to the Definitions Section of Handbook 44:

section capacity. – The section capacity of a scale is the greatest live load that may be divided equally on the load pivots or load cells of a section.

10. CLC on Livestock Scales

Background: Handbook 44 requires that livestock scales be marked with a CLC. It may be appropriate to test a livestock scale to see how it performs with a load concentrated on the platform. It also seems appropriate to require a marking that limits concentrated loads.

The Handbook 44 definition for CLC only explains how the term "CLC" applies to a vehicle scale. Handbook 44 does not give any guidance about how the term CLC applies to a livestock scales. When the CLC definition was developed, many livestock scales were a derivation of a vehicle scale design. Now some scales are designed exclusively for the weighing of livestock, such as livestock ring scales, animal scales, or portable livestock scales.

In actual use, the loads on a livestock scale are randomly distributed depending on the number of animals being weighed. A full load will generally be distributed over the entire platform. If only a small number of animals are being weighed, the animals may crowd into one corner. When a vehicle scale is in actual use, a load typically follows a wheel spread of eight feet wide and depends more on the vehicle's footprint.

The basis for CLC on a vehicle scale was derived from the highway bridge formula which allows a tandem axle to be loaded to a maximum of 34 000 lb. For a livestock scale, the USDA Grain Inspection Packers and Stockyards Administration (GIPSA) requires that the maximum usable capacity for the platform be based on 110 lb per square foot of platform area. At its October 1999 meeting, the Sector generally agreed that the CLC test criteria currently in Publication 14 should apply to livestock scales. However, the Sector recognized that the discussions during the development of the CLC definition centered primarily on vehicle scales. The Sector agreed that Handbook 44 and Publication 14 should be changed to eliminate the requirement for marking and testing of CLC on livestock scales. The Sector did not develop a specific proposal at this meeting. The Sector agreed that it will develop a proposal, with input from GIPSA, to replace the Handbook 44 requirements for marking CLC on livestock scales with concentrated load marking and test criteria based on the GIPSA loading formula of platform area times 110 lb per square foot. It will also develop a proposal, with input from GIPSA, for test criteria to be added to Publication 14 for livestock scales based on the proposed changes to Handbook 44. The Sector agreed to revisit this item at its next meeting.

Recommendation: At its September 2000 meeting, the Sector was asked to consider the following proposal for changes and additions to NIST Handbook 44. If the Sector agrees with the proposal it will be forwarded to the S&T Committee.

Definition: ***area load ratio (ALR).*** *A capacity rating for a livestock scale expressed as load in pounds per square foot (lb/ft^2), specified by the manufacturer, defining the maximum load concentration for which the weighbridge is designed. The ALR for a specific scale shall be determined by the formula (ALR) nominal scale capacity ∋ scale platform area) and shall be not less than 110 lb/ft^2.*

S.6. Marking Requirements. [See also G-S.1., G-S.4., G-S.6., G-S.7., G-UR.2.1.1., and UR.3.4.1.]

S.6.1. Nominal Capacity; Vehicle, Axle-Load, and Livestock Scales. - *For all vehicle, axle-load, and livestock scales, the marked nominal capacity shall not exceed the concentrated load capacity (CLC) times the quantity of the number of sections in the scale minus 0.5. As a formula, this is stated as:*

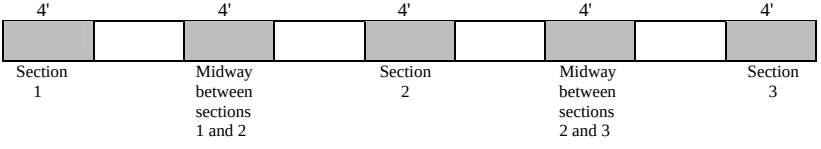
nominal capacity < CLC x (N - 0.5)

where N = the number of sections in the scale.
(See N.1.3.4. and T.N.3.1.)
[Nonretroactive as of January 1, 1989.]

N.1.3.4. Vehicle Scales, Axle-Load Scales, and Livestock Scales With More Than Two Sections. - A shift test shall be conducted with at least two different test loads and may be performed anywhere on the load-receiving element using the prescribed test patterns and maximum test loads specified below. (Two-section livestock scales shall be tested consistent with N.1.3.8.)
(Amended 1991)

(a) **Prescribed Test Pattern.** The normal prescribed test pattern shall be an area of 1.2 m (4 ft) in length and as wide as the scale platform. Multiple test patterns may be utilized when loaded in accordance with Paragraph (b). (Amended 1997)

(b) **Maximum Loading.** When loading the scale for testing, one side of the test pattern shall be loaded to no more than half of the concentrated load capacity or test load before loading the other side. The area covered by the test load may be less than 1.2 m (4 ft) x the width of the scale; for test patterns less than 1.2 m (4 ft) in length the maximum loading shall meet the formula (wheel base of test cart or length of test load divided by 48 in) x 0.9 x CLC. The maximum test load applied to each test pattern shall not exceed the concentrated load capacity of the scale. When the test patterns exceeds 1.2 m (4 ft), the maximum test load applied shall not exceed the concentrated load capacity times the largest "r" factor in Table UR.3.2.1. for the length of the area covered by the test load. For weighing elements installed prior to January 1, 1989, the rated section capacity may be substituted for concentrated load capacity to determine maximum loading. An example of a possible test pattern is shown below:
(Amended 1997)



(c) ***Maximum loading livestock scales.*** *In an area 1.2 m (4 ft) x the width of the scale platform a load of 50 % of the nominal capacity (not to exceed the ALR) shall be applied at each section and midway between sections of the scale platform.*

(*d*~~c~~) **Multiple Pattern Loading.** To test to the nominal capacity, multiple patterns may be simultaneously loaded in a manner consistent with the method of use.

(*e*~~d~~) **Other Designs.** Special design scales and those that are wider than 3.7 m (12 ft) shall be tested in a manner consistent with the method of use but following the principles described above.
(Amended 1988)

Table S.6.3.a.

Marking Requirements

Weighing Equipment To Be Marked With	Weighing, load-receiving, and indicating element in same housing	Indicating element not permanently attached to weighing and load-receiving element	Weighing and load-receiving element not permanently attached to indicating element	Load cell with CC (11)	Other equipment or device (10)
Concentrated Load Capacity (CLC) (12)(20)		x	x (9)		
Area Load Ratio (ALR) (22)		*x*	*x*		

For applicable notes, see Table S.6.3.b.
(Added 1990) (Amended 1992 and 1999)

Notes For Table S.6.3.a.

9. *For vehicle~~,~~ and axle-load~~, and livestock scales~~ only. The CLC shall be added to the load-receiving element of any such scale not previously marked at the time of modification. [Nonretroactive as of January 1, 1989.]*

12. Required on the indicating element *and the load-receiving element* of vehicle~~,~~ and axle load~~, and livestock~~ scales. *Such marking shall be identified as "concentrated load capacity" or by the abbreviation "CLC".* [*Nonretroactive as of January 1, 1989]*

14. Required on the indicating element of railway track scales only. When marked on vehicle~~,~~ and axle-load~~, and livestock~~ scales manufactured before January 1, 1989, it may be used as the CLC.

22. *The value of the area load ratio (ALR) if other than 110 lb / ft^2 shall be marked on the load receiving element and on the indicator at the time of installation.*

Discussion: The Sector generally agreed that the CLC requirements added to Handbook 44 in 1998 were based on scale platform loading forces created by highway vehicles. The CLC requirements should not have been applied to livestock scales at that time. Initially the Sector viewed the proposal to replace CLC requirements, for livestock scales, with Area Load Ratio (ALR) requirements as a good start; however, there was some concern about the introduction of a new term into Handbook 44. One manufacturer voiced concern that scales with platforms larger than 21 feet by 21 feet would require a capacity that would not meet the 10 000 division limit of Handbook 44 with the 5 lb division typically used for livestock scales. One member suggested that an easier solution to the problem is to revert back to the "section capacity" requirements that existed in Handbook 44 for livestock scales prior to 1988.

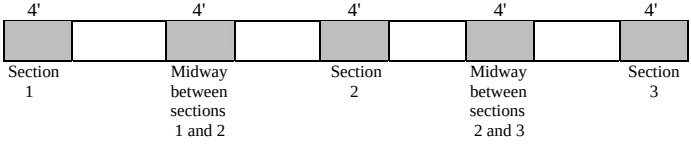
Conclusion: The Sector agreed that the technical advisor should develop wording similar to that, which existed when the term "section capacity" applied to livestock scales. The proposed language should be distributed to the Sector for a vote by ballot with sufficient time to forward any language adopted by the Sector to the S&T Committee by November 1, 2000.

The proposed changes to Handbook 44 were distributed to the Sector members along with a ballot on October 17, 2000. The ballot results indicated Sector support of the following proposed changes to Handbook 44 for submission to the S&T Committee.

Recommendation: Modify Handbook 44, 2.20. Scales., N.1.3.4. and tables S.6.3.a. and S.6.3.b. as follows, and add a definition for section capacity as follows.

N.1.3.4. Vehicle Scales, Axle-Load Scales, and Livestock Scales with More Than Two Sections. - At least one shift test shall be conducted with a minimum test load of 12.5% of scale capacity and may be performed anywhere on the load-receiving element using the prescribed test patterns and maximum test loads specified below. (Two-section livestock scales shall be tested consistent with N.1.3.8.) (Amended 1991 and 2000)

(a) **Prescribed Test Pattern.** The normal prescribed test pattern shall be an area of 1.2 m (4 ft) in length and ~~as wide as the scale platform~~ *3.048 m (10 ft) in width or the width of the scale platform, whichever is less*. Multiple test patterns may be utilized when loaded in accordance with Paragraph (b) *or (c) as applicable*. (Part (a) Amended 1997)



(b) **Maximum Loading *for Vehicle and Axle Load Scales*.** When loading the scale for testing, one side of the test pattern shall be loaded to no more than half of the concentrated load capacity or test load before loading the other side. The area covered by the test load may be less than 1.2 m (4 ft) x *3.048 m (10 ft) or* the width of the scale *whichever is less*; for test patterns less than 1.2 m (4 ft) in length the maximum loading shall meet the formula: [(wheel base of test cart or length of test load divided by 48 in) x 0.9 x CLC]. The maximum test load applied to each test pattern shall not exceed the concentrated load capacity of the scale. When the test pattern exceeds 1.2 m

(4 ft), the maximum test load applied shall not exceed the concentrated load capacity times the largest "r" factor in Table UR.3.2.1. for the length of the area covered by the test load. For weighing elements installed prior to January 1, 1989, the rated section capacity may be substituted for concentrated load capacity to determine maximum loading. An example of a possible test pattern is shown below:
(Part (b) Amended 1997)

(c) ***Maximum Loading for Livestock Scales.*** *When loading the scale for testing, one side of the test pattern shall be loaded to no more than half of the sectional capacity or test load before loading the other side. The area covered by the test load may be less than 1.2 m (4 ft) x 3.048 m (10 ft) or the width of the scale whichever is less. The maximum test load applied to each test pattern shall not exceed the section capacity of the scale.*

(d) ~~(c)~~ **Multiple Pattern Loading.** To test to the nominal capacity, multiple patterns may be simultaneously loaded in a manner consistent with the method of use.

(e) ~~(d)~~ **Other Designs.** Special design scales and those that are wider than 3.7 m (12 ft) shall be tested in a manner consistent with the method of use but following the principles described above.
(Amended 1988)

N.1.3.8. All Other Scales Except Crane Scales, Hanging Scales, Hopper Scales, Wheel-Load Weighers, and Portable Axle-Load Weighers. - A shift test shall be conducted with a half-capacity test load centered, as nearly as possible, successively at the center of each quarter of the load-receiving element, or with a quarter-capacity test load centered, as nearly as possible, successively over each main load support.
(Amended 1987)

Table S.6.3.a.
Marking Requirements

Weighing Equipment / To Be Marked With	Weighing, load-receiving, and indicating element in same housing	Indicating element not permanently attached to weighing and load-receiving element	Weighing and load-receiving element not permanently attached to indicating element	Load cell with CC (11)	Other equipment or device (10)
Concentrated Load Capacity (CLC) (12)(20)*(22)*		x	x (9)		
Section Capacity (14)(20)*(22)*		x	x		

For applicable notes, see Table S.6.3.b.
(Added 1990) (Amended 1992, 1999 and 2000)

Table S.6.3.b. Notes For Table S.6.3.a.

9. *For vehicle~~,~~ and axle-load~~, and livestock~~ scales only. The CLC shall be added to the load-receiving element of any such scale not previously marked at the time of modification. [Nonretroactive as of January 1, 1989.]*

12. Required on the indicating element *and the load-receiving element* of vehicle *and* axle load~~, and livestock~~ scales. *Such marking shall be identified as "concentrated load capacity" or by the abbreviation CLC".* [*Nonretroactive as of January 1, 1989.]*

14. Required on the indicating element of railway track scales *and livestock scales* only. When marked on vehicle~~,~~ *and* axle-load~~, and livestock scales~~ manufactured before January 1, 1989, it may be used as the CLC.
(Nonretroactive as of January 1, 200X.)

22. *Combination vehicle/livestock scales must be marked with both the CLC for vehicle weighing and the section capacity for livestock weighing. All other requirements relative to these markings will apply. [Nonretroactive as of January 1, 200x.]*

Definition:

section capacity. The greatest live load which may be divided equally on the load supports or load cells of a section without inducing stresses in any member in excess of the working stresses allowed for the load supports or load cells and the portion of the load receiving/weighing element involved.

11. Standard Features and Options to be Listed on a CC

Background: Prior to the 1999 meeting of the NTEP Laboratories, the Maryland laboratory submitted a discussion stating concerns that some Certificates of Conformance list nonmetrological features and options that have not been evaluated by an NTEP Laboratory. At the 1999 NTEP Laboratory meeting, the laboratories generally agreed that, if features and options were not evaluated, they should not be listed as standard features and options. Andrea Buie (MD) agreed to draft a proposal for the Weighing Sector. The following proposal was submitted for consideration by the Weighing Sector at its 1999 meeting.

Add the following language to Publication 14, NTEP Technical Policy for Scales, Section A. & B.

A. Models to be Submitted for Evaluation

A type is a model or models of the same design, as defined in the NTEP Policy and Procedures. A complete list and description of all models of a type to be included on the CC (CC) shall be submitted with the request for type evaluation. All options and features to be included on the CC must be submitted for evaluation. If the CC is to include more than one model of the same type, the submitter shall contact the evaluation agency to determine which model or models will be evaluated. A CC will be amended when new models of the same type meeting the specified criteria are added by the manufacturer. *Nonmetrological features may be listed on a CC, but only if the feature has been tested and operates properly.*

B. Certificate of Conformance Parameters

The following guidelines apply.

4. Indicating Element

A CC will apply to all models that have:

a. equivalent hardware and software
b. the same or smaller number of scale divisions
c. subsets of standard options and features of the equipment evaluated.

Metrological features not recognized by Handbook 44, but capable of being used as the basis for commercial transactions, shall be capable of being disabled before the device can receive an NTEP CC.

The following units of measure are not recognized in Handbook 44: tael, tical, & momme. Listing these units on a CC would appear to indicate that they meet the applicable requirements of Handbook 44 and are acceptable for use in commercial applications.

At its October 1999 meeting, the Sector generally agreed that the standard features and options listed on page one of a CC should be the metrological functions that were evaluated. Listing additional units of measure that are not used in the United States can benefit the manufacturer of the device. Some devices submitted for NTEP are also sold in other countries. In some of those countries, the NTEP CC may aid the manufacturer in being allowed to distribute the device. During NTEP evaluation units of measure that are not recognized in Handbook 44 may not be subjected to full

evaluation. However, the evaluation laboratory may check at several points for proper conversion from the units of measure being evaluated to other units of measure to be listed on the CC. There also may be exceptions for non-commercial features. An example would be a NTEP scale with a non-commercial counting feature that may be listed on the certificate. Some members were also concerned about devices other than scales, such as grain analyzers that will perform non-commercial measurements for starch and oil content. Some members thought that features that had not been evaluated should be listed on page two of the certificate.

The Sector agreed to carry this item forward to its next meeting to allow for further development of the issue. There was concern that all types of devices should be considered. Other Sectors may also need to provide input.

At its April 2000 meeting, the NTEP Laboratories discussed what needs to be on a CC in the Standard Features and Options box and what should go into the test conditions. The Laboratories generally agreed that anything necessary for the system to operate should be listed on page one of a CC. Any minimum system requirements should also be listed on the first page. The test conditions should give details of what was evaluated and how the evaluation was performed.

The Sector was asked to discuss the issue at its September 2000 meeting, and to provide input as to what should be listed in the standard features and options box and what should be included in the test conditions.

Discussion: Several NTEP Laboratories expressed the opinion that features should not be listed on a CC unless they have been evaluated. The Sector generally agreed with the Laboratories. One member suggested that the words "operates properly" be changed to "operates as intended."

Conclusion: By a vote of 12 in support to 1 opposed the Sector agreed that the following language should be added to the end of the first paragraph of Part A., Models to be Submitted for Evaluation in the Technical Policy for Scales, as follows:

> Nonmetrological features may be listed on a CC, but only if the feature has been tested and operates as intended.

12. Shift Test Pattern for Scales Based on Number of Load Cells

Background: The agenda for the 1999 Weighing Sector meeting included an item informing the members that during the evaluation of a Mettler-Toledo scale, a question regarding the appropriate pattern for conducting a shift test arose. The question was resolved for that evaluation, but Darrell Flocken (Mettler-Toledo) thought that Pub 14 should be changed to clarify the appropriate test pattern to be used for various devices when conducting a shift test. Darrell recommends that Section 55 of Pub 14 be removed and replaced with the current wording of Part 1 – General Information, Section 14 of the Measurement Canada Laboratory Manual, January 1997 edition. The Sector was asked to consider this proposal and decide if it concurred. (A copy of the General Information, Section 14 of the Measurement Canada Laboratory Manual is available by contacting the Sector Technical Advisor, Dick Suiter [NIST].)

At the October 1999 Sector meeting, the Sector Technical Advisor, Dick Suiter (NIST), showed examples of current shift test patterns. Various members of the Sector provided opinions related to the appropriate shift testing of single load cell and four load cell designs. One member was concerned that the Measurement Canada Laboratory Manual provides for a shift test on hopper and tank scales; however, Publication 14 does not require a shift test on hopper and tank scales. The Sector decided to readdress this issue at its next meeting. The Sector also asked the SMA technical committee to review the current shift test patterns and provide feedback to the Sector as to what is appropriate prior to the next Sector meeting.

At its October 2000 meeting, the Sector was asked to review the analysis and recommendation (see Appendix A) provided by the SMA technical committee and decide how to proceed.

Discussion: Darrel Flocken introduced the proposal stating that its intent is to clarify the loading patterns for weighing elements based on the number of load cells in the element. Existing loading patterns were based on mechanical scales with levers, pivots, and bearings. One member suggested that the procedures used by the NTEP Laboratories and procedures used in routine field tests should be the same. Another member stated that in the laboratory it is easier to determine the number of load cells in the scale than it is in the field.

Conclusion: The Sector agreed to add the diagrams depicted in the proposed procedures under the headings of "Bench, Counter, or Hanging Scales" (depicting scales with one load cell) and "Other Platform Scales" (depicting scales with more than one load cell) to Publication 14**.**

Darrell Flocken, Mettler-Toledo, agreed to put together a paper on the procedures used for shift tests in the United States, Canada, and OIML; the paper will include a summary of the differences in the test procedures as well as an analysis of the differences in the tolerance application when testing a weighing element as a separate component. Darrell's paper will be included in the next Sector meeting agenda for consideration by the Sector members.

13. Recorded Representation of Count Items on Electronic Cash Registers (ECR) Systems

Background: Prior to the 1999 meeting of the NTEP laboratories the Maryland W&M reported finding instances of ECR receipts with items by count expressed in a decimal format with as many as three places to the right of the decimal. At the 1999 NTEP laboratory meeting, other laboratories indicated finding similar receipts. Paragraph 3.7 on page 9-11 of Pub 14, ECRs/Retail Motor Fuel Dispensers, states that decimal expressions of count are acceptable. The Checklist for ECRs Interfaced with Scales does not refer to using a decimal format for items by count on the receipt. The Laboratories agreed that language should be added to Pub 14 to indicate that a decimal expression of count on the receipt from an ECR interfaced with a scale is not appropriate. Andrea Buie (MD) agreed to draft language for Sector consideration.

At the October 1999 Weighing Sector meeting the Sector Technical Advisor, Dick Suiter (NIST), showed an example of 3.000 @ 3/1.00 for items being sold by count. Tom Ahrens (NIST), then Technical Advisor to the Measuring Sector ,stated that the Measuring Sector reviewed this issue at its meeting on September 24-25, 1999. The manufacturers present at the Measuring Sector meeting did not think eliminating the trailing zeros would cause a problem.

Dennis Krueger (NCR) stated that the problem began with ECRs in service stations. The software was written to print to a resolution of 0.001 gallon. When the system applications expanded into deli operations, the same software routines were continued. Mr. Krueger noted that prohibiting decimal expressions of count would not be a problem for NCR; however, he indicated he could not speak for other manufacturers. Other members agreed that it would not be a problem for their companies. Sector members agreed that other potentially affected parties should be made aware of the proposed change, before the Weighing Sector recommends a change to Publication 14. The Sector decided that the technical advisor, Dick Suiter, should develop specific language for changes to Publication 14 and a proposal for the S&T committee for changes to Handbook 44.

Recommendation: At its September 2000 meeting, the Sector was asked to consider the following language for possible addition to Handbook 44 and to both ECR checklists in Publication 14.

G-S.5.2.2. Digital Indications and Representations.

(e) For items sold by count, the number of items shall be expressed as a whole number without any trailing decimal zeros.

Discussion: One member explained that the problem began in convenience stores with ECRs that were interfaced with retail motor-fuel dispensers. The recorded representation of delivered quantity was printed to a resolution of 0.001 gallon. The print routine for the system causes items sold by count to be recorded with three zeros after the decimal point. If the proposal is accepted it should not be nonretroactive or an overwhelming amount of software will have to be rewritten.

Several Sector members agreed that, at present, most ECR systems interfaced with scales submitted for NTEP approval would not print a decimal value with trailing zeros for items sold by count. The Sector generally agreed that the language in the checklist for ECRs interfaced with retail motor-fuel dispensers could make it difficult for an NTEP Laboratory to discourage the use of trailing zeros in the representation of items sold by count.

Conclusion: The Sector agreed to ask the Measuring Sector to consider removing the language relative to trailing zeroes for items sold by count from the ECR-RMFD checklist. The Sector did not support sending a proposal to change the language in Handbook 44 or to add any additional text to Publication 14.

New Items

14. Power Voltage Variation Tests for Automatic Weighing Systems (AWS)

Source: Maryland NTEP Laboratory & NIST

Background: Section 44. Power Voltage Variations of the draft AWS checklist stipulates that the supply voltage be reduced to the minimum specified and increased to the maximum specified in Handbook 44. Paragraph T.7.3.1. of Handbook 44, 2.24. Automatic Weighing Systems requires that devices perform within tolerance values over the line voltage range of 100 V to 130 V or 200 V to 250 V rms (root mean square) as appropriate. To date, all AWS systems submitted to NTEP evaluation have used a single voltage source for the entire system.

Recently NTEP received an application for an AWS system that uses normal 110/115 V AC single-phase 60 Hz power for the indicator and 440 V three phase power for the drive motors. In this case an *ad hoc* decision was made to vary only the voltage to the indicator. The Sector was asked to discuss this situation and determine if changes to the voltage variation tests are necessary.

Recommendation: At its September 2000 meeting, the Sector considered the following recommendation to modify T.7..3.1. as follows:

T.7.3.1. Power Supply, Voltage, and Frequency.

(a) **Alternating Current.** - Weighing devices that operate using alternating current must perform within the conditions defined in paragraphs T.3. through T.7., inclusive, over the line voltage range of 100 V to 130 V or 200 V to 250 V rms as appropriate, and over the frequency range of 59.5 Hz to 60.5 Hz. *This requirement does not apply to supply voltages, such as drive motor supply, if they have no metrological effect on the system.*

Discussion: The Sector generally agreed that variations in the supply voltage for drive motors will not affect device accuracy in the same manner as it might affect the indicator. If different supply voltages are used for the drive motors and the indicator, only the indicator supply needs to be varied during evaluation. One member stated that changing the frequency of the supply power rather than the voltage usually controls the speed of the belt for these systems.

Conclusion: The Sector agreed to forward the proposal to modify Handbook 44 Scales Code Paragraph T.7.3.1. to the S&T Committee for consideration. The Sector also agrees that the issue of frequency variation needs to be addressed and asked the NTEP laboratories and the SMA Technical Committee to review the issue and provide input to the Sector for consideration at the next Sector meeting.

15. n_{max} for CC Based on Device Evaluated

Source: NTEP Laboratories & NIST

Background: At the 1988 Weighing Sector meeting, the Sector decided that for vehicle scales the n_{max} covered by a CC could be larger than the n_{max} for the device submitted for evaluation. This was providing that the value of the scale division was equal to or greater than the scale division evaluated and the n_{max} for the system did not exceed the n_{max} of either the load cell(s) or the indicator. The NTEP Technical Policy for Scales in Publication 14 does not address n_{max} for scale capacities grater than 30 000 lb or for modular vehicle scales. For devices with capacities less than 30 000 lb the n_{max} covered by the CC is limited to the largest n_{max} evaluated. At the April 2000 meeting of the NTEP Laboratories the laboratories agreed that the n_{max} covered by a CC should be limited to the n_{max} of the device evaluated. The Sector was asked to discuss the issue and decide if the 1988 decision is still applicable or if the n_{max} covered by the CC for devices with capacities greater than 30 000 lb and vehicle scales should be limited to the n_{max} of device evaluated. Publication 14 will be modified to include the decision of the Sector.

Discussion: Several of the NTEP Laboratories agreed that a CC should not have an n_{max} greater than the number of divisions on the device submitted for evaluation. One member stated that the original reason for allowing a larger n_{max} on a CC was because of the allowance for a CC to include capacities up to 135 % of the capacity of the device evaluated.

When the capacity is increased you naturally increase the number of divisions unless you increase the size of the division. Some Sector members commented that there is little market for vehicle scales with a 50 lb division.

Conclusion: The Sector agreed to maintain the policy of allowing the CC for devices with a capacity greater than 30 000 lb to list a larger n_{max} value than the n_{max} of the device evaluated. The Sector asked the NTEP laboratories to discuss this issue further to determine whether or not additional changes are needed to the language. If the laboratories determine that changes are needed to the criteria, the laboratories should submit a proposal to the Sector for consideration at its next meeting. The Sector agreed to include the following decisions from the 1988 meeting in Publication 14 until such time that the Sector determines a change is needed.

> A manufacturer of a vehicle scale should strive to have the scale with the largest number of scale divisions tested for type evaluation. Based upon the current parameters for scale capacity NTEP will issue a CC to cover the number of scale divisions that would exist for scales included in the range of capacities provided that:
>
> 1. the scales have scale division values equal to or greater than the value of the scale division in the scale that was tested; and
>
> 2. the number of divisions for the scale does not exceed the maximum for which the load cells and indicator have been separately evaluated.

16. Families of Scale with Capacities Above and Below 30 000 lb

Source: NIST

Background: NTEP frequently receives applications for a family of class IIIL vehicle and/or livestock scales with a range of capacities that go well below 30 000 lb at the low end. The NTEP Technical Policy for scales has separate criteria for scales with capacities above and below 30 000 lb; however, there is a question whether or not criteria B.2. for less than 30 000 lb should be applicable to these types of devices.

There also is a question as to the class designation. Should there be a lower capacity limit for class IIIL devices? For example, on-board weighing systems are divided into class III and IIIL at 30 000 lb. Handbook 44, 2.20 Scales, Table 7b requires unmarked Animal Scales to have a divisions value of 1 lb or less. Table 7a does not include Animal Scales and places Livestock Scales in accuracy class IIIL. A class IIIL livestock scale with a capacity of 10 000 lb and a division size of 1 lb has a larger tolerance than a class IIIL floor scale with the same capacity and division size.

The Sector was asked to discuss options for modifying Handbook 44 to address the problem. Options may include adding Animal Scales to Table 7a as accuracy class III and/or placing a lower limit on the division size for accuracy class IIIL devices.

Discussion: One member stated that the intent of the S&T Committee when Table 7a was developed was to allow the use of devices of a higher accuracy class for an application, but not ones with a lower accuracy class. Another member gave an example of inequity in the table; a 2000 x 1 lb floor scale would be considered Class III, but a 2000 x 1 lb hopper scale could be considered Class IIIL.

Conclusion: The Sector agreed that scales used in the applications outlined in Scales Code Table 7a are restricted to the accuracy classes specified in the table or a higher accuracy class. While "typical" is in the title, the note in the table precludes the use of a *lower* accuracy class scale than that specified in the table; however, a *higher* accuracy class than specified may be used. For example, a Class IIIL scale cannot be used in a single animal scale application, but a Class III scale could be used in a vehicle scale application.

Because of the some of the questions raised at the meeting, the Sector suggested that the NTEP laboratories further discuss this issue to determine whether or not changes should be proposed to Handbook 44 to clarify the application of the appropriate accuracy class for a specific application. Should the laboratories feel that changes to Handbook 44 are warranted, they are asked to submit the proposed change to the Sector for consideration at its next meeting.

17. Load Cell CC Limited to Six Wire Design

Source: NIST

Background: Typically when load cells are submitted for evaluation they are evaluated in a four-wire configuration. The subsequent CC may cover both four-wire and six-wire options. The four-wire design is considered the "worst case" for testing purposes.

Recently a manufacturer submitted a six-wire design for evaluation. The manufacturer requested that the CC include both six-wire and four-wire designs as options. The testing was successful when the cell was connected in a six-wire configuration but failed when connected in a four-wire configuration. The manufacturer then requested to have the CC issued for only the six-wire design. Handbook 44 and Publication 14 have no requirements for marking load cells with restrictions such as "six wire only."

Recommendation: At its September 2000 meeting, the Sector was asked to discuss this issue and consider the following proposal, which will be forwarded to the S&T Committee for possible addition to Handbook 44.

Table S.6.3.a.

Marking Requirements

Weighing Equipment To Be Marked With	Weighing, load-receiving, and indicating element in same housing	Indicating element not permanently attached to weighing and load-receiving element	Weighing and load-receiving element not permanently attached to indicating element	Load cell with CC (11)	Other equipment or device (10)
Area Load Ratio (ALR) (22)	X	X	X		
Wiring Design				*X(23)*	
Section Capacity (14)(20)		X	X		

For applicable notes, see Table S.6.3.b.
(Added 1990) (Amended 1992 and 1999)

Notes For Table S.6.3.a.

9. *For vehicle~~,~~ and axle-load~~, and livestock scales~~ only. The CLC shall be added to the load-receiving element of any such scale not previously marked at the time of modification. [Nonretroactive as of January 1, 1989.]*

12. Required on the indicating element *and the load-receiving element* of vehicle~~,~~ *and* axle load~~, and livestock~~ scales. *Such marking shall be identified as "concentrated load capacity" or by the abbreviation "CLC." * [*Nonretroactive as of January 1, 1989]*

14. Required on the indicating element of railway track scales only. When marked on vehicle~~,~~ *and* axle-load~~, and livestock~~ scales manufactured before January 1, 1989, it may be used as the CLC.

22. The value of the Area Load Ratio (ALR) if other than 110 lb / ft^2 shall be marked on the load receiving element and on the indicator at the time of installation.

23. If a load cell is designed with a restricted wiring configuration, such as six wire only, that limitation must be marked on the cell or the accompanying document.

Discussion: One member stated that if a load cell had been compensated for a 4-wire design it would work okay as a 6-wire design; however, the reverse scenario would not work. Another member expressed concern with exchanging 4-wire

designs and 6-wire designs in any manner. The Sector generally agreed that there presently is no policy or requirement to address the issue. The Sector agreed that before a decision is made on the issue more information on the performance differences between 4-wire and 6-wire designs is needed.

Conclusion: The Sector agreed to carry this item over until next year. Sector Chairman Nigel Mills (Hobart Corporation), Steve Patoray (NTEP Director), and Quenton Olson (Tedea Huntleigh) agreed to develop a paper to address the technical aspects of 4-wire vs. 6-wire design load cells and to propose a policy to address this in NTEP evaluations.

18. Replacement of Load Cell Mount with Design Other than that Evaluated in Complete Scale

Source: NIST

Background: The policy for substitution of load cells in Publication 14, Technical Policy for Scales, Section D., states that a substitution requires no modification to the basic design of the mounting assembly. That policy infers that the mounting assembly is a significant part of a complete scale; however, there is no specific requirement related to the replacement of only the mounting assembly with one of a different design than that evaluated.

The Sector will:

Discuss the replacement of the original mounting assembly with one of a different design.
Determine if the mounting assembly should be identified on the CC for some devices (such as vehicle scales).
Determine if changing the load cell mounting assembly to a different design than what was evaluated is considered a modification of type that requires testing.

Recommendation: Add additional language to Section E. Modification of Type, in the Digital Electronic Scales Checklist as follows.

E. Modification of Type

1. Replacing a Lever System with Load Cells. Changing a scale from a lever system scale to a full electronic scale is considered a modification of type. Such a change would require a complete NTEP evaluation on the modified type in order to be covered by an NTEP CC.

2. Replacing all of the load cell mounting assemblies with a different type is a modification of type and requires full evaluation.

3~~2~~. Conversion of Mechanical Scale to Electro-Mechanical. Changing a scale from mechanical to electro-mechanical (e.g., installation of a load cell into a steelyard rod) is a modification of type; however, the electro-mechanical version can be covered on the CC without additional testing.

4~~3~~. Conversion of a Vehicle Scale to a Livestock Scale. In order for a CC for a vehicle scale to include an optional application for use as a livestock scale:

Discussion/Conclusion: The Sector generally agreed that replacing a load cell mounting assembly with one of a different design may be as metrologically significant a change as changing the type of load cell. The Sector agreed to insert a new item 2 into Publication 14, Scales Checklist, Technical Policy for Scales, Section E. Modification of Type as follows:

2. Replacing some or all of the load cell mounting assemblies with a different basic design is a modification of type and requires full evaluation.

19. What Is to be Submitted for a Family of Load Cells of Models of Different Metals

Source: NIST

Background: Publication 14 requires load cell manufacturers to provide information on the types of metals from which load cells are made when applying for a CC. There is no official policy for covering a family of load cells that are offered in different metals. Many load cell Certificates of Conformance do not list what type of metal was submitted for

evaluation. For Certificates of Conformance with the metal listed, typical metals are alloy steel, high alloy steel, tool steel, stainless steel, and aluminum. The Sector will discuss the item and determine if all future Certificates of Conformance should list the material tests. A policy should also be developed for covering different materials on the same CC. That policy may consider a "worst case" metal being submitted or may require that all metals covered by the certificate be tested.

Discussion: Several Sector members expressed the opinion that load cells manufactured from different metals will perform differently and should be evaluated separately.

Conclusion: The Sector agreed that all material types or categories, such as aluminum, alloy steel, and stainless steel, must be submitted for evaluation. The Sector agreed that this policy would be applied nonretroactively for the purposes of NTEP evaluations. The policy will apply to new applications for NTEP evaluations. The policy will not be applied to devices already covered on existing Certificates; however, the policy will apply to requests to add new devices to existing Certificates.

20. NTEP Technical Policy for Scales, Part D. Substitution of Load Cells in Scales, Add Hydraulic Load Cells to Replacement of all Cells in a System

Source: NIST

Background: The policy for substitution of load cells in Publication 14, Technical Policy for Scales, Section D., states that, provided all of the other substitution requirements are met, the replacement of all analog cells in the system with approved and compatible digital load cells is considered a metrologically equivalent replacement. The Sector will discuss this item and determine if the policy should also apply to hydraulic load cells.

Recommendation: Add additional language to D. Substitution of Load Cells, of the Digital Electronic Scales Checklist as follows:

D. Substitution of Load Cells in Scales

In a system with multiple analog load cells, the replacement of a single cell with an approved and compatible digital load cell is not a metrologically equivalent replacement. The replacement of all analog load cells in the system with approved and compatible digital load cells or hydraulic load cells is considered a metrologically equivalent replacement provided all requirements in 1 though 6 above are met.

Discussion: The Sector generally agreed that all load cell technologies should be included in substitution policy. One member offered the following alternate language for the proposal:

Conclusion: The Sector agreed to add the following language to Publication 14, Digital Electronic Scales. Part D. Substitution of Load Cell in Scales, (page 1-17, 2000 edition):

> In a system with multiple load cells, the replacement of *all* load cells in the system with approved and compatible load cells that have a type of output (e.g., analog, digital, or hydraulic) different from the original load cell is considered a metrologically equivalent replacement provided all requirements in sections (1) through (6) above are met. The replacement of a load cell (s) resulting in a combination of analog, digital, or hydraulic load cells in one system is not considered a metrologically equivalent replacement. All load cells in a multiple load cell system must have the same type of output (e.g., all analog, all digital, or all hydraulic).

The Sector also agreed to add the following similar language to Publication 14, Load Cells Checklist, Part 5, (page 5-12, 2000 edition):

> In a system with multiple load cells, the replacement of *all* load cells in the system with approved and compatible load cells that have a type of output (e.g., analog, digital, or hydraulic) different from the original load cell is considered a metrologically equivalent replacement provided all requirements in sections (a) through (f) above are met. The replacement of a load cell (s) resulting in a combination of analog, digital, or hydraulic load cells in one system is not considered a metrologically equivalent

replacement. All load cells in a multiple load cell system must have the same type of output (e.g., all analog, all digital, or all hydraulic).

21. Replacing Non-NTEP Load Cells with NTEP Cells in a Complete Device

Source: California NTEP Laboratory

Background: At its November 1997 Meeting, the Sector discussed the replacement of load cells in a scale tested as a complete scale. The Sector determined that if a scale which was tested as a complete scale contained load cells with their own CC, replacement with another NTEP cell is acceptable provide all requirements of Publication 14, Technical Policy for Scales, Section D., are met. However, the current language in Section D does not clearly address whether or not load cells with an NTEP CC can be substituted into a device tested as a complete scale which contains load cells without their own CC without additional testing. The Sector was asked to discuss the issue and determine how the scenario should be addressed.

Discussion: One member expressed a concern that when a load cell without a separate CC is tested as part of a complete scale you cannot be sure how well the load cell would perform or if it would perform within tolerances if tested separately. Without a separate evaluation for the original cell there is no way to verify whether or not a replacement cell with a CC has the same characteristics as the original cell.

Conclusion: The Sector agreed to revise Publication 14, Digital Electronic Scales. Part D. Substitution of Load Cell in Scales, (page 1-17, 2000 edition) and Load Cells Part 5, (page 5-12, 2000 edition) as follows:

D. Substituting Load Cells in Scales
Metrologically equivalent load cells from the same or a different manufacturer may be substituted into a scale provided that the load cells to be substituted:

1. ~~Have been evaluated separately and have a Certificate of Conformance;~~
   Have both been evaluated separately and have separate Certificates of Conformance;

2. have as many or more verification scale divisions (n_{max}) for the same;
   …etc.

5. Substitution of Metrologically Equivalent Load Cells in Scales

Metrologically equivalent ~~L~~load cells from the same or a different manufacturer may be substituted into a scale provided that the load cells to be substituted:

a. ~~Have been evaluated separately and have a Certificate of Conformance;~~
   Have both been evaluated separately and have separate Certificates of Conformance;

b. have as many or more verification scale divisions (n_{max}) for the same;
   …etc.

[Editor's Note: The introductory paragraph in Part 5 of the Load Cells Checklist was editorially revised as shown above to be consistent with corresponding language in Scales Checklist section D., also shown above.]

22. NTEP Technical Policy Publication 14 Section B.5.b. Change Platform Area to Length and Width

Source: NIST

Background: Publication 14, NTEP Technical Policy for Scales, B.2., states that models submitted for evaluation shall be those with the largest platform area for each capacity submitted and that a CC will apply to all models that have platform areas up to but not larger than that evaluated at each capacity. For example: a model with a platform 5 ft x 5 ft (25 ft^2) submitted would allow a model with a platform 3 ft x 8 ft (24 ft^2) to be covered by the CC.

Recommendation: The Sector was asked to discuss the item and to consider the proposed changes to Section B of Publication 14:

NTEP Technical Policy for Scales

B. Certificate of Conformance Parameters

2. Weighing Systems, Scales or Weighing Elements of 30 000 lb Capacity or Less

The models to be submitted for evaluation shall be those having:

a. the lowest capacity and the highest capacity[1]
b. the ~~largest platform area~~ *greatest length and width* for each of the capacities submitted
c. the most resolution (highest number of scale divisions)
d. the smallest scale division value (d).

A CC will apply to all models that:

a. are within the range of capacities,
b. have ~~platform areas~~ *lengths and widths* up to but not larger than that evaluated at each capacity,
c. have the same number of scale divisions or fewer,
d. are within the range of the values of the scale division,
e. have a platform construction with material similar to that of the equipment evaluated.

Discussion: One member questioned whether submitting a device with a platform 3 ft x 8 ft (24 ft^2) would cover a platform 5 ft x 5 ft (24 ft^2). The designation of length and width may be subject to different interpretations. Another member suggested that the platform area criteria for the device to be submitted for evaluation remain as presently written, but that the length or width covered by the CC be allowed to increase by 25 %.

Conclusion: The Sector agreed that the present requirement which states that the models to be submitted for evaluation shall be those having the largest platform area and width for each of the capacities submitted is appropriate. The Sector also agreed that B.2. (2nd part b.) be revised as follows:

A CC will apply to all models that:

a. are within the range of capacities,
b. have platform ~~areas~~ *lengths and widths* up to but not larger than *125 % of the length or width* ~~that~~ evaluated at each capacity,
c. have the same number of scale divisions or fewer,
d. are within the range of values of the scale division,
have a platform construction with material similar to that of the equipment evaluated.

23. Modify Handbook 44 2.20 Scales Table 7a.

Source: NIST

Background: Handbook 44, 2.20 Scales, Table 7a., indicates that the class designations are for "typical" application and that a scale with a higher accuracy class may be used. The word typical has sometimes been misinterpreted as limiting. The Sector was asked to consider submitting the following proposed changes to Table 7a to the S&T Committee to modify Table 7a.

Table 7a. ~~Typical~~ Class or Type of Device For Weighing Operations	
Class	Weighing Application or Scale Type
I	Precision laboratory weighing
II	Laboratory weighing, precious metals and gem weighing, grain test scales
III	All commercial weighing not otherwise specified, grain test scales, retail precious metals and semi-precious gem weighing, animal scales, postal scales, scales used to determine laundry charges, and vehicle on-board weighing systems
III L	Vehicle, axle-load, livestock, railway track scales, crane, hopper (other than grain hopper) scales, and vehicle on-board weighing systems
IIII	Wheel-load weighers and portable axle-load weighers used for highway weight enforcement
Note: A scale with a higher accuracy class than that specified as "~~typical~~" may be used. *If a higher accuracy class is used the tolerance for the higher accuracy class will apply.* (Amended 1985, 1986, 1987, 1988, 1992, and 1995)	

Discussion/Conclusion: The Sector clarified its position on the application of Table 7a in conjunction with Agenda Item 16, Families of Scale with Capacities Above and Below 30 000 lb. See Item 16 for additional information and discussion.

24. Policy for initial test only vs. full evaluation when a modification is made which requires testing

Source: NIST

Background: Frequently when a device is submitted for evaluations to expand the parameters on an existing CC, the manufacturer will ask if full testing is required or if only an initial test is sufficient. In most cases NTEP requires full evaluation. The Sector will discuss the item and determine if a policy stating what modifications require full evaluations and those that require only an initial test. In the case of an initial test only, NTEP should reserve the right to require full evaluation if the results of the initial test are marginal.

Discussion: The Sector generally agreed that a policy for determining when full evaluation is not required would be beneficial.

Conclusion: The Sector asked that the SMA Technical Committee, the NTEP Laboratories, and the NTEP Director provide input for review at the next Sector meeting.

25. Publication 14 Administrative Procedures

Source: NCWM

Background. With the transfer of NTEP administration to the NCWM the task of updating the Administrative procedures was appropriately also transferred. Wes Diggs will update the Sector on the status of that project.

Discussion/Conclusion: NTEP Committee Chairman, Wes Diggs, provided an update of the progress on the Publication 14, Administrative Policies and Procedures. This issue was provided only as an information item for Sector members, therefore, no decision was required by the Sector.

26. Manual Weight Entries as a Sealable Parameter

Source: NTEP Laboratories & NIST

Background: At the April 2000 meeting of the NTEP Laboratories there was a discussion on manual weight entries for vehicle scales. Some indicators submitted for evaluation have the capability of manual weight entries. The NTEP Laboratories agreed that manual weight entries should be included in the Publication 14 list of sealable parameters as a feature that must be sealed. At the July 2000 Annual Meeting of the NCWM, Handbook 44 was changed to allow manual weight entries on vehicle scales; however, an indicator with the capability of manual weight entry could be used in another application where manual weight entries are not recognized. In applications where the use of manual weight entries is prohibited, the manual weight entry feature should be sealed. The Sector was asked to consider adding the manual weight feature to the list of sealable parameters in Publication 14.

Discussion: The Sector Technical Advisor, Dick Suiter (NIST), provided background on Handbook 44 paragraph UR.3.9. outlining the four instances when manual gross weight entries are allowed on weighing systems. When a general-purpose indicator is submitted for evaluation, NTEP must assume that the indicator could be used in applications where manual weight entries are allowed and also in applications where they are not. One member pointed out that if an indicator is intended for only a specific application where manual weight entries are recognized and the CC specifically limits the application, then sealing should not be necessary.

Conclusion: The Sector agreed that the manual weight entry feature must be a sealable parameter on devices which are intended for use in "*general* applications" since Handbook 44 does not permit the use of manual weight entries in all applications. In many cases, the manual weight feature on these devices is selectable, enabling it to be selected for those applications in which Handbook 44 permits the use of the feature.

The Sector agreed that in cases where the device is intended for use only in *specific* applications (and the "Application Section" of the CC is limited accordingly), the manual weight feature is *not* required to be sealable. In many cases, the manual weight feature on these devices is *not* selectable since the device is intended for use only in applications where the manual weight feature is permitted by Handbook 44.

The Sector agreed to add the manual weight entry feature on general application devices to the Publication 14 list of typical features and parameters to be sealed.

27. Reference to Other Requirements in the ECR Checklist

Source: NIST

Background: The ECR Checklist in Publication 14 does not include a section specifying sealing requirements or a list of sealable parameters as is presently included in the Scales Checklist.

Recommendation: Add a new Section 6 to the ECR Checklist for Scales and renumber successive paragraphs accordingly.

Discussion: One member noted that for some software based systems most metrological features cannot be changed at the local level. The Sector generally agreed that all metrological features of a point of sale system need to be sealed if they can be accessed and changed at the installation site.

Conclusion: The Sector agreed to add a new Section 6 to the ECR Checklist for Scales as follows and renumber successive paragraphs accordingly.

> *6. Provision For Metrological Sealing of Adjustable Components of Audit Trail.*
> *All components of a point-of-sale system must comply with Section 10 of the Digital Electronic Scale Checklist if they have a metrological effect on the system. Other sections in the Digital Electronic Scales Checklist may be applied if appropriate.*

28. Proposed Change to Tolerance Applied to Dynamic Monorail Scales During Type Evaluation

Source: Nebraska NTEP Laboratory

Background/Discussion: Don Onwiler (Nebraska NTEP Laboratory) informed the Sector that when the proposal to modify T.N.3.8. was submitted to the NCWM S&T Committee, the intent was to have maintenance and acceptance tolerance be the same for routine field examinations, but not for NTEP evaluations. The intent was for the existing acceptance tolerance equal to one half of maintenance tolerance to apply for type evaluation; however, the proposal failed to make that distinction. Don asked the Sector to discuss the issue and, if it agreed, to forward a proposal to the S&T Committee to modify T.N.3.8. to recognize an acceptance tolerance equal to one half of maintenance tolerance. During NTEP evaluations the device may be tested while the plant is shutdown. Conditions, such as carcass swing and vibration, may be controlled. During routine field examinations the devices are operating under more severe conditions and may not be able to meet the tighter acceptance tolerance.

Conclusion: The Sector agreed to forward a proposal to the S&T Committee to modify paragraph T.N.3.8. Dynamic Monorail Weighing System, as follows:

> T.N.3.8. Dynamic Monorail Weighing System**.** – Acceptance tolerance shall be the same as the maintenance tolerance shown in Table 6……
> *For equipment undergoing type evaluation, a tolerance equal to one-half the maintenance tolerance values shall apply.*

29. Location for Next Meeting

Discussion/Conclusion: The Sector agreed to continue the current rotation policy for the location of the Sector meetings. This would mean having the next meeting in Albany, NY. The Sector agreed that a time frame of September or October is acceptable. The Technical Advisor will contact NCWM Headquarters to coordinate the meeting time so as to create as little conflict with other meetings as possible.

The Sector also heard comments from NTEP Committee Chairman, Wes Diggs, who noted that the NCWM Board of Directors is presently considering holding the Belt-Conveyor, Measuring, and Weighing Sectors consecutively in a single location. The Sector acknowledged that this approach might be used for the 2001 Sector meetings and that the tentative time frame and location discussed by the Sector may vary accordingly.

Attendance List NTETC Weighing Sector September 10-11, 2000 -- Columbus, OH			
Name	**Company**	**Telephone**	**E-mail**
Bill Bates	GIPSA	202-690-0961	Bbates@gipsadc.usda.gov
Ken Butcher	NIST/TSAP	301-975-4859	Kbutcher@nist.gov
Tina Butcher	NIST/OWM	301-975-2196	Tbutcher@nist.gov
Lou Cerny	AAR	301-947-0208	Ltcerny@erols.com
Terry Davis	KS NTEP Lab	785-862-2415	Tdavis@kda.state.ks.us
G. Wes Diggs	VA Weights & Measures	804-786-2476	Gdiggs@vdacs.state.va.us
John D. Edmond, Sr.	GIPSA	202-730-5841 202-690-3207	John_d.edmond@usda.gov
Bill Fishman	NY Weights & Measures	518-457-3452	Campusw@nysnet.net
Darrell Flocken	Mettler Toledo	614-438-4393	Darrell.flocken@mt.com
Bob Hamilton	Mettler Toledo	614-438-4432	Bob.hamilton@mt.com
David Hawkins	Thurman Scale	614-221-9077	Dave.hawkins@fancor.com
Rafael Jimenez	AAR	719-584-0691	Rafael_jimenez@ttci.aar.com
Ken Jones	CA MS	916-229-3017	Kjones@cdfa.ca.gov
Jack Kane	MT Weights & Measures	406-444-3934	Kane@state.mt.us
Dennis A. Krueger	NCR Corp	770-623-7743	Dennis.Krueger@atlantaga.ncr.com
Ken Lake	CA MS	916-229-3050	Klake@cdfa.ca.gov
Gary Lameris	Hobart Corp.	937-332-3053	Lamergj@pmifeg.com
Steven Langford	Cardinal Scale Mfg.	417-673-4631	Slangford@cardet.com
Todd Lucas	OH Weights & Measures	614-995-0641	Lucas@odanT.agri.state.oh.us
Ed Luthy	Brechbuhler Scales	330-453-2424	Luthy@brechbuler.com
Michel Miranda	Measurement Canada	613-952-0612	Maranda.michel@ic.gc.ca
Angie McCoy	OH NTEP Lab	61478-6290	Mccoy@odant.agri.state.oh.us
Nigel Mills	Hobart Corporation	937-332-3205	millsng@pmifeg.com
Quenton Olson	Tedea-Huntleigh	818-673-2700	Quenton@tedea_huntleigh.com
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Jim Price	MD NTEP Lab	410-822-0548	Pricejt@mda.state.md.us
Dave Quinn	Fairbanks Scales	910-253-1424	Dave.quinn@fancor.com
George Shefcheck	OR MSD	503-986-4668	gshefche@oda.state.or.us
Dick Suiter	NIST/OWM	301-975-4406	rsuiter@nist.gov
Ambler Thompson	NIST	301-975-2333	Ambler@nist.gov
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Walter Young	Emery Winslow	203-881-9333	Wmyoung@emerywinslow.com

Action Items Weighing Sector September 10-11, 2000 Meeting, Columbus OH			
Agenda Item	**Task**	**Responsible Party**	**Due Date**
1-Double Wide Scales	(1) Refine the test patterns for legal highway applications for wider scales; and (2) work on recommended methods for safe loading in a 4' x 10' pattern.	NTEP Labs	5/1/01
1 – Double Wide Scales	Ask SMA Tech Cte to work on developing test methods/criteria for larger ratings for CLC. (Perhaps along the line of AAR methods of analyzing scale ratings.)	SMA Tech Cte	5/1/01
1 – Double Wide Scales	Forward proposed changes to definition of CLC to the S&T Committee.	Sector Tech Advisor	11/1/00
2-Combination Vehicle/RR Scale	Modify Pub 14 to establish a minimum strain load for combo RR/vehicle scales greater than "X" feet in length. Contact GIPSA to determine what "X" should be, based upon the limitations of the test car.	Sector Tech Advisor	11/1/00
3- Weighing Elements and Indicators Not Permanently Attached Definition	Forward proposed changes to Table S.6.3.a. (column headings and new footnote 1) and proposed definition for "Electronic Security Seal" to S&T Committee for consideration.	Sector Technical Advisor	11/1/00
4-POS Receipt	Modify Pub 14 to include examples of receipts and to discourage use of "#" sign.	Sector Tech Advisor	1/1/01
4-POS Receipt	Forward proposal to S&T Committee to modify footnote 1 to Scales Code S.1.8.4. to discourage the use of the "#" sign.	Sector Tech Advisor/ S&T Cte Tech Advisor	11/1/00
6-Modular Scale Connection Points	Modify language --- per Technical Advisor's notes.	Sector Tech Advisor	TBD
7-Load Cell Placement in Modular Scales	Add the language to Section E. Modification of Type to note that changing the location of a load cell in a modular scale is a modification of type requiring re-evaluation. The Sector also agrees that drawings of large capacity scales should be submitted with the NTEP application.	Sector Technical Advisor	1/1/01
9- Application of Modular Criteria to Combination Vehicle/Railway Track Scales	Review the modular criteria for vehicle scales to determine if changes might be made to enable these criteria to apply to RR scales.	NTEP laboratories	5/1/01
9- Application of Modular Criteria to Combination Vehicle/Railway Track Scales	Propose changes to Pub 14 to address modular criteria for RR scales for consideration by the Sector at its next meeting.	NTEP laboratories	Fall 2001
9- Application of Modular Criteria to Combination Vehicle/Railway Track Scales	Forward to the S&T Committee the following proposed changes to Handbook 44: (1) Modify Scales Code Paragraph S.6.4. Railway Track Scales to include language from the AAR Handbook definition for Nominal Capacity Section 2.2.1.(b). (2) Add a definition to H44 for "Sectional Capacity."	Sector Technical Advisor	11/1/00

Action Items Weighing Sector September 10-11, 2000 Meeting, Columbus OH			
Agenda Item	**Task**	**Responsible Party**	**Due Date**
10- CLC on Livestock Scales	Develop wording similar to what existed when the term "section capacity" applied to livestock scales. Distribute the proposed language to the Sector for a vote by letter ballot.	Sector Technical Advisor	10/1/00
10- CLC on Livestock Scales	Review and respond to letter ballot on revised language for livestock scales.	Sector Members	10/15/00
10- CLC on Livestock Scales	If Sector adopts proposed language in letter ballot, forward results as a proposal to S&T Committee.	Sector Technical Advisor	11/1/00
11- Recorded Representation of Count Items on ECR Systems	The Sector agreed that the following language should be added to the end of the first paragraph of Part A., Models to be Submitted for Evaluation in the Technical Policy for Scales as follows: Nonmetrological features may be listed on a CC, but only if the feature has been tested and operates as intended.	Sector Technical Advisor	1/1/01
13- Recorded Representation of Count Items on ECR Systems	Ask that the Measuring Sector to consider removing the language relative to trailing zeroes in the ECR-RMFD checklist.	Sector Technical Advisor	9/15/00
16- Families of Scales with Capacities Above and Below 30 000 lb	Review the criteria in Table 7a and other Handbook requirements to determine whether or not changes should be proposed to Handbook 44 to clarify the application of the appropriate accuracy class for a specific application. Submit any proposal to the Sector for consideration at its next meeting.	NTEP Labs	7/15/01
17-Load Cell CC Limited to Six-Wire Design	Develop a paper to address the technical aspects of 4-wire vs. 6-wire design load cells and to propose a policy to address this in NTEP evaluations.	Nigel Mills, Steve Patoray, Quenton Olson	7/15/01
18- Replacement of Load Cell Mount with Design Other than that Evaluated in Complete Scale	Insert a new item 2 into Publication 14, Scales Checklist, Technical Policy for Scales, Section E. Modification of Type to state that replacement of load cell assemblies with a different type of mounting is a modification of type and requires full evaluation.	Sector Technical Advisor	1/1/01

Appendix A - To Weighing Sector Summary

SMA Recomendation to Modify Shift Test Procedure as Stated in Publication 14, May 1998 Edition

Darrell Flocken of Mettler-Toledo, Inc., is submitting these recommendations for the consideration of a change to the current wording of the Shift Test as stated in Publication 14. (Refer to Attachment 1.)

Recommendation: It is my recommendation that the current wording in Section 55 of Publication 14 (May 1998 Edition) be removed and replaced with the current wording of Part 1 – General Information, Section 14 of the Measurement Canada Laboratory Manual, January 1997 Edition. (Refer to Attachment 2.)

Rationale: The current wording in Publication 14 concerning shift tests is vague. This has led to different interpretations among NTEP Laboratories. The differences in interpretations can even be found in conversations between manufacturers. These differences have resulted in varying test methods.

The current wording and diagrams found in Publication 14 can be traced back to mechanical scales where the actual test method was determined by the force introduction method, between the platform or platter and the internal lever system. While it is not my intent to change the test method, it is my intent to better define which method should be used. Publication 14 currently identifies three test patterns for "Bench or Counter Scales," "Other Small Platform Scales," and "Equal Arm Scales" with each having a separate test pattern for test load placement. The determination of which test pattern to use is at the discretion of the inspector. By adopting the suggested changes below the documents will clearly describe the test method to be used for the device being tested. These suggestions also better align the requirements between the U.S. and Canadian regulations.

As additional support, I have included the shift test method from OIML R76. (Refer to Attachment 3.) The suggested approach can also be seen in this document.

Suggested Change #1: It is my recommendation that the current wording in Section 61.3. of Publication 14 (May 1998 edition) be removed and replaced with the current wording of Part 3 – Performance Tests, LG-3.03, Procedure A and the Interpretation of Results of the Measurement Canada Laboratory Manual, January 1997 edition. (Refer to Attachment 2.)

Rationale: The current wording in Publication 14 is vague.

For a "Bench and Counter Scale" it is unclear which test positions should be used under which conditions. The Canadian example takes into account the technology used in the design of the load receiving element (i.e., a single load cell or multiple load cells). This approach is consistent with the original U.S. concept as applied to mechanical scales.

The addition of the Interpretation of Results paragraph from the Canadian document will better align the test results with the intent of testing the device for a single influence factor while maintaining all other influences at a constant condition. By performing the tests as stated in the Canadian document you remove the influence of linearity and hysteresis of the load cell.

Suggested Change #2: It is my recommendation that the current wording in Section 68.1.3. and 68.4.3. of Publication 14 (May 1998 edition) be removed and replaced with the current wording of Part 3 – Performance Tests, LG-3.03, Procedure B and the Interpretation Of Results of the Measurement Canada Laboratory Manual, January 1997 edition. (Refer to Attachment 2.)

Rationale: The current wording in Publication 14 is vague.

For Monorail Scales the two procedures are similar. The change will correct an inconsistency in the wording of Sections 68.1.3. and 68.4.3.

The addition of the Interpretation of Results paragraph from the Canadian document will better align the test results with the intent of testing the device for a single influence factor while maintaining all other influences at a constant condition.

By performing the tests as stated in the Canadian document you remove the influence of linearity and hysteresis of the load cell.

Attachment 1
to Weighing Sector Appendix A
(Publication 14, May 1998)

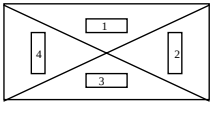
55. Device Tolerances
(second paragraph)
When main elements (indicating elements and weighing/load receiving elements) are tested separately, the tolerance applied to all laboratory tests (influence factors and permanence tests) are 0.7 times the acceptance tolerance for the complete scales. It is strongly…

---

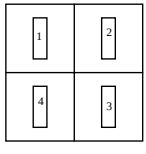
61. Performance and Permanence Tests for Counter (Bench) Scales (Including Computing Scales)
61.3. Shift Test

Test with test loads equal to one-half capacity as specified in N.1.3.1 and at test positions as illustrated below:

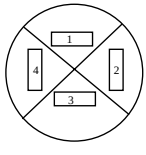
Bench or Counter Scales

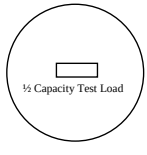


Other Small Platform Scales



Equal Arm Scales





68.1 Static Test with Standard Weights:
…….

68.1.3. A shift test at scale capacity. Test loads to be located at the left, center, and right ends of the scale.
…….

68.4 Repeat Static Test with Standard Weights:

…….

68.4.3. A shift test at scale capacity, at maximum used capacity but never less than ½ scale capacity. Test loads to be located at the left, center, and right ends of the scale.
…….

Attachment 2
to Weighing Sector Appendix A
(Measurement Canada Laboratory Manual, January 1997)

14. LIMITS OF ERROR (Part 1 – General Information)

14.1 ……

14.2 Limits of error applicable to complete devices and major components tested separately

The full acceptance limits of error apply to complete devices subjected to approval testing.

When a major component, such as an electronic indicating element or a load receiving/weighing element, is tested separately, the limits of error that apply are 0.7 times the acceptance limits of error normally applied to a complete device. This does not apply to a major component that is the only element likely to produce measurement errors (linearity, hysteresis, repeatability and so on) because of disturbances or influence factors (for example, a load receiving/weighing element that produces a digital signal interpretable by computer software). In this case, the full acceptance limits of error will be granted to the load receiving/weighing element.

LG-3.03 ECCENTRICITY (Part 3 – Performance Tests)

APPLICATION

Eccentricity tests are performed on complete devices and weighing elements tested separately. Shift tests are also performed on single point hanging scales if the load receptor is relatively large.

The purpose of this test is to reveal the ability of load cell(s), load cell mounting, and check systems of a weighing elements to ignore or compensate for the torsion effects of non-axial loads. The purpose of this test is also to ensure that the load cells of electronic scales or the lever of mechanical scales can be adequately "balanced" in order to obtain accurate weighing regardless of the position of the load on the platter.

The device must be capable of weighing accurately despite changes of position of the test load over the load receiving element.

SETTINGS

1. AZSM may be in any status. When practical, this test can be performed while performing Increasing/Decreasing load tests.

2.1 If the IZSM range does not exceed 20 % of the device capacity, tests will be performed with the IZSM set at the upper limit of its range.

2.2 If the IZSM range exceeds 20 %, tests will be performed twice. A first series of tests using the lighter platter provided by the applicant, and the second series with the IZSM set to the upper limit of its range.

3. The device must be set for the maximum capacity and smallest verification scale interval for which the approval is sought.

4. If so equipped, the "enhance resolution feature" of the device will be used during the tests. If this feature is not available, use the small weight method to determine the device errors before rounding.

5. This test is performed at ambient temperature 20 °C; or at the mid point of the temperature range if significantly different from 20 °C.

PROCEDURE

A. Bench, Counter, or Hanging Scales, other Small Platform Scales, and Equal Arm Scales with load receiving elements having no more than four points of support.

A.1 Stabilize the device at nominal conditions; zero the device.

A.2 Apply a load equal to 1/2 Max on the center of the platter. Record the indication.

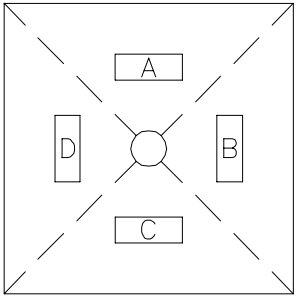
A.3 Apply the same test load on the device in such a manner that the center of gravity of the test load lies approximately at the center of one of the lettered target boxes in the following illustrations. Record the indication.

A.4 Proceed in the same manner with the other points of application. Record the indication.

Note: In the case of weighing elements that comprise 4 load cells (one at each corner), a load of 1/4 Max applied to each corner is also a valid test.

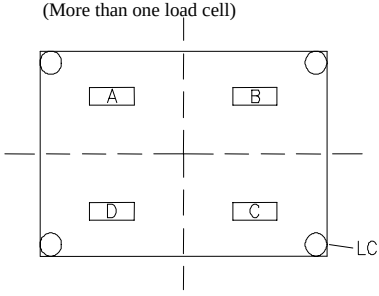
Bench, Counter or Hanging Scales

(one single load cell)

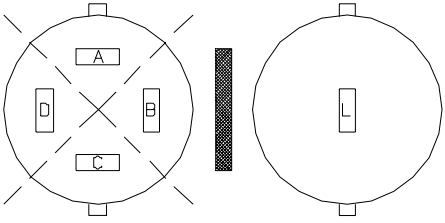


Other Platform Scales

(More than one load cell)



Equal Arm Scales



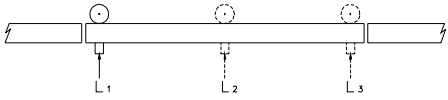
B) Monorail scales

B.1 Stabilize the device at nominal conditions; zero the device.

B.2 Apply a rolling load corresponding to the usual rolling load, the heaviest and the most concentrated one which may be weighed, but not exceeding 0.8 times Max at different points of the load receiving element.

B.3 Record the indications.

Monorail Scales



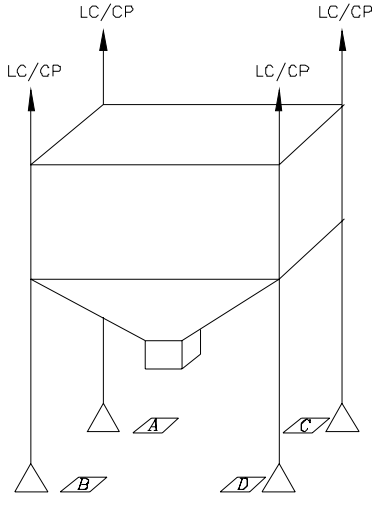
C) Tank or Hopper Scales

C.1 Stabilize the device at nominal conditions; zero the device.

C.2 Use a load of at least 1/10 without exceeding 1/4 of Max. Apply the load to each point of support. Care must be taken to keep the center of gravity of the load within the parameter formed by the points of support; otherwise the tank or hopper could tilt or shift.

C.3 Record the indications.

Tank or Hopper Scales



INTERPRETATION OF RESULTS

Reference: Sections 9, 10, 11, 12 and 14 of the Specifications

The difference between the results for different positions of the load must not exceed the absolute value of the In-Service limit of error for that load; and

Each individual result must be within the limits or error permitted.

Attachment 3
to Weighing Sector Appendix A
(OIML R 76-1, 1992 (E))

3.5.4 Apportioning of errors
Where modules are examined separately in the process of pattern approval, the following requirements apply:
3.5.4.1 Error limits applicable to a module
The error limits applicable to a module, M_i, which is examined separately, are equal to a fraction, p_i, of the maximum permissible errors or the allowed variations of the indication of the complete instrument. The fractions for any module have to be taken for the same accuracy class and the same number of verification scale intervals, as for the complete instrument incorporating the module. The fractions p_i shall satisfy the equation $\{p_1\}^2 + \{p_2\}^2 + \{p_3\}^2 + \ldots = 1$.
3.5.4.2 Choice of fraction
The fraction, p_i, shall be chosen by the manufacturer of the module and shall be verified by an appropriate test. However, the fraction shall not exceed 0.8 and shall not be less than 0.3 when more than one module contributes to the effect in question.
Acceptable Solution
See 4, second paragraph (page 30).
For mechanical structures such as weighbridges, load-transmitting devices, and mechanical or electrical connecting elements designed and manufactured according to sound engineering practice, an overall fraction, $p_i = 0.5$, may be applied without any test. [For example, when levers are made of the same material and when the chain of levers has two planes of symmetry (longitudinal and transverse), or when the stability characteristics of electrical connecting elements are appropriate for the signals transmitted, such as load cell output, impedance etc.]
For instruments incorporating the typical modules (see acceptable solution in 8.2.1) the fractions p_i may have the values given in Table 7.

Table 7. Typical module fractions (NA means not applicable)

Performance criteria	Load cell	Electronic indicator	Connecting elements, etc.
Combined effect*	0.7	0.5	0.5
Temperature effect on no load indication	0.7	0.5	0.5
Power supply variation	NA	1	NA
Effect of creep	1	NA	NA
Damp heat	0.7	0.5	0.5

* Combined effects: non-linearity, hysteresis, temperature effect on span. After the warm-up time specified by the manufacturer the combined effect error fractions apply to modules.

3.6.2 Eccentric loading
The indications for different positions of a load shall meet the maximum permissible errors, when the instrument is tested according to 3.6.2.1 to 3.6.2.4.
Note: If an instrument is designed in such a way that loads may be applied in different manners, it may be appropriate to apply more than one of the following tests.

3.6.2.1 General case
Unless otherwise specified hereafter, a load corresponding to one-third of the sum of the maximum capacity and the corresponding maximum additive tare effect shall be applied.

3.6.2.2 Load receptor with more than four points of support
On an instrument with a load receptor having n points of support, with $n > 4$, the fraction $1/(n - 1)$ of the sum of the maximum capacity and the maximum additive tare effect shall be applied to each point of support.

3.6.2.3 Instruments with minimal off-center loading, e.g., tanks and hoppers
On an instrument with a load receptor subject to minimal off-center loading, e.g., a tank or hopper, a test load corresponding to one-tenth of the sum of the maximum capacity and the maximum additive tare effect shall be applied to each point of support.

3.6.2.4 Instruments for weighing rolling loads
On an instrument used for weighing rolling loads, e.g. a vehicle scale or rail suspension instrument, a rolling test load corresponding to the usual rolling load, the heaviest and the most concentrated one which may be weighed, but not exceeding 0.8 times the sum of the maximum capacity and the maximum additive tare effect, shall be applied at different points on the load receptor.

A.4.7 Eccentricity tests (3.6.2)
Large weights should be used in preference to several small weights. Smaller weights shall be placed on top of larger weights, but unnecessary stacking should be avoided within the segment to be tested. The load shall be applied centrally in the segment if a single weight is used, but applied uniformly over the segment if several small weights are used.
The location of the load shall be marked on a sketch in the evaluation report.
The error at each measurement is determined according to A.4.4.3. The zero error E_o used for the correction is the value determined prior to each measurement.
If the instrument is provided with automatic zero setting or zero tracking, it shall not be in operation during the following tests.

A.4.7.1 Instrument with a load receptor having not more than four points of support
The four-quarter segments roughly equal to a quarter of the surface of the load receptor (as in the sketches in Figure 8 or similar sketches) shall be loaded in turn.

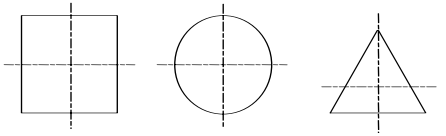


Figure 8. Examples of quarter segments of load receptors for eccentricity tests

A.4.7.2 Instrument with a load receptor having more than four points of support
The load shall be applied over each support on an area of the same order of magnitude as the fraction 1/*n* of the surface area of the load receptor, where *n* is the number of points of support.
Where two points of support are too close together for the above-mentioned test load to be distributed as indicated above, the load shall be doubled and distributed over twice the area on both sides of the axis connecting the two points of support.

A.4.7.3 Instrument with special load receptors (tank, hopper, etc.)
The load shall be applied to each point of support.

A.4.7.4 Instrument used for weighing rolling loads (3.6.2.4)
A rolling load shall be applied at different positions on the load receptor. These positions shall be at the beginning, the middle and at the end of the load receptor in the normal driving direction. The positions shall then be repeated in the reverse direction.

Report of the Resolutions Committee

Chip Kloos
Colgate-Palmolive Company

Reference
Key No.

700

GENERAL

The Resolutions Committee would like to express appreciation to the members of the National Conference on Weights and Measures (NCWM) who contributed their time and talents toward the arrangements for the conduct and the success of this 86th Annual Meeting. A special note of thanks is extended to the following people:

(1) Dr. Richard Kayser, Director of Technology Services at the National Institute of Standards and Technology (NIST) for his opening address commemorating the 100th Anniversary of NIST and for perpetuating the NIST partnership with the NCWM;

(2) Henry Oppermann, Chief, Office of Weights and Measures (OWM) and NCWM Executive Secretary for his remarks on the accomplishments of State Weights and Measures Organizations and for sharing his vision of the future for the NCWM;

(3) Lou Straub and the officers and appointed officials of the National Conference on Weights and Measures for their leadership and dedicated service on the issues of the Conference, as well as their outstanding performance and administration of the standing committees, subcommittees and working groups of the 86th Annual Meeting;

(4) Sergeants-at-Arms Vernon Lee Massey, Shelby County Weights and Measures, Memphis, TN and Edward A. Payne, Maryland Weights and Measures, for their assistance during the Conference sessions;

(5) The members of the United States Navy Color Guard for presenting the colors during the opening of the General Session;

(6) Regulatory officials of State and local jurisdictions for the advice, interest and support of weights and measures administration in the United States;

(7) Representatives of business and industry for their cooperation and assistance in committee and Conference work;

(8) Retired NCWM members for continued support of the work of the NCWM and participation in these Annual Meetings;

(9) NCWM Headquarters staff for their dedicated assistance in planning and conducting the work and program of this Annual Meeting.

(10) NIST Office of Weights and Measures Technical Advisors, other OWM staff members and Henry Oppermann, for their participation in the Annual Meeting and continued support of the work of the NCWM and its constituency;

(11) Joan Koenig who retired after working 33 years at NIST and who performed outstanding service as the Technical Advisor to the Administration and Public Affairs (A&P) and Executive Committees of the NCWM; and

(12) Staff of the Grand Hyatt Washington Hotel for their assistance and courtesies, all of which contributed to the success of this Annual Meeting.

C. Kloos, Chairman, Colgate-Palmolive Company
R. Alviene, Morris County, NJ Weights and Measures

L. DiTizio, NCWM, Coordinator

Report of the Nominating Committee

G.W. Diggs, Chairman
Supervisor, Virginia Products and Industry Standards

Reference
Key No.

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The Nominating Committee met at the Interim Meeting at the Hilton Mesa Pavillion, Mesa, AZ, at which time the Committee nominated the following persons to be officers of the 87th National Conference on Weights and Measures. In selecting nominees from the membership, the Committee considered professional experience, individuals qualifications, Conference attendance and participation, and other factors considered to be important.

The Nominating Committee unanimously voted to select the following slate of officers:

CHAIRMAN-ELECT: *	Ross J. Andersen New York Bureau of Weights and Measures
BOARD OF DIRECTORS: **AT-LARGE DIRECTOR**	Dennis Ehrhart State of Arizona
ASSOCIATE DIRECTOR:	David W. Quinn Fairbanks Scales
TREASURER:	Thomas F. Geiler Town of Barnstable, MA

G.W. Diggs, VA, Chairman

C. Gardner, Suffolk County, NY
C. Guay, Proctor and Gamble Co.
J. Kane, MT
S. Malone, NE
N. D. Smith, NC
A. Thompson, AK

Nominating Committee

New Chairman's Address
Ronald D. Murdock
North Carolina Department of Agriculture

It is an honor and pleasure to stand before you today. The month of May began my 30th. year in weights and measures, and a lot of change has occurred in all of our programs during those years.

I began my career in 1972 as an assistant on one of our large capacity scale test units covering western North Carolina. In 1972, only a small number of vehicle scales being used exceeded 50 feet in length along with a scale capacity of more than 50 tons.

There were only a very small number of both vehicle scales and livestock scales at that time that had one of the new scale components called “load cells”. All of the vehicle scales, which we tested at that time, were mechanical with either type registering beams or multi-drop dials with printers. Hanging dials and price computing cylinder scales along with an old meat beam or an occasional platform scale were being used by the local grocery stores. Equal-arm and unequal-arm scales, fan scales and different capacity platform scales were used at the local farm & garden and hardware stores. Farm commodities such as different feeds, seeds or grains along with bales of cotton and the baskets or burlap sheets full of tobacco were being weighed on platform scales.

In today’s world, most of the scales used are electronic, with digital indicating elements with capacities ranging from one so small that you can weigh a human hair, to capacities large enough that planes, trains, and automobiles and yes, even the space shuttle can be weighed. Today, the weighing of bulk loads of coal, grains, stone, or even sand, may be accomplished by the use of hi-speed belt conveyer scales that may be suspended hundreds of feet above or below the earth’s surface, all the while depositing the accurately weighed product into waiting trucks, train cars or even into large ocean going vessels.

In today’s package shipping businesses, the scales they use will not only weigh the package that you wish to ship but the scale can also calculate what the cost will be based on the dimensions of the package.

At today’s grocery store, customers may weigh their own packages of meats or produce, scan their packages for checkout and even pay for them without having to deal with that cashier who missed his or her morning cup of coffee. Shoppers can shop for their groceries and various other items by use of the Internet and have them delivered to the front door that day or the next.

Back in 1972, when you needed gasoline for your automobile, you would go to your nearest corner service station where the attendant washed your windshield, checked your engine’s oil level and used a gasoline pump which had an analog computer that could only compute as high as 50 cents per gallon or less in some cases. There were still a few old “visible” gasoline pumps being used in the 70’s. There you could at least see the gasoline before you filled your car’s tank. Kerosene was sold from bulk by use of a hand pump while motor oil was sold in one-quart glass bottles. Today’s dispensers are electronic wonders. They can talk to you, show you full color commercials for new products or services while you are filling your tank. You can send and receive e-mail at the pump, check the local weather forecast and traffic conditions. You can even keep up with the latest, real time tradings from the various stock exchanges. But, be careful, don’t overflow the gas tank should you get a little excited about the money you just made or lost. These dispensers can accept your cash, take your credit cards, or even debit your bank account before you start pumping the gasoline into your tank. You can relax in the comfort of your vehicle, while a robotic arm is filling your car’s fuel tank and payment is made by use of a “rf” ID tag. The tag may be on your key chain, on the back of your rear view mirror or even mounted in your vehicle’s back window. Makes you wonder what’s next?

Your home heating oil may be ordered over the Internet and your delivery ticket can be sent by e-mail within minutes of the completion of your delivery.

Package inspection is another area which has given many an inspector gray hair and sleepless nights. Things like wet tare, dry tare, moisture loss, random numbers and the like are just a few of the changes we have made to our package inspection programs over the last several years. Inspectors have gone from using equal-arm scales and

weights in testing packages to the latest in electronic scales and laptop computers with programs for weights and measures package inspection interfaced to the scale, thus making the inspection process faster, easier and much more accurate.

As a major part of their daily quantity control programs, industry has returned to the classroom along with our weights and measures officials just to learn how the packages are to meet all of the requirements which we now have in place.

As new packaging technology has been developed, the industries bagging bark mulch and potting soils and the packers of various liquid commodities, as well as many others, are finding their products checked closer for net content.

When you talk of yesteryear and the history of weights and measures and the conference, you speak of those "old has beens": Fred Gerk, Allan Nelson, Tom Geiler and Sid Colbrook along with Charlie Gardner, Jim Truex, Barbara Bloch, Steve Malone, and some guy that I heard about from North Carolina named 'Smith'. All of these I just mentioned along with the recent "has beens": Aves Thompson, Wes Diggs, and now Lou Straub. Their names will not soon be forgotten.

At the old NBS, you had Al Tholen, Carol Brickenkamp, as well as Dick Smith and Dick Whipple, and Ann Turner just to name a few. But at today's OWM, you have both Ken and Tina Butcher, along with Tom Coleman, Dick Suiter and Diane Lee, Lynn Sebring, Juana Williams and others all working with some guy named 'Opperman' who returned from old Mexico to work with Tom Gills and Rich Kayser to get things back on track.

The future is unknown. Many challenges surely lay ahead. Daily we ask, "How do we do more with less?" Funding in many of our states is at an all time low. What is to be cut first and how deep do we cut? We alone can only make our future be what we want it to be. This is why my theme for the year ahead is still tied with Lou's theme, "Success Through Communication". Mine is "A Progressive Partnership for the Future, You and the National Conference on Weights and Measures".

We have to look ahead to build our future and not look behind. We need to work closer with agencies such as USDA, ASTM, and NIST and in the foreign arena with agencies such as OIML and PTB. We must work closer and stronger with our friends in Canada and we must be ready to look to our neighbors in South America. By the combined efforts of Canada and the Americas working together we can master the challenges which lie ahead and then we can be as the countries of the "EU". For us to achieve all that lies before us, this conference must be led in the technical areas of our weighing and measuring devices, by officials like Steve Hadder of Florida, Will Wotthlie of Maryland, Bill West of Ohio and Bill Fishman of New York. We need officials like Tim Chesser of Arkansas, Dennis Ehrhart of Arizona, Jack Kane of Montana, and Archie Lambert of Louisiana, to name a few, to help Ross Andersen and me and the future leaders of this conference to advance into the future. With the men and women of weights and measures in this country facing the future with both feet planted firmly on the ground, our leadership is bound by the confidence that everyone is ready to face whatever the future holds.

To strengthen our partnership, I make the following appointments for the next year, Ms. Celeste Bennett of Michigan to the A&P Committee, Mr. Ed Price of Texas to the L&R Committee and Mr. Clark Cooney of Oregon to the S&T Committee. All three of these people are good, hard-working officials who along with their committees and Mr. Ken Fraley from Oklahoma, Mr. LF Eason from North Carolina, Ms. Michelle Phillips from Indianapolis, IN and Ms. Julie McLemore from the State of Mississippi, as the new presiding officers, shall lead us into Cincinnati, Ohio and the 87th. National Conference…

With all of the southern lingo which has been used in the positions of chairman and chairman-elect the last several years starting from the Commonwealth of Virginia, coming down through the shores of Maryland and now from the piedmont of the 'Ole North State', it has been mentioned that it might not be a bad idea to help y'all who did not understand that "Southern drawl". Some of you may have gotten a little off track listening and then started asking yourself, "What did he say?" or " Did I really hear what I thought I did?"

So as a management decision, I feel a little help may be justified. So it is my pleasure to introduce the new

interpreters for the National Conference: Mr. Aves Thompson, from the state of Alaska and Mr. Charlie Gardner from Suffolk County, New York and Mr. Charlie Carroll from Boston, Massachusetts. I know you are asking yourself, "Why did he pick some guy from Alaska and two old Northerners to tell us what was said by those southern guys?"

Well, you know Aves has been here on God's green earth a long time, and he has been around us good old southern guys and gals a lot during those years. He's even been with us so long he is starting to sounds like one of us. You know, he understands this Southern drawl pretty well now. An even though both of these Yanks have been with us about as long, you may have to ask them to slow down and repeat what they said when the talk turns to "gooining down to the corner and getting a "soodaaaa."

In closing, it has been a pleasure working with Lou this year, but the game ain't over yet Lou. I look forward to working with Ross during the upcoming year. Remember if we continue working together in this 'progressive partnership', the rest of the world will look to us as the worldwide leader in weights and measures standards activities and enforcement.

Should you have any questions or if we can be of any assistance, contact Ross or me or any one of the board members or any of Beth's staff at Management Solutions and we will get you an answer or help in any way we possibly can.

Please continue to give your support to the officers and committees of the conference and to the staff at OWM.

Thanks!!! We will be seeing y'all in Ohio next July.

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