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REPORT OF THE 81ST NATIONAL CONFERENCE ON WEIGHTS AND MEASURES

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National Conference on
Weights and Measures 1996

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1996

Report of the 81st National Conference on Weights and Measures

Sponsored by the National Institute of Standards and Technology (NIST)

Attended by Officials from the Various States, Counties, and Cities, and
Representatives from U.S. Government, Industry, and Consumer Organizations

New Orleans, Louisiana - July 21-25, 1996

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Technology Administration
Mary L. Good, Under Secretary
National Institute of Standards and Technology
Arati Prabhakar, Director

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Abstract

The 81st Annual Meeting of the National Conference on Weights and Measures (NCWM) was held July 21 through 25, 1996, at the Westin Canal Place, New Orleans, Louisiana. The theme of the meeting was "Sharing Information, Delivering Equity."

Reports by the standing and annual committees of the Conference comprise 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 Metrology Subcommittee, the Associate Membership Committee, the Retired Officials Committee, the Scale Manufacturers Association, the Meter Manufacturers Association, the Gasoline Pump Manufacturers Association, the National Industrial Scale Association, the American Petroleum Institute, the Industry Committee on Packaging and Labeling, the regional weights and measures associations, and the National Association of State Departments of Agriculture Weights and Measures Division.

Key words: grain moisture; legal metrology; meters; motor-fuel dispensers; safety; scales; specifications and tolerances; training; type evaluation; uniform laws and regulations; 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. 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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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

The following designated State Representatives were present and voted on reports presented by the Conference standing and annual committees.

1996 STATE VOTING REPRESENTATIVES AND ALTERNATES

State	Representative	Alternate
Alabama	Charles A. Burns, Jr.	Larry Turberville
Alaska	Aves Thompson	None
American Samoa	Silimusa Solomona	None
Arizona	Sharon Rhoades	None
Arkansas	Mike Hile	Billy W. Sullivant
California	Darrell A. Guensler	Barbara J. Bloch
Colorado	None	None
Connecticut	Allan M. Nelson	Michael Dynia
Delaware	None	None
District of Columbia	None	None
Florida	Maxwell H. Gray	Jack Y. Jeffries
Georgia	Jerry Flanders	Marvin Pound
Guam	None	None
Hawaii	None	None
Idaho	James Boatman	None
Illinois	Sid Colbrook	None
Indiana	Larry J. Stump	Charles E. Critzer
Iowa	Jerry L. Bane	Darryl L. Brown
Kansas	Constantine V. Cotsoradis	None
Kentucky	Vicki VanHoose	Danny Willis
Louisiana	Melvin Lyons	Ronald Harrell
Maine	David E. Gagnon	Stanley K. Millary
Maryland	Louis E. Straub	M. Richard Shockley
Massachusetts	Charles H. Carroll	None
Michigan	Mike Pinagel	Tim White
Minnesota	Michael F. Blacik	None
Mississippi	William P. Eldridge	None
Missouri	Roy Humphreys	Dwain Snider
Montana	Jack Kane	None
Nebraska	Steve Malone	Richard Suiter
Nevada	None	None
New Hampshire	Michael Grenier	None

1996 STATE VOTING REPRESENTATIVES AND ALTERNATES		
State	**Representative**	**Alternate**
New Jersey	Pasquale D'Errico	None
New Mexico	Gary D. West	None
New York	Ross J. Andersen	None
North Carolina	N. David Smith	Ron Murdock
North Dakota	None	None
Ohio	Lewis R. Jones	James Truex
Oklahoma	Charles Carter	None
Oregon	George Shefcheck	None
Pennsylvania	Charles M. Bruckner	A. Courtney Yelle
Puerto Rico	Otilio Rodriguez Colón	None
Rhode Island	None	None
South Carolina	None	None
South Dakota	Michael Mehlhaff	None
Tennessee	Robert G. Williams	Randy F. Jennings
Texas	Ed Price	James H. Eskew
Utah	David O. McKay	None
Vermont	Bruce Martell	None
Virginia	J. Alan Rogers	G. Wes Diggs
Virgin Islands	Archie Corbitt	None
Washington	Robert D. Arrington	None
West Virginia	Karl Angell, Jr.	None
Wisconsin	Alan Porter	James Akey
Wyoming	None	None

National Conference on Weights and Measures Organization Chart 1995-1996

Executive Committee and NTEP Board of Governors (BoG)

Chairman:	C. Gardner, Suffolk Co., NY
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	C. Carroll, MA (2)
	C. Fulmer, SC (1)
	M. Gray, FL (3)
	R. Suiter, NE (3)
	A. Thompson, AK (1)
President:	A. Prabhakar, NIST Director
Executive Secretary:	G. Ugiansky, NIST Office of Weights and Measures
Technical Advisors:	J. Koenig, NIST
	S. Roussy, Canada (Executive Committee only)
Associate Member Representative:	R. Davis, James River Corporation
Conference Coordinator:	A. Turner, NIST

See Working Groups and Annual Committees to the Executive Committee after the Standing Committees.

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Chairman:	L. Straub, MD (1)
Members:	K. Angell, WV (4)
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Chairman:	B. Bloch, CA
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Specifications & Tolerances Committee

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Chairman: J. Truex, OH
Members: S. Colbrook, IL
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A. Nelson, CT
K. Simila, OR
N. David Smith, NC
S. Rhoades, AZ

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Chairman: C. Gardner, Suffolk Co., NY
Members: D. English, Measurement Systems International (3)
D. Guensler, CA (2)
H. Lodge, Cargotec Inc (1)
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Coordinator: A. Turner, NIST

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Chairman:
Members: J. Bane, IA (2)
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C. Pittman, TN (3)
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R. Marceau, Canada
P. Peterson, GIPSA
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J. Truex, OH
O. Warnlof, NIST
K. Yee, NIST

Private Sector Members:
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L. Cerny, Association of American Railroads
J. Elengo, Contractor
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D. Joines, Wayne Div., Dresser Ind.
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T. Runyon, Seedboro Equipment
F. Seeber, Shore Sales Co., Grain Elevator & Processors Society
C. Watson, Stein Labs, Perstorp Analytical, Foss Foods

*(Grain Moisture Meter Sector only)

President's Address

Dr. Peter L. M. Heydemann, Director of Technology Services, National Institute of Standards and Technology (NIST), addressed the Conference July 23, 1996, representing the NIST Director, Dr. Arati Prabhakar, who is also President of the National Conference on Weights and Measures. Dr. Heydemann's speech, which was not recorded and was extemporaneous, focused on new initiatives in uniformity both nationally and internationally.

Chairman's Address to the 81st Annual Meeting 1996

Presented by Charles A. Gardner, Director
Weights and Measures, Suffolk, Co., NY

Commissioner Odom, Dr. Heydemann - on behalf of the Conference membership, I thank each of you for appearing before us today. Your remarks and your presence are greatly appreciated. To you and to all of my fellow members of the Conference, I welcome you to our 81st Annual Meeting. It has been my privilege to represent you throughout the past year. I have traveled the country bringing our message of "Sharing Information, Delivering Equity" to all those who are interested in our goal of providing equity in the marketplace.

I want to thank our Louisiana delegation - Ronnie Harrell, Mel Lyons, Fay, and all the rest of the staff who have been so helpful to us as we planned this meeting. Their support has been terrific! As for the city of N'Orleans itself, the attendance figures for this meeting speak volumes about the reaction of the membership to meeting here - we heard many times "N'Orleans? In July? Are you crazy??" Well, I guess a lot of us are - crazy about this great city anyway! It's been a great week and our reception here has been wonderful.

As I stood before you one very short year ago, a big concern of many of us was how the change at the top in the Office of Weights and Measures was going to affect the Conference. Little did we know that in a couple of months, our concerns were going to be about the continued existence of NIST itself and the potential impact of that possibility on the future of the Conference. Well, we survived - we're here - we're strong - and we continue to grow. We did that because of the foundation that this group is built upon. I'll say it again... in my opinion, the best example, in the world of a collaboration of government/industry/consumer interests working together toward a common goal - equity in the marketplace.

As strong as we are, however, we need to continue our self-examination process - who we are, what we do, how we do it, and why we are necessary. We need to get that message out not only to our customers but to ourselves as well. We have the vehicles in place to continue that process - I'm talking about the Program Evaluation Work Group and the long-range planning efforts by the Executive Committee. In the past year, we have seen the potential benefits to regulatory officials when information is shared. What we have seen is truly only the tip of the iceberg. Our system of weights and measures regulations and enforcement will be enhanced and strengthened by these efforts. The benefits will accrue to industry, consumers, and officials alike - only, however, if we use this information carefully and precisely. How this information is distributed, to whom, for what purpose, and in what form it is presented - these are critical considerations and important to the success of our programs. We need to develop policies that will serve our needs while at the same time ensuring that unauthorized or inappropriate use of information is minimized. We also must not let our focus narrow so that information sharing is confined to devices or commodities tests. Where there are successful administrative programs, enforcement strategies, public relations programs, for example, we need to deliver that information to those who would need it.

We must continue this year's increased pace of delivering training in all areas of weights and measures activities. We must activate the plan for the expenditure of the remaining grant funds. We must maximize the use of the OWM training funds while they last. We must continue the delivery of training to lab personnel, initiate administrative training seminars, continue the train-the-trainer program, and ensure uniformity in application of standards and procedures. Equity can be delivered and uniformity achieved only by continued training. We must be ready to respond to NIST if we are asked to assist in weights and measures training in other nations. We should be the international leaders. We should be the pace setters.

I believe that we should be ensuring the delivery of equity by concentrating more time and resources (I didn't say all!) on the final sale or delivery of commodities as opposed to the time-honored tradition of setting a goal of the inspection of all of the different device types in use in the marketplace. This is not a new concept and, in some places, there are already existing similar partial programs. I would rather see a program where only a certain sample number of devices are tested during a particular period of time with the time that would have been spent testing all of the other devices reserved for test purchases, greater frequency of tests for "problem" locations, increased monitoring of UPC scanning systems - in short a concentration on how the devices are being used and did the buyers get what they paid for? That's the bottom line, that's what we're all about - the details are important but the final result is most telling. I believe that we can better measure the effectiveness of a program by the pass/fail results of test purchases, for instance, as opposed to the pass/fail results of device inspections. Those inspection results still beg the question: did the buyers get what they paid for? I submit to you that many of our customers - our bosses, budget people, business people, consumers, etc. - would also be more likely convinced of the effectiveness and the worth of our efforts by presenting to them the results of a program that was focused on ensuring and proving that more people are in fact "getting what they paid for."

I am pleased by the assurances that we have received from Peter Heydemann, Stan Rasberry, and Bob Hebner of their intent concerning the continued support by NIST of the National Conference. The administrative support, technical guidance, publications schedule, training opportunities, and overall flow of information are critical to our continued success. We appreciate the commitment.

I want to publicly acknowledge the support and help that I have received from Jim Truex and Barbara Bloch. I thought that we were a pretty fair team, if I do say so myself. Jim was a tough act to follow. He was always available to answer questions and help out in any way possible, and I know that the Conference will enjoy and prosper under the tenure of Barbara Bloch - a true professional. Our still active past chairmen were also a great help to me at different times throughout my tenure first as Chair-Elect and then, as Chairman - thanks Darrell, *David, Sid, Allan and Tom. Joan Koenig was especially helpful in her role as advisor to the* Executive Committee, and Gil has ensured that OWM has been there for us, when and as we needed them.

Finally, I want to acknowledge the support of my county executive - Bob Gaffney - allowing me to travel out and about the country as your representative. To my office staff back home in Suffolk County, my thanks for keeping the ship afloat in my absence.

To all of the membership of this great organization - thank you for the opportunity to serve. I hope that I lived up to your expectations and, remember, bring back what you learned here, continue to be an active part, we need to hear from you. Thanks again!!

HONOR AWARDS

10 YEARS

Charles Carter
Samuel Chappell
Dean Ely
David English
Bob Fuehne
Max Gray
Paul Hadyka
Dan Kushnir
Patrick Marino
Sharon Rhoades
John Skuce
Richard Suiter
Billy Sullivant
Chester Szyndrowski
Aves Thompson

15 YEARS

Charles Carroll
Robert Land
James Truex

20 YEARS

William Braun
Thomas Geiler
Chip Kloos
Daryl Tonini

25 YEARS

Merrill Thompson
James Akey

Special Recognition Awards

The success of this Conference is the result of the dedication and hard work of many individual members. The work of the following members was recognized at the general session for their contributions over the past years within their respective committees and for their contributions to the National Conference in general.

Executive Committee

Carol Fulmer, State of South Carolina
Aves Thompson, State of Alaska
Rene Magnan, Canada

Laws and Regulations Committee

Louis Straub, State of Maryland
Giles Vinet, Canada

Specifications and Tolerances Committee

Gary West, State of New Mexico

Administration and Public Affairs Committee

Barbara DeSalvo, State of Ohio

Vice-Chairmen

Michael Blacik, State of Minnesota
Charles Carroll, State of Massachusetts
Vernon Massey, Shelby County, TN
Sharon Rhoades, State of Arizona

Sergeants-at-Arms

Ike Lawson, District Supervisor, New Orleans, LA
Cecil Shivor, District Supervisor, Central Louisiana

Associate Membership Committee

The associate members have contributed immeasurably to the many achievements of the Conference, most notably the development and widespread acceptance of the National Type Evaluation Program, the National Training Program, and Handbooks 44, 130 and 133. Today, we have even more involvement with our business partners in such activities as the Type Evaluation Technical Committee Sectors, Handbook 133 Working Group, Petroleum Subcommittee, Price Verification Work Group, and Multi-Dimension Measuring Devices Working Group. A Certificate of Appreciation was presented to the Associate Membership from the NCWM, and the Administration and Public Affairs Committee presented the Associate Membership with a *Certificate of Recognition* for the scholarships awarded to the States for training.

Annual Committees

Budget Review Committee

Harvey Lodge, Cargotec, Inc.

Auditing Committee

Raymond Kalentkowski, State of Connecticut

Nominating Committee

James Truex, State of Ohio
Sidney Colbrook, State of Illinois
Thomas Geiler, Barnstable County, MA
Allan Nelson, State of Connecticut
Sharon Rhoades, State of Arizona
Kendrick Simila, State of Oregon
N. David Smith, State of North Carolina

Special Service Award

A Certificate of Appreciation was presented to Ann H. Turner, Weights and Measures Coordinator, National Institute of Standards and Technology, in recognition of her years of dedicated service to the NCWM and her tireless efforts to plan, coordinate, and conduct high quality meetings of the Conference and its committees.

President's Award

This was the eleventh annual presentation of the President's Award. This award is given for two levels of achievement:

1) A banner presented to those directors representing States that have 100 percent membership, both State and local weights and measures officials, in the National Conference on Weights and Measures for the first time in the membership year July 1, 1995, through June 30, 1996. Those States that repeat with 100 percent membership are awarded a streamer for their banner. A streamer is presented for each year the State qualifies.

2) The second level of the President's Award is a certificate presented to any State in which all of the weights and measures officials from the State office are members of the Conference.

Awards For First Year Banner

The **State of Kentucky** received a banner for first year membership of all State weights and measures officials. Congratulations to the **State of Kentucky**.

Streamer Awards for the Third Year

The State of Nevada
The State of Tennessee

Streamer Awards For The Fourth Year

The Territory of The Virgin Islands

Streamer Awards For The Fifth Year
The Commonwealth of Puerto Rico
The State of West Virginia

Streamer Awards for the Sixth Year
The State of Colorado

Streamer Awards for the Seventh Year
The State of Montana
The State of Oregon
The State of Utah
The State of Vermont
The State of Washington
The State of Wyoming

Streamer Awards For The Eighth Year
The State of Arizona
The State of Michigan
The State of New Hampshire
The State of Virginia

Streamer Awards for the Tenth Year
The State of Alaska
The State of Delaware
The State of Idaho
The State of Kansas
The State of New Mexico
The State of South Dakota

Streamer Awards for the Eleventh Year
The following two States have had 100 percent membership in the National Conference on Weights and Measures for their States since the beginning of the award. These two States continue to participate 100 percent in the membership program:

The State of Arkansas
and
The State of Nebraska

President's Certificate

Eight States qualified for the President's Certificate with 100 percent of their State office staff members for the 1995-96 Conference year:

Second Year Award
State of Missouri

Third Year Award
State of Connecticut

Fourth Year Award
State of Massachusetts

Fifth Year Awards
State of Illinois
State of Indiana

Seventh Year Awards
State of Maine
State of New York
State of Wisconsin

Report of the Executive Committee and National Type Evaluation Program Board of Governors

Charles A. Gardner, Chairman
Director, Weights and Measures
Suffolk Co., NY

James Truex, Chairman of the NTEP Board of Governors
Inspections Manager, Weights and Measures
Ohio Department of Agriculture

100 Introduction

This is the Report of the Executive Committee and the National Type Evaluation Program (NTEP) Board of Governors for the 81st Annual Meeting of the National Conference on Weights and Measures (NCWM). The Report is based on the Interim Report offered in NCWM Publication 16, Program and Committee Reports; the Addendum Sheets issued at the Annual Meeting; and actions taken by the membership at the Voting Session of the Annual Meeting.

The Report is divided into two parts: (1) management of the National Conference on Weights and Measures (items in the 101 Series) and (2) management of NTEP (items in the 102 Series), as addressed by the Committee in its role as the NTEP Board of Governors. 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. Items marked with a "W" have been withdrawn. 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.

Table A
Index to Reference Key Items

Table A (Continued)
Index to Reference Key Items

Table B
Appendices

Table C
Voting Results

Reference Key No.	House of State Representatives		House of Delegates		Results
	Yes	No	Yes	No	
102-4	42	0	61	0	Passed
102-6	40	0	62	0	Passed
100 (Report in its Entirety)	41	0	61	0	Passed

Detail of Items

Part I - Executive Committee

101-1 W Constitution and Bylaws: Add Associate Member Representative to Specifications and Tolerances (S&T) Committee

(This item was withdrawn.)

This item was carried over from Item 101-3 from the Report of the 79th NCWM, 1994, and Item 101-1D from the Report of the 80th NCWM, 1995.

At the 1995 NCWM Annual Meeting, the NCWM membership adopted the Committee's recommendations to appoint "Associate Member Representatives" (AMR) to the Executive, Laws and Regulations, and Administration and Public Affairs Standing Committees of the Conference on a trial basis. The appointment of an AMR to the Specifications and Tolerances Committee was not recommended by either the Associate membership or the Executive Committee because there was disagreement among the Associate members as to the desirability of such an appointment. The Scale Manufacturers Association (SMA), the Gas Pump Manufacturers Association (GPMA), the AMC, and other interested participants said they would continue to evaluate and develop this proposal. At the Interim Meeting, the Chairman of the Associate Membership Committee (AMC), Richard Davis, reported that AMC members could not reach a consensus on the item; consequently, the Executive Committee decided to withdraw it.

101-2 I Constitution and Bylaws: Addition of Mission Statement and Need for Long-Range Planning Group as a Permanent Part of the NCWM Organization

This item was carried over from Item 101-4 from the Report of the 80th NCWM, 1995.

The Executive Committee is preparing a long-range plan for the NCWM, using the OWM long-range plan and reports of the Task Force on Planning for the 21st Century as resource materials. In addition, at the suggestion of the Scale Manufacturers Association (SMA), the Committee will reconsider the "Recommendation For a Legal Metrology Control System Applicable to the United States," which SMA adopted and presented to the NCWM in 1978 (see the Report of the 64th NCWM, pages 58 to 87).

The initial step in the planning process was to conduct a "strategic planning session" attended by the Executive Committee. Individuals selected to compose the long-range planning document were: Tom Geiler, Barnstable, MA, and N. David Smith, NC. NIST Technology Services Deputy Director David Edgerly provided a planning facilitator, Mr. Richard Lefante, The Lefante Group, for the first session. This meeting was held in Alexandria, VA, on March 23 and 24, 1995. At the meeting, the Executive Committee began development of a long-range plan that includes a new mission statement.

The Committee had hoped to schedule a meeting with OWM staff and Standing Committee Chairmen prior to the Interim Meeting to review current OWM projects in support of the NCWM and to begin to set priorities for those projects as a preliminary step to identifying future objectives. Tentative plans for a meeting at the Southern Weights and Measures Association's Annual Meeting were canceled when budgetary constraints made it impossible for OWM staff to attend.

The long-range planning process was resumed at the Interim Meeting. The Committee reviewed the following vision, values, mission, and goals statements and decided to publish them for comment:

Vision

The National Conference on Weights and Measures will be the national and international leader in measurement standards development and legal metrology training. The Conference will provide a wide area information network for collection, retrieval, and dissemination of information related to weights and measures. An international training center will deliver professional training to all regulatory officials and industry representatives desiring training.

Values

The National Conference on Weights and Measures is dedicated to a fair and equitable marketplace free from trade barriers and is committed to maintaining the highest ethical standards. The National Conference on Weights and Measures stands for leadership in weights and measures issues, providing quality service to its members, and promoting continuing quality weights and measures education. The Conference is dedicated to providing a forum for all points of view and to ensuring open communications, open deliberations, and preserving a democratic consensus-based decision making process.

Mission

The National Conference on Weights and Measures is a standards development organization comprised of individuals and associations representing government, industry, and consumer interests. The Conference provides an inclusionary forum to promote a fair and equitable marketplace for anyone involved in buying and selling goods or services by weight or measure.

Goals

I. Enhance the National Conference on Weights and Measures as a national and international resource for standards development.

II. Establish a Professional Development Program for industry and government officials.

III. Develop alternatives for the delivery of weights and measures services.

IV. Become an international leader in Legal Metrology.

At the Annual Meeting, the Committee received an update from the co-chairman of the Long-Range Planning Subcommittee, who recommended a special meeting of the full Executive Committee to review the proposed Vision, Values, Mission, and Goals of the Conference. The Committee agreed with the recommendation and tentatively scheduled such a meeting for the fall of 1996.

Further, the Committee received a revised Legal Metrology Control Plan from the Scale Manufacturers Association (SMA). This plan was originally reviewed and endorsed by the Conference in 1978. The SMA proposed and the Committee agreed that much, if not all, of the plan is still relevant to the needs of the Conference. The Committee intends to publish the Plan in its next Interim Meeting Agenda for review and comment.

101-3 I Constitution and Bylaws: Duties of Officers

This item was carried over from Item 101-5 of the Report of the 80th NCWM, 1995.

During the 1996 Interim Meeting, the Committee reviewed a draft revision of the Constitution and Bylaws (NCWM Publication 1) that included policies related to the management of the NCWM that had been adopted by the Conference over the last 10 years. Some of these policies had been reprinted in NCWM Publication 3, NCWM Policy, Interpretations, and Guidelines, but others had only been published in the Conference reports. It became obvious as the Committee went through the Constitution and Bylaws that other changes are needed besides adding a policy section. The Committee is continuing its review of Publication 1 with the intent of proposing several revisions next year.

101-4 I Finances, Treasurer's Report

NCWM Treasurer J. Alan Rogers presented a report on the Conference's finances to the Executive Committee at the Interim Meeting (see the separate Treasurer's Report for more information). The 1996 NCWM and National Type Evaluation Program budgets are shown in Appendix A.

At the Annual Meeting, the proposal of the Budget Review Committee for the 1997 Operating Budget was reviewed and accepted by the Executive Committee. (See Appendix A for the 1997 budget.)

101-5 I Finances, Auditing Committee

The actual income and expenses for 1996 were reviewed by the Auditing Committee at the Interim Meeting. Auditing Committee member Monty Hopper, reporting for Chairman Ray Kalentkowski, told the Executive Committee that the Conference's books were in order. (See the Auditing Committee's report.)

101-6 I Finances, Associate Membership Committee

A status report was given by AMC Chairman Richard L. Davis. He confirmed that all 20 of the training scholarships of $500 dollars each that were made available by the AMC for the 1995-96 membership year had been awarded. (See the Administration and Public Affairs Committee agenda for further details.) He announced that the AMC was planning to use its funds next fiscal year to sponsor seminars on dealing with the media in all four regions, pending approval of the proposal by the AMC membership next July.

101-7 I Finances, Use of NIST Grant to NCWM for Training

Funds remaining from the second grant from NIST to the NCWM for the development of training materials total $95,884.28. Because of the recent success of the OWM-sponsored instructor classes on NIST Handbook 133, it has been suggested that some of the remaining grant funds might be used to pay the costs of holding training classes for trainers, including participant expenses. Two Handbook 133 classes were held in 1995. NIST paid all costs for the classes and all participant expenses. In return, participants promised to go back to their jurisdictions and conduct similar training. A total of 40 individuals were trained in the two classes. By January 1996, the 20 participants in the first class had provided more than 700 weights and measures and industry officials with Handbook 133 training. (Figures were not available for the number trained by the individuals in the second class.) Many others could benefit from Handbook 133 training and other trainer training classes; however, the resources to pay for such classes are not currently available. The NCWM's training grant from NIST is currently limited to developing training materials for weights and measures officials.

At the Interim Meeting, the Committee discussed the possibility of using the grant funds to continue the classes for instructors. In addition, the Administration and Public Affairs (A&P) Committee asked the Executive Committee to request an expansion of the scope of the NIST grant so that they could use the remaining funds not only to update Examination Procedure Outlines and current training programs but to sponsor additional classes for instructors. The Executive Committee agreed to request an amendment to the scope of the NIST grant.

The A&P Committee also presented a proposal to the Executive Committee to establish a pilot public information officer project in 1997. The project would involve the hiring of a part-time public information officer for a year to implement an ongoing national public relations effort (see the A&P Committee Report Item 405-3). The cost of the project was estimated to be $20,000. Executive Committee members heard the proposal and raised some questions about it; however, they did not take any action on it.

At the Annual Meeting, it was reported that the Executive Committee's request for a change in the scope of the grant had been approved. Based on that approval, the Executive Committee met with the A&P Committee to discuss the mission, goals, and objectives of the A&P Committee. The Executive Committee charged the A&P Committee with developing a plan to use the grant funds for the purposes of training in weights and measures activities. The Executive Committee decided not to fund the part-time public information officer project.

101-8 I Organization, Appointments, and Assignments, Status Report

Chairman Gardner presented a review of his appointments since the 1995 Annual Meeting. His appointments include:

To the Executive Committee:
Charles Carroll, MA, 3 years
Richard Davis, James River Corporation, Associate Member Representative

Strategic Planning Subcommittee Co-Chairs:
Thomas Geiler, Barnstable, MA
N. David Smith, NC

To the Laws and Regulations Committee:
Stephen Morrison, San Luis Obispo Co., CA, 5 years
Jennifer Colman, Idaho Retail Grocers Association, Associate Member Representative

To the Petroleum Subcommittee:
Ross Andersen, NY
Randy Jennings, TN, Chairman

David Lazier, CA
Roger Leisenring, Texaco, Inc.

To the Specifications and Tolerances Committee:
Monty Hopper, Kern Co., CA, 5 years
Allan Nelson, CT, 2 years

To the Administration and Public Affairs Committee:
Nelson Kranker, Dutchess Co., NY, 5 years
Christopher Guay, Procter & Gamble, Associate Member Representative

To the Resolutions Committee:
J. Michael Hile, AR, 3 years
Vernon Massey, Shelby Co., TN, 3 years
Joe Silvestro, Gloucester, NJ, 3 years
Cathryn Pittman, TN, 3 years

To the Nominating Committee:
Sidney Colbrook, IL, 1 year
Thomas Geiler, Barnstable, MA, 1 year
Allan Nelson, CT, 1 year
Sharon Rhoades, AZ, 1 year
Kendrick Simila, OR, 1 year
N. David Smith, NC, 1 year

To the Auditing Committee:
Richard Philmon, IL, 3 years
Robert Williams, TN, 3 years

To the Credentials Committee:
Mark Coyne, Brockton, MA, 3 years

To the Budget Review Committee:
Steven Malone, NE, 4 years

To the NTETC Weighing Sector:
Louis T. Cerny, Assoc. of American Railroads
Darrell Flocken, Metler-Toledo
David Hawkins, Thurman Scale
Vijay Pandit, Allegany Technology, Inc.

To the NTETC Measuring Sector:
Clyde Mohr, Shell Oil
Kelly White, Brooks Instrument Division

At the Interim Meeting, Executive Committee members reviewed the results of a questionnaire on the need for a subcommittee that would address metrology issues for the NCWM. The questionnaire had been sent to all State weights and measures directors and metrologists. Of the 24 responses received, 23 indicated that the formation of a metrologist subcommittee would be beneficial, and only 1 indicated that there is no need for the subcommittee. Based on the questionnaire's findings and other considerations, Committee members recommended that Chairman Gardner establish a Metrology Subcommittee that would report to the Executive Committee on specific issues of importance to the Conference. The Chairman plans to establish the subcommittee and appoint its members before the next NCWM Annual Meeting.

Between the Interim and the Annual Meetings, Chairman Gardner made the following appointments:

To the Laws & Regulations Committee:
Michael S. Pinagel, MI

To the NIST Handbook 133 Working Group:
Aves Thompson, AK

To the Petroleum Subcommittee:
Sean Turner, The Natural Gas Vehicle Coalition

To the new Metrology Subcommittee:
James Akey, WI
Ron Balaze, MI
Richard Calkins, Rice Lake Weighing Systems
L. F. Eason, NC
Herb Eskew, TX
Joe Rothleder, CA
José Torres, PR

Parliamentarian:
Bruce Adams, MN

Chaplain:
J. Michael Hile, AR

To the Resolutions Committee:
Melvin Lyons, LA

Sergeants-At-Arms:
Isaiah Lawson, LA
Cecil Shivor, LA

To the NTETC Belt-Conveyor Scales Sector:
Kevin A. Alexeff, Stock Equipment Company

To the NTETC Measuring Sector:
Rodney Cooper, Schlumberger (Neptune)
Melvin C. Hankel, Consultant
Ken Hoffer, Hoffer Flow Controls, Inc.
Andre K. Noel, Schlumberger Industries
Robert E. Traettino, Liquid Controls Corp.
Marcel Woiton, Endress+Hauser

On the Laws & Regulations Committee:

Gale Prince, Kroger Co., has been substituting for Jennifer Colman, Idaho Retail Grocers Association

101-9 I Publications, Status Report

During the Committee's review of the status of NIST and NCWM publications, it was reported that NIST Handbooks 44 and 130 and the Report of the 80th NCWM had been delayed as a result of a number of factors impacting the NIST Office of Weights and Measures (OWM), including budget cuts and Federal Government furloughs (see Item 101-13 for more information). OWM Chief Gil Ugiansky said that his office planned to send prepublication copies of the Handbooks to State Weights and Measures Directors as a temporary measure. He noted that continuing funding problems might further delay publication of NIST and NCWM documents and asked that the Executive Committee establish publication priorities. The Committee listed its priorities as follows: 1) the Program and Committee Reports for the 81st NCWM, 2) Handbook 44, 3) Handbook 130, and 4) the Report of the 80th NCWM.

A summary of the distribution level, income, and costs of selected NIST and NCWM publications as of June 30, 1996, and OWM's publication calendar for 1996 follow.

1996 NIST and NCWM Publication Summary

(As of June 30, 1996)

NIST Publications				
NIST Publication Title	Quantity	Total Printing Costs	Total Postage (NIST)	Total Printing & Postage
Handbook 44 1996 edition	3,300	$6,977	$5,772	$12,749
SP 894 Report of 80th NCWM	4,200	12,000	5,624	17,624
Handbook 130 1996 edition	3,100	7,582	3,200	10,782
Totals (All NIST Expense)	**10,600**	**26,559**	**$14,596**	**$41,155**

NCWM Publications and Membership Mailing (Printed at Conference Expense Publications Mailed at NIST Expense)					
1996 Pub 2 Membership Directory	3,000	$9,500 (NCWM)		$3,996	$13,496
Pub 5 Index of Dev Evals, 8th Ed	400		$2,700 (NTEP)	592	3,292
Pub 15 Interim Agenda	3,700	3,700 (NCWM)		6,965 (First Class)	10,665
Pub 16 Prog & Committee Reports (Announcement Book)	4,000	9,200		5,624	14,824
Totals	**11,100**	**$22,400 (NCWM)**	**$2,700.00**	**$17,177**	**$42,277**

1996-1997 NCWM Membership Renewals and Invitations to Join					
Renewals and Invitations (printing at NCWM expense postage & mailing service paid by NIST)	**Quantity**	**Printing (NCWM)**	**Mailing Service (NIST)**	**Total Postage**	**Total Printing, Postage & Mailing Service**
Totals	**27,000**	**$2,003**	**$698**	**$8,506**	**$11,207**

Summary

Total Printing at NIST Expense	Total Postage/Mailing Service at NIST Expense	NISTGrand Total (Postage and Printing)
$26,559	**$32,471**	**$59,030**

Total NCWM Printing Costs	NTEP (Printing Only Applicable)
$24,403	**$2,700**

1996 OWM Publications Calendar

Status as of 7/15/96

Month	Publication	Comments
February	W&M Today Newsletter	Completed
March	Handbook 44 - 1996 edition Template Quality Manual	Completed Completed
April	Handbook 130 - 1996 edition Report of the 80th NCWM NCWM Pub 5, 8th ed. NTEP CCs Handbook 105-2	Completed Completed Completed Completed
May	Handbook 143 Lab Program NCWM Pub 1 NCWM Bylaws NCWM Pub 2 NCWM Directory NCWM Pub 14 NTEP Admin. NCWM Pub 16 Prog & Comm Rpt NCWM Pub 5, Supp 1, NTEP CCs W&M Today Newsletter	Completed Completed Completed Completed Completed Completed Completed
June	NCWM Pub 10 Conduct of Annual Meeting	Completed
July	NTEP Grain Brochure NCWM Training Resource Catalog	Completed Completed
August	W&M Today Newsletter Handbook 145 Quality Assurance of Metrological Measurements - draft	To contain Annual Mtg. summaries
September	NCWM Pub 5, Supp 2, NTEP CCs Handbook 105-3 S&T for Field Stds Handbook 105-4 S&T for Field Stds Handbook 105-5 S&T for Field Stds Handbook 105-6 S&T for Field Stds Handbook 105-7 S&T for Field Stds	
August-October	Report of the 81st NCWM Handbook 44 - 1997 (Oct 1) Handbook 130 - 1997	
October	NCWM Pub 9 - Nom Comm Rpt	Just for Nominating Comm
November	W&M Today Newsletter Handbook 133 draft	To contain information on Interim Mtg.
December	NCWM Pub 15 - Interim Agenda	

101-10 I Membership, Status Report

The total membership of the NCWM as of June 30, 1996, was 3,483, which is slightly less than the total at the same time last year (3,570). The membership breakdown by category is as follows:

State	-	855 (24.5%)	Foreign Industry	-	45 (1.2%)
County	-	401 (11.5%)	U.S. Government	-	53 (1.5%)
City	-	188 (5.3%)	Foreign Government	-	38 (1%)
U.S. Industry	-	1,851 (53.1%)	State/local, not w&m	-	52 (1.5%)

See Appendix B for a breakdown of the composition of the NCWM mailing list from 1994-1996.

101-11 I Meetings, Networking with Other Associations

At the Interim Meeting, Chairman Gardner reported that he had attended the Southern and Western Weights and Measures Associations Annual Meetings, the Scale Manufacturers Association Annual Meeting, and a meeting of the National Industrial Scale Association since taking office in July 1995.

Alan Rogers reported on the comments he had received from the southern and western regional associations on his draft recommendations for linking the regional associations with the NCWM to improve their membership base. After considering various alternatives, the Executive Committee decided on a 3-step plan to promote membership in the regional groups:

1) Invite the regional associations to display their membership information at the next NCWM Annual Meeting,

2) Ask the regional groups to provide membership forms and information on officers and meetings for distribution through the NCWM Fax-On-Demand system, and

3) Ask OWM to modify the NCWM membership renewal forms to include a box that members can check to get information on the regional associations.

NCWM Chairman Charles Gardner agreed to contact the regional associations to invite their participation in the Annual Meeting and to request association information.

101-12 I Meetings, Annual and Interim, Future

1997 Interim Meeting
The 1997 Interim Meeting will be in Rockville, MD, at the Doubletree Hotel from January 12 to 16.

1997 Annual Meeting
The 1997 Annual Meeting will be in Chicago, IL, at the Swissotel from July 20 to 24.

1998 Interim Meeting
The city selected for the 1998 Interim Meeting is San Antonio, TX. The Conference Coordinator is investigating sites for the meeting.

1998 Annual Meeting
Portland, OR, has been selected for the 1998 Annual Meeting.

Future Meetings
The year 2001 marks 100 years since the founding of the NCWM's parent organization, the National Institute of Standards and Technology (NIST) in 1901. NIST plans to celebrate its Centennial with special events throughout the year. In recognition of NIST's Centennial, it was proposed that the NCWM's 86th Annual Meeting in 2001 be held in the Washington, DC, area and that special commemorative activities be planned for that meeting to recognize NIST for its role in promoting uniformity in weights and measures laws, standards, and practices. The Executive Committee agreed with the proposal and selected the Washington, DC, area as the site for the NCWM's 86th Annual Meeting in 2001. It is the intention of the Committee to adhere to the following schedule for future Annual Meetings of the Conference: 1999 - Northeast region; 2000 - Southern region; 2002 - Central region; 2003 - Western region.

101-13 I Program, OWM and NIST

The NCWM Executive Secretary and Chief of the NIST Office of Weights and Measures (OWM), Dr. Gilbert M. Ugiansky, presented the following chronology of the funding problems and furloughs that had a significant impact on OWM since the fall of 1995:

FISCAL YEAR 1996 FUNDING OF NIST-OWM

September 1995: Travel canceled and purchases required high-level approval.
Beginning before October 1, 1995, all travel for October was canceled due to an expected reduction in funding under the first continuing resolution (CR). For all purchases (including envelopes, mailing, etc.), approval was required by the Executive Officer of Technology Services (two levels above OWM).

October 1: CR #1.
Above in effect.

Mid-October: Reduced travel budget allocated.
OWM was allocated a travel budget (too late for the SWMA, Measuring Sector, and NISA meetings) based on a percentage of Fiscal Year 1995's travel budget. This budget was at the level of 5 percent for the first quarter (Oct.-Dec.), and 10 percent for each remaining quarter. A decision was made to save the travel budget for the Interim Meeting. For all purchases, approval continued to be required by the Executive Officer of Technology Services.

November 13: Furlough #1.
Government workers were furloughed. While on furlough, it was illegal for workers to volunteer their time, including phone calls. NIST continued to work on funds being held for other purposes until close of business November 16 and then its employees were furloughed.

November 20: CR #2. Travel and purchase restrictions continue.
The second CR sent government employees back to work. Travel and purchase restrictions stayed in place at NIST.

December 13-18 OWM office moved.
OWM moved to NIST North. Prior to the move, normal operations were interrupted — due to reducing files, packing, and unavailability of computers, etc.

December 16: Furlough #2.
Government workers were furloughed for a second time. NIST shut down on December 18. NCWM Interim Meeting agendas were delivered on schedule to the NIST mail room as furlough was being initiated, but not in time to get agendas to the Post Office before furlough. Request for funds to mail agendas during furlough was denied.

January 8: CR #3. Funding opened government — snow closed it.
Third CR sent government employees back to work; however, snow closed NIST on January 8, 9, 10 and 12. On January 11, NIST delivered NCWM Interim Agendas by truck to U.S. Postal Service.

January 19: Short-term travel and purchase budget.
OWM was given a travel and purchase budget good through January 26 (the end of the current CR).

January 26: Third CR expires.
NIST-OWM status is uncertain.

Deliberations on future funding of agencies (including NIST) will continue between Congress and the President. NIST management and staff have no control over the direction or outcome of this process.

Because of the uncertainties over future funding for NIST/OWM, the Executive Committee formulated some contingency plans to ensure that the Program and Committee Reports for the 81st NCWM would be completed and distributed and that the Annual Meeting could go on as scheduled in July.

OWM also reported on the success of the new NCWM Fax-On-Demand information system, which can send a variety of documents to an individual's fax machine almost immediately 24 hours a day 7 days a week free of charge. Over 40 documents are currently available through the system. Besides providing a service to NCWM members, the system saves OWM staff time.

At the Annual Meeting, Dr. Ugiansky provided a status report on the NIST Office of Weights and Measures since the Interim Meeting.

101-14 I Program, International Organization of Legal Metrology (OIML)

Dr. Sam Chappell, Chief of the NIST Standards Management Program, reported on U.S. participation in OIML standards development activities in legal metrology.

Darrell A. Guensler, Director, Division of Measurement Standards, CA Department of Food and Agriculture, who attended the Second Asia-Pacific Legal Metrology Forum (APLMF), the OIML Developmental Council Meeting and Symposium, and a meeting of the International Committee of Legal Metrology (CIML) in Beijing, People's Republic of China, with Dr. Chappell, presented a summary of his trip report to the Executive Committee.

Based on his participation in the APLMF, Mr. Guensler made the following recommendations to the NCWM:

1) *Continue active participation in the Forum. Its objectives are consistent with other APEC forums and should help promote the elimination of non-tariff trade barriers in the Asia-Pacific region.*

2) *Participate in the intercomparison on pattern approval testing of nonautomatic weighing instruments. This study will help to evaluate the possibility of expanding the U.S.-Canada Mutual Recognition Agreement on Pattern Approval to other regional countries.*

3) *Urge NIST to become a participant in the "Mutual Recognition Agreement" working party and volunteer to assist NIST in this endeavor. This working party will perform an important role in identifying appropriate legal metrology links between economies in many areas important to NCWM.*

Mr. Guensler made the following recommendations to the NCWM based on his participation in the OIML/CIML meetings:

1) *Continue active participation in OIML at this level. This will allow the NCWM to be more aware of and influential in the policy decisions and resolutions of OIML. Our interests in reciprocal pattern approval systems, production meets type issues, and the general globalization of legal metrology demand that we have a say in our own destiny.*

2) *Develop a relationship with other regional metrology groups such as the Western European Legal Metrology Cooperation (WELMEC). WELMEC is quite similar to NCWM in that it serves as a collaborating body between legal metrology authorities in Western Europe much the way NCWM serves the United States. WELMEC's principal aim of establishing harmony and a consistent approach to legal metrology in Europe is in concert with NCWM aims for the United States. There is an obvious advantage to comparable organizations such as NCWM and WELMEC working together to share knowledge and develop consistent resolution to similar problems. Additionally, such a relationship can further the development of harmonized requirements and mutual recognition agreements.*

3) *Consider establishing a program for developing countries that includes sponsoring first time attendance at NCWM conferences for a delegate from such a country. This recommendation is prompted by a suggestion from Mr. K. Ramful, Controller of Weights and Measures for Mauritius. Mauritius is a small island country in the Indian Ocean with a population of approximately 1.2 million. Mr. Ramful informed me that they use Handbook 44 as their guide for device regulation. Such a program could further the interests of the NCWM in providing needed information, harmonization, and training for constituents outside our borders but within our scope of influence.*

Because of the significant cost of participation in international activities, the Executive Committee feels it is important to have input on these recommendations from NCWM members and invites comments in favor of or against participation.

The Executive Committee received an updated report from Dr. Chappell at the Annual Meeting. (See Appendix C for a copy of his report.) Comments were received by the Committee concerning the level of NCWM/NTEP involvement in OIML. These comments will be addressed by the Committee with representatives of NIST.

101-15 I U.S. - Canada Mutual Recognition of Type Evaluation Program Report

René Magnan, Director, Policy, Planning, and Program Development, Legal Metrology Branch (LMB), Canada, and Tina Butcher, Manager, National Type Evaluation Program, NIST reported the following to the Board of Governors on the status and plans of the mutual recognition program.

Weighing Devices:
The Weighing Sector had identified several areas of priority for expansion of the program: (1) complex indicators; (2) larger capacity scales; (3) computing scales; and (4) mechanical scales. Laboratories began accepting capacities of scales up to 2000 lb following the request of the Weighing Sector. Canada has done a comparison of requirements for computing scales and complex indicators. Steve Cook, CA, prepared a comparison of requirements for mechanical scales. Preliminary reviews by representatives indicate that these areas can be included in the mutual recognition program with little training for the laboratories involved.

NTEP representatives met with representatives from Canada's LMB following the NCWM 1995 Annual Meeting to discuss plans for future work in mutual recognition activities. Canada reported that major revisions were proposed to their scale requirements, and, if accepted, they would become effective in April 1996. It was also noted that several of the NTEP laboratories had indicated a need for refresher training in the Canadian requirements due to turnover in staff and a lack of practice in applying the Canadian requirements. It was agreed that it would be best to schedule training for the U.S. NTEP laboratories after adoption of the requirements had taken place. A training session was tentatively scheduled for June 1996. A notice announcing the expansion of the program was to be distributed after the training session.

Measuring Devices:
Representatives from the measuring industry, LMB, and NTEP met in Ottawa, Ontario, in April 1995 to review Canadian and U.S. requirements for liquid-measuring devices. An initial comparison indicated some significant differences, but the group believed that some areas of mutual recognition might be established. Areas of significant difference include Canadian requirements for testing electronics over a range of ambient temperatures and meters over a range of product temperatures. While LMB has facilities to enable this type of testing, NTEP laboratory facilities do not currently accommodate this type of testing. It was suggested that private laboratories witnessed by NTEP representatives might be a possible alternative. Lack of resources on the part of NTEP may limit progress in this area; however, both NTEP and Canada are interested in pursuing the issue. Manufacturers who participated in the meetings will be asked to assist in identifying and establishing priorities for this work.

At the Annual Meeting, Tina Butcher (NIST/OWM) and Sonia Roussy (Canada/LMB) gave the Committee an update on the U.S./Canada Mutual Recognition Program. The highlights of their report are:

- As of September 1, 1996, the Mutual Recognition Program will be expanded to include complex indicators, computing scales less than or equal to 1000 kg, and mechanical scales less than or equal to 10 000 kg (certain dimensional restrictions may apply).

- Until the new Canadian specifications for scales are adopted, the old regulations and tolerances still apply.

- The inclusion of multiple dimension measuring devices in the Program will be delayed until evaluation procedures are reviewed and formalized.

Part II - NTEP Board of Governors

102-1A I OIML Certificate Project

This is carried over from the Committee's 1994 Report, Item 102-6, and the 1995 Report, Item 102-1.

In 1995, the United States informed the International Bureau of Legal Metrology, Paris, that the National Type Evaluation Program will act as the Issuing Authority for non-automatic weighing devices (OIML R76). The NIST Force Group also is preparing to offer OIML R60 tests for load cells. NTEP's efforts in this area have been in response to requests from industry for assistance in eliminating trade barriers for U.S. manufacturers exporting products.

There was general agreement by those at the fall NTETC Weighing Sector meeting that NTEP should immediately pursue the completion of steps required for NTEP to issue OIML Certificates for R60, Load Cells. It was reported that the NIST Force Group is developing software to automate the presentation of test data in the R60 Annex A format. An electronic certificate form will be developed by NIST OWM.

There also was support from Sector members for NTEP to actively pursue work in performing testing to OIML R76, Non-Automatic Weighing Devices. California and Ohio NTEP laboratories agreed to take steps to begin testing to R76 as soon as possible. The OIML tests will be conducted separately, rather than being combined with the NTEP tests; however, it will be possible to request both sets of tests under the same submission. Before testing can begin, private laboratories near the Ohio laboratory that can perform the required EMI testing need to be identified. The BOG also is interested in knowing what NTETC and industry representatives think about using EMI test data where the tests were conducted at a manufacturer's facility but witnessed by an NTEP representative. Once final arrangements are complete, an announcement will be distributed to provide details on submitting devices for R76 testing. NTEP will also take steps to explore the purchase of software for generating the test report forms for R76; however, it was agreed that testing should proceed using manual recording of test results in the interim period.

NTEP had hoped to be able to offer testing for R60 Certificates by the 1996 Interim Meeting; however, the Federal Government furloughs and other problems affecting NIST resulted in a postponement of work on the project.

At the Annual Meeting, comments were received by the Committee concerning the level of NCWM/NTEP involvement in OIML. These comments will be addressed by the Committee with representatives of NIST.

102-1B I Mutual Recognition

At the July 1995 Annual Meeting, the Executive Committee and NTEP Board of Governors reviewed draft language for an agreement between the NCWM and the Nederlands Meetinstituut (NMi) that would establish mutual recognition of tests performed as part of the process of issuing an OIML Certificate. Based upon comments from industry, the Executive Committee asked that the language be revised to indicate that NMi would recognize testing performed by NTEP laboratories for use in issuing a European Community (EC) Certificate.

The draft language was presented to NMi during a visit to NMi by NTEP representatives in September 1995. During the visit, NMi representatives advised that EC Certificates are not presently issued for components such as load cells; however, a report of test could be issued by an EC country for reference in an EC Certificate. NMi returned the draft to NTEP with some additional changes suggested by their legal staff. The draft was updated by Daryl Tonini, Scale Manufacturer's Association, to indicate the changes suggested by NMi.

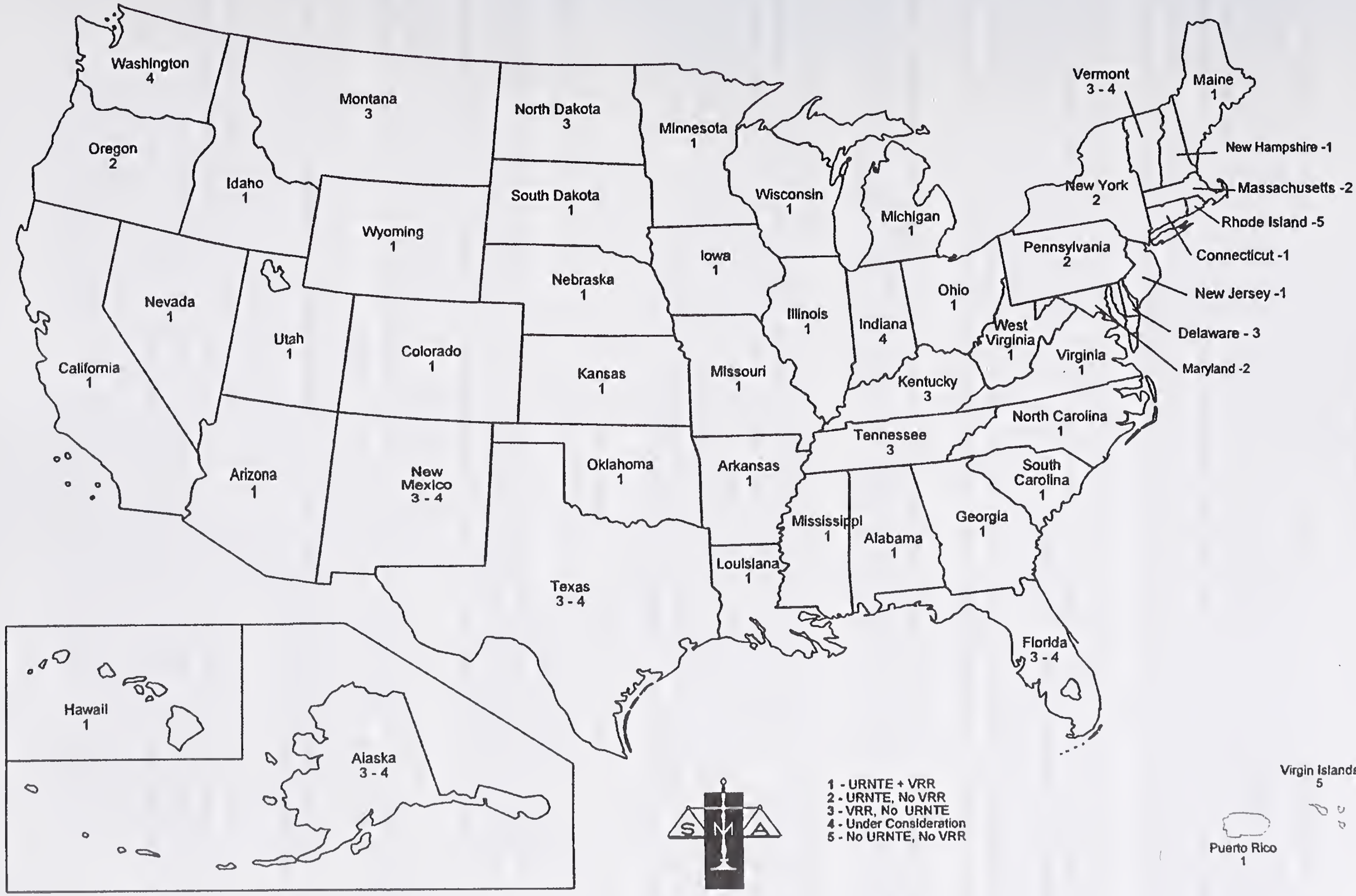
The revised draft language was presented to the Weighing Sector of the National Type Evaluation Technical Committee for review and comment at the Sector's Fall 1995 meeting. The Sector was unable to come to a consensus on whether or not to recommend that the NTEP Board of Governors support the agreement. Concerns were raised over the fact that EC Certificates were not available for load cells and that the agreement would not provide an equivalent benefit to U.S. manufacturers seeking to sell products in Europe. Some members of industry expressed reservations about entering into the agreement on the basis that it would put U.S. manufacturers at a disadvantage. Other manufacturers indicated an interest in pursuing the agreement since this would offer them an alternative site at which to obtain NTEP testing for load cells, possibly avoiding the current backlog through the NTEP laboratories.

Since a consensus could not be reached by industry representatives at the Weighing Sector's meeting, no recommendation was made by the Sector to the Board of Governors. Industry representatives at the Sector meeting agreed to further discuss the issue at the Fall 1995 meeting of the Scale Manufacturers Association and to provide feedback on any conclusions to the NTEP Board of Governors.

At the 1996 Interim Meeting, SMA indicated that it would support going forward with the agreement. (A copy of the draft agreement as adopted by SMA November 18, 1995, and later amended by the BOG in response to comments from John Elengo, a consultant, is shown in Appendix D.) It was noted that NTEP would like to go forward with an agreement that does not require official signatures; however, NMi wants to have signatures on the agreement. According to David Edgerly, Deputy Director, NIST Technology Services, NIST has said that it will no longer sign bilateral agreements, preferring instead to participate in regional international agreements; therefore, NIST might not support NTEP going forward with the agreement. He said that he would like to have the NIST's legal office review the agreement before any further action is taken. Consequently, the agreement was put on hold until the legal review could be completed.

102-2 I Adoption of Uniform Regulation for National Type Evaluation by the States

Daryl Tonini, Scale Manufacturers Association (SMA), updated the Board of Governors 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). See the map on the next page for the status of State adoption of the URNTE and VRR.



URNTE: Uniform Regulation for National Type Evaluation
VRR: Uniform Regulation for the Voluntary Registration of Service Persons and Service Agents

January, 1996

102-3 W NTEP Policy: Verification that Production Meets Type

(This item was withdrawn.)

This was carried over from the 1994 Report in which it was Item 102-2 and the 1995 Report in which it was item 102-6B.

The BOG is considering whether changes are needed to the NTEP process to better ensure that devices installed in the field that are covered by a Certificate of Conformance conform to the device type that was evaluated and approved by NTEP (i.e., production meets type). Concerns have been expressed because some States report that they have found installed devices that do not conform to their Certificates, and some manufacturers have reported noncompliance of competitors' devices. In addition, NTEP labs have found devices and main elements that differ from the original type.

As an augmentation of field verification, the Board discussed additional approaches to verifying that production meets type. One possibility is voluntary cooperation by manufacturers with in-plant inspection visits by NTEP. Although some manufacturers will cooperate with this approach, not all are in favor.

The question of paying for sampling and testing production devices is of concern to the Board. Estimated cost figures will have to be developed if voluntary sampling or mandatory testing are considered.

At the 80th NCWM in 1995, the Conference adopted a policy to provide due process when claims are made that production does not meet type. Questions remain on how the information contained in these claims will be evaluated and who will pay for the evaluation.

At the 1996 Interim Meeting, the BOG heard testimony from a representative of the Gas Pump Manufacturers Association that there should not be a blanket way of treating all companies; instead, NTEP should look at the controls a company has in place and its ability to produce a quality product before deciding what additional steps are needed. Another representative stated that NCWM has the right to evaluate the system; however, this is best accomplished by adequate field enforcement. It was suggested that a means to improve field enforcement might be to update the NCWM's Examination Procedure Outlines. One weights and measures official noted that some temperature-related problems are difficult to pick up in the field; consequently, supplemental forms of verification may be necessary.

A representative of the Scale Manufacturers Association said that NTEP's role should be to:

1) Give manufacturers a means to determine if a model device meets Handbook 44 requirements before they go from hard tooling to mass production;
2) Make it possible for manufacturers to get a device approved just once rather than making them go to individual weights and measures jurisdictions for approval; and
3) Unburden the weights and measures system from equipment that does not conform to Handbook 44.

He said that the United States depends on subsequent verification (field evaluation) more than other countries and suggested that NCWM look at the broader picture as depicted in SMA's "Recommendation for a Legal Metrology System Applicable to the U.S.A." for other approaches to the problem of device verification.

NCWM Chairman Gardner noted that the activities of the Program Evaluation Work Group might help with the collection of data needed for a better evaluation of devices.

Based on comments received, the Committee decided to withdraw this item. However, verifying that production meets type remains an important issue before the Conference. The Committee is not comfortable with either the language or the procedures as proposed in this item (e.g., in-plant inspections). The Committee hopes that the Program Evaluation Work Group and the Metrology Control Plan will provide some alternatives in this area.

102-4 V NTEP Policy: Examples of Appropriate Language to Use in Conjunction with the NTEP Name and Logo in Advertising and Brochures

(This item was adopted.)

This was carried over from the 1994 Report in which it was part of Item 102-1 and the 1995 Report in which it was item 102-7B. Last year the BOG published proposed examples of appropriate language to use in conjunction with the NTEP name or logo in advertising or brochures for weighing devices and components. The examples were initially developed by Mettler-Toledo. The Grain Moisture Meter Sector and the Gas Pump Manufacturers Association (GPMA) suggested that similar examples of appropriate wording were needed to accompany the logo in advertising for grain moisture meters and motor-fuel devices. The Board announced its intention to consider the concerns raised by GPMA and the NTETC Grain Moisture Meter Sector.

Sample wording for grain moisture meter advertising was endorsed by the Grain Moisture Meter Sector at its September 1995 meeting and was recommended to the BOG for consideration at the Interim Meeting. During the Interim Meeting, the BOG received recommended language for advertising retail motor-fuel devices from GPMA. The wording shown below is not mandatory; it is intended to provide manufacturers with examples of the type of language that they should use in any advertising or brochures that reference the NTEP name or include an illustration of the NTEP logo.

At the Annual Meeting, the Executive Committee received suggestions for additional sample language for mass flow meters and liquid-measuring devices from the Central Weights and Measures Association and for wholesale and larger volume flow measuring devices from the Meter Manufacturers Association. These were accepted by the Committee and are included in the recommendation below.

It also was reported at the meeting that NIST is actively pursuing registration of the NTEP logo.

Recommendation: The Board of Governors is recommending that the following examples be printed as an appendix to Part I in Publication 14:

Examples of Language to Use in Conjunction with the NTEP Name and Logo in Advertising and Brochures

<u>Truck Scale</u>

The [Model XXXX] Truck Scale meets or exceeds Class III L, 10 000 division accuracy requirements in accordance with the National Institute of Standards and Technology (NIST) Handbook 44. A Certificate of Conformance (CC), Number XX-XXX, was issued under the National Type Evaluation Program (NTEP) of the National Conference on Weights and Measures.

<u>Floor Scale</u>

The [Model XXXX] Floor Scale meets or exceeds Class III, 5000 division accuracy requirements in accordance with the National Institute of Standards and Technology (NIST) Handbook 44. A Certificate of Conformance (CC), Number XX-XXX, was issued under the National Type Evaluation Program (NTEP) of the National Conference on Weights and Measures.

<u>Indicating Element</u>

The [Model XXXX] Weight Indicator meets or exceeds Class II, 60 000 division and Class III/III L, 10 000 division accuracy requirements in accordance with the National Institute of Standards and Technology (NIST) Handbook 44. A Certificate of Conformance (CC), Number XX-XXX, was issued under the National Type Evaluation Program (NTEP) of the National Conference on Weights and Measures.

Load Cell

The [Model XXXX] Load Cell meets or exceeds Class III L, 10 000 division accuracy requirements in accordance with the National Institute of Standards and Technology (NIST) Handbook 44. A Certificate of Conformance (CC), Number XX-XXX, was issued under the National Type Evaluation Program (NTEP) of the National Conference on Weights and Measures. The CC specifies the maximum number of scale divisions (n_{max}), load cell verification interval (v_{min}), and capacities for the Model XXXX load cell family.

Grain Moisture Meter

The [Model XXXX] meets or exceeds the accuracy and performance requirements for Grain Moisture Meters as detailed in National Institute of Standards and Technology (NIST) Handbook 44. A Certificate of Conformance (CC), Number XX-XXX, was issued under the National Type Evaluation Program (NTEP) of the National Conference on Weights and Measures, approving this model for commercial use on the following grains: (append list of grains for which NTEP approval has been granted for this model).

Retail Motor-Fuel Devices

The [Model XXXX] meets or exceeds requirements in accordance with the National Institute of Standards and Technology (NIST) Handbook 44. A Certificate of Conformance (CC), Number XX-XXXXX, was issued under the National Type Evaluation Program (NTEP) of the National Conference on Weights and Measures.

Or

The [Model XXXX] meets or exceeds the accuracy and performance requirements for Retail Motor-Fuel Dispensers as detailed in the National Institute of Standards and Technology (NIST) Handbook 44.A Certificate of Conformance (CC), Number XX-XXX, was issued under the National Type Evaluation Program (NTEP) of the National Conference on Weights and Measures.

Mass Flow Meters
The [Model XXXX] meets or exceeds requirements in accordance with the National Institute of Standards and Technology (NIST) Handbook 44. A Certificate of Conformance (CC), Number XX-XXXX, was issued under the National Type Evaluation Program (NTEP) of the National Conference on Weights and Measures.

Liquid-Measuring Devices
The [Model XXXX] meets or exceeds requirements in accordance with the National Institute of Standards and Technology (NIST) Handbook 44 for XXXX product families. A Certificate of Conformance (CC), Number XX-XXXX, was issued under the National Type Evaluation Program (NTEP) of the National Conference on Weights and Measures.

Wholesale and Larger Volume Flow Measuring Devices
The [Model XXXX] meets or exceeds the accuracy and performance requirements of the Liquid-Measuring Devices Code and the Vehicle-Tank Meters Code as detailed in the National Institute of Standards and Technology (NIST) Handbook 44. A Certificate of Conformance (CC), Number XX-XXXX, was issued under the National Type Evaluation Program (NTEP) of the National Conference on Weights and Measures.

102-5 I NTEP Policy: Separate CCs for Software

This item was carried over from Item 102-9 of the Report of the 80th NCWM, 1995.

The Scale Manufacturers Association asked the NTEP Board of Governors to look at the issue of software as it applies to NTEP. Concern has been expressed over the NTEP policy of issuing separate CCs for software. Although the issue was initiated by SMA's request, it applies to all types of devices.

In its 1995 Report, the Board recommended that NTEP continue, for the present, to evaluate stand-alone software with the same procedures used to evaluate software that is part of a measuring or weighing system; however, it endorsed the establishment of a Software Work Group, composed of volunteers from weighing, measuring, and other sectors, as well as participants from the NTEP Participating Laboratories, the S&T Committee, and Canada, to study this issue.

In December 1994, the Work Group was formed. Michael Adams, Fairbanks Scales, was named Chairman. The Work Group had its initial meeting in April 1995 and a second meeting during the 1995 Annual Meeting. At the 1996 Interim Meeting, Mr. Adams reported on the progress and recommendations of the Work Group (see Appendix E). He said that Work Group members support NTEP continuing to issue separate CCs for software. They are in the process of reviewing current type evaluation checklists to determine if they adequately verify the suitability of software to the specifications and tolerances in NIST Handbook 44 and are making recommendations for changes where necessary. They believe that there is more that can be accomplished in such areas as revision of the checklists, development of a definition for "metrologically significant software," and education; therefore, they are recommending that the Work Group be continued through the next NCWM Interim Meeting.

The Executive Committee agreed to continue the Work Group through the 1997 Interim Meeting so that members could complete their evaluations of NTEP checklists and make recommendations to the appropriate NTETC Sectors.

The Software Work Group met at the 81st Annual Meeting, and the Executive Committee is awaiting its report.

102-6 V NTEP Policy: Appointments to NTETC Sectors

(This item was adopted.)

A number of questions have been raised recently concerning appointments to the National Type Evaluation Technical Committee (NTETC) Sectors, which are classified as special committees in the NCWM structure. According to the NCWM Bylaws, the Conference Chairman is responsible for appointing members of special committees, task forces, and study groups from the active, advisory, or associate membership; however, since these groups normally are expected to be of limited duration, no mention is made of term lengths, number of members, filling of vacancies, or other details. The NTETC Sectors do not have a limited life span and, as such, are more like standing committees than special committees. The long-term nature of Sector membership has led to questions such as: Should there be term limits for members? Should there be a limit to the number of Sector members? What happens if members never attend a meeting of the Sector--should they be removed? What happens if individuals do not maintain their NCWM membership? Is Sector membership conferred on individuals or companies? What happens if a member takes a job with another company?

At the Interim Meeting, members of the BOG addressed the questions that had been raised. They agreed that membership is conferred on individuals, not companies; therefore, the resignation of an individual from a Sector does not automatically entitle the individual's company to continued Sector membership. The company may, however, nominate another individual for consideration by the NCWM Chairman, who makes all appointments to the Sectors. Although membership is conferred on individuals, the BOG reaffirmed that each individual does not necessarily have a separate vote. Only one vote per company or agency is permitted.

Due to the absence of a formal policy on the appointment of Sector chairmen, it is usually left up to each Sector to choose its own chairman. The BOG would like the Sectors to add an item to their next meeting agenda on the appointment of chairmen. The Sectors should discuss whether or not they have had problems as a result of the lack of formal procedures for appointment of the chairman and whether there should be specified terms for chairmen. If the Sectors have had problems, they should make recommendations to the BOG on procedures that should be used to appoint chairmen or on term limits. The Measuring Sector addressed this issue at its October 1995 meeting; the Sector's recommendations are contained in its report in Appendix H.

The BOG felt that there should not be limited terms for Sector members; however, it is considering establishing criteria for the removal of Sector members who never attend Sector meetings or contribute to the activities of the Sector. If nonparticipants are removed from the list of Sector members, a separate mailing list could be established of individuals who are interested in the outcome of Sector activities but do not want to participate in these activities. Comments from the Sectors on the need for such criteria would be appreciated.

The NCWM Bylaws (Article V, Section 5, Duties and Fields of Operation of Committees), state that the Executive Committee... "3. utilizes the industry members of the Technical Committee on National Type Evaluation, who will comprise the NTEP Advisory Committee and who will represent the interest of industry, in advising the Board of Governors."

The Sectors have been operating in such a manner that the entire Sector membership, including both public and private sector representatives, provides advice to the Board of Governors; consequently, the Board decided at the Interim Meeting that a separate industry advisory committee is not required. It is, therefore, recommending that references to the Advisory Committee be dropped from Publication 14. If these recommendations are accepted by the NCWM membership at the Annual Meeting in July, the BOG plans to propose a change to the NCWM Bylaws next year to delete references to the Advisory Committee.

The BOG recommends the following changes to NCWM Publication 14 to clarify some voting and membership issues with regard to the NTETC Sectors and to delete references to the NTEP Advisory Committee.

Recommendation: Revise Section 2 of the NCWM Publication 14 Administrative Procedures as follows (proposed revisions are shown by ~~crossing-out~~ what is to be deleted and <u>underlining</u> what is to be added):

2. National Type Evaluation Technical Committee

The National Type Evaluation Technical Committee (NTETC) is responsible for the development of test criteria and procedures for use in the evaluation process by the Participating Laboratories. The membership and voting status of the NTETC ~~is~~ are as follows:

a. Associate Members. The NCWM Chairman will appoint new Associate members on the advice of the sector chairman and technical advisor. There is no fixed term for this representation; the Associate member will serve until removed by the NCWM Chairman, by the sponsoring company, or when the member resigns. If one company owns another, or if two companies are owned by the same parent company, only one vote per parent company will be permitted. The company(ies) involved will decide who will vote. ~~The Associate members also serve as the NTEP Advisory Committee (see below).~~

b. Active Members.

(1) <u>State</u> Participating Laboratory Representation. The NCWM Chairman will appoint a voting representative from every NTEP Participating Laboratory conducting complete <u>design</u> evaluations <u>and field tests</u> in the particular device sector. (Those <u>authorized to</u> performing ~~only~~ field tests ~~will not necessarily~~ <u>may</u> be appointed.) There will be no fixed term for this representation.

~~(2) S&T COMMITTEE REPRESENTATION. If funds are available, the NCWM Chairman will appoint a representative from the S&T Committee, based on the recommendation of the S&T Committee. The term of this member will be concurrent with his/her membership on the S&T Committee.~~

(~~3~~<u>2</u>) Other Active Member Representation. Additional Active members may be appointed (with voting status) by the NCWM Chairman with the advice of the technical committee sector chairman and technical advisor. If financially feasible, the NCWM will underwrite their participation to provide additional weights and measures perspective.

<u>(3) Voting Rights. Active members shall have one vote per jurisdiction.</u>

c. ~~Advisory Members~~ <u>Federal Agencies and Federal Participating Laboratories</u>. The NCWM Chairman will appoint ~~appropriate representation from Federal agencies~~ <u>Federal Advisory members</u> with the advice of the chairman of the sector and its technical advisor. The Executive Secretary will appoint the technical advisor. Advisory members <u>shall</u> have ~~voting rights within the sector~~ <u>one vote per agency</u>.

Although the Chairperson will appoint members, an appointed representative may designate an alternate with full voting rights <u>for an individual meeting</u> whenever necessary.

~~3. NTEP Advisory Committee~~

~~The NTEP Advisory Committee is composed of those members of the National Type Evaluation Technical Committee who are the Associate Members of the NCWM appointed by the NCWM Chairman to advise the Board of Governors and represent the interests of industry. (See Bylaws, Article V, Section 5.)~~

The Organization Chart for the Administration of the National Type Evaluation Program is shown in Figure 1.

102-7 W NTEP Policy: Remanufactured and Repaired Devices

(This item was withdrawn.)

In July 1995, the NCWM amended the NTEP policy with respect to remanufactured and repaired devices. Gordon Johnson of Gilbarco, Inc., recommended that the newly adopted policy be amended as follows (underlined wording):

a. *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.*

b. *If companies or individuals repair or remanufacture a device, they are obligated to repair or remanufacture it consistent with the manufacturer's original design, <u>as determined by the original equipment manufacturer</u>; otherwise, that specific device is no longer traceable to the NTEP CC.*

The justification for the change was that it is not clear who determines whether the change is consistent with the original design. The Western, Southern, and Northeastern Weights and Measures Associations endorsed the proposed change. The Gasoline Pump Manufacturing Association refrained from taking a position on the item.

At the Interim Meeting, the BOG decided to withdraw this item from its agenda. The Board felt that it had not received sufficient proof that a problem exists with the current wording and could not support the proposed wording. In addition, it was clear to the BOG that many "original equipment manufacturers" were not prepared to accept the added burden suggested by the proposed language.

The BOG heard substantial testimony that the proposed language could be detrimental to independent companies that remanufacture and repair devices and could result in a restraint of trade. The testimony also indicated that there may be some misunderstanding of the NTEP requirements. The BOG agrees that weights and measures officials must be careful not to dictate who may remanufacture or repair a device. Nonetheless, the existing language clearly states that repairs and overhauls of devices must not change the metrological characteristics of the device. Mixing and matching main components may very well change the metrological characteristics. When this happens, an NTEP evaluation is required by many States.

It was noted that this issue may appear on the agenda of the S&T Committee in the future, perhaps in the form of a specification requiring manufacturers to apply a remanufactured label on remanufactured devices.

102-8 I NTEP Participating Laboratories and Evaluations Report

A report on the NTEP Participating Laboratories was given at the Interim Meeting. (See the summary of the activities of the Laboratories over the last 4 years in Appendix F.) It was reported that OWM staff have been analyzing the certification process to find areas where improvements are needed to make the process more efficient. They have quantified the time it takes to complete different stages of the certification process and are now planning to further refine their data by looking at the time it takes to process different types of devices.

The Board reviewed the status of payment of NTEP maintenance fees in 1995 and noted that, compared to 1994, there was some improvement in the number of fees paid on time. However, a number of companies still did not meet the initial deadline set by OWM; therefore, the Board will continue to monitor payments and, if necessary, may consider establishing penalties for late payments. Delays in fee payments cause a number of problems including delays in the publication of NCWM Publication 5, NTEP Index of Device Evaluations.

102-9 I NTETC Weighing, Measuring, and Belt-Conveyor Scale Sector Reports

The Board received reports from the Weighing Sector and the Measuring Sector at the Interim Meeting. A summary of the decisions made at the Weighing Sector meeting on October 31 to November 1, 1995, in Baltimore, MD, is provided in Appendix G. The Measuring Sector met on October 14, 1995. Funding problems at NIST at that time made it impossible for OWM staff to attend the meeting. Ron Murdock, NC, agreed to serve as Technical Advisor for the meeting and Rich Tucker, Tokheim Corporation, chaired the meeting because the Sector Chairman was unable to attend. A summary of the decisions reached at the Measuring Sector's meeting was prepared by Frances Holland, Schlumberger, and Steven Cook, CA. (See Appendix H.) There was no report from the Belt-Conveyor Sector because it had not met in the past year.

102-10 I NTETC Grain Moisture Meter and Near Infrared Protein Analyzer Sector Reports

A report of the progress of these sectors was given at the Interim and Annual Meetings. See Appendices I and J for summaries of the September 13-14, 1995, and March 26-27, 1996, meetings of the sectors. At the September meeting, the Grain Moisture Meter Sector developed an example of appropriate language to use in conjunction with the NTEP name and logo in advertising and brochures on grain moisture meters. This language has been incorporated into Item 102-4 of this report.

C. Gardner, Suffolk County, NY, Chairman

J. Truex, Ohio, Chairman of the NTEP Board of Governors
B. Bloch, California, Chairman-Elect
J. A. Rogers, Virginia, Treasurer
B. Adams, Minnesota
C. Carroll, Massachusetts
C. Fulmer, South Carolina
M. Gray, Florida
R. Suiter, Nebraska
A. Thompson, Alaska

G. Ugiansky, NIST, Executive Secretary

Technical Advisors:
S. Roussy, Canada Legal Metrology Branch
J. Koenig, NIST

Associate Member Representative:
R. Davis, James River Corporation

Executive Committee

Appendix A - NCWM and NTEP Budgets for Fiscal Years 1996 and 1997

NCWM Budget for FY 1996

Category Number	Account Description	FY 96 Budget
	INCOME	
410	General Revenues	
411	Registration Fees	$ 72,000
411.1	Annual Meeting	
411.2	Interim Meeting	
412	Membership Fees	128,000
413	Interest	1,000
480	Other Income	
480	Service Revenues	
481	Special Events	2,000
482	Publications	1,500
484	NTP Seminars	3,000
485	Promotional	
	TOTAL INCOME	**$207,500**
	EXPENSES	
510	General Expenses	
511	Annual Meeting	$ 50,000
512	Interim Meeting	33,000
513	Committee Meetings	40,000
513.1	Executive Committee	15,000
513.2	L & R Committee	6,000
513.3	S & T Committee	5,000
513.4	A & P Committee	11,500
513.7	Annual Committees	2,500
514	Task Forces & Special Committees	18,000
515	Chairman/Chairman Elect	20,000

Category Number	Account Description	FY 96 Budget
516	Administration	25,000
517	Printing and Publications	9,000
518	Train the Trainers	
580	Service Revenues	
581	Special Events	2,000
582	Publications	1,500
584	NTP Seminars	3,000
585	Promotional	500
	TOTAL EXPENSES	**$202,000**

NTEP Budget for FY 1996

Category Number	Account Description	FY 96 Budget
600	GENERAL REVENUE	
600.1	Maintenance Fees	$105,000
650	DEDICATED INCOME	
651	Grant-Grain Equipment Cooperative Agreement	5,000
660	SALES	
661	Publications	
661.1	Publication 14	10,000
661.2	Publication 5	10,000
665	NTEP LOGO	
665.1	Seals	1,000
670	INTEREST INCOME	
680	MISCELLANEOUS INCOME	
700	EXPENSES	
701	Administration	10,000
702	Personal Services	
705	Supplies	
710	Board of Governors	10,000
710.1	Chairman Expenses	
710.2	Interim Meeting	
710.3	Annual Meeting	
710.4	Appeal Hearing	

Category Number	Account Description	FY 96 Budget
710.5	Technical Committee Meeting	
715	PARTICIPATING LABORATORIES	6,000
715.1	NTEP Laboratory Training	
720	INTERNATIONAL MEETINGS	
721	OIML	12,500
722	USA/Canada Work Group	10,000
725	SPECIAL COMMITTEES	
725.1	Software Group	1,500
730	TECHNICAL COMMITTEE - WEIGHING SECTOR	
730.1	Technical Committee Meeting	5,000
730.2	Automatic Weighing Systems	3,500
730.3	Multiple Dimensional Devices	3,500
731	TECHNICAL COMMITTEE - BELT CONVEYOR	
731.1	Technical Committee Meeting	2,500
735	TECHNICAL COMMITTEE - MEASURING SECTOR	5,000
735.1	Technical Committee Meeting	5,000
750	EXPENDITURE OF DEDICATED FUNDING	
750.1	Grain Equipment Cooperative Agreement Committee	5,000
760	SALES	
761	Publications	

Category Number	Account Description	FY 96 Budget
761.1	Publication 14	5,000
761.2	Publication 5	3,000
765	NTEP LOGO	
765.1	Seals	1,000
770	INTEREST EXPENSE	
780	MISCELLANEOUS EXPENSE	1,000
INCOME		**$131,000**
EXPENSE		**$84,500**

Proposed 1997 NCWM Budget Compared with Budgets for Fiscal Years 1994-1996

Category Number	Account Description	FY 94 Budget	FY 94 Actual	FY 95 Budget	FY 95 Actual	FY 96 Budget	Proposed for FY 97
	INCOME						
410	**General Fund Revenues**						
411	**Registration Fees**	$66,000.00	71,915.00	69,000.00	70,900.00	72,000.00	**71,000.00**
411.1	Annual Meeting		50,315.00		45,525.00	50,000.00	48,000.00
411.2	Interim Meeting		21,600.00		25,375.00	22,000.00	23,000.00
412	**Membership Fees**	122,500.00	128,890.00	129,500.00	121,740.00	128,000.00	**122,000.00**
412.1	Government Membership		59,555.00		51,135.00	53,000.00	51,000.00
412.2	Associate Membership		69,335.00		70,605.00	75,000.00	71,000.00
413	**Interest**	1,000.00	2,605.92	1,000.00	2,763.95	1,000.00	**2,500.00**
414	**Transfer**				(15.00)		
416	**Other Income**	-0-	188.45	-0-	1,710.05	-0-	**1,000.00**
480	**Service Revenues**						
481	**Special Events**	2,000.00	2,485.00	2,000.00	104.00	2,000.00	-0-
481.1	Annual Meeting Optional Events				20.00		
481.2	Interim Meeting				84.00		

Category Number	Account Description	FY 94 Budget	FY 94 Actual	FY 95 Budget	FY 95 Actual	FY 96 Budget	Proposed for FY 97
481.3	Receptions; Meeting Rooms						
481.4	Joint Outing		2,485.00				
482	**Publications**	20,000.00	5,030.93	3,500.00	2,704.75	1,500.00	**2,500.00**
482.1	NTP Training Modules - Sales		956.00		395.00		
482.2	NCWM Publications - Sales		942.80		418.00		
482.3	Videos - Sales		2,451.63		142.50		
482.4	H-133 Third Edition - Sales		916.80		1,749.25		
483	**NTEP Operations** This category is now a separate bank account (Signet)				9,328.27[1]		-0-
484	**NTP Seminars**	6,000.00	3,800.00	-0-	25,260.00	3,000.00	-0-
484.1	Metrology Seminars		3,600.00		25,260.00		
	Seminars		200.00				
485	**Promotions**	2,000.00	-0-	-0-	497.70	-0-	500.00
	TOTAL INCOME	219,500.00	219,796.92	205,000.00	234,994.72[2]	207,500.00	199,500.00

Category Number	Account Description	FY 94 Budget	FY 94 Actual	FY 95 Budget	FY 95 Actual	FY 96 Budget	Proposed for FY 97
	EXPENSES						
510	**General Expenses**						
511	**Annual Meeting**						
511.1	Annual Meeting/Hotel/Food		23,794.81		18,668.73		32,000.00
511.2	AV; Equipment; Supplies		1,188.03		373.86		1,000.00
511.3	Personnel/Photo		2,140.35		620.35		2,000.00
511.4	Print/Copy		2,333.94		1,918.35		2,000.00
511.5	Awards		2,382.40		2,758.66		3,000.00
511.6	Treasurer/Committee Expenses		1,111.50				1,000.00
511.7	Printing Announcement Book		384.40		13,325.00		7,500.00
	Conference Outing						7,500.00
511.9	Miscellaneous		6,644.26		797.27		1,500.00
511	**TOTAL**	44,000.00	39,979.69	47,200.00	38,462.12	50,000.00	**57,500.00**
512	**Interim Meeting**						
512.1	Hotel/Food Services		12,193.08		18,607.04		16,000.00
512.2	Equip/Personnel/Printing				1,540.21		2,000.00
512.3	Executive Committee		3,094.30		6,214.15		5,000.00
512.4	L & R Committee		1,274.21		1,681.50		2,500.00
512.5	S & T Committee		2,062.30		2,226.35		2,500.00
512.6	A & P Committee		1,870.65		2,308.95		2,500.00

Category Number	Account Description	FY 94 Budget	FY 94 Actual	FY 95 Budget	FY 95 Actual	FY 96 Budget	Proposed for FY 97
512.7	(Liaison Committee)						
512.8	Other Committees & Task Forces		1,758.59		1,322.51		1,500.00
512.9	Printing Agenda		2,778.90		6,638.00		6,000.00
512	**TOTAL**	35,000.00	25,032.03	31,000.00	40,538.71	38,500.00	**38,000.00**
513	**Committee Meetings**						
513.1	Executive Committee		1,232.80		6,933.17	15,000.00	10,000.00
513.2	L & R Committee		(558.89)		1,162.31	6,000.00	4,000.00
513.3	S & T Committee		11,395.48		-0-	5,000.00	6,000.00
513.4	A & P Committee		10,524.61		4,312.31	11,500.00	4,000.00
513.7	Annual Committees		2,271.78		1,652.45	2,500.00	2,500.00
	Other				3,915.13		
513	**TOTAL**	24,000.00	24,865.78	33,500.00	17,975.37	40,000.00	**26,500.00**
514	**Task Forces & Special Committees**						
514.2	Checkweigher Group					-0-	
514.3	Program Evaluation					6,000.00	6,000.00
514.4	FPLA - Metric Work Group					-0-	
514.5	Handbook 133 Work Group					6,000.00	4,000.00
514.6	Petroleum Sub-Committee		880.76		1,495.90	6,000.00	4,000.00
514.9	Miscellaneous				4,992.00		
514	**TOTAL**	17,700.00	5,492.60	22,000.00	6,487.90	18,000.00	14,000.00

Category Number	Account Description	FY 94 Budget	FY 94 Actual	FY 95 Budget	FY 95 Actual	FY 96 Budget	Proposed for FY 97
515	**Chairman/Chairman-Elect**						
515.1	Chairman		11,728.50				10,000.00
515.2	Chairman-Elect		6,703.58				10,000.00
515	**TOTAL**	22,000.00	18,432.08	20,500.00	16,696.50	20,000.00	**20,000.00**
516	**Administration**						
516.1	Equipment/Supplies/Stationery		648.08		1,110.40		2,000.00
516.2	Contracts/Personnel		16,446.50		19,292.92		20,000.00
516.3	Mail/P.O. Box		155.00		172.00		200.00
516.4	Treasurer Bond				698.00		300.00
516.5	Bank Charges		63.63		150.61		100.00
516.6	NTP		2,287.21		1,921.00		2,000.00
516.9	Miscellaneous		50.00		160.00		400.00
516	**TOTAL**	36.500.00	19,686.42	23,500.00	23,504.93	25,000.00	**25,000.00**
517	**Printing/Publications**						
517.1	Membership		1,732.00		10,618.14		2,000.00
517.2	NCWM Pubs-Members		5,739.40		12,817.00		10,000.00
517.3	Consumer Pamphlet						
517.4	Videos - HB's						
517.9	Miscellaneous		16.00		1,362.00		

Category Number	Account Description	FY 94 Budget	FY 94 Actual	FY 95 Budget	FY 95 Actual	FY 96 Budget	Proposed for FY 97
517	**TOTAL**	8,500.00	7,847.40	19,500.00	24,797.14	9,000.00	**12,000.00**
518	**Train the Trainers**		-0-	-0-		-0-	**3,500.00**
581	**Special Events**	2,000.00	-0-	2,000.00	-0-	2,000.00	-0-
582	**Publications**						
582.1	Modules		1,567.55				
582.2A	NCWM Publication 5						
582.2B	NCWM Pubs (other)						
582.3	Videos		1,506.75				
582.4	HB - 133 Third Edition						
582	**TOTAL**	13,500.00	3,074.30	3,500.00	-0-	1,500.00	**2,500.00**
583	**NTEP**						
	These categories are now moved to the separate NTEP account						
584	**NTP Seminars**	6,000.00	3,371.30	-0-	9,686.20	3,000.00	
585	**Promotional Items**	1,000.00	-0-	-0-	9,786.35	500.00	500.00

Category Number	Account Description	FY 94 Budget	FY 94 Actual	FY 95 Budget	FY 95 Actual	FY 96 Budget	Proposed for FY 97
586	Grain Equipment Coop Agreement	15,000.00	9,780.04	-0-	5,441.12[1]		
587	Software Work Group				-0-		
	TOTAL EXPENSES		147,421.60	202,700.00	193,376.34[3]	207,500.00	199,500.00

1. Activity transferred to NTEP.
2. Includes $1.00 account origination fee.
3. Expenses of $193,376.34 offset by $1,847.99 reimbursement for special events.

Proposed 1997 NTEP Budget Compared with Budget for Fiscal Year 1996

Category Number	Description	1996 Budget	Proposed 1997 Budget
600	**GENERAL REVENUE**	$105,000.00	**120,000.00**
600.1	Maintenance Fees	105,000.00	120,000.00
680	**DEDICATED INCOME**	5,000.00	**-0-**
651	Grant-Grain Equipment Coop. Agreement	5,000.00	-0-
660	**SALES**	20,000.00	**10,000.00**
661	Publications		
661.1	Publication 14	10,000.00	5,000
661.2	Publication 5	10,000.00	5,000
680	**NTEP LOGO**	1,000.00	**1,000.00**
665.1	Seals	1,000.00	1,000.00
670	**INTEREST INCOME**		**4,000.00**
680	**TOTAL INCOME**		**135,000.00**
700	**EXPENSES**	10,000.00	**25,000.00**
701	Administration	10,000.00	5,000.00
702	Personal Services		15,000.00
705	Supplies		5,000.00
710	**BOARD OF GOVERNORS**	10,000.00	**28,000.00**
710.1	Chairman Expenses		3,000.00
710.2	Interim Meeting		5,000.00
710.3	Annual Meeting		-0-

Category Number	Description	1996 Budget	Proposed 1997 Budget
710.4	Appeal Hearing		10,000.00
710.5	Technical Committee Meeting		10,000.00
715	**PARTICIPATING LABORATORIES**	6,000.00	**8,000.00**
715.1	NTEP Laboratory Training		
720	**INTERNATIONAL MEETINGS**	22,500.00	**10,000.00**
721	OIML	12,500.00	10,000.00
722	USA/Canada Work Group	10,000.00	10,000.00
725	**SPECIAL COMMITTEES**	1,500.00	**8,500.00**
725.1	Software Group	1,500.00	3,500.00
725.3	Budget Review		5,000.00
730	**TECHNICAL COMMITTEE - WEIGHING SECTOR**	12,000.00	**19,500.00**
730.1	Technical Committee Meeting	5,000.00	16,000.00
730.2	Automatic Weighing Systems	3,500.00	-0-
730.3	Multiple Dimension Devices	3,500.00	3,500.00
731	**TECHNICAL COMMITTEE - BELT CONVEYOR**	2,500.00	**2,500.00**
731.1	Technical Committee Meeting	2,500.00	2,500.00
735	**TECHNICAL COMMITTEE - MEASURING SECTOR**	5,000.00	**7,500.00**
735.1	Technical Committee Meeting	5,000.00	7,500.00
750	**EXPENDITURE OF DEDICATED FUNDING**	5,000.00	**15,000.00**
750.1	Grain Equip. Coop. Agreement Committee	5,000.00	15,000.00

Category Number	Description	1996 Budget	Proposed 1997 Budget
760	**SALES**	8,000.00	**16,000.00**
761	Publications		
761.1	Publication 14	8,000.00	10,000.00
761.2	Publication 5	3,000.00	6,000.00
765	**NTEP LOGO**	1,000.00	**1,000.00**
765.1	Seals	1,000.00	**1,000.00**
770	**INTEREST EXPENSE**		
780	**MISCELLANEOUS EXPENSE**	1,000.00	**1,000.00**
	INCOME	$131,000.00	**135,000.00**
	EXPENSE	$84,500.00	**152,000.00**

Appendix B - Composition of NCWM Mailing List (as of 6/30/96)

Category	NCWM Members				Nonmembers			Total NCWM Members and Nonmembers			% of total who are members		
	End of 1993-94	End of 1994-95	End of 1995-96	End of 1995-96 % change	94	95	96	94	95	95	94	95	96
State	818	831	855		665	664	662	1483	1495	1517[6]	55.1%	56%	56%
County	377	443	401		521	544	544	898	947	945	41.9%	46[3]%	42%
City	219	214	188		341	341	342	898	555	530	39.1%	38[3]%	35%
Subtotal	1414	1488	1444	-3%	1527	1509	1548	2941	2997	2992[3]			
US Industry	1702	1893	1851		19732	19498	19398	21434	21391	21249	7.9%	9%[4]	8.7%
Industry (foreign)	34	36	45		326	341	337	360	377	382	9.4%	9.5%	11.7%
Subtotal	1736	1929	1896	-1.7%	20058	19839	19735	21794	21768	21631			
US govt	60	60	53		258	239	241	316	299	294	18.3%	20%	18%
Foreign govt	36	60	38		151	172	197	187	213	235	19.2%	19%	16%
State & local govt (not W&M)	39	52	52[5]	-6.5%	942	945	933	981	997	985	3.9%	5%	5%
Subtotal	133	153	143		1351	1356	1371	1484	1509	1514			
Guests					347	381	453	347	381	453			
Total	3283	3570	3483[1]	-2.5%	23283	23085	22654	26566	26655[2]	26590	12.3%	13.4%	13%

[1] As of membership closeout, 623 or 18% are brand new, never having joined the NCWM previously. In March of 1990, retirees were made complimentary members of the NCWM. In 1991, retirees numbered 313; in 1996, they oumber 235 and are not included in the totals here.

[2] The large increase in the mailing list is due to the fact that we are keying in repair firms lists kept by States; this will continue (petroleum device repair firms continue to be entered in the database). Over 16,500 constituents have been added to the potential Associate Member category since January 1, 1991. We continue to recruit these individuals as members through ongoing marketing of NCWM, its resources, services, and publications. As of membership year closeout, 18.9% of the membership are shown to be new to NCWM, never having previously joined.

[3] The proportion of weights and measures officials who are members has been increasing since the total number of officials has dropped (attrition, unfilled or abolished positions, for example, have impacted the total number of weights & measures officials).

[4] As the number of potential associate members in the mailing list has grown, the proportion who are associate members has decreased.

[5] A membership category was established to include State and local government employees other than weights and measures (e.g., consumer advocacy, law enforcement personnel, attorneys general, etc.).

[6] Of the 1517 State employees, 237 (15.6%) are State Petroleum Program Personnel.

Appendix C

Report on OIML
By
Samuel E. Chappell, Chief
Standards Management Program, NIST

International Committee of Legal Metrology (CIML)

The CIML establishes the policy and approves the technical plans and work of the various OIML Technical Committees. Its 30th meeting and a meeting of the Asia Pacific Legal Metrology Forum (APLMF) was held in Beijing, People's Republic of China from October 22 through 28, 1995. Representatives of 42 of the 54 OIML member nations attended. I represented United States as member of CIML and was accompanied by Darrell Guensler, Director of Measurement Standards in the State of California, who also represented the U.S. National Conference on Weights and Measures. The following significant reports and decisions were made at the meeting:

Reports presented:

- Report on the status of the work of the OIML technical committees and subcommittees was presented by myself.

- Report on the status of the program of the OIML Certificate System presented by M. Kochsiek, CIML Member, Germany. As of September 1995, more than 71 OIML Certificates have been issued for R76 "Nonautomatic Weighing Instruments" and 40 for R60 "Load Cells." Many more applications have been received and are in the process of evaluation.

- A. Vichenkov of the International Bureau of Legal Metrology (BIML) presented a report on the results of three separate questionnaires sent to CIML members, issuing Authorities, and manufacturers concerning participation in, implementation of, and future acceptance of the Certificate System.

- A panel discussion was held on "Confidence in Pattern, or Type, Approval." During the discussion, I along with Guensler and A. Johnston of Canada presented the U.S.A.-Canadian experience in cooperation in this area. The result of this discussion is expected to provide guidance in the development of bi- and multi-lateral mutual recognition agreements.

- G. Faber, President and CIML Member, the Netherlands, established an ad hoc task group to meet with a comparable group of the International Committee of Weights and Measures (CIPM) to discuss a French government proposal regarding the merger of the Treaties for OIML and the Mètre Convention. The task group would consist of the President (CIML Member, the Netherlands), the two Vice Presidents (CIML Members, U.S.A. and Germany), and the CIML Member, Australia.

- Report on the activities of and the proposed budget (1997-2000) for BIML was presented by B. Athané, Director.

- It was reported that Kazakhstan became a member and Mozambique, Thailand, and Uruguay had become corresponding members of OIML in 1995.

Decisions:

- Recommendations (4 total) were approved. Three of these are of interest to the NCWM:
  - "Automatic Catchweighing Instruments" (revision of OIML R51) developed by the United Kingdom.
  - "Automatic Gravimetric Filling Instruments" (revision of OIML R61) developed by the United Kingdom
  - "Automatic Rail-Weighbridges" Annexes on the test procedures and the test report format for OIML R106 developed by the United Kingdom

Future Meetings:

- The next meeting of CIML will be held in November 1996 in Vancouver, British Colombia, Canada, in conjunction with the 10th International Conference of Legal Metrology.

- Brazil offered to host the CIML meeting in Rio de Janeiro in the fall of 1997, and the Republic of Korea offered to host the CIML meeting in Seoul in the fall of 1998.

OIML Development Council:

- The Council sponsored a Seminar on "Metrological Activities in Developing Countries" that included twenty-one papers presented on the topic. I presented a paper, co-authored with B.S. Carpenter, Director of International and Academic Affairs at NIST, on "U.S.A. Participation in the Inter-American Metrology System."

- At a meeting of the Council, a report was provided on the results of the Seminar and other activities by member nations in support of development including some seminars cosponsored with OIML.

- Mr. G.M. Putera, CIML member for Indonesia, was elected President of the Council replacing Mr. M. Benkirane of Morocco who had been President since 1988.

Asia Pacific Legal Metrology Forum (APLMF):

- This was a one-day meeting attended by representatives of twelve APLMF member nations, six observer nations, and three observing international or regional organizations.

- The Secretariat, Australia, presented the results of surveys of member nations on "Legislation," "Prepackaged Products," and "Training" with the aim of identifying needs for development and harmonization. The United states contributed to all three surveys.

- Decisions at the APLMF meeting included the approval of initiating among some member nations intercomparisons of "weights" and of the "pattern evaluation of non-automatic weighing instruments" (according to OIML R76), with consideration being given to intercomparisons of "pattern evaluation of load cells" in the future.

- A report was presented on activities of other related Asia Pacific specialized bodies, namely for metrology and accreditation, with which potential cooperation of mutual benefit may be established.

- The next meeting of APLMF is scheduled to be held in conjunction with OIML meetings in Canada in November 1996.

CIML Presidential Council

The CIML Presidential Council met from February 20 - 21, 1996, in Paris, France. The principal items on the agenda were as follows:

- A review of the current work of the OIML technical committees.

- The status of the OIML Certificate System.

- Preparations for the 31th CIML meeting and the 10th Conference of Legal Metrology to be held in Canada in November 1996.

- Status and preparation for discussion of the French government proposal to merge the treaties for OIML and the Convention of the Mètre. A meeting was held of the joint task group (representing CIML and CIPM) on February 22.

OIML Technical Advisory Group on Certificates (TAG_{cert}):

TAG_{cert} was established by CIML in 1994 to monitor and develop the OIML Certificate System. Members include: Australia, People's Republic of China, Denmark, France, Germany, Japan, Republic of Korea, Hungary, Norway, Poland, Russia, Slovakia, Slovenia, United States, United Kingdom, and Yugoslavia. A meeting was held in Paris, France on February 19 - 20, 1996. I participated in the meeting on behalf of the United States and was selected to chair the meeting. The agenda included:

- a family of patterns
- modules of instruments
- accreditation of testing laboratories
- ISO 9000 (Quality Systems) registration
- mutual recognition agreements
- revision of "OIML Certificate System" document.

The BIML is revising the document on the "OIML Certificate System" in response to comments presented at the meeting and by correspondence.

Activities of OIML Secretariats

This part of the report provides: (1) an identification of work, either Recommendations (Rs) or Documents (Ds), being developed in Technical Committees (TCs) and Technical Subcommittees (SCs) of specific interest to the NCWM and (2) a schedule of activities of secretariats, the U.S. National Working Groups (NWGs), and the International Working Groups (IWGs) of committees and subcommittees that have recently taken place or are planned for the near future. More details of these activities have been reported to the Specifications and Tolerances Committee of the NCWM.

- TC1 Terminology (Poland)

  A revision of the "Vocabulary of Legal Metrology" (1978 Edition) has been distributed by the Secretariat for review and comment. Comments were provided on behalf of the United States. This vocabulary will complement the "International Vocabulary of Basic and General Terms in Metrology" developed by BIPM, IEC, IFCC, ISO, IUPAC, IUPAP, and OIML (latest Edition 1993 published by ISO).

- TC6 Prepackaged Products (United States)

  The draft revision of R79 "Information on Packaged Products" prepared by the Secretariat has been approved by CIML and will be presented at the 10th conference for approval.

- TC7 Instruments for Measuring Length and Associated Quantities (United Kingdom)

  - TC7/SC5 Multi-dimensional Measuring Instruments (Australia)

  The second CD Recommendation on "Multi-dimensional Measuring Instruments" developed by the Secretariat was discussed at an IWG meeting on September 11 - 12, 1995, in Paris, France. A third CD was developed and distributed for comment. It will be discussed at an IWG meeting in October 1996 at NIST.

- TC8 Instruments for Measuring Quantities of Fluids (Switzerland)

  - TC8/SC6 Measurement of Cryogenic Liquids (United States)

  A third CD revision of OIML R81 "Measuring Devices and Systems for Cryogenic Liquids" developed by the Secretariat was discussed at an IWG meeting in Braunschweig, Germany in May 1996. The next draft revision is expected to be distributed to the IWG for comment and vote in October 1996.

- TC9 Instruments for Measuring Mass and Density (United States)

  A first CD draft revision of R60 "Load Cells" prepared and distributed for comment by the Secretariat was further discussed at an IWG meeting in Braunschweig, Germany in May 1996. A NWG meeting was scheduled to discuss the status of the draft revision in conjunction with the Annual meeting of the NCWM in New Orleans in July 1996. The next CD draft revision will take into account the decisions made at these NWG and IWG meetings.

- TC9/SC1 Nonautomatic Weighing Instruments (Germany and France)

An OIML Seminar "Weighing Towards the Year 2000" was held in Paris, France, from September 13 - 15, 1995. Five papers were presented at the Seminar by persons attending from the United States.

- TC9/SC2 Automatic Weighing Instruments (United Kingdom)

A first CD draft Recommendation on "In-motion Road Vehicle Weighing Instruments" was developed and distributed by the Secretariat and was further discussed at a IWG meeting in Braunschweig, Germany in May 1996. The second CD on this subject is expected to be distributed in the fall of 1996 and reflect the decisions of this meeting.

- TC9/SC3 Weights (United States)

An OIML workshop on "Practical Test Procedures for Classes E_1, E_2, F_1, F_2, M_1, M_2, and M_3 Weights" will be held in Boras, Sweden, from October 2 - 4, 1996, sponsored by the Nordic Task Force for this work related to OIML R111.

Appendix D

Draft U.S./Netherlands Mutual Recognition Agreement on Type Evaluation

1. Purpose

The purpose of this Mutual Recognition Agreement (MRA) is to set out a working relationship to provide for the mutual recognition of device evaluations administered and performed by the Nederlands Meetinstituut (NMi) and by the National Type Evaluation Program (NTEP) of the U.S. National Conference on Weights and Measures.

2. Background

The NMi and NTEP operate ongoing type evaluation systems for commercial measuring devices. The Netherlands and other European countries, many U.S. 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.

Both NMi and NTEP have been appointed by their respective OIML Representatives as Issuing Authorities for OIML Certificates of Conformity for OIML R60 (Load Cells). NMi, a European Community (EC) Notified Body is also a point of issuance of EC Test Certificates for load cells. NTEP is the point of issuance of U.S. Certificates of Conformance for load cells.

Rather than evaluating load cells for the United States market in NTEP laboratories and then evaluating essentially the same load cell for the European market in EC Notified Body laboratories, or vice versa, manufacturers have requested the utilization of a system based upon mutual recognition of evaluation results.

The Force Group of the National Institute of Standards and Technology (NIST), which performs NTEP tests of load cells on behalf of the NCWM, has been collaborating with the Nederlands Meetinstituut to review test procedures and methods and to exchange data collected on models of devices tested by both laboratories. Both parties have expressed a willingness to recognize the results of tests performed in accordance with OIML Recommendation R60 and issued by the other party for the purpose of issuing NTEP and EC Certificates. Since requirements for these two types of Certificates may include some variations for the load cells, it may be necessary to conduct separate tests for some aspects of the type evaluation process.

3. Agreement

The United States National Type Evaluation Program (NTEP) agrees to recognize the results of the tests performed by the Nederlands Meetinstituut (NMi) for the purpose of issuing NTEP Certificates of Conformance for load cells. In the event that an NTEP Certificate of Conformance is not applicable to the load cell, NTEP will recognize the results for the purpose of issuing the substantially equivalent document, if it has not already been issued.

NMi agrees to recognize the results of the tests performed by NTEP for the purpose of issuing EC Test Certificates for load cells. In the event an EC Test Certificate is not applicable to the load cell, NMi will recognize the results for the purpose of issuing the substantially equivalent document, if it has not already been issued.

Each party will:

- maintain confidentiality of information unless otherwise agreed upon;
- make all information pertaining to the tests and the instruments involved available to the other party, maintaining confidentiality of proprietary information;
- in time and by mutual agreement, collaborate in the development of additional areas of mutual recognition;
- 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 identify and document differences in requirements and test methods so as to enable efficient load cell evaluation.

5. Resolution of Complaints

This MRA does not create obligations which are legally binding. 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 agreement will become effective on _____(Date)_____. It will remain in effect for a period of five (5) 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.

Appendix E

MEMORANDUM To: The NTEP Board of Governors
c/o Jim Truex, Chairman

Subject: U.S. Software Work Group's Report to Board of Governors at the Interim NCWM

From: U.S. Software Work Group
Michael Adams, Chairman

Current membership of the U.S. Software Work Group:

Deidre M. Adams	IBM Corporation	**Michael Adams**	Fairbanks Scales
Chris H. Bagley	Sooner Scale Inc.	**Dennis A. Beattie**	Legal Metrology Branch
Doug Bliss	Mettler-Toledo Inc	**Steve Cook**	CA Measurement Standards
John W. DeFeo	Hoffer Flow Controls, Inc	**Frances Holland**	Schlumberger Technologies
John Hughes	Weigh-Tronix Inc	**Dennis Krueger**	AT&T
Larry Martens	UniBridge Scale Systems	**Debbie Ripley**	NIST

Note: This report is based on discussions in which software refers to stand alone software and is not intended to apply to software/programs installed in the device, when a device is submitted for type approval.

The U.S. Software Work Group supports continuing to issue CCs on software.

Charge 1) Definition

Investigate the ways software is used in weighing and measuring devices and recommend a definition of "metrologically significant software." The definition is to contain specific criteria for determining which software is subject to and which software is not subject to weights and measures regulations.

The definition for "metrological integrity" (of a device), in Appendix D, Definitions, of H44, suggests that the term "metrological" encompasses three areas:

(1) The accuracy and validity of a measurement or transaction,
(2) compliance of the device with weights and measures requirements, or
(3) the suitability of the device for a given application.

The Work Group felt that metrologically significant software would:

a) involve Commercial Transactions as defined in Handbook 130, Uniform Laws and Regulations, (Model Law),
b) have features or characteristics regulated by H44 and not other documents,
c) be anything which affects the metrological integrity (Parts 1, 2, and 3),
d) involve software located in a system, up to the first final of the system,
e) be tied to identified hardware system requirements,
f) not involve book keeping.

The Work Group felt that dedicated and stand-alone software are different in that software evaluated in a dedicated device may not function correctly in a general device and vice versa. The assumption is that a dedicated device is not configured the same as a general device. In a specific case where there is not a difference, then a manufacturer would have to provide an explanation at the time of evaluation to have both considered with one submitted program.

The Work Group has discussed "first final" when discussing what software would need to be submitted for type approval. The term comes from Pub 14 Administrative Procedures: "all equipment to the point of the first indication or recorded representation of the final quantity on which the transaction will be based." Results are no better then the current description in Pub 14. The U.S. Work Group members brought with them a good understanding of "first final." Many visitors at the Work Group Meetings were not so sure of what a 'first final' could be. (The Canadians at the two Canadian software meetings were confused by the term "first final" as well.) The U.S. Work Group members understanding of "first final" is due in part because of exposure to the concept in Pub 14.

Getting this concept into H44 would give it more exposure and perhaps device Users will better understand which devices and software need type approval in their applications. Users could use this 'first final' concept to structure their applications in such a way as to reduce the extent of type approval impact. Many areas where very few metrological features are being performed could be delimited by moving the occurrence of the "first final" up in the application system. For example, software controlling manifests, bills of lading, and loadout sheets can be clearly kept from type approval requirements if a ticket printer operating from the weighing device is providing a printed ticket to the customer early on in the system.

Software has minimum system requirements which should be recorded on the CC. The operating system (such as dos or windows), processor requirements, (such as 286 or 486) and CPU clock speed (such as 12 MHz or 66 MHz) were named as part of a minimum system.

The processor and clock speed are required because of real-time considerations (processing speeds). When the program being run is not real-time dependent, then naming these in a minimum system requirement is not so important.

Conclusion: Price computing systems would not have minimum system requirements in regards to processor or clock speed.

Marking requirements apply to software. Stand alone software will need to be marked with an identity so that it can be traced back to a CC.

Conclusion: All main elements, including software, must be identified for traceability back to a CC.

Adding a serial number to all individual installations of software would be a burden beyond its value to Field Inspectors.

Conclusion: Software should not require a serial number and should be exempt from H44 G.S.1 (c).

This would require a change to Handbook 44, or an interpretation from the S&T Committee that G.S.1 (c) contains the exemption currently.

Charge 2) Checklists

Investigate the current type evaluation checklists and determine if they are adequately verifying the suitability of software to the weights and measures specifications and tolerances in Handbook 44. Recommendations are to be made for modification of checklists to address software verification, as required.

The current checklists are nearly adequate for evaluation of software. The following checklists have been assigned to be reviewed to determine if clarifications are needed or if additional items should be added to cover software concerns:

a) Digital Electronic Scales Checklist
Steve Cook & Michael Adams

b) Belt-Conveyor Scales Checklist
Steve Cook

c) Load Cells Checklist
John Hughes

d) Electronic Cash Registers Interfaced with Scales Checklist
Deidre Adams & Dennis Krueger

e) Electronic Cash Registers Interfaced with Motor-Fuel Dispensers Checklist
Deidre Adams & Frances Holland

f) Liquid-Measuring Devices Checklist
John DeFeo & Frances Holland

The Work Group has reviewed the first draft of the "Digital Electronic Scales Checklist" provided by Steve Cook.

The Work Group plans to have all of the drafts ready for review by the next Annual Meeting of the National Conference on Weights and Measures.

Charge 3) Field

Study how field enforcement officials handle software in the field and investigate ways to improve effectiveness of the investigation/verification process. Recommendations are to be made on investigation guidelines.

Since software is not a type of weighing or measuring device, the Work Group believes a separate EPO on software would be inappropriate. Adding clarification or new references to existing EPOs is more appropriate. EPOs address applicable H44 sections as they pertain to application categories, for example truck scales or hopper scales. In terms of documentation structure, EPOs are a vertical sectioning of H44. Applicable code has been pulled out along the length of H44. Software does not pertain to an application category, it cuts across all categories of application. Software documentation is a horizonal sectioning of H44. (Other horizonal items would include marking requirements and shift tests.) This structure makes software a candidate to be a portion of each EPO rather than to be a separate EPO.

The Work Group envisions many software concerns would be addressed in the beginning of an EPO as part of a pretest evaluation. The Work Group does not plan to address each EPO because of the current need for general updating of the EPOs. Software concerns should be added when Publication 12 is updated.

The field inspectors present at the various meetings were questioned about their encounters with software in the field and what support they would find useful.

a) Education on computers. This education would need to start at a very basic level and involve hardware and software. For instance, many inspectors would not know the significance of the processor identification number (286 vs 486), the processor speed, or operating system on software performance. Also, many inspectors do not know how to verify these features on a computer.

b) The inspectors indicated that they are routinely encountering systems that are controlled by computers; that they have concerns about the possibility of fraud. These systems are evaluated as best they can with the owner's help. The inspectors were not comfortable with the level of inspection they are able to do. (The amount of time available to do an inspection was cited as a reason as well as lack of familiarity with computers and software.)

c) The inspectors felt they needed more information about what to inspect on computer-controlled systems.

Charge 4) Education

Investigate ways to promote understanding about software and its relationship to weights and measures regulations. Recommend ways of improving the education delivery system and subject matter.

Basic training/education is needed for computers/software. The Administration and Public Affairs (A&P) Committee should consider offering training in this area. The Work Group believes that a course would be better than a book alone. Possibly some of the scholarship money could be used to provide computer literacy training.

If the A&P Committee pursues computer training, the Work Group is willing to provide a list of important features/terms with which inspectors should be familiar. The only contact with the A&P Committee was to verify that this is the type of training they would consider.

Charge 5) User Programmable

Look into the uses of and needs for User Programmable software. Report on findings including conclusions and recommendations.

User Selectable features are controlled and should not be considered User Programmable.

Users who reprogram or add to the programming of metrological features would be modifying the type and subject to type approval requirements.

If there is some point in type approved software that control of a metrological feature was intentionally turned over to a User Programmable section, then this would need to be listed on the CC of the type evaluated family. (The Work Group is not endorsing this concept, just commenting on the necessity of making it clear when such a situation exists.)

"User exit" and "hook" are terms to describe situations where a manufacturer has intentionally left a means for another programmer to gain control of the program to be executed by the computer.

Charge 6) Third-Party Software

Investigate third-party software and report findings including conclusions and recommendations.

Two definitions of "third party" are put forward:

a) A party not normally involved with weights and measures considerations.

b) A party who writes software for a dedicated piece of equipment, which they do not manufacture.

It would be constraint of trade to discriminate against either type of third-party software writers. Identifying someone as third party and having them agree that they are third party may be difficult. Third-party software writers need to be held accountable for correct control of weights and measures considerations, the same as any manufacturer. This would include type approval.

Third party "a" software raises concerns that manufacturers who are new to weights and measure applications, may not be aware that there are regulations to be considered. This situation requires that awareness be raised in three areas:

a) the new manufacturers on regulations they need to meet,

b) users on what to require when purchasing equipment, and

c) regulators on how to identify inadequate software in the field.

Manufacturers "in the business" are concerned that third party programmers do not pay their dues in supporting the culture, nor are they held to the same standards and requirements as "in the business" companies are held to. This gives them an economic advantage in bidding jobs.

Third party "a" software is connected to the "one of a kind" issue in that starting manufacturers are more likely to declare their software one of a kind than an established manufacturer. Manufacturers have a concern over advantage in the marketplace with respect to this situation.

Regulators are concerned that third party programmers are ignorant of requirements and will saddle users and jurisdictions with inappropriately operating equipment, too expensive to make removal or complete correction practical.

Third party "b" software is a current trade practice. Companies have come forward pointing out that they offer hardware and hardware/partial software packages to third party "b" types, who then expand the software to suit their application. This does not diminish the requirement for additional type evaluation if the third party software affects metrological features.

Charge 7) Type Modification

Look into manufacturers modification of software after type evaluation and which modifications need to be reported to NIST for consideration of impact on documented type. Recommendations to be given on description of modifications which need reporting.

Most modifications are not in the regulated areas. These modifications are not of concern.

Modification to software type is controlled the same as other main elements. Part "k," "What Constitutes Different Type," of the Administration procedures would apply. "A type is considered MODIFIED if a change alters a metrological or technical characteristic."

Adding a regulated feature to a program or changing a metrologically significant part of the software (except for maintenance) would have to be reported and is subject to type evaluation.

Currently it is the practice **not to report** maintenance to software or devices. This would include:

a) compliance to new regulations in established product

b) fixing of bugs/errors

Charge 8) Main Element

Investigate current practice and impact of issuing CCs on software. Report on findings including conclusions and recommendations.

Conclusion: Work Group finds no reason to discontinue the practice of issuing CCs to software.

Conclusion: States will handle "not practicable and enforceable" as they do other parts of NTEP, at the level they feel is required. (The Work Group is not supporting nonuniform enforcement but merely pointing out that "practicable and enforceable" are State issues with other avenues for being addressed.)

California reported that Software CCs are helpful in regulating weighing and measuring devices. CCs offer a source of recourse to help administer weights and measures regulations.

Issuing software CCs will add the benefits of the type approval process to software products. The benefits of the type approval process include:

1) educates Manufacturers on Weight and Measure requirements.
2) demonstration of ability to manufacture appropriate equipment.
3) increases Field Inspector's confidence in equipment.
4) extensive evaluation of features or characteristics that are difficult or can not be inspected in the field.
5) increases consumer confidence in equipment.
6) registers who is responsible for the design of the equipment
7) CCs contain information useful to the Field Inspectors.

Legal Metrology Software Working Group (Canadian Work Group)

1. The Canadians are interested in the OIML positions on software but clearly want to be aligned with the U.S. positions if possible.

2. Some form of type approval is appropriate for software.

3. An allowance for modification of software is needed. Maintenance modifications for certain and some degree of modification allowed for meeting customer needs.

4. It is a foregone conclusion that some form of software legislation will be necessary. It is the intent of the Canadian Regulators to ask for more demanding regulations than currently apply to devices. Canadian Industry wants to be involved in writing the software legislation. This is, in part, the reason for the Working Group.

5. The Canadians are looking into software security. The WELMEC approach is mentioned as having merit.

6. The Canadians are not using "first final" criteria as a requirement on which type approval is to be based. This means some software that would require type approval in the United States, would not require type approval in Canada. This may have some impact on Mutual Recognition Work done at the labs. (The area of mismatch is what Canadians call

Type 2 software. The area of match is called Type 1 software. Type 3 software does not need type approval in either country.)

Back in the Definition section of this report metrological was split into three parts:

(1) The accuracy and validity of a measurement or transaction,
(2) compliance of the device with weights and measures requirements, or
(3) the suitability of the device for a given application.

Basically the Type 1 software is defined by the part 1 metrological definition and the Type 2 is defined by parts 2 and 3. Type 3 is actually defined as software beyond the mandate of weights and measures.

Work Group Continuing

The Work Group believes there is more which can be accomplished in the area of stand-alone software. Important areas we would like to work further on are the checklist drafts, definition, and education. We ask that the Work Group be continued through the next Interim NCWM Meeting.

Appendix F - NTEP Participating Laboratories Report

Participating Laboratories Evaluation						July 10, 1996
				01/01/96 - 06/30/96		
All Labs	**1993**	**1994**	**1995**	**Total**	**TEs**	**Up-dates**
Requests Assigned[1]	313	364	395	249	214	35
US Mutual Recognition Requests Assigned		21	40		32	
Certificates Effective[2]	35	68	21	53	0	53
Certificates Issued	237	164	188	213	163	50
Average Time (wks) to Perform Activities for Successful Type Evaluations						
	TEs: (CCs Issued 1993)	TEs: (CCs Issued 1994)	TEs: (CCs Issued 1995)		TEs: (CCs Issued 1 - 6/30/96)	Updates: (CCs Issued 1 - 6/30/96)
"Date Assigned" to "Equipment Received"		8	8		10	
"Equipment Received" to "Type Evaluation Complete"		6	11		8	
"Type Evaluation Complete" to "CC Effective"		6	6		7	
"CC Effective" to "Draft Certificate To NIST"		9	17		17	
"Draft Certificate To NIST" to "Certificate Issued"		9	9		3	2
"Date Assigned" to "Certificate Issued"	34	39	50		46	21

Activity	CA	MD	NY	OH	NIST	OTHER	TOTAL
Number of Requests Assigned[1]							
1993	65	24	21	60	134	–	304
1994	103	39	32	73	93	24	364
1995	64.5	68	44.5	75.5	142.5	22	395
1996 (1/1/96 - 6/30/96)	49	38	18	45	85	`3	249
Number of Certificates Effective[2]							
1993	8	5	4	4	14	–	35
1994	14	4	2	23	22	3	68
1995	2	5	3	–	8	3	21
1996 (1/1/96 - 6/30/96)	4	6	3	7	29	5	53
Number of Certificates Issued							
1994	42	11	10	38	131	–	237
1994	42	9	19	21	71	2	164
1995	37	7.5	8.5	36	89.5	9.5	188
1996 (1/1/96 - 6/30/96)	38	~7	10	53	71	14	213

[1] Beginning in 1994, if a device fails a type evaluation, it is then entered as a new request for a new type evaluation. Previous to 1994, multiple failures of the same device were still considered as a single type evaluation.

[2] "Effective" means the type evaluation is complete but the certificate has not yet been issued.

Appendix G

NTETC Weighing Sector
Summary of Decisions Made at Meeting
October 31 - November 1, 1995
Baltimore, Maryland

1) Review of Procedural Issues

Conclusions of Items (a), (b), and (c):

Meeting Frequency: Meeting agendas must be kept to a manageable level. Current meeting frequency of once per year with ongoing review by the Chairman and technical advisor is acceptable. To keep Sector members up to date on items accumulating on the agenda, a mailing will be done every 6 months.

The Sector agreed that a rigorous deadline must be placed on minutes, especially if meetings are only once per year. The technical advisor agreed that this is critical especially since manufacturers design using Pub 14 criteria and the NTEP laboratories need the decisions to incorporate into their evaluations. Members of the Sector are assisting in taking notes during the meeting in an effort to help make meeting results available in a more timely manner. A summary of the decisions will be distributed to the Sector within a week of the meeting, and a summary of the discussions within a month of the meeting.

Decisions Between Meetings: The process of having labs review decisions and reaching a consensus works well. It is acknowledged that ad hoc decisions are to address situations for which policy or procedures do not currently exist. This is different from a deviation from policy which is not practiced by the laboratories; if current policies are found to be inappropriate or incorrect, NTEP brings the issue with a proposed change to the policy before the Sector for review and decision.

Communication Between Meetings: The Sector agreed that additional avenues of communication such as BB, e-mail, etc. should be explored and taken advantage of to maximize benefit.

Reanalysis of Load Cell Data: Permitting reanalysis of data is appropriate whether done on data from previous evaluations or reanalysis of current data at different values than originally requested. Members acknowledge that additional costs are necessary and warranted to recover labor costs of reanalysis.

Timeliness of NTEP Process:
The Sector reviewed a breakdown of several main areas of the process and discussed who is responsible for each portion. NTEP is reviewing the process to find ways of improving those sections of the process under control of NIST and/or the NTEP laboratories. Sector members support this review and acknowledge that improvements are needed in the timeliness of the process. Manufacturers present also acknowledged that manufacturers can help by following the process for submitting equipment and providing quick feedback on draft Certificates. NTEP will continue to update the Sector on progress in improving the timeliness of the process.

2) Update of Canada/US Mutual Recognition Work

Discussion/Conclusions: The Sector reviewed the activities in this area. It was noted that both the U.S. and Canada are committed to continuing the mutual recognition work and to expanding the scope of the agreement where practical. Canada has proposed changes to their scale requirements and anticipates that the requirements will become effective in April 1996. Plans will be made to provide additional training in Spring 1996 for the U.S. NTEP laboratories in the areas which are changed.

3) NTEP Testing of Junction Boxes

Conclusions: The Sector agreed that the decision made on the balloted issue is appropriate. The decision was consistent with other applications and is analogous to requiring an NTEP load cell in the steelyard of an electromechanical scale. It was acknowledged that there may also be other temperature-sensitive components in the box in the scenario; however, these are not presently subject to test in other types of junction boxes, thus they were not required to be tested in the letter ballot scenario.

The Sector agreed that establishing a rule that says all junction boxes must be tested is not appropriate. There will be cases where it is appropriate to test a j-box in chamber with device; the NTEP laboratories will make this assessment on a case-by-case basis based on a review of the device capabilities with the manufacturer. The boxes can be generally placed into categories of "passive" and "active."

An "active" box means that the device has amplifiers, adjustable components such as adjustable load cell summing cards or a significant component such as an A/D converter. A passive box is one which may have temperature-sensitive resistors, but not significant components warranting separate evaluation. It is expected that manufacturers choose resistors appropriate for their applications. If the box is classified as "active," then it would be tested and designated as either an indicator or a platform rather than as a separate component. The resulting CC would also be for either an indicator or a weighing element; not for a separate junction box.

4) Concrete Decks - Single Piece vs. Multiple-Piece Deck (3/95)

Conclusions: The Sector recognized two possible scenarios in which a scale is offered with a single or multiple-piece deck option: (1) the weighbridge remains structurally the same for both options; only the deck is different, being offered as either a single, poured piece of concrete or multiple pieces; and (2) the weighbridge itself is structurally different for the single-piece option vs. the multiple-piece option.

The Sector concluded that for the first scenario (1) above, the manufacturer can offer both options and have them covered with a single test since the weighbridge remains structurally the same for both options. The second scenario (2) above addresses modular vs. non-modular designs, and the two options are structurally different. In this case, separate tests would be required and, because the designs are different, the devices would be covered under separate Certificates.

5) Concrete Deck Thickness

Conclusions: Concrete deck thickness is a manufacturer design criterion and is left up to the manufacturer. The manufacturer will select and submit a device with a specific deck thickness for NTEP evaluation. The manufacturer can vary the thickness and still have it covered under the NTEP Certificate. The Sector acknowledged that the manufacturer is sometimes asked by the customer to vary deck thickness; the Sector agreed that the manufacturer is responsible for assessing the impact on the scale design and controlling variations to ensure continued compliance with Handbook 44 requirements.

The Sector also agreed to submit a proposal to the S&T Committee to modify Scales Code paragraph UR.4.3. to recognize modification to deck thickness as an example of a modification which would require approval by a competent engineering authority, preferably the manufacturer of the scale.

6) Application of $v_{min} \leq d/N^{1/2}$ Applies to Complete Scales Tested in the Environmental Chamber

Conclusions: The Sector believes that deviation from formula specified in Handbook 44 is appropriate under certain conditions. Specifically, deviation should be permitted for scales which have been tested as a complete device and which utilize automatic zero tracking. This conclusion is to be forwarded to the S&T Committee with a request that the Committee consider adding it to their 1996 agenda. The proposal would modify paragraph S.5.4. to recognize the deviation under the conditions noted above.

The Sector also encourages the S&T Committee to consider adding a definition for "v_{min}" to Handbook 44 to clarify references to the term in the Handbook.

The Sector recognized that devices submitted for testing as complete scales in the environmental chamber do not have to use NTEP load cells. If a scale is tested for influence factor requirements as a complete device and it uses non-NTEP load cells, current NTEP policy does not permit substitution of the cells without additional testing. The policy was established based on the fact that the NTEP evaluation provides no information to establish whether or not the substitution is metrologically significant. This is different from a scale using load cells with an NTEP CC since the CC defines metrological characteristics of the cell as verified by NTEP.

There is some disagreement among Sector members over current NTEP policy referring to replacement of load cells; however, the group agrees that current policy should apply unless the group decides to reopen the issue of the current policy as a separate discussion. The group agreed to think about this policy and its application to the scenario in which the cell/scale combination does not comply with the formula specified in S.5.4.

7) Permanence of ID Badges and Labels

Conclusions: Industry representatives present at the meeting do not generally feel that the current criteria are overly stringent and duplicate conditions normally encountered in the device environments. The Sector does see a need to improve consistency in applying the requirements. The specific cleaning materials used and the type of eraser will be specified in Pub 14. The household cleanser to be used is Bon Ami brand, the window cleaner is Windex, and the all purpose cleaner is Fantastic or 409. The pencil eraser is a Number 2 ink eraser.

The Sector considered differentiating the permanence criteria for marking information required by G-S.1. from the permanence criteria for marking information required by S.6.3.a. However, the Sector agreed with the assessment it originally made in 1993 that the permanence criteria in Pub 14 applies to ***all*** markings of all weighing devices, including load cells.

8) Multi-Interval/Multiple Range Devices -- Rules for Tare

Conclusions: The Sector acknowledged that there are differences in the way that Handbook 44 and NTEP address the expression of tare values on multi-interval and multiple-range scales. The United States requires representations to be mathematically correct. This means that representations may not be in units of 1,2, or 5, and, because the tare division is a rounded value, it may not be consistent with the scale division. In addition, the United States does not permit an entry of zero tare. OIML requires that representations be in increments of 1,2, or 5; this sometimes results in representations that appear to be mathematically incorrect.

Jim Truex, OH, and Gary Lameris, Hobart Corporation, agreed to review the performance of a sample device and identify the primary concerns surrounding this issue. Based upon their findings, they will come back to the Sector with recommendations on whether or not a proposal should be made to the S&T Committee to change Handbook 44 and whether or not changes should be made to Publication 14.

9) Software Working Group -- Update of Activities

Conclusions/Discussions: Mike Adams, Chairman of the Software Work Group, provided an update to the Sector on the work that has been done since the last Sector meeting. In addition to the information provided in the Sector's agenda, Mike reported that the Work Group will hold another meeting prior to the Interim and will provide a progress report to the Board of Governors at the Interim Meeting. The Work Group is reviewing existing checklists for scales, liquid-measuring devices, and point-of-sale systems to determine if information should be added to these checklists to recognize evaluations of software used in these applications. The Work Group has referred frequently to a WELMEC document on software and has found the document very helpful in defining commonly used terms and procedures in software applications. Mike also noted that, although the final report and recommendation has not yet been developed, the Work Group has generally found no reason to discontinue issuance of NTEP Certificates of Conformance for software.

10) Test Procedures for In-Motion Monorail Scales

Conclusions: Adopt the proposed modifications to the procedures with the following changes and clarifications.

Testing can be performed in either a laboratory environment to cover a range of capacities, rail sizes, and speeds. Permanence testing can also be performed in either a laboratory environment or in the field. If permanence testing is performed in a laboratory environment, then, this is to be followed up with a one-time field test using the test procedures outlined in "2. Dynamic Tests with Livestock Carcasses." This latter decision is based on concerns that a laboratory test may not duplicate performance of the device in an actual installation. NTEP and manufacturer will come to an agreement on best available installation to be selected for the test.
Current NTEP policy for devices is to put the complete device in the environmental chamber and test for compliance with influence factors requirements. If it won't fit into chamber, it must use type evaluated load cells. The Sector agreed that this policy, like other technical policy specified for all scales, applies to in-motion monorail tests.

Change first sentence of part 2.a. to read "No less than 20 carcass weighments should be used..." and change the "Note" in that section to read "In the lab, at least 2 carcasses must be available for the test; multiple weighments of the same carcasses may be used to achieve a total of 20 weighments."

On Page 9 of the agenda in the last sentence of the second paragraph change "smaller" to "larger" and "ratio" to "number."

11) NTEP Laboratory Testing to OIML Requirements

Conclusions: ***R60:*** The revised draft language was presented to the Sector for review and comment. The Sector was unable to come to a consensus on whether or not to recommend that the NTEP Board of Governors support the agreement. Concerns were raised over the fact that EC Certificates were not available for load cells and that the agreement would not provide an equivalent benefit to U.S. manufacturers seeking to sell products in Europe. Some members of industry expressed reservations about entering into the agreement on the basis that it would put U.S. manufacturers at a disadvantage. Other manufacturers indicated an interest in pursuing the agreement since this would offer them an alternative site at which to obtain NTEP testing for load cells, possibly avoiding the current backlog through the NTEP laboratories. Some members indicated that the OIML Certificate, which NTEP is already authorized to issue, is what is of most benefit to the manufacturer.

NTEP's efforts in this area have been directed by requests from industry to assist in eliminating trade barriers for U.S. manufacturers exporting products. Since a consensus could not be reached by industry representatives at the Weighing Sector, no recommendation was made by the Sector to the Board of Governors. Industry representatives at the Sector meeting agreed to further discuss the issue at the fall 1995 meeting of the Scale Manufacturer's Association and to provide feedback on any conclusions to the NTEP Board of Governors.

There was general agreement that NTEP should immediately pursue the completion of steps required for NTEP to issue OIML Certificates for R60, Load Cells. It was reported that the NIST Force Group is working to develop software to automate the presentation of test data in the R60 Annex A format. An electronic Certificate form will be developed by NIST/OWM. NTEP expects to be able to offer testing for R60 Certificates by the Interim Meeting.

R76: There was also support from Sector members for NTEP to actively pursue work in performing testing to OIML R76 Non-Automatic Weighing Devices. California and Ohio NTEP laboratories agreed to take steps to begin testing to R76 as soon as possible. It was acknowledged that these tests would be offered as separate tests from NTEP tests, rather than a combined test; however, both sets of tests could be performed under the same submission. Included in the final arrangements are the identification of private laboratories near the Ohio laboratory for performing some of the required electrical testing. Once arrangements are complete, an announcement will be distributed to provide details on submitting devices for R76 testing. NTEP will also take steps to explore the purchase of software for generating the test report forms for R76; however, it was agreed that testing should proceed using manual recording of test results in the interim period.

12) NCWM Publication 14 Update

Discussion: The 3rd Edition of NCWM Publication 14, dated August 1995 is now available from the NCWM at a cost of $40 for members and $60 for non-members. Order forms were made available to those attending the meeting and are available upon request from OWM. If a company needs a copy of a single checklist, OWM will provide it at no charge. OWM is exploring the availability of providing the document in an electronic copy, and in the long-term is striving to make the document accessible through electronic means such as the Internet.

The next edition of NCWM Publication 14 is scheduled for May 1996 following completion of the meetings of the Grain Moisture Meters and NIR Protein Analyzer Sectors. The document will be updated annually after that date.

13) Changes to Reflect Handbook 44 Changes at the NCWM 1995 Annual Meeting

Conclusions: Make the following modifications to Publication 14 to reflect July 1995 action of the NCWM.

Include a notation in the Code reference for paragraph G-S.6. Marking Operational Controls to reference the CECIP document on pictograms as a resource for identifying possible pictograms; however, since all symbols in this list may not be consistent with past NCWM interpretations, NTEP laboratories will continue to review on a case by case basis any submissions of symbols not already on the list currently included in Publication 14.

Modify Section 9. of the scales checklist to address the changes to paragraphs S.1.8.3. Customer's Indications.

- Modify the last sentence of the first paragraph of Section 9 to read "Scales indicating in metric units may indicate the price per 100 grams. Otherwise fractional pricing is prohibited~~, but m~~Multiplier keys that multiply the unit price entry by 2 or 4 are acceptable because the unit price is always in whole units of weight.

- Modify Section 9.3.: Customer's unit price displays must be in terms of whole units of weight (price per pound or multiple pound prices, e.g., 3 lb/$1.00) except for scales indicating in metric units which may indicate unit prices in price per 100 grams. Otherwise, fractional pricing (i.e., 1/4 lb or ½ lb) prices is prohibited.

Modify Section 50. Motion Detection, of the scales checklist as follows:

- change part (a) to read: "plus or minus 3 scale divisions for axle load, railway track, ~~and~~ vehicle scales, and hopper (other than grain hopper) scales with a capacity exceeding 22 000 kg (50 000 lb); and...

14) NTEP Evaluation of Portable Vehicle Scales -- Installation Surface

Conclusions: Installation surface is significant; however, it is not in the realm of NTEP to verify performance in various types of installation. There are requirements for NTEP and requirements for field enforcement. It is not up to NTEP to verify the appropriateness of the final installation.

Note: Items 15-18 were added to the Committee's agenda during the Sector Meeting.

15) Definition of "One-of-A-Kind"

The Committee reviewed a request for clarification of one-of-a-kind devices. The request specifically questioned the designation of a scale design such as a 70 ft x 10 ft truck scale which is not unique or custom made and for which similar designs have been issued NTEP CCs. Also questioned was building one single 70 ft x 10 ft scale, one single 60 ft x 10 ft scale, and one 35 ft x 10 ft scale and designating them as "one of a kind."

Conclusions: The Sector agreed that an adequate definition already exists for one-of-a-kind devices. Jim Truex agreed to research the issue and provide the Sector with the definition agreed to by the NTEP BOG. It was also agreed that the definition should have been included in the Administrative Procedures and Policy Section (Section 1) of Publication 14. The Sector also noted that individual States still have the prerogative to treat devices without NTEP CCs as they deem appropriate. Although a device may not fall into the definition of "one-of-a-kind," the State may elect to perform their own type evaluation on the device as a special evaluation. When a State elects to perform its own evaluation on a device, NTEP encourages States to perform the same type and amount of tests that would be performed in an NTEP evaluation.

Since the Sector's meeting, Jim Truex has provided references from the 77th and 78th NCWM final reports which address the policy for one-of-a-kind devices. Since the NTEP BOG has already indicated support of these positions, these references will be incorporated into the next edition of NCWM Publication 14.

16) NTEP Certificates for Retrofit Kits

Can a manufacturer receive an NTEP CC for a "retrofit kit" that significantly changes the original design of another manufacturer's device? (Particularly for the case in which the original manufacturer's device has an NTEP CC.)

Conclusions:
The Sector addressed the following questions:

a) Is this permissible?
Sector found no reason that this would be prohibited. However, there was agreement that a type evaluation of retrofitted device would be required and the resulting CC would limit the use of the retrofit kit to the device used during the evaluation.

b) Does the OEM have to give their permission?
No, the OEM's permission is not required. The device would be marked by the company making the retrofit kit and that company would be responsible for the resulting product and ensuring that it continues to be produced consistent with the device originally submitted for NTEP evaluation and continues to comply with all applicable current Handbook 44 requirements.

c) Should any other limitations be imposed?
No other limitations were suggested.

17) Use of Non-NTEP Indicators During Type Evaluation

In 1992, the Sector agreed that NTEP indicators were not required during type evaluation testing of weighing elements in field applications; however, NTEP load cells must be used. The Sector was asked to revisit and discuss this decision.

<u>**Conclusions:**</u>
It is acceptable to use non-NTEP device with the full understanding of the NTEP evaluator. The issue of special features such as linearization correction must be understood and accepted. Applies to both laboratory and field evaluations. Still must use NTEP load cells as originally decided in 1992.

18) Review of 1994 Minutes

Conclusions:
The Sector reviewed a copy of minutes from the Sector's 1994 meeting. No additions or changes were suggested, and the minutes were accepted by the Sector as presented.

Appendix H

National Type Evaluation Technical Committee (NTETC)
Measuring Sector
October 14, 1995, Jacksonville, Florida

Outline of Agenda Items

1) Update to NCWM Publication 14
   a) Liquid-Measuring Devices Technical Policy Remanufactured Equipment
   b) Liquid-Measuring Devices NTEP Logo
   c) S.2.1.1. Guidelines for applying Vapor Eliminators on Loading Rack Meters
   d) S.3.1. Diversion Prohibited Liquid-Measuring Devices
   e) T.2.3.1. Measurement of Agri-Chemical Liquids; Tolerances Liquid-Measuring Devices
   f) S.2.2. Provision for Sealing; Audit Trail Requirements Liquid-Measuring Devices
   g) A.1. Application, S.5.2. Discharge Rates Measurement of Water Tolerance for Vehicle-Mounted Water Meters
   h) S.1.5.2. Money-Value Computations; Multi-Unit Price Applications Liquefied Petroleum Gas (LPG) and Anhydrous Ammonia (AA) Liquid Measuring Devices
   I) A.1. Application Code Cryogenic Liquid-Measuring Devices
   j) Vapor Elimination on Loading Rack Mass Flow Meter Systems
   k) Provision for Sealing Audit Trail Requirements Mass Flow Meters
   l) G-UR.1.3. Selecting Requirements; Suitability of Equipment for Liquid-Measuring Devices
   m) G-S.6 Marking Operational Controls, Indications, and Features; Use of Pictograms
2) Publication 14 Status
3) Status of the Family of Products List for Mass Flow Meters
4) Status of the Retail Compressed Natural Gas (CNG) Meter Examination Procedure Outline
5) Retail Motor Fuel Dispenser-Electronic Cash Register Receipt Format for Recalculated Cash/Credit Prices
6) Changes to Section 3.37 Mass Flow Meters Section of NIST Handbook 44
7) Status of Mutual Recognition of Type Evaluation Between Canada and the United States
8) Checklist for Cryogenic Liquid-Measuring Devices
9) Checklist for Mass Flow Meters

1) Update to NCWM Publication 14

The following code or policy changes were adopted by the 80th National Conference on Weights and Measures (NCWM) and, with the exception of items a) and b), which have already been added to Publication 14, will be reflected in the 1996 edition of Handbook 44 and Publication 14. These items are included as part of the agenda to inform the NTETC of the immediate changes that will take place in National Type Evaluation Program (NTEP) procedures as a result of NCWM actions.

a) Liquid-Measuring Devices Technical Policy Remanufactured Equipment

The addition of new language to the Administrative Procedures section of Publication 14 to address remanufactured devices resulted in the relettering of paragraphs in the Administrative Procedures. The new policy is located in section M. and states:

M. Policy on Remanufactured and Repaired Devices

a. If a company or individual makes changes to a device to the extent that the metrological characteristics are ~~changes~~ changed, that specific device is no longer traceable to the NTEP CC.

b. If companies or individuals repair or remanufacture 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 the NTEP CC.
Discussion: Committee consensus to support with suggested editorial changes.

b) Liquid-Measuring Devices NTEP Logo

The NCWM voted to modify the Administrative Procedures section of Publication 14 on permissible use of statements that reference NTEP and the NTEP logo resulting in changes in the lettering of Section S. to Section T., and deletion of Section S.2.a(2)(a) and (b), to read:

2. Permissible Use of Statements and NTEP Logo

(1) Use of NTEP Statement and Logo

The NTEP statement or logo shall be used only in conjunction with products that have been certified in accordance with this publication and Handbook 44. The statement or logo shall never be used in any manner that could suggest or imply that certification extends to a product that is not NTEP-certified.

Where reference is made to NTEP or an NTEP CC, it is essential to clearly identify which products are NTEP certified, if the copy also includes products that are not certified. Reference to NTEP must always be located in close proximity to any reference to a certified product when uncertified products are shown on the same page.

Discussion: Committee consensus to support.

c) S.2.1.1. Guidelines for applying Vapor Eliminators on Loading Rack Meters

The Guideline adopted by the NCWM will be added to the Liquid-Measuring Devices Wholesale and Loading-Rack Meter checklist, Section 20. The proposed modification to read:

20.1. A loading rack...enter the system.

The following provide guidelines for determining wholesale metering systems applications in which an air eliminator is not needed. The list is provided for guidance and is not intended to be all-inclusive. These guidelines are to be used for systems dispensing petroleum products, such as diesel fuel, distillate, gasoline, fuel oil, kerosene, light oil, and spindle oil. These guidelines do not apply to systems dispensing lubricating oils, heated petroleum products, and compressed gases.

1. The storage tank is above ground.
2. Means are provided to ensure that the level of liquid in the storage tank is such that no air or vapor can be drawn into the piping to the measuring system, and that the delivery is inhibited and cannot be initiated unless the tank contains sufficient product. These means may consist of (a) low-level sensors interlocked to the pump, or (b) an automatic tank gauging system, or © a terminal automation system which monitors inventory and has automatic daily reconciliation against product receipts and sales, and which is further backed up by manual tank gauging.
3. The pump is installed so that no section of its suction piping exceeds the elevation of the minimum operating level of the liquid in the tank.
4. The pump supplying the meter is a non-self-priming centrifugal pump.
5. The pump is installed so that there is no possibility of product vaporization at the pump inlet; that is, the pump inlet pressure is not less than the net positive suction head for that pump when the storage tank is at its minimum operating level.
6. Where the installation contains control or automatic valves, the sequence of valve openings begins at the control valve nearest the storage tank and ends at the control valve downstream of the meter.
7. There is no common piping between the installation intended for delivery of the product through the meter and the installation intended for the receipt of product into the storage tank unless proper isolation valves are provided.

The Committee expressed concern about field enforcement being placed in Publication 14. Members felt the Conference voted to place this item in Publication 12, EPO 25, and Training Module 19. (See NCWM Annual Meeting agenda July

1995, Specifications and Tolerances Committee Item 330-1 S.2.1.1.) It is the Committee consensus to recommend and support the following:

a) This is not a checklist item and should not be placed in Publication 14.

b) Recommend placement in Publication 12, EPO 25, and Training Module 19, to comply with the NCWM vote.
c) The following footnote be placed in Publication 14 stating: "Guidelines are available in Publication 12, EPO 25."

d) S.3.1. Diversion Prohibited Liquid-Measuring Devices

The NCWM adopted modifications to the language in paragraph S.3.1. The new language permits manual diversion of product in the measuring system for specific applications. Modifications will appear under Sections 11 and 21 of the Liquid-Measuring Devices Code Checklist in Publication 14, Discharge Lines and Discharge Line Valves. The addition of new language will result in the renumbering of subsequent checklist items in Sections 11 and 21. The proposed modifications to read:

Liquid-Measuring Devices, Retail Motor-Fuel Dispensers:

11. Discharge Lines and Discharge Line Valves

Code Reference: S.3.1. Diversion of Measured Liquid

To prevent fraudulent practices, ~~it shall be possible to divert measured liquid~~ <u>no means shall be provided by which any measured liquid can be diverted</u> from the measuring chamber of the meter or the discharge line of a device.

b. the direction of liquid flow is definitely and conspicuously indicated.

11.1 Except....the device

11.2 Two or ... indicated
<u>11.X</u> <u>Except as indicated above, a manually controlled outlet may be installed to be opened for purging or draining the measuring chamber when the system is measuring food products if suitable means are provided to ensure liquid cannot flow through any such outlet during normal operation and to prevent advancement of meter indications and recorded representations while the outlet is in use</u>.

Liquid-Measuring Devices, Wholesale and Loading-Rack Meters:

21. Discharge Line and Discharge Line Valves

Code Reference: S.3.1 Diversion of Measured Liquid

21.1 No .... chamber.

<u>21.X.</u> <u>Except a manually controlled outlet that may be installed to be opened for purging or draining the measuring chamber when the system is measuring food products if suitable means are provided to ensure liquid cannot flow through any such outlet during normal operation and to prevent advancement of meter indications and recorded representation while the outlet is in use.</u>

Discussion: Committee consensus to support.

e) T.2.3.1. Measurement of Agri-Chemical Liquids; Tolerances Liquid-Measuring Devices

The NCWM voted to delete the acceptance and maintenance tolerance table for Agri-Chemicals from paragraph T.2.3.1. and to change the tolerances to 0.3 percent and 0.5 percent, respectively. Tolerance values are not included in Publication 14; therefore, these changes will not appear in Publication 14. This item is included to alert the Sector and the evaluating laboratories of the change in tolerance for these products.

Discussion: This is an informational item. No action required.

f) S.2.2. Provision for Sealing; Audit Trial Requirements Liquid-Measuring Devices

The NCWM voted to modify Table S.2.2. Category of Device and Methods of Sealing for Category 2 devices. An additional change was made in the effective date for enforcement of these requirements. It should be noted that all Category 2 mass flow meters will be held to the same requirements as LMD's that are affected by these changes. These modifications will be reflected in changes to the Liquid-Measuring Devices Common General Code Criteria, Retail Motor-Fuel Dispensers Section 10 and Appendix A Table S.2.2. The changes to read as follows:

Category 2 Device (Remote Configuration Capability But Controlled by Hardware)

Discussion: It is a Committee consensus to recommend and support the following:

- *The physical hardware enabling access for remote communication must be on-site.*
- *The hardware must be sealable with a security seal.*
- *An adequate number (see below table) of event counter(s) must be available to monitor the calibration and configuration parameters of each individual device.*

Minimum Number of Counters Required:

	Minimum Event Counter(s) at Individual Device	*Minimum Event Counter(s) at System Controller*
Only one type of parameter accessible (calibration or configuration)	*One (1) event counter*	*One (1) event counter for each separately controlled device, or a one (1) event counter, if changes are made simultaneously.*
Both calibration and configuration parameters accessible	*Two (2) event counters*	*Two (2) event counters for each separately controlled device, or two (2) or more event counters if changes are made to all controlled devices simultaneously.*

- *Event counters located at the system controller must be provided with a means to generate a hard copy of the audit trail information.*

10. Measuring Elements

Code Reference: S.2.2 Provision for Sealing

10.5 Retail motor-fuel dispensers ~~shall not have~~ remote configuration capabilities and shall be sealed according to ~~Category 1 devices as specified~~ Table S.2.2 in Appendix A, Audit Trail Checklist for Liquid-Measuring Devices and ~~"Category 1" devices~~ under the "Common and General Code Criteria" section of this checklist.

The Committee also recommends that the indicated editorial changes be made to Table S.2.2.
The Committee discussed the "unlevel playing field" that has been created with the separation of audit trail requirements into specific codes and the differences between the requirements. It was the feeling that requirements should be the same throughout all codes. However, they are not going to make a recommendation at this time for a review of all codes. It was felt the item, if it is brought before the S&T Committee, should come from the regionals.

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 ~~even~~ event counters: one for calibration 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 or shall not operate ~~which~~ while in this mode.*	*[The hardware enabling access for remote communication must be ~~at the device~~ on-site. The hardware must be ~~and~~ sealed using a physical seal ~~or~~ and ~~two event counter: one for calibration parameters and one for configuration parameters~~ 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 my be unlimited or controlled through a software switch (e.g. password)	*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 10 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)

g) A.1. Application, S.5.2. Discharge Rates Measurement of Water; Tolerance for Vehicle-Mounted Water Meters

The NCWM voted to amend paragraph A.1. of Section 3.31 Vehicle-Tank Meters (VTM) Code to include bulk deliveries of water and delete specific references to types of pesticides from the language. A new paragraph and accompanying tables for maintenance and acceptance tolerances for vehicle-mounted water meters were added to this code. Tolerance values are not included in Publication 14; therefore, these changes will not appear in Publication 14. This item is included to alert the Sector and the evaluating laboratories of the change in tolerances and to the expansion of the scope of the VTM code.

A.1. - This code applies to meters mounted on vehicle tanks including those used for the measurement and delivery of petroleum products or agri-chemical liquids such as fertilizers, feeds, ~~herbicides~~, pesticides, ~~insecticides, fungicides, and~~ defoliants, and bulk deliveries of water.
(Amended 1985, and 1995)

T.2. Tolerance Values. - Maintenance and acceptance tolerances shall be as shown in Tables 1 ~~and~~ , 2, 3, and 4.
(Amended 1995)

Table 3. Tolerances for Vehicle-Mounted Water Meters Normal Tests				
Meter size (inches)	Rate of flow (gal/min)	Maximum Rate		
		Meter indication		Tolerances on over- and under-registration
		gal	ft^3	
5/8	15	50	5	1.5%
3/4	25	50	5	
1	40	100	10	
1 ½	80	300	40	
2	120	500	40	
3	250	500	50	
4	350	1 000	100	
6	700	1 000	100	

Table 4. Tolerances for Vehicle-Mounted Water Meters Special Tests									
Meter size (inches)	Intermediate rate				Minimum rate				
	Rate of flow (gal/min)	Meter indication		Tolerance on over- and under-registration	Rate of flow (gal/min)	Meter indication		Tolerance	
		gal	ft^3			gal	ft^3	Under-registration	Over-registration
5/8	2	10	1	1.5%	1/4	5	1	5.0%	1.5%
3/4	3	10	1		½	5	1		
1	4	10	1		3/4	5	1		
1 1\2	8	50	5		1 ½	10	1		
2	15	50	5		2	10	1		
3	20	50	5		4	10	1		
4	40	100	10		7	50	5		
6	60	100	10		12	50	5		

Discussion: This is an informational item. No action required.

h) S.1.5.2. Money-Value Computations; Multi-Unit Price Applications LPG and NH^3 Liquid Measuring Devices

The NCWM voted to modify the language in paragraph S.1.5.2. of the LPG and NH_3 Liquid-Measuring Device Code to exclude fleet and price contract sales from the requirements. Additionally the new language more specifically addresses the computing capabilities of an LPG device. Changes will appear under Section 3,1 Stationary Retail Devices, of the LPG and NH_3 Checklist of Publication 14.

S.1.5.2. Money-Value Computations. - ~~A retail device that computes money value shall be capable of computing such values for a single unit price or at each of a series of unit prices for every delivery possible within either the range of measurement of the device or the range of the computing elements, whichever is less.~~ <u>A computing device shall compute the total sales price at any single-purchase unit price (excluding fleet sales and other price contract sales) for which the product is offered for sale at any delivery possible within either the measurement range of the device or the range of the computing elements,</u>

<u>whichever is less.</u> The analog money value indication shall not differ from the mathematically computed money value (quantity x unit price = sales price), for any delivered quantity, by an amount greater that the values shown in Table 1.

Discussion: Committee consensus to support.

I) A.1. Application Code Cryogenic Liquid-Measuring Devices

The NCWM voted to modify paragraph A.1. to include additional cryogenic liquids and delete the reference to device installation. The Committee did not recommend that carbon dioxide and liquefied natural gas be included in the application statement. An equivalent paragraph is not included in Publication 14; this item is included on the agenda to alert the Sector of changes to the scope of the Cryogenic LMD Code.

A.1. - This code applies to ~~cryogenic liquid-measuring~~ devices used for the measurement of <u>cryogenic liquids such as, but not limited to</u> oxygen, nitrogen, <u>hydrogen,</u> and argon, ~~whether such devices are installed in a permanent location, or mounted on a vehicle, or mounted on a portable tank~~.
(Amended 1986, and 1995)

No discussion, the Committee was alerted.

j) Vapor Elimination on Loading-Rack Mass Flow Meter Systems

The NCWM voted to add a new paragraph S.3.3.1. to the Mass Flow Meters Code to address vapor elimination on loading-rack liquid-metering systems. Additionally the seven guidelines [see item 1 (c)] developed for vapor elimination for loading-rack meters should also apply to determine whether or not the system is designed or operationally controlled in a manner that air and/or vapor cannot enter the system.

S.3.3.1. Vapor Elimination on Loading-Rack Liquid-Metering Systems. -

(a) A loading-rack liquid-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 statutory authority 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.

Discussion: This is an informational item. No action **required. The same comments as under 1 (c).**

k) Provision for Sealing Audit Trail Requirements Mass Flow Meters

The NCWM voted to modify Table S.2.2. Category of Device and Methods of Sealing for Category 2 Devices and to change the effective date for enforcement of the requirements for Category 2 devices. The modification of these provisions for sealing a Category 2 mass flow meter will hold this device to the same requirements as Liquid-Measuring Devices. Changes to the Liquid-Measuring Devices Checklist in Publication 14 will be made to reflect these changes and those noted in agenda item 1.f. This item is included to alert the Sector and the evaluating laboratories of the changes to sealing requirements for mass flow meters.

Discussion: It was the consensus of the Committee that the same recommendation made for Item 1 (f) of the agenda be implemented for this item in the Mass Flow Meter Checklist.

l) G-UR.1.3. Selecting Requirements; Suitability of Equipment for Liquid-Measuring Devices

NCWM voted to add the following language on suitability of use requirements for LMD's.

G-UR.1.3. Liquid-Measuring Devices - To be suitable for its application, the minimum delivery for liquid-measuring devices shall be no less than 100 divisions, except that the minimum delivery for retail analog devices shall be no less than 10 divisions. Maximum division values and tolerances are stated in the specific codes.

The Sector should consider adding this information to the technical policy for LMD's.

Discussion: The Committee feels there is insufficient justification to include this in the technical policy of Publication 14. It is already in HB 44 as a user requirement.

m) G-S.6. Marking Operational Controls, Indications, and Features; Use of Pictograms

NCWM voted to modify the language in paragraph G-S.6. to read:

G-S.6. Marking Operational Controls, Indications, Features. - All operational controls, indications, and features, including switches, lights, displays, push button, and other means, shall be clearly and definitely identified. <u>The use of approved pictograms or symbols shall be acceptable.</u> [Nonretroactive as of January 1, 1977.]
(Amended 1978, and 1995)

Section 2 of Publication 14, LMD Checklist and Test Procedures, Common General Code Criteria, will be modified to reflect these changes.

Discussion: Committee consensus to support.

2) Publication 14 Status

The August 1995 Third Edition of NCWM Publication 14 is now available through the Office of Weights and Measures (OWM). The complete 412 page Administrative Procedures, Technical Policy, Checklists, and Test Procedures can be purchased at $40 per copy for NCWM members and $60 per copy for nonmembers. Individual checklists are currently available at no charge. To obtain copies of Publication 14 contact Terry Grimes (OWM). This item was included to update the Sector on the status of the latest edition of Publication 14.

Discussion: Concern was expressed about the publication of changes made to Publication 14 during this agenda and when they are implemented. The next full publication of the Checklist is scheduled for May.

It is the Committee's recommendation and consensus that update pages be available to the labs and Committee members between full printings.

3) Status of the Family of Products for Mass Flow Meters (MFM)

Initially NTEP Certificates of Conformance for metering devices covered applications for those products which were used during the type evaluation process. Manufacturers found it difficult to anticipate every product the meters might be used to dispense. Testing a meter with every possible product would be too costly to the manufacturer and place a strain on NTEP resources. In 1991 the Sector adopted a policy to alleviate the need for additional testing and to determine which tests would cover specific product types. This policy was developed and agreed to based on the principles of measurement demonstrated by a positive displacement meter; a positive displacement meter tends to perform better as viscosity increases and the change in its performance with viscosity change is very predictable. Under this policy, common commercially metered products were categorized into "families" or groups of liquids. Although NTEP routinely evaluates other types of metering technology such as mass flow and turbine meters, it has no policy which addresses the specific categories of products used with these meters. There are inconsistencies in how an NTEP CC for mass flow meters has listed products covered under the CC; the CC may list a range of specific gravities, but does not address the differences in performance expected for products dispensed at extreme temperatures or under pressure and the influence of meter size. The Sector has been asked to develop a policy which serves to reduce the amount of testing and is representative of the device performance over a range of products for other types of metering technology.

Discussion to address the possibility of creating such a policy and product family list for additional metering technologies began at the October 1994 sector meeting. MFM manufacturers have been approached just as PD meter manufacturers to help establish specific performance parameters for these meters. The 1994 meeting concluded with the formation of a subcommittee consisting of the following associate members present: Mike Keilty (Micro Motion), Randy Smith (Schlumberger), Norm Alston (Daniel Flow Products Inc.), John Skuce (Smith Meter Inc.), and Tim Scott (Brooks Instrument). As yet there has not been any guidance from industry on how to proceed on developing a policy.

The lack of a policy raises the question of how NTEP will proceed on verifying claims on a product type application. Mass flow meter technology is relatively new in its association with a wide range of products. Existing policy for cryogenic and lpg meters are not based on specific gravity, thus it would be difficult to derive guidelines from currently observed meter performance in those areas.

The other issues raised by manufacturers are the competitive advantage given to companies with unconditional CC's and the additional restrictions imposed by the requirement to evaluate all product applications.

Discussion: Mike Keilty will draft a letter to other manufacturers within the month soliciting input for the project.

4) Status of the CNG Meter Examination Procedure Outline

During the October 1993 meeting, the Sector established a subgroup to work with the Natural Gas Vehicle Coalition (NGVC) to develop an examination procedure outline (EPO) for use in field testing compressed natural gas meters. The group was provided with draft procedures from Jim Akey (WI), which were developed on behalf of the NCWM Metrologist Group, Nebraska Weights and Measures, California Division of Measurement Standards, and with additional guidelines based on OWM work with Maryland Weights and Measures.

The Sector will be updated on the progress of this work.

Discussion: A committee was appointed to review the distributed checklists and EPOs developed for CNG dispensers. The committee included Mike Keilty (Chairman), Richard Huff, Gordon Johnson, Rich Tucker, Bob Traettino, Dick Shockley, and Ross Andersen. Individual members will report proposed changes to Mike Keilty by November 14.

5) Retail Motor-Fuel Dispenser-Electronic Cash Register Receipt Format for Recalculated Cash/Credit Prices

Industry has approached NTEP for guidelines on the sales receipt information that is required when cash/credit transactions are initiated at the dispenser and, at the transaction end, the method of payment is changed at the console at the customer's request. The result of a change in method of payment to cash instead of credit or vice versa is precipitated by any number of circumstances. For example a credit card is forgotten or a customer notices an optional free service (i.e., carwash) is offered with a minimum fuel purchase. A poll of the NTEP Participating Laboratories did not result in a clear consensus on this issue. This item is being brought to the Sector for guidelines on an acceptable sales receipt format when a customer desires to change the condition of the sale, at the transaction end.

Handbook 44 Section 3.30 paragraph S.1.6.7. Recorded Representation, Point of Sale requires a sales receipt from an electronic cash register (ECR) interfaced with a retail motor-fuel dispenser (RMFD) to contain the following information:

(a) the total volume of delivery,
(b) the unit price,
© the total computed price, and
(d) the product identity

The following draft text was included in the August 1995 edition of Publication 14 with a request that it be reviewed by the Sector at its next meeting:

> Should the customer elect to use another method of payment following completion of delivery, the console may be used to recalculate the total price--provided the dispenser complies with all applicable Handbook 44 requirements. For example, the customer selects the credit card unit price on the dispenser and dispenses product at that unit price; however, the customer discovers that he forgot his credit card and decides to pay cash. In this case, the console might be used to calculate the total price at the cash unit price. In keeping with the intent of NCWM action in 1989 to require dispensers to calculate at all unit prices for which a product is offered for sale, it is anticipated that the console would be required to recalculate the new total price using the formula (quantity x unit price = total price). ~~However, specific criteria for recalculation of the new total price must be determined by the Measuring Sector.~~ *The receipt should contain the information required in paragraph S.1.6.7. at the completion of the transaction. At the minimum, the volume has to agree between the ticket and the dispenser (G-S.5.2.2.).*

Discussion: The Committee discussed whether or not a recalculated price should be clearly indicated as recalculated on the receipt. How is it justified when the customer is fully aware that the unit price is being changed? There are no requirements in HB 44 other than items (a)-(d) in paragraph S.1.6.7. that require additional information on the receipt.

It is a Committee consensus and recommendation that, at a minimum, the receipt should be printed out with the information for which the transaction was completed. Correction should be made as indicated to the above text.

6) Changes to Section 3.37 Mass Flow Meters Section of NIST Handbook 44

Changes are being recommended by California Division of Measurement Standards (DMS) to incorporate existing code sections from the Liquid-Measuring Device Code into the Mass Flow Meter Code in Handbook 44. A summary of the additional Sections to be referenced are included in an attachment to the agenda. DMS notes that although these devices utilize a mass flow meter as a measuring element many other design features are similar to those of a retail motor-fuel dispenser.

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 (0.009 gal) of a delivery and its associated total sales price need not be indicated.

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 user-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]

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.]

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

© 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.

S.5.1. Totalizers for Retail Motor-Fuel ~~Dispensers~~ <u>Devices.</u> - 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.]

UR.1.1.1. Length

© shall not exceed ~~5.5 m (18 ft)~~ <u>3.6 m (12 ft)</u> unless it can be demonstrated that a longer hose is essential to permit deliveries to be made to receiving vehicles or vessels.

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.

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.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.

Discussion: Paragraph S.1.6.1., which is applicable to most retail motor-fuel dispensers, is not appropriate for dispensers of highly pressurized products such as CNG. Liquefied Petroleum Gas (LPG) retail motor-fuel dispensers are not held to these requirements.

Since these sections are included with the draft type evaluation checklist for retail CNG dispensers, the Committee recommended this item be addressed and reviewed by the subcommittee appointed for the review of CNG draft checklist (Item 4.) Mike Keilty requested that Richard Huff solicit information from other CNG dispenser manufacturers and return to the Committee for review.

7) Status of Mutual Recognition of Type Evaluation Between Canada and the United States

Members of the National Conference on Weights and Measures and representatives from Canada's Legal Metrology Branch (LMB) met in the fall of 1992 to discuss mutual recognition efforts for scales. Dialogue began on the harmonization of U.S. and Canadian weights and measures requirements in an effort to reduce existing trade barriers for equipment manufacturers. It was agreed that the group's first priority would be to gain mutual recognition of type evaluation tests on weighing devices performed by either the United States or Canada. In April 1993 the U.S./Canadian Mutual Recognition Work Group adopted a plan for approval of weighing devices which would eliminate the need for completing the type evaluation process in both countries. That year the group's work, in collaboration with participating NTEP laboratories, was focused on the identification of similarities, and differences in the two countries' type evaluation processes. Their efforts resulted in the development of a unified set of testing procedures, checklist, application form and applicant's guide, which satisfy all weights and measures requirements established for both the United States and Canada. In April 1994 the U.S./Canada Mutual Recognition of Type Evaluation Program accepted its first application for specific types of weighing devices. Devices which are successful in completing the single or multiple set of type evaluation test will receive certification in both countries.

The NCWM began to explore a similar mutual recognition program for liquid-measuring devices (LMD). The Conference later recommended the issue be brought before the Sector for its input on an approach to mutual recognition for the LMD industry.

At the October 1994 Sector meeting, discussions began on mutual recognition of type evaluation for LMD's. Industry was in agreement that this task warranted a joint effort from members representing both the wholesale and retail manufacturers. Initially the group decided to look at the dissimilarities between current regulations, policies, and type evaluation procedures in the United States/Canada, as this might facilitate an earlier mutual recognition for some devices. There appeared to be a number of differences with respect to procedures and volumetric devices. The LMB, unlike the United States, currently requires meters be tested over a range of temperatures. The Sector decided to examine the successes that were found in the mutual recognition of type evaluation in the weighing device sector. Review of that approach revealed the greatest hurdle was the differences in tolerances. The weighing sector resolved that dilemma by applying the most stringent requirements of the two countries, and concentrating its efforts on the smaller capacity devices, thus moving away from harmonization and more in the direction of mutual recognition. Additionally the decision was made not to aim for parallel tests. The weighing sector accomplished mutual recognition in approximately 1 year from its inception to the acceptance of the first application for type evaluation in April 1994. The Measuring Sector agreed that a realistic approach should be taken and it should not confine itself to too short a time frame for reaching its goals.

The Measuring Sector then began to identify the differences between U.S./Canada LMD type evaluation, highlighting all of the additional Canadian requirements. The LMB laboratory tests over a temperature range of 0 °C to 40 °C, measuring temperature in the prover and at the meter in applications of heated and cooled liquids (water, varsol, mineral spirits, diesel) for accuracy; it then lists the specific application on the Notice of Approval (NOA). Additionally the LMB tests for radio frequency interference and conducts both field and laboratory tests on special products. The LMB also has the capability to laboratory test both retail and wholesale meters (turbine, magnetic, etc...) that range in size from 0 inch to 4 inches. The group concluded the LMB test procedures reveal more information about the meter performance under varying conditions than the U.S. field tests.

Because the differences were so numerous, the Sector decided to work on the areas of commonality which would allow a single set of tests be conducted at one laboratory site that satisfies both U.S. and Canadian requirements. The possibility of locating a U.S. laboratory with temperature capability seemed remote. Some indicated there would be no point in continuing the process if a U.S. laboratory did not exist. It was noted that manufacturers find it difficult to obtain customer sites in the United States. There were several solutions offered. One involved securing a government facility. Another possibility would be to conduct parts of the evaluation in Canada and the remaining parts in the United States.

The Sector was aware that OIML is in the process of restructuring and wished to be as consistent as possible with their procedures.

The Sector agreed to go forward with the mutual recognition process for LMD's and formed a subgroup which met the following day, October 23, 1994, to discuss the preliminary details of establishing a process, procedures for differences, and to agree on a time frame. The members of the subgroup are John Skuce (Smith Meter Inc.), Tim Scott (Brooks Instrument), Grant Obermeier (Irving Oil Limited), Mike Keilty (Micro Motion), Randy Smith (Schlumberger), Norm Alston (DFP Inc.), Bill Raymond (Accurate Metering), Charlie Gardner (Suffolk County Weights and Measures, NY), Mel Hankel (Liquid Controls Corp.), Jim Truex (OH), Johnny Parrish (Brooks Instrument), Tina Butcher (NIST), and Juana Williams (NIST).

The subgroup agreed that a smaller group should meet in Ottawa to further review the differences between the two countries' requirements. NCWM Chairman Jim Truex recommended there be two representatives from both the Meter Manufacturers Association (MMA) and the Gasoline Pump Manufactures Association (GPMA), as well as several members from Canada and the U.S. participating NTEP laboratories involved in the smaller group. The individuals who volunteered to participate were: from GPMA, Frances Holland (Schlumberger) and Rich Tucker (Tokheim) and, from MMA, Bob Traettino (Liquid Controls) and Johnny Parrish (Brooks Instruments).

NIST agreed to provide LMB with electronic files of Publication 14, Handbook 44, and the OIML standards documents prior to the meeting tentatively scheduled for April 1995.

The subgroup held its first meeting April 10-12, 1995, Ottawa, Ontario Canada. The first task was to work to harmonize the basic requirements to be conducted at a single test site and determine which parts of the CC/NOA would be recognized. Their first priority would be wholesale meters. The group discussed the differences such as the U.S. requirement for submitting the specific product and Canada's testing of anhydrous ammonia, LPG, and heated products. Time did not permit discussion of reapplying for testing in the event a device fails the initial evaluation. LMB had prepared a matrix to allow a line-by-line comparison of U.S./Canada test requirements.

An update on these activities will be provided to the Sector.

***Discussion:** Renald Marceau presented an update on mutual recognition activities (MR). Indication was that manufacturers preferred MR as opposed to harmonization. To be able to achieve MR, testing of additional testing equipment is needed to do the temperature test. Two areas were identified as good candidates for future MR agreements: electronic registers and stand-alone gas pumps, if measuring elements have already been evaluated. At this time the Committee is in limbo, because of NIST budget problems. Canada is very interested in perusing the development of MR for new electronic equipment. Both NIST and Canada felt the next meeting could not be scheduled until next spring.*

8) Checklist for Cryogenic Liquid-Measuring Devices

Publication 14 contains some references to the type evaluation of cryogenic meters in the test procedures; however, specific code references to the Handbook 44 Cryogenic Liquid-Measuring Devices Code are not included in Publication 14. NTEP is beginning to get more inquiries about the requirements and test procedures for type evaluating meters delivering these types of products.

To ensure that NTEP can provide adequate information to manufacturers and to ensure that all code requirements are addressed in type evaluation, the Sector should consider developing a separate checklist for Cryogenic Liquid-Measuring Devices. Volunteers from industry and participating laboratories are needed to assist in the preparation and review of drafts of such a checklist.

***Discussion:** California has created a checklist from the current checklists. The Committee requested the Meter Manufacturers Association to review the checklist and report their findings to Steve Cook, John Skuce, John Defoe, and Bob Traettino.*

9) Checklist for Mass Flow Meters

In 1994, the NCWM voted to change the status of the Mass Flow Meters Code from tentative to permanent. At that time all references to mass flow meters were removed from the other measuring device codes. Publication 14 includes a short section entitled "Additional Checklist and Test Procedures for Mass Flow Meters" and a section detailing the test procedures for these devices; however, a separate section addressing the specific code requirements of the Mass Flow Meters Code is not included. NTEP continues to get requests for type evaluation of Mass Flow Meters, and must be able to provide guidance to the manufacturers on what testing of these devices will entail.

It is recommended that the Committee consider developing a separate checklist for Mass Flow Meters to assist the NTEP laboratories in the evaluation of these devices and to ensure that all Mass Flow Meters Code requirements are applied. Volunteers from industry and participating laboratories are needed to assist in the preparation and review drafts of such a checklist.

***Discussion:** The Committee appointed a subcommittee of the following individuals to review and develop a draft checklist: Will Wotthlie, Eric Kappent, Kelly White, Mike Keilty (Chairman), Monty Hopper, and Schlumberger (Neptune). The subcommittee was asked to prepare a draft checklist by the NCWM Annual Meeting in July.*

<u>Additional items</u>.

- **Proposal was made to implement a policy for rotating chairmanship of the committee. After discussions, it was apparent this problem exits throughout the Conference. The Conference Chairman suggested that in order to assist the current review of this problem, the Committee recommend criteria for membership and chairmanship be added to the NTEP Technical Policy.**

  <u>Chairman</u>

  - There should be a 2-year rotation for chairman with a vice-chair appointment on the second year of the term.

  - Chairman will be appointed by the NTETC Committee.

- **Recent interpretations by OWM and a participating lab, have raised a question as to when is it appropriate to display a price change on a dispenser if the price change is initiated during a delivery.**
  OWM has interpreted that a price change cannot be implemented until the transaction is completed. Under G.S.2. the checklist states that "the system shall prevent a change of unit price during a delivery or, in the case of a retail fuel dispenser, while the operating mechanism is in the 'on' position." This has been confused with the selection of unit prices by the customer and the completion of a transaction.
  The Committee feels that to be out of mathematical agreement is acceptable at this point, as long as the previous sale volume and price is displayed.

- **Concern was expressed by several members that several sections appear to have been added to the current edition of Pub 14 that are not in pervious NTETC meeting minutes. Ron Murdock will bring a list to OWM for clarification.**

Executive Committee

Attendees:

NAME	COMPANY/JURISDICTION	PHONE
Will Wotthlie	MD Weights and Measures	410-841-5790
Steven Cook	CA Measurement Stds	916-229-3050
Michael Keilty	Micro Motion	410-546-6699
Rodney Cooper	Schlumberger (Neptune)	303-530-8231
Johnny Parrish	Brooks Instruments	912-489-0303
Kelly White	Brooks Instruments	912-489-0228
Renald Marceau	Legal Metrology Branch, Canada	613-952-2629
Richard Huff	Universal Epsco	404-351-2740
Francis Holland	Schlumberger (RPS)	804-366-4162
Ronald Murdoch	NC Dept. of Agriculture	919-733-3313
Patrick Harcock	Legal Metrology Branch, Canada	613-952-0669
Ron Flores	CA Measurement Stds	916-229-3032
John Skuce	Smith Meter Inc.	814-898-5405
Robert M. Traettino	Liquid Controls Corporation	708-295-1056
William D. West	Ohio Weights and Measures	614-728-6290
Ross J. Andersen	New York Weights and Measures	518-457-3146
Gordon W. Johnson	Gilbarco Inc.	910-547-5375
Mike Belue	Belue Associates	903-583-9082
Debbie Joines	Dresser Industries, Wayne Division	410-546-6699
Darryl Brown	Iowa Weights and Measures	515-281-5716
Stephan Langford	Cardinal Scale Mfg.	417-673-4631
Richard Shockley	MD Weights and Measures	410-841-5790
Robert Kelly	New York City Weights and Measures	212-487-2634
Jack Jeffries	FL Dept. Of Agriculture	904-487-2634
Richard Tucker	Tokheim Corp.	219-470-4610

Appendix I

NTETC Grain Moisture Meter Sector
September 13-14, 1995, Des Moines, IA
Meeting Summary

Agenda Items

1. Report on NCWM Annual Meeting
2. NTEP Policy: Examples of Appropriate Use of the NTEP Logo
3. Update on Type Evaluation and Phase II Testing
4. Update on Publication 14
5. Addition of Audit Trail Requirement Details to Publication 14
6. Temperature Range Marking on Devices
7. Maximum Allowable Temperature Difference Between Meter and Grain
8. Sample Temperature Tests
9. Organization of Sample Exchange for Oven Moisture Standardization
10. Collection of Objective Evidence of Grain Moisture Program Effectiveness
11. Phase II - Data Collection and Calibration Maintenance Issues
12. Certificate of Conformance - Listing of Calibration Constants
13. Communication of Calibration Changes to Users
14. Promotion of NTEP
15. Date for Next Meeting

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1. Report on NCWM Annual Meeting

The NCWM Annual Meeting was held July 16-20, 1995, in Portland, ME. The conference adopted the following proposals by majority vote of both the House of State Representatives and the House of Delegates:

356-1 **Elimination of Retroactive Dates from the Grain Moisture Meters Code.** This item had been proposed by the Central Weights and Measures Association and endorsed by the Sector at its September 1994 meeting. (A more complete discussion of this issue can be found in Publication 16, *NCWM Annual Meeting Program & Committee Reports.*)

Note: The Sector notes that with retroactive dates removed, the Code is very hard to interpret and seems to contain contradictory requirements in many areas. It was generally agreed that even with editorial "patches" to these areas, the resulting code would be very confusing and difficult to interpret properly. The Sector suggests that the code be reorganized into two sections, one applicable to Meters placed in service before January 1, 1998 (other than those certified as meeting NTEP requirements), and another applicable to NTEP meters and to all other meters placed in service after January 1, 1998. The Sector requests the S&T Committee to consider approving such re-organization as an editorial change not requiring action by the Conference. The Sector further requests that a draft of the reorganized code be submitted to the Sector for review before it is published.

356-2 **S.1.2.2.(g) Digital Indications and Recording Elements (new paragraph).** This item was the Sector's recommendation which requires multi-constituent meters to display and record constituent labels.

356-3 **S.2.3. Provision for Sealing.** This item was first proposed by the Sector at its March 1994 meeting and subsequently modified by the Sector at its March 1995 meeting to explicitly state that the device is not required to display audit trail information. The Standards and Tolerances Committee accepted the modified wording as an "editorial" change allowing the proposal to be presented to the Conference for vote in the following form:

S.2.3. Provision for Sealing

(a) Provision shall be made for applying a security seal in a manner that requires the security seal to be broken, or for using other approved means of providing security (e.g., audit trail available at the time of inspection as defined in part [b]), before any change that affects the metrological integrity of the device can be made to any mechanism.

(b) If the operator is able to make changes that affect the metrological integrity of the device (e.g., slope, bias, etc.) in normal operation, the device shall use an audit trail. The minimum form of the audit trail shall be an event logger and shall include:

- An event counter (000 to 999)
- the parameter ID,
- the date and time of the change, and
- the new value of the parameter (for calibration changes consisting of multiple constants, the calibration version number is to be used rather than the calibration constants).

The device is not required to display this information, but a printed copy of the information must be available through another on-site device. The event logger shall have a capacity to retain records equal to twenty-five (25) times the number of sealable parameters in the device, but not more than 1000 records are required. (Note: Does not require 1000 changes to be stored for each parameter.)

2. NTEP Policy: Examples of Appropriate Use of the NTEP Logo
Policy for the use of the NTEP name and logo is needed to protect the integrity of NTEP and to eliminate false or misleading advertising that implies NTEP certification. Mettler-Toledo had proposed specific wording for descriptive text to accompany the logo in advertising for Truck Scales, Floor Scales, Weight Indicating Elements, and Load Cells. At the recent Annual Meeting, the NTEP Board of Governors (BOG) presented this issue as an "informational" item, not requiring formal action by the Conference, with the recommendation that the examples be printed as an appendix to Part I (Administrative Policies and Procedures) of Publication 14.

The Grain Moisture Meter Sector and the Gas Pump Manufacturers Association (GPMA) suggested that similar examples of appropriate wording are needed to accompany the logo in advertising for Grain Moisture Meters and Gas Pumps. The BOG announced its intention to make this issue a voting item next year and said it would consider the concerns raised by GPMA and the Grain Moisture Sector.

The Sector endorsed the following wording for Grain Moisture Meter advertising noting the comment of one member who expressed concern that there might not be sufficient room in a small advertisement for all the suggested wording and a list of approved grains.

> <u>Grain Moisture Meter</u>
> The [Model XXXX] meets or exceeds the accuracy and performance requirements for Grain Moisture Meters as detailed in National Institute of Standards and Technology (NIST) Handbook 44. A Certificate of Conformance, Number XX-XXX, was issued under the National Type Evaluation Program (NTEP) of the National Conference on Weights and Measures, approving this model for commercial use on the following grains: (append list of grains for which NTEP approval has been granted for this model.)

Additional concerns were raised regarding advertising claiming, "designed to meet NTEP requirements," for devices which had not been submitted for NTEP testing. Several members also questioned the use of the phrase "Currently registered in the NTEP National Type Evaluation Program" in advertising a device which had been submitted for testing but which had not yet been tested. The Sector decided to forward these concerns to the BOG. Rich Pierce, of the Grain Inspection, Packers and Stockyards Administration/Federal Grain Inspection Service (GIPSA/FGIS), reported that he had seen literature which stated that a meter used "approved NTEP/FGIS calibrations." He pointed out that although GIPSA/FGIS was the NTEP laboratory for Grain Moisture Meters, it was inappropriate to infer that NTEP calibrations have FGIS approval or that the instruments have FGIS approval.

3. Update on Type Evaluation and Phase II Testing
An update of the progress on type evaluation activity was provided by Rich Pierce of GIPSA. As of mid-September, type evaluation testing had been completed on five grain moisture meter models and Phase II calibration data was being collected on these five models. Certificate of Conformance (CC) numbers had been issued for four of the five models tested. A test report was being prepared for the fifth instrument. A CC number will be assigned to that unit after NIST has reviewed the test report. Draft CCs have been sent to California for editorial review for two of the five models. Preparation of CCs for two of the remaining models is being held pending review and clarification of calibration names, calibration constants,

calibration ranges, and individual instrument biases. A sixth instrument model had been received for NTEP testing late in May,

Sample temperature tests had been conducted to extend the allowable temperature difference between instrument and grain sample for three models. There are now two models certified with allowable temperature differences of 16 °C and two models with temperature differences of 20 °C.

On Phase II testing, Jim Rampton of GIPSA reported that as of September 12, 280 samples had been tested on each of the five NTEP meters and the Motomco 919. Nine grain types were included in these samples: two classes of barley, medium and long grain rice, sorghum, durum, soft white wheat, hard red winter wheat, and soft red winter wheat. A total of 3500 samples have been requested from GIPSA field offices and State agencies. These will be supplemented by high moisture corn samples collected by the Technical Services Division of GIPSA on field trips. Sector Chairman Lowell Hill pointed out that commercial field trials would be a good way to obtain high moisture corn samples of known variety and background. Will Wotthlie, Maryland Weights and Measures, reported that Maryland has received high moisture samples which could be made available for Phase II testing. These are sound samples which, because of their moisture content, are impractical to hold in storage for use in Maryland's moisture meter field testing program. The matter of state participation was discussed. It was noted that State participation in sample collection left something to be desired. Not all States have been supplying the number of samples requested. Diane Lee, NIST/OWM, offered to work with Jim Rampton to draft a letter which could be sent to these States by NIST to encourage the submission of samples.

Charles Hurburgh, Iowa State University, raised the question of proper sample identification. He pointed out that it was important that information regarding a sample's geographic origin and variety be available to assure that calibration sample sets exhibit the diversity necessary to be representative of the full population. Jim Rampton noted that the vast majority of samples were simply collected from marketing channels and that variety and source were not identified. In further discussions on this subject, it was decided that, as a minimum, information regarding the Field Office of origin and sample test weight would be identified for each corn sample. Test Weight, in combination with the location of the Field Office submitting the sample was thought to be a good proxy for variety and growing conditions as far as selecting samples for calibration was concerned. Manufacturers expressed the desire to have this information and any additional information which might be available on the sample.

4. Update on Publication 14

Sample copies of the new edition of NCWM Publication 14 were shown at the NCWM Annual Meeting. The new edition has been sent to the printer for volume reproduction. Diane Lee, NIST OWM, reported that copies of the complete publication are expected to be available for purchase sometime in October. She told the Sector that the price to NCWM members has now been set at $40 each ($60 each to nonmembers). Individual checklists will be available to members at no charge (probably limited to a maximum of three copies per member).

5. Addition of Audit Trail Requirements to the Grain Moisture Meters Checklist in Publication 14

The Sector considered additions to the Grain Moisture Meter Checklist of Publication 14 which had been proposed to reflect the H44 changes approved by the Conference (see Agenda item 1, Section **S.2.3. Provision for Sealing)** In addition, the Sector considered the addition of several paragraphs to the checklist to address problems discovered by NTEP laboratories while evaluating devices incorporating event loggers (paragraphs 4.1.5, 4.1.8, and 4.1.10. below).

During the discussion of the proposed changes and additions, one Sector member raised the question of the relationship of mechanical and electronic security to the audit trail, pointing out that light sources in NIR instruments were not sealed and that circuit boards could be removed and changed with no record of these actions appearing in the audit trail. It was suggested that these actions were repair actions, and that a mechanical seal of the areas containing replaceable parts would be an appropriate means to alert field inspection to unauthorized tampering with the instrument. Another Sector Member noted that the DRIE (formerly the SIM) in France requires, in addition to a physical seal, that a log book be maintained on-site to record any physical changes which could affect the metrological integrity of the device. Log book entries must show the registration number of the authorized service technician making the change or repair.

It was suggested that a similar log book should be required for U.S. grain moisture meters. Don Onwiler, Nebraska Public Service Commission, questioned how enforcement officials would make use of such a log and the motivation of users to keep a log. If users or service personnel neglected making entries, there would be no way of detecting this. The Sector set aside further consideration of repair logs and decided to confine the remainder of the audit trail discussion to matters associated with actions which could be performed by a user in the normal operation of the device. Accordingly, the requirement that an event counter be non-resettable was modified to specify that it be non-resettable by the operator.

It was noted that the checklist for Liquid-Measuring Devices did not require that date and time be sealable parameters. The necessity for requiring date and time to be sealable in Grain Moisture Meters incorporating an audit trail was questioned. In the ensuing discussion, it was pointed out that even with an event counter, a user could continue to use an old calibration well past the date at which a new calibration was to become effective; then, by altering the date, could change the calibration and make it appear that the change had been made at the proper time. With date and time not sealable, there would be no record of the date alterations on the audit trail. The Sector subsequently agreed that date and time should be considered sealable parameters and requested the Technical Advisor to add wording to that effect to the checklist either as a note to item 4.1.6. or as a new item 4.1.11. [Note: the wording appears as an explanatory note in 4.1.6. and in Appendix B, Item 3 under "Event Loggers: Acceptable Form of Audit Trail."]

Also discussed was the matter of whether the 30-day minimum requirement for audit trail power-out memory retention (Paragraph 4.1.8) would be sufficient for moisture meters which may see only seasonal use, and which may be disconnected from power for periods of 6 months or more. Although it was generally agreed that 30 days was not sufficient, there were no suggestions forthcoming on how a longer time period might be verified by the Type Evaluation Laboratory. Having to wait up to 6 months to verify conformance with a period of that length seemed neither practical nor desirable. Unable to arrive at a better suggestion, the Sector decided to accept the original proposal of 30 days minimum with the hope that new devices would not rely on battery backed memory for the audit trail.

The following paragraphs which replace all of the September 1995 version of 4.1 and its sub-paragraphs, incorporate the changes agreed to by the Sector (including the additions which the Technical Advisor was asked to make):

Code Reference S.2.3 Provision for Sealing

a. Provision shall be made for applying a security seal in a manner that requires the security seal to be broken, or for using other approved means of providing security (e.g., audit trail available at the time of inspection) before any change that affects the metrological integrity of the device can be made to any mechanism.

i.	The manufacturer has provided information on how the device should be sealed.	**Yes ☐ No ☐ NA ☐**
ii.	All calibration and metrological adjustments can be sealed, or other means of providing security such as audit trails are provided.	**Yes ☐ No ☐ NA ☐**
iii.	If the operator is able to make changes that affect the metrological integrity of the device (e.g, slope, bias, etc.) in normal operation, the device creates an audit trail incorporating an event logger.	**Yes ☐ No ☐ NA ☐**

If equipped with an event logger:

iv.	The event counter is nonresettable by the operator and has a capacity of at least 000 to 999.	**Yes ☐ No ☐ NA ☐**
v.	The event counter increments appropriately.	**Yes ☐ No ☐ NA ☐**
vi.	The event logger automatically retains the identification of the parameter changed, the date and time of the change, and the new value of the parameter (for calibration changes consisting of multiple calibration constants, the calibration version number is to be used rather than the calibration constants.) *Note: For devices incorporating an event logger, date and time are considered sealable parameters, and changes to date or time must be logged the same as any other sealable parameter.*	**Yes ☐ No ☐ NA ☐**

vii. The system is designed to attach a printer which can print the contents of the audit trail. Yes ☐ No ☐ NA ☐

viii. The audit trail information is capable of being retained in memory for at least 30 days while the device is without power. Yes ☐ No ☐ NA ☐

ix. The event logger has the capacity to retain records equal to 25 times the number of sealable parameters in the device, but not more than 1000 records are required. Yes ☐ No ☐ NA ☐

x. The event logger drops the oldest event when the memory capacity is full and a new entry is saved. Yes ☐ No ☐ NA ☐

Describe the method used to seal the device or access the audit trail information. ____________________

____

____

When audit trail requirements were added to other device codes, only essential audit trail information was distilled for inclusion in Handbook 44. Background information and detailed information to clarify how the sealing requirements of H44 Code would be interpreted during type evaluation were then added to Publication 14. Similar modifications had been proposed for the Grain Moisture Meter Checklist. The Sector reviewed a draft of the proposed background information, *Philosophy for Sealing / Typical Features to be Sealed*, and subsequently approved it for addition to the Grain Moisture Meter Checklist in Publication 14 as Appendix B (See Attachment 1 - *Note: This attachment is not included in this publication; it is available from the NIST Office of Weights and Measures.*)

6. Temperature Range Marking on Devices

At earlier Sector meetings, questions had been raised regarding the requirement for marking the operating range on the device (if other than 10 °C to 30 °C) as specified by Code Paragraph S.1.10.(c). The requirement for marking does not appear in the NIR Code. Some had suggested that the Sector did not intend to require marking of the temperature range on the device if the device did not display or record any usable values until the operating temperature necessary for accurate determination had been obtained. The necessity for marking the operating range on the device would seem to be superfluous if the meter cannot display a moisture value and must display an error message when the temperature of the meter is outside its specified operating range. The Sector considered this matter again and agreed that marking should not be required under these conditions. The Sector also approved changes to S.1.10.(a) to clarify that this paragraph applies to the device's warm-up period. The agreed to changes are shown below:

S.1.10. Operating Temperature

(a) <u>Warm-up Period: When a meter has first been turned on,</u> it ~~A meter~~ shall not display or record any usable values until the operating temperature necessary for accurate determination has been attained, or the meter shall bear a conspicuous statement adjacent to the indication stating that the meter shall be turned on for a time period specified by the manufacturer prior to use.

(b) A meter shall meet the requirements of T.2. - Tolerance Values when operated in the temperature range of 10 °C to 30 °C (50 °F to 86 °F) or within the range specified by the meter manufacturer.

(c) If the manufacturer specifies a temperature range, the range shall be at least 20 °C (36 °F) ~~and shall be marked on the device~~.

7. Maximum Allowable Temperature Difference Between Meter and Grain

H44 Code applicable to NTEP meters states:

> The maximum allowable difference in temperature between the meter and the sample for which an accurate moisture determination can be made shall be specified. The minimum temperature difference shall be 10 °C. No moisture value may be displayed when the maximum allowable temperature difference is exceeded. An appropriate error message shall be displayed when the difference in temperature between the meter and the sample exceeds the specified difference.

At its March meeting, the Sector reviewed a letter received from Sid Colbrook, Illinois Weights and Measures, in which he expressed concern that the temperature differences for which some meters were NTEP approved would lead to occasions when a moisture determination could not be made before the producer left the buying facility. He proposed several remedies, including increasing the accuracy tolerance for wider temperature differences between grain and the device.

At that time at least two manufacturers had submitted meters for NTEP evaluation specifying a minimum required temperature difference of 10 °C. [Another manufacturer has submitted a meter specifying an 18 °C temperature difference.]

Grain trade representatives were of the opinion that a 10 °C difference was too restrictive and would result in unacceptable delays at a receiving elevator. A minimum range of 20 °C was proposed.

Several Sector members expressed the opinion that the market would settle this matter. If the demand for a wider temperature difference capability was real, potential buyers would seek out the meter offering the widest range, Once apprised of this demand, manufacturers would make every effort to qualify to the widest range possible.

Although the data presented by the NTEP laboratory seemed to indicate that some meters might be capable of meeting the present accuracy limits for temperature differences greater than 10 °C, manufacturers were reluctant to agree to wider limits without the benefit of further testing of their instruments. Because any proposed changes in H44 could not be considered until 1996, the Sector decided to postpone further action on this item until its September 1995 meeting.

In the months following the March 1995 Sector meeting, several manufacturers have submitted meters for re-testing to extend the allowable temperature difference between meter and grain. Meters have subsequently been approved for temperature differences ranging from 16 °C to 20 °C.

In the light of these new approvals and the availability of at least two meter models with 20 °C temperature difference capability, the Sector considered this question a moot point with no further action required.

8. Sample Temperature Tests

The NTEP Laboratory has pointed out that testing for a meter-grain difference of 20 °C results in samples being at 42 °C for at least 36 hours. There is concern that extended exposure to high temperatures may affect test results. The Lab questions if it makes sense to test for a 30 °C difference which would require holding samples at 52 °C for 36 hours. As an alternative to testing at temperature differences which are symmetrical with respect to room temperature, the NTEP Laboratory had questioned if it would be acceptable to test and certify for a wider "cold" range than "hot" range? For example, a "hot" grain temperature of room plus 20 °C and a "cold" grain temperature of room minus of 40 °C.

The Sector agreed that meter-grain temperature differences do not need to be specified symmetrically with respect to room temperature (22 °C). It was pointed out that, because of grain stability considerations, it was not practical to perform tests with grain above 45 °C. The Sector agreed that 45 °C should be an upper limit for grain temperature and that testing (and certification) should not be done with grain above that temperature. It was suggested that these decisions be added to the appropriate sections of Publication 14.

[Editor's note: The changed portions of Publication 14, resulting from the implementation of the Sector's suggestion, are shown below.]

> **Instrument Temperature Sensitivity.** Instrument temperature sensitivity tests will be run using three HRW wheat samples ... at each temperature level.
>
> The "hot" temperature is defined as the upper operating limit claimed by the manufacturer (Note: The maximum "hot" temperature claimed cannot exceed 45 °C.) The "cold" temperature is defined as the lower operating limit claimed by the manufacturer. A relative humidity of 65 percent will be maintained for all temperature settings below 22 °C. Above 22 °C, a humidity ratio of 0.011 kg of water per kg of dry air will be maintained. To facilitate testing of instrument

temperature sensitivity, manufacturers shall provide a means of disabling the instrument feature for suppressing the display of moisture results when temperature ranges are exceeded. ...

II. Sample Temperature Sensitivity:

Additional testing is required to verify that accurate results are provided when the sample and instrument are at different temperatures. This will be referred to as the sample temperature sensitivity test. The purpose of this test is to verify that the instrument provides accurate results when the difference in temperature between the sample and the instrument is at the manufacturer specified difference (a minimum Δ of 10 °C is required). The sample temperature sensitivity test will be conducted using corn, HRW wheat, and soybean samples. Tests will be conducted with the instrument at room temperature and the sample temperature varying from room temperature + $\cancel{\Delta T}$ ΔT_H to room temperature - $\cancel{\Delta T}$. ΔT_C (where ΔT_H is the manufacturer specified difference for grain above room temperature and ΔT_C is the manufacturer specified difference for grain below room temperature. In no case will ΔT_H be allowed to exceed 32 °C, but the two differences need not be equal.)

9. Organization of Sample Exchange for Oven Moisture Standardization
Under the NTEP program for grain moisture meters, calibrations will be based on GIPSA air ovens and field inspection will be 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 GIPSA air oven which is considered the standard. The air oven method is an empirical test which may have to be adjusted to account for differences of altitude or other differences between laboratories. The subcommittee chaired by Dr. Charles Hurburgh (Iowa State University) developed a structured program for interlaboratory comparisons of oven moistures, and, if available, moisture results on various moisture meters. Sector members reviewed the subcommittee's proposal and suggested the following changes:

- Increase sample size from 1 pint to 1 quart to provide sufficient sample for testing on all moisture meter models.
- Add provisions for recording calibration version information to data sheets.
- Expand program to include all meter models a lab may have (not just NTEP meters).

(Attachment 2, dated 9/29/95, incorporates the above changes - *Note: This attachment is not included in this publication; it is available from the NIST Office of Weights and Measures.*)

With the exception of GIPSA, lab identities and meter model identities would be coded. Each participating lab and each meter manufacturer would know only their own codes. Rich Pierce, representing the NTEP Laboratory, said that even though meter identities would be coded in the collaborative study, he would require a letter from each manufacturer granting permission to release collaborative study results.

The initial interlab exchange is expected to be initiated after this year's harvest. Originating laboratories for the initial exchange will be: Iowa State (corn and soybeans) and the Arkansas Department of Standards (soft red winter wheat).

Rich Pierce, GIPSA, pointed out that although GIPSA will be participating in the collaborative study, they may not be able to accommodate every request for testing individually submitted samples. He suggested that any lab wishing to submit samples independently to the GIPSA contact Bill Burden before sending samples.

10. Collection of Objective Evidence of Grain Moisture Program's Benefits
The objective of the NTEP Moisture Meter Program is to bring interstate and intermeter comparisons closer together. To determine if this objective is being met, it will be necessary to describe the accuracy and precision of U.S. moisture measurements before and after the implementation of the NTEP program. The task of defining a program to compile the necessary data to make this comparison was assigned to the subcommittee already formed to develop an oven moisture collaborative study (see agenda item 9). Sector members reviewed and endorsed the subcommittee's proposal. (See Attachment 2, "Objective 2" - *Note: This attachment is not included in this publication; it is available from the NIST Office of Weights and Measures.*) Manufacturers have pledged $300 each to help defray the costs associated with collecting and compiling the initial data. The balance of funding will come from Agricultural Extension. The Sector will review the results of the initial effort before deciding whether to repeat the study in 2 to 5 years.

11. Phase II - Data Collection and Calibration Maintenance Issues
The NTEP Laboratory has begun the collection of data associated with Phase II of the NTEP Grain Moisture Program. Jim Rampton, GIPSA Moisture Calibration Laboratory, outlined the Quality Assurance steps being taken to minimize errors and to assure that data was being collected and recorded accurately. He cited a number of potential problems posed by different approaches taken by various manufacturers to data file management. He suggested that more consideration needs to be given to the possibility for data loss and data corruption when designing data collection software. The safest approach appears to be in systems which save an entire season's data in one file. New data is simply appended to the file without overwriting previous data. Least desirable is a system which overwrites any existing file for a given grain with the data most recently collected, effectively deleting any information previously collected. Manufacturers considering redesigning their data collection software are urged to contact Jim Rampton for suggestions before proceeding.

For dielectric meters, monthly installments of data collected can now be sent to manufacturers for review. Manufacturers were asked to contact Jim Rampton with answers to the following :

1. Regarding File Names - are the GIPSA names acceptable?
2. Separate files are now created for each day's data -- would it be acceptable to merge these into a single file?
3. What format is most desirable (ASCII, Lotus, Excel, other)?
4. Can headers (column headings) be eliminated from the files?

If a calibration change is made, manufacturers will be required to "re-predict" moistures from raw data collected during the past 3 to 5 years. This data in turn, must be supplied to the NTEP Laboratory in a standard format which is compatible with GIPSA's analysis software (See Attachment 3, "Data Flow Diagram") to allow the NTEP lab to review and approve the change before a CC can be renewed. Manufacturers were presented with a suggested standard format for submitting NTEP meter data for calibration review, and reports from GIPSA's 1994 Moisture Meter Calibration Study were presented as examples of what reports might be made available for NTEP Calibration Review. Manufacturers were asked to review the suggested data format and reports and respond to Rich Pierce by September 30 with their suggestions and comments.

The NTEP Laboratory had raised another question pertaining to calibration changes. In some instruments, temperature compensation is accomplished by including, in the calibration set, data obtained on samples at various temperatures. For these instruments, calibration updates may affect the temperature compensation and thus affect performance over temperature. The NTEP Laboratory asked whether manufacturers should be required to demonstrate that calibration changes do not adversely affect performance over a temperature range, and if so, how might this be accomplished?

The Sector was in general agreement that some form of verification was needed to assure that temperature performance had not been compromised by a calibration change. It was noted that in dielectric meters, the temperature correction coefficients are independent of other calibration changes. Thus, temperature performance of those meters would not be affected by calibration changes. It was suggested that "raw" data (spectral data in the case of NIR instruments) collected during type evaluation could be used to re-predict temperature performance of new calibrations. The NTEP Lab reported that, unfortunately, spectral data had not been collected during temperature testing in type evaluation. It was also suggested that annual temperature tests should be conducted on NTEP instruments in conjunction with the temperature studies GIPSA had been performing on the Official Meter. Rich Pierce reported that in anticipation of replacing the Motomco with an NTEP meter in the future, GIPSA was no longer performing temperature studies on the Motomco. He also reminded the Sector that temperature studies were not included in Phase II of the NTEP moisture program and that no temperature testing had been performed on the "other 13" NTEP grains [i.e., grains other than corn, soybeans, and hard red winter wheat].

Some Sector members felt that a program should be established to check the temperature performance of the "other 13" grains. Manufacturers were concerned about the cost of additional testing. There was also concern that because some of the "other 13" grains generate a very small portion of moisture meter sales, manufacturers might drop these grains from their list of supported calibrations if the cost of maintaining the calibrations exceed the revenue generated by sales to markets using the calibrations. Charles Hurburgh, Iowa State, was of the opinion that manufacturers had two choices: 1) supply data to prove that temperature performance is O.K.; or 2) pay GIPSA to collect the data. Ole Rasmussen, Foss Food Technology, observed that of the 16 NTEP grains, 7 were wheat (counting durum), 2 were rice, and 2 were barley. He suggested that it might be possible to combine the wheats into a single set which could be used for temperature testing, and that similar sets might be made for rice and for barley. This would cut the number of grain temperature tests from 16 to 8, or in terms of the "other 13" to 6. The Sector was unable to reach a consensus on what should be done with regard to obtaining objective evidence that temperature performance was acceptable for calibrations for the "other 13" grains. Further discussion on this issue was tabled until the Sector meeting scheduled for March 1996. Manufacturers were asked to review the issue and be prepared to suggest alternatives or options for providing this data. Other Sector members, particularly those representing the grain trade and grain processors, were asked to poll their members and be prepared to indicate which grains were important enough economically to justify testing for temperature performance. The NIST representative was asked to find out how comfortable NIST was with not having temperature data available for the "other 13" grains.

12. Certificate of Conformance - Listing of Calibration Constants
For multi-variant instruments, a calibration may consist of 100 or more coefficients for a single grain. At an earlier meeting the Sector decided that all calibration constants should be listed on the CC as an aid to field inspection in verifying that correct calibrations had been installed. The NTEP laboratory has questioned whether calibration constants need be listed on the CC if they cannot be displayed on the device or recorded on the device's printer. It would seem that there is no advantage to field enforcement knowing the calibration constants if there is no way to access them on-site. Handbook 44, Paragraph S.5.1. provides for two alternate methods of verifying calibrations: 1) display of calibration constants, or 2) display of a unique identifier (calibration name or calibration version number). After considering the matter the Sector rescinded its previous decision and agreed to the following:

> If a meter can neither display nor print calibration constants, calibration constants need not be listed on the CC. Only the unique calibration name, or a unique calibration version number which can be used by field inspection to verify that the correct calibration has been installed, will be listed.

13. Communication of Calibration Changes to Users
This issue had been discussed at the Sector's Meeting in March 1995. At that time, the Sector agreed that the responsibility ultimately lies with the owner to see that his instrument is updated when required. It was suggested that announcing calibration changes on the same date each year would accustom users to expect to receive the information by that date and would lead them to take action to find the information if they had not received it. A fixed date for announcement would also facilitate publicizing, through grain trade magazines, the need for owners to be aware of potential changes and to contact their manufacturer or sales agent for details. Additional details could be announced through various grain industry newsletters which have shorter lead times for publication. To speed the dissemination of detailed calibration information, it was suggested that once new calibration information was verified by the NTEP laboratory, manufacturers could make a preliminary release of the information to States and interested parties.

Randy Allman, Executive Director of the Agribusiness Association, has since suggested that State and regional grain and feed associations can play a key role in the dissemination of calibration updates. He expressed the belief, however, that it is most appropriate for this information to come to these organizations via the State weights and measures officials.

Sector Members considered Mr. Allman's suggestion, but concluded that most States don't want to assume the responsibility for disseminating this information. They agreed, however, that they would be willing, if contacted by a regional association, to verify that the information which the association had received from manufacturers was, indeed, the latest calibration. One Weights and Measures member said that his agency could provide each manufacturer with a list of owners of its meters. Such lists could be used by manufacturers to notify individual users. At least one manufacturer, however, expressed the desire to use a more economical method to disseminate the information, favoring grain industry publications and grain association newsletters.

14. Promotion of NTEP
In earlier meetings, Sector members had expressed concern that several grain producing states do not have a viable field inspection program for grain moisture meters and have not become NTEP states. It was agreed that a brochure and a detailed information packet which promoted the program's benefits would be useful in promoting the NTEP Grain Moisture Meter Program. Cliff Watson, Consultant, circulated the draft text of a brochure describing the National Grain Moisture Meter Program for review and comment. Rich Pierce, GIPSA, noting that this program is not an FGIS program, objected strongly to a cited benefit which stated: "Adoption by GIPSA/FGIS of the new technology NTEP Certified meters in early 1997." Grain Trade representatives were equally strong in their opinion that unless GIPSA/FGIS endorsed the program [as evidenced by choosing one or more NTEP meters as the Official Meter], then the program wasn't good enough for Grain Handlers. One Sector Member expressed the belief that GIPSA/FGIS had already publicly committed to adopting an NTEP meter by 1997. The Sector decided to leave this statement in the next draft. Among other comments received were: 1) suggestions to replace the phrase "..specific high performance standards" with "..established design and performance criteria"; 2) objections to the phrase "less potential for "fraud," which was thought to be inflammatory; 3) suggestions that it would be more appropriate to refer to the program as "a cooperative program, coordinated and supported by NCWM, NIST and GIPSA" rather than "Administered by NCWM, NIST, and GIPSA"; 4) recommendations to delete references to printed "tickets," using instead wording which states that printed results will be provided to the customer; and, 5) concerns that NCWM would object to referring to NTEP certified meters as "approved meters." This will be changed to "type approved meters" or "certified

meters." It was also suggested that the appeal of the brochure needed to be broadened and that the regulatory aspects of the program should be mentioned. Those present were asked to take the draft back to their organizations for further review and comment. Comments were to be submitted to Cliff Watson by September 30, 1995, so a final draft could be circulated to Sector Members by mid-October with the goal of printing the brochure early November.

15. Choosing a Date and Site for the Next Meeting

Anticipating the need for extended discussion of Phase II test results and the reorganization of the Moisture Meter Code, the Sectors agreed to a 2-1/2-day meeting (1 or 1-1/2 or 2 days for the Grain Moisture Meter Sector with the remainder for the NIR Protein Sector) to be held in St. Louis, MO, during the week of March 25-29. The exact dates will depend on availability of hotel accommodations and will be announced when arrangements have been made.

Appendix I (Continued)

NTETC Grain Moisture Meter Sector
March 25-26, 1996, St. Louis, MO
Meeting Summary

Agenda Items

1. Define Eligibility, Duties of, Term of Office, and Procedure for Electing Sector Chairperson
2. Election of Sector Chairperson
3. Report on NCWM Interim Meeting - GMM Issues
4. Editorial Reorganization of H44 - GMM Code
5. Proposed Change to H44 - S.2.3. Provisions for Sealing
6. Facilitation of Fraud - Clarification & Discussion
7. Update on Type Evaluation and Phase II Testing
8. Performance Verification over Range of Sample Temperatures
9. What Constitutes a Type Change?
10. Report on First Interlaboratory Sample Exchange
11. Progress Report on Compilation of Baseline Performance Data
12. Promotion of NTEP - Review of Draft Brochure
13. Test Weight per Bushel Indications
14. Date for Next Meeting

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1. Define Eligibility, Duties, Term of Office, and Procedure for Electing Sector Chairperson

In late September last year. Professor Lowell Hill submitted his resignation as Chairperson of the NTETC Grain Moisture Meter and Near Infrared Protein Analyzer Sectors. The NTEP Board of Governors (BOG) subsequently decided that Sectors should choose their own Chairperson and determine the term of office for the position. Because the NCWM *Constitution and Bylaws* and the NTEP *Administrative Procedures* do not specify eligibility, duties, term of office, or procedures for electing a Technical Sector Chairperson, the Sector adopted the following definitions and procedures to govern the selection of a Sector Chairperson. The duties of the Sector Technical Advisor were also formally defined to further clarify the division of responsibilities between the Technical Advisor and the Chairperson.

Sector Chairperson

Eligibility

Any active NCWM member in good standing shall be eligible for the office of Sector Chairperson. The Chairperson may or may not have experience with Grain Moisture Meter (GMM) or Near Infrared Grain Analyzer (NIR) devices, but must be able to ensure that the meeting proceeds with order and that the subjects of discussion do not stray from the intended purpose.

Duties

The role of the Chairperson is to ensure that discussions during the meeting are conducted in accordance with accepted (Parliamentary) procedure and to ensure timely discussion of each topic. The specific duties of the Chairperson are as follows:

- Review the agenda prior to the meeting to determine proper time allowances for each topic.
- Preside over the GMM/NIR Sector meetings, remind meeting participants of the GMM/NIR NTETC Sector purpose at the opening of each meeting, and oversee the timely and balanced discussion of each agenda item providing all interested parties present with an opportunity to be heard by the Sector.
- Communicate with the Sector Technical Advisor prior to Sector meetings to obtain any additional information which may be needed to carry out duties.
- Facilitate unbiased discussion during the Sector meetings.

- Perform other duties as necessary to facilitate the development and implementation of type evaluation test procedures and criteria and to promote acceptance of the NTEP program.

Term of Office
The Sector Chairperson shall serve for a 3-year term or until a successor is elected. A Chairperson may be reelected to succeeding 3-year terms if willing to serve. The Chairperson-elect shall take office immediately following the close of the Sector Meeting at which the election is held.

Nominations and Election
At the end of a term of service or when a vacancy in office occurs, the Sector's NIST representative and Technical Advisor shall jointly submit a slate of one or more candidates. Additional nominations may be made by Sector members at the meeting at which elections are to be held. The upcoming election shall be announced in the Agenda circulated in advance of the regularly scheduled Sector meeting at which the election is to be held. Voting shall be by means of show of hands. Proxy votes are not permitted. A simple majority of votes of Sector members present shall be sufficient for election. If none of the candidates receive a majority of votes on the first ballot, the slate shall be reduced to the two nominees receiving the most votes and another vote shall then be taken.

Sector Technical Advisor

Duties
The role of the Sector Technical Advisor is to solicit appropriate and essential topics for the NTETC meetings and to provide the NTETC Sector with background information on the agenda topics. The person holding this position usually has some experiences in grain moisture/protein measurements and/or is able to investigate the specific topic to facilitate discussion during Sector meetings. The specific duties of the Technical Advisor are as follows:

- Prepare a detailed written agenda for the GMM and NIR Sector meetings and deliver an electronic copy (a computer diskette) to the Office of Weights and Measures, in sufficient time for distribution to Sector members. The agenda is to include a list of agenda items, background information on each issue and a description of what is to be decided or determined by the Sector. Background information is to include detailed material pertaining to each agenda item such as the latest versions of the Handbook 44 codes and type evaluation checklists and criteria.

- Attend the GMM and NIR Sector meetings to provide technical assistance and guidance and to take meeting minutes.

- Prepare a detailed written summary of the Sector meetings and deliver an electronic copy (a computer diskette) to the Office of Weights and Measures in sufficient time for distribution to Sector Members and inclusion of Sector decisions and recommendations on the Agenda for the Interim Meeting of the National Conference of Weights and Measures. The meeting summary is to include, but is not limited to, updated recommendations for code revision, type evaluation criteria and checklist revision, and other actions as decided.

- Attend the Interim and Annual meetings of the NCWM as appropriate to provide support and information to the NCWM committees on Sector related topics and issues.

- Facilitate unbiased discussion during Sector meetings.

- Perform other duties as necessary to facilitate the development and implementation of type evaluation test procedures and criteria and to promote acceptance of the NTEP program.

2. Election of Sector Chairperson
Richard (Will) Wotthlie, Maryland Weights and Measures, was elected to the post of Chairperson for both the Grain Moisture Meter Sector and the Near Infrared Grain Analyzer Sector by unanimous vote of those present.

3. Report on NCWM Interim Meeting - GMM Issues
Diane Lee, NIST/OWM, reported on actions taken on grain moisture meter issues at the NCWM Interim Meeting held January 21-25, 1996 in Ft. Lauderdale, FL [Note: Item numbers and item headings shown below correspond to item numbers and headings of the Interim Meeting Agenda, NCWM Publication 15 dated December 1995. Additional discussion of these issues can be found in that publication.]

102-4 NTEP Policy - Examples of Appropriate Language to Use in Conjunction with the NTEP Name and Logo in Advertising and Brochures

The wording suggested by the Sector will be added to the other examples of appropriate language which the NTEP Board of Governors (BOG) is proposing to include as an appendix to Publication 14. The proposed appendix will be a voting item at the NCWM annual meeting.

In further discussion of this issue at this Sector meeting, Don Onwiler, Nebraska Public Service Commission, expressed concern that elevators in his jurisdiction may be mislead by advertising which contains the wording "designed to meet NTEP requirements" when, in fact, the devices have not yet been submitted for NTEP evaluation. The Sector was in general agreement that little could be done to stop such advertising unless it was blatantly false. The Sector's concerns in this matter have already been forwarded to the BOG. Sector members were asked to send copies of advertising containing what are believed to be false or misleading statements regarding NTEP approval to Diane Lee at NIST/OWM.

356-1 Elimination of Retroactive Dates; Effective for Devices Placed into Service after January 1, 1998

The Sector had recommended that the code be reorganized. The S&T Committee agreed in principle to reorganization of the Code into two sections, one applicable to meters placed into service before January 1, 1998 (other than those certified as meeting NTEP requirements), and another applicable to NTEP meters and to all other meters placed into service after January 1, 1998. The reorganized code will be presented to the NCWM as a voting item at the annual meeting.

356-2 S.1.10 Operating Temperature

The S&T Committee considered the Sector's recommendation to remove the requirement for marking the operating temperature range on the device and will make this a voting item at the NCWM annual meeting.

4. Editorial Reorganization of H44 - GMM Code
The Sector had noted that with retroactive dates removed, the Code is very hard to interpret and has contradictory requirements in many areas. It was generally agreed that even with editorial "patches" to these areas, the resulting code would be very confusing and difficult to interpret properly. To remedy this situation, the code was reorganized by NIST Staff into two sections, Sec. 5.56(b) applicable to Meters placed in service before January 1, 1998, and Sec. 5.56(a) applicable to meters placed in service after January 1, 1998. The Sector reviewed a draft of the reorganized code (see Attachments) and recommended the following changes:

Changes to Proposed Code Sec. 5.56(a) -

Change sentence describing applicability to read:

> This Section, 5.56(a) is applicable to all <u>NTEP grain moisture meters.</u> <u>It is also applicable to any</u> grain moisture meters manufactured or placed into service after January 1, 1998.

In proposed paragraph S.1.3.(d), change the sentence reading "The minimum temperature difference shall be 10 °C." to read:

> "The minimum temperature difference shall be 10 Celsius degrees."

Change proposed S.1.4. to read like the corresponding section of NIR code:

S.1.4. ~~**Value of Indications**~~ **Design of Measuring Elements.** - The display shall permit constituent 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.

~~(a) The value of the minimum indicated or recorded moisture indication shall not be greater than 0.1 percent.~~

~~(b) For the purposes of type evaluation, the maximum value for the moisture indication shall be 0.01 percent.~~

Change proposed S.1.5.(a) and (c) to agree with changes to be considered as agenda item 356-2 at the NCWM annual meeting. Also, revise S.1.5.(c) for clarity. [Note proposed S.1.5. is S.1.10 in the existing Code.]

S.1.5. Operating Temperature.

(a) Warm up Period: ~~A meter~~ When a meter has been turned on, it shall not display or record any usable values until the operating temperature necessary for accurate determination has been attained, or the meter shall bear a conspicuous statement adjacent to the indication stating that the meter shall be turned on for a time period specified by the manufacturer prior to use.

(b) A meter shall meet the requirements of T.2. - Tolerance Values when operated in the temperature range of 10 °C to 30 °C (50 °F to 86 °F) or within the range specified by the meter manufacturer.

(c) If the manufacturer specifies a temperature range, the range shall be at least 20 ~~°C~~ Celsius degrees (36 ~~°F~~ Fahrenheit degrees) ~~and shall be marked on the device~~.

Change proposed S.4. to read:

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:

(a) name and address or trademark of the manufacturer;

(b) the type or design of the device with which it is intended to be used;

(c) date of issue;

(d) the kind or classes of grain or seed for which the device is designed to measure moisture content; and

(e) the limitations of use, including but not confined to the moisture measurement 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; ~~but~~

~~(f) values exceeding any measurement range shall not be included.~~.

Change reference to "Federal Grain Inspection Service (FGIS)" in footnote 1 of Section N to "Grain Inspection Packers and Stockyards Administration (GIPSA)" and change "USDA FGIS" in Section T.3. to "USDA GIPSA" to reflect change in agency name.

Change proposed UR.1.1. for clarity and to agree with proposed S.1.4. as shown below:

UR.1.1. ~~**Value of the Smallest Unit on Primary Indicating and Recording Elements.** The value of the smallest unit on a moisture meter, whether the moisture meter reads directly in terms of moisture content, or~~

~~when the conventional scale unit is converted or corrected to moisture content, shall be equal to or less than one-half the value of the minimum acceptance tolerance.~~

Display Resolution - the resolution of the moisture meter display shall be 0.1 percent moisture during commercial use.

Add the note "Effective as of January 1, 1998" to proposed UR.3.4.(b).

Delete proposed UR.3.9. Operating Limitation. This paragraph is redundant. The requirement is covered by proposed S.1.3.(d).

Restore deleted UR.3.10, re-number it UR.3.9 and delete all references to calibration charts as shown below:

UR.3.10. Current Calibration ~~Chart or~~ Data. - Grain moisture determinations shall be made using only the most recently published ~~calibration charts or~~ calibration data.

Changes to Proposed Code Sec. 5.56(b) -

Change sentence describing applicability to read:

This Section, 5.56(b) is applicable to all <u>non-NTEP</u> grain moisture meters manufactured or placed into service before January 1, 1998.

Change proposed S.1.9.(c) to be consistent with defining a range in terms of "Fahrenheit degrees" or "Celsius degrees" as shown below:

(c) If the manufacturer specifies a temperature range, the range shall be at least 10 ~~°C~~ Celsius degrees (20 ~~°F~~ Fahrenheit degrees) and shall be marked on the device.

Delete proposed S.4. and the note following [these paragraphs do not apply to non-NTEP meters manufactured or placed into service before January 1, 1998.]

~~**S.4. 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 adjustments on moisture meters and, except for instrument failure and repair, only at 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 his designated service agency.~~

Change reference to "Federal Grain Inspection Service (FGIS)" in footnote 1 of Section N to "Grain Inspection Packers and Stockyards Administration (GIPSA)" and change "USDA FGIS" in Section T.3. to "USDA GIPSA" to reflect change in agency name.

Restore proposed UR.1.1. to its original wording:

UR.1.1. Value of the Smallest Unit on Primary Indicating and Recording Elements. - The value of the smallest unit on a moisture meter, whether the moisture meter reads directly in terms of moisture content, or when the conventional scale unit is converted or corrected to moisture content, shall be equal to or less than one-half the value of the minimum acceptance tolerance.

Delete proposed Table S.1.6.1. [This table is not applicable to non-NTEP meters manufactured or placed into service before January 1, 1998.]

5. Proposed Change to H44 - S.2.3. Provisions for Sealing:
Discussion: When originally considering provisions for sealing grain moisture meters, the Sector concluded that physical seals would not constitute a meaningful security measure if frequent bias adjustments were required (as might be the case with multi-constituent NIR meters) and that event counters alone would not provide meaningful information on the appropriateness of the adjustment. The Sector agreed that sealing requirements for NIR based instruments should equal or exceed those specified for Category 3 devices in the Scales Code. Accordingly, the Sector decided that audit trails for all devices with remote configuration capability should include an event counter, the parameter ID, the date and time of change, and the new value of the parameter (or the new calibration version number if the change consisted of multiple constants). The Sector also decided that devices without remote configuration capability should either be sealed by a physical seal or , if the operator is able to make changes that affect the metrological integrity of the device, should provide the same audit trail information as a remotely configurable device. At the 1995 Annual Meeting of the NCWM, H44 paragraph S.23., Provision for Sealing, was amended to specify the minimum information which must be contained in the audit trail. As S.2.3. is presently worded, however, the Sector's intent to require an audit trail in all devices capable of remote configuration (even for Category 2 devices where access to the remote configuration capability is physically sealable) is not clear. The Sector was asked to consider a change to S.2.3. which would require that any device with remote configuration capability have an audit trail. One manufacturer objected strongly to this proposal on the basis that there was no difference, from an enforcement point of view, from breaking a seal to allow a change to be made via a device's keyboard and breaking a seal to allow a change to be made from a remote site (e.g., via modem or acoustic coupler). It was also pointed out that there was an economic consideration in choosing a physical seal versus incorporating sufficient memory for an audit trail (memory being more expensive than a physical seal). Several other Sector members favored requiring audit trails for devices with remote configuration capability, whether or not a seal had to be broken to enable the device to be remotely configured. The Sector was unable to reach consensus on the issue. The Sector Technical Advisor was asked to develop an alternate proposal for consideration by the Sector at its next meeting.

6. Facilitation of Fraud - Clarification & Discussion
Several provisions of H44 General Code and Grain Moisture Meter Code specifically address the goal of minimizing the opportunity for operator error and facilitation of fraud. Some Sector members had raised questions regarding the applicability of these provisions to specific device design and operational characteristics of meters which had been issued Certificates of Conformance or which were presently undergoing testing by the NTEP Laboratory. The Sector was asked to consider the questions raised and decide if revisions should be made to the Code to address these issues.

(1) Question raised:

Does a device, which incorporates a weighing mechanism into which grain must be poured until a predetermined quantity (or weight) of grain has been introduced, meet NTEP requirements, or must the device be "fully automatic"?

GMM Code cited:

S.2.4. 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.

Background:

At the its March 28-29, 1994, meeting, in discussing this issue, the Sector agreed that weighing (and taking the temperature) of the grain should be automatic, in order to avoid any potential human error, with the goal being to eliminate all operator interaction that requires particular care to achieve an accurate reading. The Sector acknowledged that some operator judgement might be needed, but that specific quantities taken to the meter should not be critical to the final accuracy of the moisture determination. The Sector stipulated that there should be a clear indication when the required sample amount has not been provided by the user. The Code is very explicit in prohibiting *external* weighing. It would seem that as long as the weighing mechanism is an integral part of the device, and as long as operator judgement is not required to determine when the predetermined weight has been reached, that the described device meets the intent of S.2.4. If, however, the accuracy of the readings can be influenced by the rate at which the operator introduces the sample into the weighing mechanism, there may be reason to question whether the device complies.

(2) Questions raised:

a) If it is possible to cause an inaccurate reading in a device (in this case, a higher moisture reading) by adding additional grain into a meter after the predetermined amount has been introduced, would this device be considered one which facilitated the perpetration of fraud?

b) If a device's grain temperature sensing element is accessible to the operator, and if manipulation of the element affects meter results, would this device be considered one which facilitated the perpetration of fraud?

Code Cited - General Code G-S.2.

G-S.2. Facilitation of Fraud. - All equipment and all mechanisms and devices attached thereto or used in connection therewith shall be so constructed, assembled, and installed for use such that they do not facilitate the perpetration of fraud.

Background:
In previous Sector discussions, the operation of a scale has been cited as a benchmark to judge whether a device facilitates the perpetration of fraud. If the operator places his finger on a scale as a measurement is being made, the customer will receive an inaccurate reading, but as long as the scale (and the actions of the operator) can be viewed by the customer (G-UR.3.3. and GMM Code UR.3.7.), the customer can prevent obvious fraud. If the addition of grain to a meter or the manipulation of the temperature sensing element is *obvious to the customer,* then the meter would not be considered in violation of G-S.2. On the other hand, it might be argued that the location requirement of GMM Code UR.3.7. is not realistic, because drivers delivering grain to an elevator frequently remain on the truck and cannot always observe the actions of the person operating the moisture meter.

3) Question raised:
If it is possible to affect a meter's result by placing one's hand near the instrument during the device's automatic calibration (or auto-zeroing) process, does the device facilitate fraud?

General Code Cited:

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

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

Background:
As mentioned in the discussion of Question 2 above, the determining factor in such cases has been the degree to which the operator's actions can be considered obvious to the user. In this instance, one might also question if placing a hand near the instrument during the measuring process also affects the reading. The Sector might want to consider requiring that warnings be prominently displayed on the device if it is sensitive to the position of the operator during calibration or operation.

A few Sector members expressed the belief that devices which operate as described above did indeed facilitate fraud, citing the fact that in many instances a grain seller will remain on the delivery truck and will not see what the operator is doing. Some were of the opinion that in the absence of evidence to the contrary, the present Code appeared to be adequate and that the described devices did not facilitate fraud. Others felt that this was a matter of interpretation of the Code by the NTEP laboratory and pointed out that if anyone was in disagreement with the laboratory's interpretation or with the issuing of a certificate of conformance, there was an established process for filing an appeal with the NTEP BOG. One Sector member asked if the real issue wasn't the question of whether or not open cell instruments should be permitted? This provoked a quick response from another member who suggested that the question of open cells should have been brought up 4 years ago. The Sector Chairman expressed concern that this issue was turning into a "shooting match" between manufacturers and stated his belief that the Sector was not the place to settle the issue. He suggested that if any jurisdiction experienced recurring problems in the field this should be brought to the attention of NIST/OWM for appropriate action. Further discussion on this issue was tabled indefinitely.

7. Update on Type Evaluation and Phase II Testing

Rich Pierce of the Grain Inspection, Packers and Stockyards Administration (GIPSA, formerly FGIS), the NTEP laboratory for Grain Moisture Meters, reported on the progress of Type Evaluations and the collection of Phase II data on 1995 crop. The NTEP laboratory is currently evaluating three additional grain moisture meter models. Testing of those models which successfully meet NTEP requirements on the first pass is expected to be completed by April 30, 1996. Calibration data and summary reports for 1995 crop samples have been provided to the five manufacturers having models in the Phase II, Calibration Maintenance and Review Program. Sample summary reports were presented for corn, soybeans, and hard red winter wheat (HRW) [see Attachments]. The reports which incorporate data collected on the GIPSA official meter and the five NTEP meter models, illustrate the type of information which was provided to manufacturers on their individual models. Dr. Pierce asked the Sector to consider if the format of these reports might be acceptable for tracking improvement in NTEP meter performance over time. In response, the Sector noted that the summary report for corn included results which were outside the moisture range for which several instruments had been approved. The Sector generally agreed that if this summary format was to be used to track improvement in NTEP meter performance, it should not include meter data which was outside the range of moistures claimed for any meter. Dr. Pierce also presented a list of commodities with corresponding calibration change dates presently observed by GIPSA for putting new calibrations into effect [see Attachments]. The Sector had previously indicated a desire to release calibration changes simultaneously with GIPSA and also had agreed on a single target date of May 1 for release of all calibration changes. Dr. Pierce noted that a single date for release of all calibration changes was not consistent with GIPSA's present release schedule. The Sector reaffirmed the desirability of a single target release date for calibration changes citing two reasons:

1) The logistics of publishing new certificates of conformance (and getting timely information into the midyear addendum to Publication 5).
2) The logistics of disseminating and installing new calibrations. (A single release date is the only practical option for a meter in which calibration changes can be made only by returning a meter to the manufacturer or distributor for re-programming.)

The following schedule was suggested for each of the significant milestones in the Calibration Review and Maintenance Program:

1. GIPSA provides last of summary reports with corresponding meter data to manufacturers (GIPSA to release report and data for each grain as it is available. It is assumed that summary reports and data on many of the grains would be available before the date shown here).	March 1
2. Manufacturer makes any required calibration changes and provides the NTEP laboratory with repredicted values in standard data format.	April 15
3. NTEP laboratory validates manufacturer's calibration change and forwards information for revised CC to NIST and to manufacturer.	May 1
4. NIST issues updated CC's and publishes midyear addendum to NCWM Publication 5.	(to be determined)

Because of delays in getting Phase II data to manufacturers for the 1995 crop, the feasibility of releasing new calibrations by May 1, 1996, was questioned. For this year only, the above schedule will be modified to call for manufacturers to provide the NTEP laboratory with repredicted values in standard data format on changed calibrations by May 1, 1996, and for the NTEP laboratory to forward validated calibration information to NIST and manufacturers by May 10, 1996.

8. Performance Verification over Range of Sample Temperatures

In some instruments, temperature compensation is accomplished by including, in the calibration set, data obtained on samples at various temperatures. For these instruments, calibration updates may affect the temperature compensation and thus affect performance over temperature. At an earlier meeting, the Sector was reminded that temperature studies were not included in Phase II of the NTEP moisture program and that no temperature testing had been performed on the "other 13" NTEP grains [i.e., grains other than corn, soybeans, and hard red winter wheat]. At that time the Sector was unable to reach a consensus on what should be done with regard to obtaining objective evidence that temperature performance was acceptable for calibrations for the "other 13" grains and for any calibration changes made on the three "basic" grains subsequent to NTEP testing. Manufacturers were asked to review the issue and to suggest alternatives or options for providing this data. One manufacturer expressed the opinion that manufacturers should submit temperature data for the "other 13" grains and also for any grain when a calibration change is made. Another suggested that calibration changes for a given meter model could be evaluated based on spectral or "raw" data if it is available for the moisture and temperature ranges involved. It was suggested that moisture data be collected on one or two samples at both extremes of temperature in each 2 percent interval of moisture over the desired moisture range. The Sector Technical Advisor and the NTEP laboratory representative were asked to propose minimum data requirements and a detailed procedure for collecting temperature data on: 1) the "other 13" grains and 2) the "standard 3" grains for extended moisture ranges. A draft proposal will be presented at the next Sector meeting.

9. What Constitutes a Type Change?
The following information was provided to the Sector as an information item in response to questions which had been raised regarding NTEP policy and procedures for issuing of updated CC's for device changes and annual calibration endorsements of Moisture Meters. There was no discussion of this item at the Sector meeting.

Unlike Certificates of Conformance (CC's) for scales, CC's for Moisture Meters will be updated (re-issued) annually as evidence that calibrations shown on the CC are appropriate for use for the current year's harvest. When CC's are re-issued (whether to reflect currently approved calibrations or to reflect an instrument modification or to include an additional model) a sequentially assigned identifier (A1, A2, A3, ... etc.) will be appended to the original CC number. For example, if the original CC number was 95-021 the second update of that CC would be 95-021A2. If requests for model changes or additions to an existing CC are submitted to the NTEP between October and February, those changes can be included on the annual update of the CC and the manufacturer will pay only a single reissue fee.

A 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 submits two similar types to the NTEP, a decision must be made whether to conduct one or two separate evaluation processes. 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.

When a manufacturer makes changes to an approved type, evaluation of the modification may be necessary. Publication 14 delineates a manufacturer's responsibilities when making changes or modifications to an NTEP certified device and lists the options available to the NTEP in such cases:

> The manufacturer must report changes that might require the attention of the NTEP; the decision to report is dictated by the significance of the modification.

Notification of Change
The manufacturer notifies the NTEP that a change to an approved device has been made or is contemplated. The manufacturer may make judgement concerning the modification and request issuance of an approval of a modification by citing the existing Certificate of Conformance, detailing the changes, and giving any data, analysis, and conclusions concerning the technical or metrological consequences of the changes.

NTEP Options
On the basis of the manufacturer's notification, the NTEP will decide whether or not to require an evaluation for approving the modification or issuance of a new Certificate of Conformance. NTEP will inform the manufacturer accordingly.

Marking
Any device modified to meet the influence factors requirements must carry a model designation different from a previous model. The differentiation may simply be a prefix or a suffix to the original model designation. The device may still carry the same model series designation on the device, but the model designation on the identification badge must be unique.

10. Report on First Interlaboratory Sample Exchange
Under the NTEP program for grain moisture meters, calibrations will be based on GIPSA air ovens and field inspection will be based on state air ovens. The air oven method is an empirical test which may have to be adjusted to account for differences of altitude or other differences between laboratories. A structured program for interlaboratory comparisons of air oven moisture determinations has been developed by a Sector Subcommittee chaired by Dr. Charles Hurburgh (Iowa State University). The first sample exchange under this program has been completed. 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. A summary of results is shown in the following two tables.

NTEP Moisture Collaborative - Oven Data							
Grain	Data	Sample					
		1		2		3	
		Average	SD	Average	SD	Average	SD
Corn	ALL (21 labs)	15.02	0.23	14.91	0.23	16.44	0.26
	NTEP lab	15.06	---	14.94	---	16.45	---
Soybeans	ALL (17 labs)	14.54	0.19	12.42	0.11	11.89	0.10
	NTEP lab	14.56	---	12.39	---	11.83	---
Wheat	ALL (17 labs)	12.31	0.10	10.58	0.08	---	---
	NTEP lab	12.36	---	10.55	---	---	---

	Standard Deviation Across Labs, By Type of Device (% pts)		
Grain	Oven	NTEP Approved	Non-NTEP
Corn	0.23	0.31	0.23
Soybeans	0.12	0.22	0.13
Wheat	0.07	0.28	0.20

[Editor's Note: Some of the devices classified as "NTEP Approved", although of the same brand and of similar construction, were not necessarily identical to the models submitted for type approval, and may or may not have been factory aligned with those models. All devices classified as "NTEP Approved" did, however, utilize current NTEP calibrations.]

Dr. Hurburgh pointed out that the oven procedure was very well done with states' data essentially equivalent to the NTEP lab. He observed that the units in the NTEP lab for Phase II calibration maintenance were not always well aligned with other units of the same brand, and was of the belief that the precision (SD across labs) of NTEP meters can be improved through better standardization.

11. Progress Report on Compilation of Baseline Performance Data
The objective of the NTEP Moisture Meter Program is to bring interstate and intermeter comparisons closer together. To determine if this objective is being met, data is being compiled from State Weights and Measures existing field test reports to establish a "pre-NTEP" performance baseline which can be compared to data compiled from field tests made after the NTEP program has been in effect for several years. Dr. Charles Hurburgh, Iowa State University, reported that the collection and compilation of data was well underway with about one megabytes of data entered into the spreadsheet thus far. An early look at the data seems to indicate that the reference used for the field test (i.e., other meter, oven, or oven modified with a meter re-test) appears to have a profound effect on the variability of results. A full report should be available for the next Sector meeting.

12. Promotion of NTEP - Review of Draft Brochure
In earlier meetings, Sector members had expressed concern that several grain producing states do not have a viable field inspection program for grain moisture meters and have not become NTEP states. It was agreed that a brochure which promoted the program's benefits would be useful in promoting the NTEP Grain Moisture Meter Program. A draft (see Attachments), incorporating comments from the previous Sector meeting was reviewed by the Sector. The following changes were agreed upon:

Page 1, modify the first paragraph to spell out the full name of GIPSA:

> The National Type Evaluation Program (NTEP) is a program of the National Conference on Weights and Measures (NCWM). NTEP is a cooperative program between the National Institute of Standards and Technology (NIST), NCWM, states, the Grain Inspection, Packers and Stockyards Administration (GIPSA, formerly FGIS), and private sectors for determining, on a uniform basis, conformance of a type or pattern of device with the relevant provisions of NIST Handbook 44, "Specifications, Tolerances, and Other Technical Requirements of Weighing and Measuring Devices."

Page 1, last paragraph:

> Remove "(NTETC)", it is not used elsewhere in the brochure.
> Remove the word "regulatory" from the last sentence.

Page 2, change third bullet under "Benefits of NTEP" to read:

- A single evaluation to satisfy all ~~States~~ state agencies.

Page 3, Modify the 4th, 5th. 6th, and 8th bullets to read:

- ~~GIPSA~~ NTEP lab evaluates the device in accordance with the test procedures and technical criteria specified in NCWM Publication 14.
- ~~GIPSA~~ NTEP lab reports deficiencies, if any, to the manufacturer who must correct these deficiencies before the process can continue.
- ~~GIPSA~~ NTEP lab prepares and forwards to NIST a report summarizing the results of the evaluation.
- NIST reviews the type evaluation results.
- ~~GIPSA~~ NTEP lab prepares the draft Certificate of Conformance ~~(CC)~~ and obtains a certificate number from NIST if the device passes the evaluation.

Page 3, Modify the section headed "Phase II" to read -

- Manufacturers must participate in the annual on-going calibration program to keep the certificate current.
- Manufacturers are provided with calibration data collected on the same sample set used by GIPSA for calibrating the Official Meters ~~and must develop calibration updates~~.
- Manufacturers develop calibration updates as required.

Page 4, Modify the second bullet to read:

- National Conference on Weights and Measures, Board of Governors, establishes administrative policy and procedures for NTEP and hears and provides resolution of appeals. ~~(See Bylaws, Article V, Section 5.)~~

Page 5, change sentence to read:

- For more information please contact your local State Weights and Measures Office or call the NCWM 24-Hour Fax Line ~~listed below~~ at 1-800-925-2453.

Page 6 (cover), Modify subtitle:

Grain Moisture Meters and Near Infrared Grain Analyzers

NIST/OWM has written the following organizations asking for permission to list their names in the brochure as supporting NTEP:

National Grain & Feed Association
Grain Elevator and Processor Society
National Corn Growers Association
American Soybean Association
National Wheat Growers Association
Rice Growers Association
American Farm Bureau
National Farmers Association

When answers have been received from these organizations, OWM will make arrangements for final design and printing of the brochure.

13. Test Weight per Bushel Indications

Background: The Grain Moisture Meter Code in H44 contains the following field test requirement for Test Weight per Bushel Indications:

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 FGIS.
(Amended 1992)

Some time ago, when the Sector was discussing this requirement, the reasonableness of the tolerance, was questioned, especially as it applied to the test weight of corn. It was pointed out that the tolerance was taken from FGIS (now GIPSA) procedures which compared the average of a large number of replicate measurements (10?) using the "standard" quart container to a like average obtained with the container under test. Only dry hard red winter wheat was used for this test. The Sector was in general agreement that the test was not realistic as a field test and that tolerances should be revised to indicate a different tolerance for each applicable grain. The Sector considered dropping this section from the Moisture Meter Code, reasoning that it would be more appropriate to include it in a separate chapter of H44 devoted specifically to the requirements for test weight per bushel devices. Several members of the Weights and Measures Community objected, however, stating that deletion of this section, prior to the development of a separate code chapter, would leave them without inspection and enforcement authority over these devices. Consequently, the Sector deferred further action on this matter to an unspecified future date.

There are now 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 Code, however, the test weight capability of these meters was disabled for the NTEP tests. Some State W&M Officials are permitting these devices to display and print the test weight information provided that some disclaimer appears on the printed ticket (e.g., the word "approximate" next to the test weight result) or that a warning against use of the information for commercial purposes is posted prominently on the device.

Discussion: The Sector reviewed this issue and was in general agreement that Test Weight per Bushel devices (Grain Bulk Density Apparatus) should be addressed in Code separate from the Grain Moisture Meter Code. All Sector members present expressed an interest in working on this new code noting that the measurement of Test Weight was next in priority behind moisture and protein measurement when the Grain Quality Incentives Act of 1990 authorized GIPSA to work with NIST and NCWM to standardize commercial inspections. Furthermore, Test Weight meets the criteria for consideration as a factor needing standardization: 1) it has economic significance; 2) it is in widespread use; 3) existing design criteria are in place; and 4) independent reference methods are available. It was brought to the Sector's attention that GIPSA and the Canadian Grain Commission had undertaken an effort to resolve differences in methods used by the two agencies, and that ISO has recently issued two standards relating to grain bulk density measurement: ISO 7971 and ISO 7971-2. The Sector decided to undertake development of new code for grain bulk density measurement. This will be an agenda item for the next Sector meeting. All known manufacturers of Test Weight apparatus will be invited to participate in this matter.

14. Choosing a Date and Site for the Next Meeting
The Sector agreed to a two and one-half day meeting to be held September 9-11, 1996, in the Kansas City area. Preliminary plans call for beginning the meeting at 9:00 a.m., September 9, with NIR Sector business. Issues common to both NIR and GMM Sectors will be considered beginning at 1:00 p.m. (or shortly thereafter) that same day. The remaining GMM issues will be taken up on September 10 and 11. The meeting will adjourn at noon on September 11.

Appendix J

NTETC Near Infrared Grain Analyzer Meter Sector
September 14, 1995, Des Moines, IA
Meeting Summary

Agenda Items

1. Report on NCWM Annual Meeting
2. Update on National Type Evaluation Testing Schedule
3. Update on Publication 14
4. Adding *Philosophy of Sealing & Typical Features to be Sealed* to Checklist
5. Addition of Audit Trail Requirement Details to Publication 14
6. Calibration Identification on Multi-Constituent Instruments
7. Phase II Testing - On-going Calibration Review

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1. Report on NCWM Annual Meeting
The NCWM Annual Meeting was held July 16-20, 1995, in Portland, ME. The Conference adopted the following proposal by majority vote of both the House of State Representatives and the House of Delegates:

357-1 **UR.2.8 Calibration Adjustments and S.2.5.1. Calibration Transfer.** This item was the Sector's recommendation to eliminate references to user slope adjustments and to more explicitly describe the information which the user must keep to justify calibration adjustments.

2. Update on National Type Evaluation Testing Schedule
Rich Pierce, Grain Inspection, Packers and Stockyards Administration/Federal Grain Inspection Service (GIPSA/FGIS) reported that he had just received from NIST the form to apply for certification as the NTEP Participating Laboratory for Near Infrared Grain Analyzers. To become certified, the lab must submit evidence that: 1) adequate trained personnel are available to perform the tests; 2) they have an understanding of the test procedures; 3) the necessary reference methods and samples are available; and, 4) that they have adequate facilities to do the testing. With regard to these four items, Rich noted that 1) Two new technicians had joined his group to replace two who had been transferred to another group. Training will be required to acquaint the new technicians with the requirements of NIR type evaluation testing; 2) Detailed test plans will have to be developed; 3) Samples have been in underground storage. These will have to be retrieved and sorted out; 4) The facilities at Kansas City are being remodeled and the type evaluation lab is being relocated to another space in the building. With lab certification in process, applications can be accepted for testing. Present plans call for sending out type evaluation application forms to NIR instrument manufacturers (along with a questionnaire regarding the need for calibration assistance) around October 1, 1995, with completed applications due October 15 and instruments due on site November 1, 1995.

Rich reviewed the availability of samples for calibration assistance. They include the 100 calibration samples and 50 validation samples per wheat class from '92 and '93 crop years used in developing FGIS' calibrations. Unfortunately, many of these are limited in quantity (somewhat less than 100 g), and the moisture range of these samples is somewhat limited. This set of samples might have to be supplemented with samples from crop years '93 through '95 which have been used for monitoring. Samples from '93 through '95 crop years will also be used for Type Evaluation Testing. Combustion Nitrogen Analyzer (CNA) protein data (12% moisture basis) is available for the calibration assistance samples. The CNA tests will not be repeated on those samples.

Charles Hurburgh, Iowa State University, asked how temperature compensation would be handled if calibration assistance was provided. Rich Pierce reported that this had not been determined. The lab will have to consider each case separately. Costs will depend on what additional testing the manufacturer will required to collect sufficient data for temperature compensation. Ole Rasmussen, Foss Food Technology, asked if manufacturers could arrange to bring samples into the lab and run them themselves on their "standard instruments." Rich Pierce saw no objections to this provided it didn't conflict with the NTEP Lab's need to collect Phase II or other data. He was not certain what arrangements could be made if CNA analysis was required.

3. Update on Publication 14
See Grain Moisture Meter Agenda Item 4 for general information on availability and cost of the 1995 edition of Publication 14. The Checklist for Near Infrared Grain Analyzers has also been included in the 1995 edition of Publication 14.

4. Adding Philosophy of Sealing & Typical Features to be Sealed to Publication 14
When audit trail requirements were added to other device codes, only essential audit trail information was distilled for inclusion in Handbook 44. Background information and detailed information to clarify how the sealing requirements of H44 Code would be interpreted during type evaluation were then added to Publication 14. Similar modifications had been proposed for the Near Infrared Grain Analyzer Checklist. The Sector reviewed a draft of the proposed background information, *Philosophy for Sealing / Typical Features to be Sealed,* and subsequently approved it for addition to the Grain Moisture Meter Checklist in Publication 14 as Appendix A. (See Near Infrared Grain Analyzer Attachment 1 - *Note: This attachment is not included in this publication; it is available from the NIST Office of Weights and Measures.*)

5. Addition of Audit Trail Requirement Details to Publication 14
The Sector considered the addition of several paragraphs to the checklist to address problems discovered by NTEP laboratories while evaluating devices incorporating event loggers (paragraphs 3.9.3, 3.9.5, 3.9.8, 3.9.10 below.) This item was discussed thoroughly during the Grain Moisture Meter Sector Meeting immediately preceding the NIR Grain Analyzer Sector Meeting. The NIR Sector approved the proposed additions (subject to incorporation of changes corresponding to those made by the Moisture Meter Sector) without further discussion. A summary of the Grain Moisture Meter Sector's discussion on this issue is reproduced below. *[Note: In the discussion reproduced below, paragraph references have been changed to the corresponding NIR Checklist paragraph numbers.]*

During the discussion of the proposed changes and additions, one Sector member raised the question of the relationship of mechanical and electronic security to the audit trail, pointing out that light sources in NIR instruments were not sealed and that circuit boards could be removed and changed with no record of these actions appearing in the audit trail. It was suggested that these actions were repair actions, and that a mechanical seal of the areas containing replaceable parts would be an appropriate means to alert field inspection to unauthorized tampering with the instrument. Another Sector Member noted that the DRIE (formerly the SIM) in France requires, in addition to a physical seal, that a log book be maintained on-site to record any physical changes which could affect the metrological integrity of the device. Log book entries must show the registration number of the authorized service technician making the change or repair.

It was suggested that a similar log book should be required for U.S. grain moisture meters. Don Onwiler, Nebraska Public Service Commission, questioned how enforcement officials would make use of such a log and the motivation of users to keep a log. If users or service personnel neglected making entries, there would be no way of detecting this. The Sector set aside further consideration of repair logs and decided to confine the remainder of the audit trail discussion to matters associated with actions which could be performed by a user in the normal operation of the device. Accordingly, the requirement that an event counter be nonresettable was modified to specify that it be nonresettable by the operator.

It was noted that the checklist for Liquid-Measuring Devices did not require that date and time be sealable parameters. The necessity for requiring date and time to be sealable, in Grain Moisture Meters incorporating an audit trail, was questioned. In the ensuing discussion it was pointed out that even with an event counter, a user could continue to use an old calibration well past the date at which a new calibration was to become effective; then, by altering the date, could change the calibration and make it appear that the change had been made at the proper time. With date and time not sealable, there would be no record of the *date alterations on the audit trail. The Sector subsequently agreed that date and time should be* considered sealable parameters and requested the Technical Advisor to add wording to that effect to the checklist in the appropriate section(s). [Note: the wording appears as an explanatory note in 3.9.6. and in Appendix A, Item 3 under "Event Loggers: Acceptable Form of Audit Trail."]

Also discussed was the matter of whether the 30-day minimum requirement for audit trail power-out memory retention (Paragraph 3.9.8) would be sufficient for near infrared grain analyzers which may see only seasonal use, and which may be disconnected from power for periods of 6 months or more. Although it was generally agreed that 30 days was not sufficient, there were no suggestions forthcoming on how a longer time period might be verified by the Type Evaluation Laboratory. Having to wait up to six months to verify conformance with a period of that length seemed neither practical nor desirable. Unable to arrive at a better suggestion, the Sector decided to accept the original proposal of 30 days minimum with the hope that new devices would not rely on battery backed memory for the audit trail.

The following paragraphs which replace all of the September 1995 version of 3.9 and its subparagraphs, incorporate the changes agreed to by the Sector (including the additions which the Technical Advisor was asked to make):

[Note: Paragraph numbers shown below do not correspond exactly with paragraph numbers in Publication 14. Some items have been combined and paragraph levels have been changed for clarity.]

Code Reference: S.2.6. Provision for Sealing

i. Provision shall be made for applying a security seal in a manner that requires the security seal to be broken, or for using other approved means of providing security (e.g., audit trail available at the time of inspection) before any change that affects the metrological integrity of the device can be made to any mechanism.

i.	The manufacturer has provided information on how the device should be sealed.	Yes ☐ No ☐ NA ☐
ii.	All calibration and metrological adjustments can be sealed, or other means of providing security such as audit trails are provided.	Yes ☐ No ☐ NA ☐
iii.	If the operator is able to make changes that affect the metrological integrity of the device (e.g., slope, bias, etc.) in normal operation, the device creates an audit trail incorporating an event logger.	Yes ☐ No ☐ NA ☐

If equipped with an event logger:

iv.	The event counter is nonresettable and has a capacity of at least 000 to 999.	Yes ☐ No ☐ NA ☐
v.	The event counter increments appropriately.	Yes ☐ No ☐ NA ☐
vi.	The event logger automatically retains the identification of the parameter changed, the date and time of the change, and the new value of the parameter (for calibration changes consisting of multiple calibration constants, the calibration version number is to be used rather than the calibration constants.) *Note: For devices incorporating an event logger, date and time are considered sealable parameters, and changes to date or time must be logged the same as any other sealable parameter.*	Yes ☐ No ☐ NA ☐
vii.	The system is designed to attach a printer which can print the contents of the audit trail.	Yes ☐ No ☐ NA ☐
viii.	The audit trail information is capable of being retained in memory for at least 30 days while the device is without power.	Yes ☐ No ☐ NA ☐
ix.	The event logger has the capacity to retain records equal to 25 times the number of sealable parameters in the device, but not more than 1000 records are required.	Yes ☐ No ☐ NA ☐
x.	The event logger drops the oldest event when the memory capacity is full and a new entry is saved.	Yes ☐ No ☐ NA ☐

Describe the method used to seal the device or access the audit trail information. ______________________

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6. Calibration Identification on Multi-Constituent Instruments

The NTEP Lab had requested the Sector to consider whether it would be desirable to issue a single (or combined) CC for multi-constituent instruments. This request was based on the concern that a device approved for both moisture and protein may have to use a single common name to enable the results for both constituents to be displayed for a single measurement of the grain sample. If a common identifier is used for both constituents, a change in wheat moisture calibrations will require that the wheat protein CC also be updated. The Sector discussed the matter, noting advantages in enforcement (a single CC number for a given instrument) and in updating (only one certificate maintenance fee). The only disadvantage seemed to be that it would require the effective date of protein and moisture calibrations to be the same. The Sector had previously decided that May 1 should be the target date for reissuing CCs and that it would be desirable to make protein and moisture changes simultaneously. The Sector recommended that multi-constituent instruments be issued by a single CC.

In connection with this subject, several Sector members asked how CCs would be renewed each year and what numbering system would be used. A uniform, easily understood system is needed so field enforcement can determine if calibrations are the most recent. The NIST representative was asked to find out how NIST proposed to handle the yearly reissuing of CCs and to report to the Sector at its next meeting. *(Note: Under the Grain Moisture Meter and Near Infrared Grain Analyzer Program, CCs for these devices are valid only for a single season. They must be renewed each year with calibrations changed where necessary. A CC must be renewed even if no calibration changes are required.)*

7. Phase II Testing - On-going Calibration Review
This item first appeared on the Sector's agenda for its September 1994 meeting. It was discussed again in detail at their meeting in March 1995. In the course of these discussions, the Sector has agreed that:

- participation in a monitoring program of some sort should be mandatory for NTEP instruments.
- data should be collected (and made available to manufacturers) annually by the NTEP laboratory on instruments in the on-going calibration review and maintenance program for NIR grain analyzers.
- only reference method protein data (corrected to 12% moisture basis) and basic instrument data would be provided (i.e., no moisture data would be provided).
- no more than 100 samples per year per class would be required for calibration review or monitoring purposes.
- the problem of capturing new crop problems in local areas would be up to the manufacturer to address [and need not be part of the monitoring program].
- the accuracy limits used for NTEP approval should also apply to the annual review of NTEP calibrations.

The Sector had also recommended earlier that should GIPSA/FGIS decide to issue a new calibration for their official instruments, data on the same set of samples used to calibrate the GIPSA instruments (in addition to data on GIPSA/FGIS' validation sample set) should be collected on the NTEP instruments and should be made available to manufacturers (along with CNA data on those same samples).

For purposes of discussion, the Sector agreed to the following definitions for the two main elements of Phase II of the NTEP NIR Grain Analyzer Program:

1. Monitoring - verification that an existing calibration continues to meet accuracy requirements over time or, viewed another way, determining when recalibration is required.
2. Calibration Development and Maintenance - recalibration of NTEP instruments using (as a minimum) data obtained on samples selected from the same sample pool from which GIPSA/FGIS selected samples for calibrating the official instrument. It is recognized that manufacturers may wish to supplement GIPSA data with data from additional manufacturer-provided samples. Validation of new calibrations would be done using the same validation set used by GIPSA/FGIS.

[Note: As used above, "monitoring" applies to tests performed on the instruments in the NTEP lab and not to devices in the field. "Recalibration" means derivation of a new set of calibration coefficients.]

When an estimate of program costs was presented at the Sector's March 1995 meeting, manufacturers questioned why they should have to pay for CNA analyses when GIPSA was already analyzing samples in connection with their own monitoring program. Manufacturers felt that they should bear only the incremental costs associated with a monitoring program. This concern was addressed by Rich Pierce, GIPSA/FGIS, at the Sector's most recent meeting (September 1995). He stated that as long as GIPSA/FGIS had appropriated funds for collecting reference data (CNA analyses) on monitoring samples (or some portion thereof), there would be no charge to manufacturers for the analyses on these samples. He also pointed out that, at present, optical data was not being collected routinely on monitoring samples. Each year some 10,000 monitoring samples are run through the "Master" instruments at Kansas City. Only protein is predicted on these samples. Approximately 10 percent of the monitoring samples are set aside for later compositional analysis by reference methods. He cautioned that the GIPSA/FGIS monitoring program was subject to change as it was still under development and suggested the following for an NTEP monitoring program:

> During the first week in January, run 100 samples of each variety on each NTEP instrument. Of these 100 samples, 80 would be chosen from the wheat monitoring program. The remaining 20 would come from the moisture monitoring program (to verify the robustness of the protein calibration over a wider range of sample moistures).

Charles Hurburgh, Iowa State University, expressed concern that if calibration validation is performed using stored samples, which are typically drier than samples seen at the first point of purchase, we are not really checking performance under conditions which will be seen in the field. He recommended that performance be monitored over time using samples collected on a flow of time basis to verify that a calibration is robust and gives accurate results for all varieties, regions, growing conditions, etc Manufacturers generally agreed that testing over time was preferable to a "one time" test each year.

Considering that one of the goals of the program is uniformity and closer agreement with official measurements, it was suggested that a useful monitoring program might be an on-going stream of results on each NTEP instrument compared to the GIPSA/FGIS "Master" unit. Under this proposal, the standard reference method (CNA) would still be the basis for validation of calibrations.

Dr. Pierce was requested to develop a proposal (including budgetary costs) for an on-going monitoring program that addresses the concerns expressed above, to be presented to the Sector in March 1996. He was requested to structure the program, as far as practical, to take advantage of GIPSA/FGIS's current procedures for monitoring system performance over time.

Attendance List - Sector Meetings September 13 & 14, 1995 - Des Moines, IA

Name	Affiliation	GMM	NIR
Jack Barber	JB Associates	x	x
Connie Brown	DICKEY-john Corp.	x	x
Darryl Brown	Iowa Department of Agriculture	x	x
Randy Burns	Arkansas Bureau of Standards	x	x
Allen Butler	Perten Instruments NA	x	x
Bob Davis	Illinois Department of Agriculture	x	
Cassie Eigenmann	DICKEY-john Corp.	x	x
Arnold Eilert	Bran+Luebbe	x	x
Rich Flaugh	GSF Inc.	x	x
Lowell Hill	University of Illinois	x	x
David Hopkin	Perstorp Analytical	x	
Charles Hurburgh, Jr.	Iowa State University	x	x
Diane Lee	NIST/Office of Weights and Measures	x	x
Keith Locklin	ConAgra Corn Processing (representing GEAPS)	x	x
Jeff Martin	Steinlite Corporation	x	x
Chris Morris	DICKEY-john Corp.	x	
Don Muller	Bran+Luebbe	x	x
Pontus Nobreus	Perstorp Analytical	x	x
Don Onwiler	Nebraska Public Service Commission	x	x
Allison Pflug	CSC Scientific	x	
Richard Pierce	Grain Inspection, Packers and Stockyards Admin.	x	x
James Rampton	Grain Inspection, Packers and Stockyards Admin.	x	x
Ole Rasmussen	Foss Food Technology	x	x
Joe Rothleder	California Dept. of Food & Agriculture	x	x
Tom Runyon	Seedburo Equipment Co.	x	x
Cheryl Tew	North Carolina Dept. Of Agriculture	x	x
Cliff Watson	Consultant	x	x
Robert Wittenburger	Missouri Dept. of Agriculture	x	x
Richard Wotthlie	State of Maryland	x	x

Appendix J (Continued)

NTETC Near Infrared Grain Analyzer Meter Sector
March 26-27, 1996, St. Louis, MO
Meeting Summary

Agenda Items

1. Report on NCWM Interim Meeting - NIR Issues
2. Update on National Type Evaluation Testing Schedule
3. Proposed Change to Publication 14 - Sample Temperature Sensitivity
4. Proposed Change to H44 - S.2.6. Provisions for Sealing:
5. Phase II Testing - On-going Calibration Review

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1. Report on NCWM Interim Meeting - NIR Issues
Diane Lee, NIST/OWM, reported that the S&T Committee had accepted the Sector's recommendation, endorsed by the Southern Conference, to amend S.2.2.1. to narrow the operating voltage range for NIR grain analyzers (NCWM Interim Meeting Agenda Item 357-1). This will be a voting item at the NCWM Annual Meeting in July.

2. Update on National Type Evaluation Testing Schedule
Dr. Richard Pierce, Grain Inspection, Packers and Stockyards Administration (GIPSA, formerly FGIS), reported that the GIPSA Laboratory in Kansas City is not yet certified as the NTEP Participating Laboratory for Near Infrared Grain Analyzers. Detailed test procedures and data analysis procedures are now in place and technicians are being trained. Renovation of the Tech Center lab is complete and ample refrigerated storage is now available for NTEP samples. The laboratory must next locate and segregate test samples from among the 6000 samples now in underground storage in 400 or so 5-gallon buckets. Unfortunately, the 6000 samples are not presently cataloged. Dr. Pierce was of the opinion that segregation of samples and submission of the final application for certification of the laboratory would not be completed until some time after June 1, 1996. He asked Sector members if there was interest in having the laboratory provide calibration development assistance in advance of NTEP testing. Formal certification would not be required for the laboratory to provide calibration assistance. Members were in favor of any action which would get the program going. Experience with the moisture program indicated that many calibrations were likely to fail the first time through NTEP testing. Members believed that calibration development effort in advance of formal NTEP testing would eliminate many calibration related problems when devices were submitted for formal evaluation. Several manufacturers also indicated that initially they were not interested in all six classes of wheat. Dr. Pierce suggested that interested manufacturers who did not already have NTEP moisture instruments at the laboratory submit instruments to the lab by May 1 so technicians could familiarize themselves with operation of the instruments. He will contact individual manufacturers to find out the extent of their interest in calibration services and to determine if 300 gram samples are useable in their instruments [some of the samples for calibration development are available only in limited quantities, typically 300 grams/sample.]

3. Proposed Change to Publication 14 - Sample Temperature Sensitivity
The Sample Temperature Sensitivity test of Publication 14 calls for using two sample sets from each of the six wheat classes representing low (10 to 11%) and high (13 to 14%) moisture ranges with each set consisting of three samples, one from each of three protein ranges (the upper third, middle third, and lower third of the protein range for the class). For those classes of wheat less frequently traded and those grown in more arid regions, a complete set of high moisture samples may not be available. The NTEP Lab (to be) had asked the Sector to consider if tempered samples might be used for this test. Sector members were in general agreement that tempered samples should not be used unless objective evidence could be obtained to demonstrate that Sample Temperature Sensitivity test results would not be affected adversely by using artificially moistened samples. One Sector member pointed out that the Canadian Grain Commission had been using tempered samples in their protein calibration development and evaluation for a number of years. Foss Canada agreed to submit data to the NTEP lab (to be) to support the use of tempered samples for this test. The NTEP lab (to be) will review the data and will fax a recommendation to Sector Members for consideration.

4. Proposed Change to H44 - S.2.6. Provisions for Sealing
Discussion: At the 1995 Annual Meeting the NCWM approved the addition of wording to the audit trail provisions of the Grain Moisture Meter Code to explicitly state that the device is not required to display audit trail information. Because

several of the devices currently holding Certificates of Compliance (CC's) under the GMM Code will also be submitted for evaluation under the NIR Code, it is desirable to keep corresponding provisions of the two Codes in agreement to the greatest extent possible. The Sector approved the changes shown below to bring this portion of the NIR Code into agreement with the GMM Code and will forward their recommendation to the S&T Committee.

S.2.3. Provision for Sealing. -

(a) Provision shall be made for applying a security seal in a manner that requires the security seal to be broken, or for using other approved means of providing security (e.g., audit trail available at the time of inspection as defined in part (b)), before any change that affects the metrological integrity of the device can be made to any mechanism.

(b) If the operator is able to make changes that affect the metrological integrity of the device (e.g., slope, bias, etc.) in normal operation, the device shall use an audit trail. The minimum form of the audit trail shall be an event logger and shall include:

- *An event counter (000 to 999)*
- *the parameter ID,*
- *the date and time of the change, and*
- *the new value of the parameter (for calibration changes consisting of multiple constants, the calibration version number is to be used rather than the calibration constants.)*

<u>The device is not required to display this information</u>, but a printed copy of the information must be available through another on-site device. The event logger shall have a capacity to retain records equal to twenty-five (25) times the number of sealable parameters in the device, but not more than 1000 records are required. (Note: Does not require 1000 changes to be stored for each parameter.)

5. Phase II Testing - On-going Calibration Review

Background: This item first appeared on the Sector's agenda for its September, 1994 meeting. It was discussed again at length at their two meetings in 1995. In the course of these discussions, the Sector has agreed that:

- participation in a monitoring program of some sort should be mandatory for NTEP instruments.
- data should be collected (and made available to manufacturers) annually by the NTEP laboratory on instruments in the on-going calibration review and maintenance program for NIR grain analyzers.
- only reference method protein data (corrected to 12% moisture basis) and basic instrument data would be provided (i.e., no moisture data would be provided).
- no more than 100 samples per year per class would be required for calibration review or monitoring purposes.
- the problem of capturing new crop problems in local areas would be up to the manufacturer to address [and need not be part of the monitoring program].
- the accuracy limits used for NTEP approval should also apply to the annual review of NTEP calibrations.

The Sector had also recommended earlier that should GIPSA/FGIS decide to issue a new calibration for their official instruments, data on the same set of samples used to calibrate the GIPSA instruments should be collected on the NTEP instruments and should be made available to manufacturers (along with CNA data on those same samples).

For discussion purposes, the Sector has accepted the following definitions for the two main elements of Phase II of the NTEP NIR Grain Analyzer Program:

1. Monitoring - verification that an existing calibration continues to meet accuracy requirements over time, or, viewed another way, determining when recalibration is required.

2. Calibration Development & Maintenance - recalibration of NTEP instruments using (as a minimum) data obtained on samples selected from the same sample pool from which GIPSA/FGIS selected samples for calibrating the Official instrument. Manufacturers may supplement GIPSA data with data from additional manufacturer-provided samples. Validation of new calibrations will be performed using the same validation set used by GIPSA/FGIS.

[Note: As used above, "monitoring" applies to tests performed on the instruments in the NTEP lab and not to devices in the field. "Recalibration" means derivation of a new set of calibration coefficients.]

Discussion: Dr. Richard Pierce, GIPSA, outlined what GIPSA is presently doing to monitor the performance of the 103 NIR instruments in the Official System. Five "monitor" samples per week per class are requested from locations performing official testing. The actual number of samples received in FY95 ranged from 209 to 10,519 samples per class for a total of 23,763 samples. From these "monitor" samples, a calibration verification (C/V) algorithm is used to identify a maximum of 8 samples per week for HRW and HRS and 5 samples per week for Durum and Soft White wheat. Samples are selected to cover a range of growing conditions and protein levels. The C/V algorithm has the effect of flattening the classic gaussian distribution of protein values. CNA protein values are obtained for the C/V samples. Control charts are maintained to track weekly bias between CNA proteins and master instrument results. In November of each year, calibration performance data is reviewed and calibration updates are recommended when indicated. Between January and April, spectral data is obtained on 100 samples from each year not represented in the current calibration. New calibrations are developed for release in early May or June when stocks are lowest. A detailed outline of GIPSA's Annual Calibration Review can be found in the Attachment labeled "NIR96-Item 5."

For the NTEP Calibration Review Program Dr. Pierce suggested collecting instrument protein results and calibration data on 100 samples per class each year, with 80 samples selected from the 100 C/V samples on which GIPSA had obtained spectral data and the additional 20 selected from moisture survey samples. Existing CNA protein values would be used for the 80 C/V samples. CNA analysis would be required for the 20 moisture survey samples. Instruments would be required to simultaneously provide predicted proteins and spectral data. The required data would be collected over time as samples, instruments, and operators become available with the goal of providing optical and chemical data to manufacturers by January 1. The estimated cost for collecting and analyzing NTEP calibration performance data for all six classes of wheat as outlined above is $1750 per year per instrument model. Details of the estimate can be found in the Attachment labeled "NIR96-Item 5."

Dr. Hurburgh commented that if samples were selected on the basis of spectral diversity, all instrument models must be involved, because reflectance and transmission instruments will select different samples as spectrally significant.

Dr. Pierce responded to several issues and concerns which the Sector had raised earlier:

1. *Concern*: Performance should be monitored using samples collected on a flow of time basis to verify that at calibration is robust for all varieties, regions, growing conditions, etc. The Sector had expressed concern over using a "one time" test each year.

   Response: Moisture survey samples are received as varying moisture levels become available in the field. Weekly protein "monitors" reflect the samples being marketed in various growing regions at a given point in time. The C/V selection algorithm is designed to provide a representative sampling of grain samples over a 3-month period.

2. *Concern:* It would be useful if an on-going stream of results on each NTEP instrument could be compared to the GIPSA "Master" units.

   Response: This may not be an option. GIPSA has just started to review policy and the legal implications of releasing calibration performance data on official moisture meter and NIR protein instrument models before the Agency has announced a calibration update.

3. *Concern:* When GIPSA updates calibrations, calibration data should be collected on NTEP instruments and provided to the manufacturer for the same set of samples used to develop the new calibration.

> *Response:* This will not be possible for "historical" samples for which GIPSA has spectral data but no longer has the sample. Where possible (i.e., where sample size permits) data on current calibration samples will be provided to manufacturers requesting assistance in calibration development prior to submitting an instrument for NTEP testing. Looking into the future, the samples used for NTEP calibration review will probably be many of the same ones used by GIPSA to update calibrations.

Dr. Pierce asked if it is realistic to require NTEP instruments to participate in an on-going calibration review program forever. He reasoned that the calibration set would eventually cover many years' data and he questioned if a calibration review program would improve performance. He was of the opinion that standardization was the real problem and he expected that after the first 2 or 3 years calibrations would mature and would not change more frequently than once every 3 years or so. Sector members still favored starting out with a calibration review program of some sort reasoning that it would take fourth or fifth generation data for calibrations to reach maturity. Dr. Pierce responded that participation in the calibration assistance program would already represent crop from the past 3 to 5 years. One sector member commented that the stored samples used for the calibration assistance program would not reflect the moisture extremes which would be seen in the previously outlined calibration review program. Additionally, some Sector members were of the opinion that if a performance problem is addressed through a calibration change, there is a need for a common validation set to verify that the desired objective has been achieved. Dr. Pierce conceded that he could see the value of being in a monitoring program for the first 3 years. The Sector agreed that regardless of whatever program is finally decided upon, it should be reviewed at the end of each year to assess its value and determine if it should be continued, modified, or abandoned.

As an alternative to regarding NTEP lab instruments as "master" instruments which would be used to collect data used in calibration development, the Sector considered regarding them as "validation" units with the "master" instruments maintained at the manufacturer's (or distributor's) site. In this case, the manufacturer would be responsible for performing whatever adjustments were necessary to keep the NTEP lab instruments closely aligned with the masters. Then, rather than using data on the same set of samples used by GIPSA in developing their calibrations, a common "validation" set selected from the balance of the C/V samples not included in the calibration set would be used to validate calibration changes. One Sector member suggested that manufacturers be allowed to contribute "golden" samples to the validation set. Another even suggested that the validation set contain samples which had historically shown poor agreement with the CNA protein values. It was also suggested that it would be useful if validation samples could be identified with the residual values obtained on each model. At its next meeting, the Sector will attempt to define the composition of a validation set and determine if it should be "rotated" or updated each year.

Attendance List - Sector Meetings March 25-27, 1996 - St Louis, MO

Name	Affiliation	GMM	NIR
Jack Barber	JB Associates	x	x
Connie Brown	DICKEY-john Corp.	x	
Randy Burns	Arkansas Bureau of Standards	x	x
Dieter Curlis	Perstorp Analytical	x	x
Bob Davis	Illinois Department of Agriculture	x	x
Cassie Eigenmann	DICKEY-john Corp.	x	
Arnold Eilert	Bran+Luebbe	x	x
Rich Flaugh	GSF Inc.	x	
Victor Gates	Shore Sales Co.	x	
Mike Hile	Arkansas Bureau of Standards	x	x
Charles Hurburgh, Jr.	Iowa State University	x	x
Diane Lee	NIST/Office of Weights and Measures	x	x
Keith Locklin	ConAgra Corn Processing (representing GEAPS)	x	x
Charles Lowden	Foss Food Technology	x	x
Dr. Douglas Martin	Bran+Luebbe	x	x
Jeff Martin	Steinlite Corporation	x	
Chris Morris	DICKEY-john Corp.	x	
Ray Oberg	Zeltex, Inc	x	x
Don Onwiler	Nebraska Public Service Commission	x	x
Allison Pflug	CSC Scientific	x	
Richard Pierce	Grain Inspection, Packers and Stockyards Admin.	x	x
Ole Rasmussen	Foss Food Technology	x	x
Joe Rothleder	California Dept. of Food & Agriculture	x	x
Tom Runyon	Seedburo Equipment Co.	x	x
Cheryl Tew	North Carolina Dept. Of Agriculture	x	x
Cliff Watson	Consultant	x	x
Robert Wittenburger	Missouri Dept. of Agriculture	x	x
Richard Wotthlie	State of Maryland	x	x

Report of the Laws and Regulations Committee

Louis E. Straub, Chief
Maryland Department of Agriculture
Weights and Measures Section

200 Introduction

This is the Report of the Laws and Regulations Committee (Committee) for the 81th Annual Meeting of the National Conference on Weights and Measures (NCWM). This report is based on the Committee's Interim Report offered in the Conference "Program and Committee Reports" (NCWM Publication 16), the addendum sheets issued at the Annual Meeting, and actions taken at the Voting session at the Annual Meeting. Table A identifies items in the report by Reference Key Number, item 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 issues are indicated with a "V" after the item number. Items marked with an "I" after the item number are for information. The items marked with a "W" were withdrawn by the Committee. This Report contains recommendations to revise or amend National Institute of Standards and Technology (NIST) Handbook 130, 1996 edition, "Uniform Laws and Regulations," or NIST Handbook 133, "Checking the Net Contents of Packaged Goods," Third Edition and Supplements 1 (1990), 2 (1991), 3 (1992), and 4 (1994). Revisions proposed by the Laws and Regulations Committee are shown in **bold face print** by ~~crossing-out~~ what is to be deleted and <u>underlining</u> what is 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 otherwise identified as informational. "SI" means the International System of Units. "FPLA" means the Federal Fair Packaging and Labeling Act. 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
Motor Fuel Inspection Law (MFIL)	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
Motor Fuel Regulation (MFR)	237 Series
Interpretations and Guidelines	238 Series
Price Verification	239 Series
NIST Handbook 133 - General	250 Series
Other Items	260 Series

Table A Index to Reference Key Items

Table B
Appendices

Appendix	Title	Reference Key No.	Page

Table C
Voting Results

Reference Key No.	House of State Representatives		House of Delegates		Results
	Yes	No	Yes	No	
200 (Consent Calendar)	43	0	50	0	Passed
223-1A	33	8	44	2	Passed
232-1 and 237-2 (Motion to Consider Amendment)	8	27	10	29	Failed
232-1 and 237-2	42	1	49	2	Passed
200 (Report in its Entirety)	42	0	47	0	Passed

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

210 NIST Handbook 130 - General

210-1 I Ensuring that the PLR is Identical to Federal Regulations

As of the Annual Meeting, the Food and Drug Administration (FDA) had not issued final regulations to implement the metric revisions made to the Federal Fair Packaging and Labeling Act in 1992. The Committee will contact FDA to request that final regulations be issued before the Interim Meetings in 1997 so that any changes needed in the handbook can be developed for NCWM adoption at the 82nd Annual Meeting.

223 Uniform Engine Fuels, Petroleum Products, and Automotive Lubricants Inspection Law

223-1A V Amendments to the Uniform Inspection Law

(This item was adopted.)

The following amendments to the uniform law were recommended by the Petroleum Subcommittee following the Committee's 1995 Interim Meeting. The Committee recommended NCWM adoption of these items at the 81st NCWM Annual Meeting.

A. Falsely Representing the Brand of a Product - If a purchaser makes an effort to acquire a particular brand, the purchaser should have some assurance that the dispensed product is the brand represented. This is a basic consumer right that weights and measures/petroleum quality regulatory programs must provide to the public. Although enforcement of this provision would entail procedures other than routine sampling and testing of the products, there are various means by which jurisdictions can effectively enforce this requirement. Effective procedures may include auditing the product bill of lading, cooperative programs with industry to analyze for proprietary additives, and surveillance programs whereby inspectors witness and document product commingling. At the Annual Meeting the Committee received comments from the Petroleum Marketers Association of America, Arizona, and Virginia indicating that they did not support the addition of the word "Brand" to Section 8.1. The comments indicated there is some concern that placing additional responsibilities on the States for enforcing brand names would be an expensive and unnecessary burden for those jurisdictions that adopt the uniform law. It was also stated that investigations of this type of violations are often complex and time consuming. The Committee also received comments in support of the recommendation from Mobil, the American Petroleum Institute (API), California, and Tennessee. API stated that the recommendation from the Petroleum Subcommittee was developed to provide States an additional tool for use in consumer protection activities. The Committee recommended adoption of the item as proposed in its Interim Report.

Recommendation: Amend Section 8.1. by adding the word "brand" so the paragraph reads:

> 8.1. Represent engine fuels, petroleum products, or automotive lubricants in any manner that may deceive or tend to deceive the purchaser as to the nature, **brand**, price, quantity and/or quality of such products."

223-1B VC Amendments to the Uniform Inspection Law

(This item was adopted as part of the consent calendar.)

B. API (American Petroleum Institute) Service Classification and S.A.E. (Society of Automotive Engineers) Number Classification for Automotive Lubricants - The Committee believes that the inclusion of a section to reference the API service classification and S.A.E. viscosity number will provide protection for purchasers by ensuring that products are accurately represented. The Committee modified the original proposal from the Petroleum Subcommittee to include the API Service Classification commonly referred to in vehicle owners manuals.

Recommendation: Amend Section 8 by adding Section 8.6. as follows:

8.6. Represent automotive lubricants with a S.A.E. (Society of Automotive Engineers) viscosity grade or API (American Petroleum Institute) service classification other than those specified by the intended purchaser.

232 Method of Sale of Commodities Regulation

232-1 V § 2.20 Gasoline-Oxygenate Blends

(This item was adopted.)

The Committee recommended the following revisions to §2.20 Gasoline-Oxygenate Blends in the Uniform Regulation for the Method of Sale of Commodities. Identical changes are recommended for §3.26 and §3.27 of the Uniform Regulation for Engine Fuels, Petroleum Products, and Automotive Lubricants. See Item 237-2 for details on this proposal.

Recommendation: Revise 2.20 as follows. Revisions proposed by the Committee are in **bold face print.**

2.20 Gasoline-Oxygenate Blends

2.20.1. Method of Retail Sale. -- All automotive gasoline or automotive gasoline-oxygenate blends kept, offered, or exposed for sale, or sold, at retail containing at least ~~1~~ 1.5 mass percent ~~by volume of any~~ oxygen~~ate or combination of oxygenates~~ shall be identified as "with" or "containing" (or similar wording) the ~~specific~~ **predominant** ~~type of~~ oxygenate~~(s)~~ in the engine fuel. For example, the label may read "contains ethanol" or "with MTBE~~/ETBE~~." **The oxygenate contributing the largest mass percent oxygen to the blend shall be considered the predominant oxygenate. Where mixtures of only ethers are present, the retailer may post the predominant oxygenate followed by the phrase "or other ethers" or alternatively post the phrase "contains MTBE or other ethers." In addition, gasoline-methanol blend fuels containing more than 0.15 mass percent oxygen from methanol shall be identified as "with" or "containing" methanol.** This information shall be posted on the upper 50 percent of the dispenser front panel in a position clear and conspicuous from the driver's position in a type at least 12.7 mm (½ in) in height, 1.5 mm (1/16 in) stroke (width of type).

2.20.2. Documentation for Dispenser Labeling Purposes.-- The retailer shall be provided, at the time of delivery of the fuel, on an invoice, bill of lading, shipping paper, or other documentation, a declaration of ~~any~~ **the predominant** oxygenate or combination of oxygenates present in concentrations ~~of at least 1 percent by volume~~ **sufficient to yield an oxygen content of at least 1.5 mass percent in the fuel. Where mixtures of only ethers are present, the fuel supplier may identify either the predominant oxygenate in the fuel (i.e., the oxygenate contributing the largest mass percent oxygen) or, alternatively, use the phrase "contains MTBE or other ethers." In addition, any gasoline containing more than 0.15 mass percent oxygen from methanol shall be identified as "with" or "containing" methanol.** This documentation is only for dispenser labeling purposes; it is the responsibility of any potential blender to determine the total oxygen content of the engine fuel before blending.

233 Uniform Unit Pricing Regulation

233-1 I Updating the Regulation

In 1993 the Committee was contacted by several weights and measures jurisdictions and retail trade associations requesting that the Uniform Unit Pricing Regulation (UPR) be updated to add new commodity groups and pricing requirements. The comments indicated that many commodity groups for nonfood products were not included in the table and that some of the required units may not be appropriate for many of the new products being sold in stores. Another concern was that the UPR specified pricing only on the basis of price per pound on most products sold by weight. This has resulted in some jurisdictions not enforcing the requirements on stores that voluntarily unit price on the basis of price per ounce instead of price per pound. The Committee believes that the UPR should be revised to encourage wider adoption and use of the uniform regulation and that provisions for unit pricing in metric units should be included.

At the 1996 Interim Meeting the Committee drafted a revision of the regulation to permit retail stores that voluntarily provide unit pricing to present prices using various units of measure. The Committee eliminated the table of product groupings because it is difficult to keep it up to date and it was not all inclusive so some newer products were not included under the uniform requirements. The table was replaced with requirements that specify that the unit price is to be based on price per ounce or pound, or price per 100 grams or kilogram if the packaged commodity is labeled by weight. For example, the proposed revisions would require the unit price for soft drinks sold in various package sizes (e.g., 12 fl.oz cans through 2 liter bottles) to be uniformly and consistently displayed in terms of either price per fluid ounce, or price per quart, or price per liter. The Committee also increased the price of commodities exempted from unit pricing from 10 cents to 50 cents. The Committee believes these revisions will ensure that unit pricing information facilitates value comparison between different package sizes and/or brands offered for sale in a store.

At the Annual Meeting the Committee reviewed several comments on this item from members of the U.S. Metric Association (USMA). Several of these comments suggested that the uniform regulation be amended to require unit pricing in metric units and permit inch-pound unit pricing to be provided voluntarily. When it developed the proposed revisions the Committee included guidelines for both inch-pound and metric unit pricing and believes this is correct approach to implementing metric revisions in the regulation. The Committee does not support a metric only requirement at this time. The Committee will consider the other comments received from the USMA members at the 1997 Interim Meeting. The Committee made no change to the Uniform Unit Pricing Regulation presented in Appendix A of its Interim Report. The Committee requests that the draft be reviewed and discussed at the State and regional weights and measures meetings over the next year.

236 Uniform National Type Evaluation Regulation

236-1 VC Updating the Regulation

(This item was adopted as part of the consent calendar.)

Several years ago the Western Weights and Measures Association submitted a draft revision of the Uniform Regulation for National Type Evaluation to incorporate the policies and guidelines adopted by the Executive Committee. The Committee made further revisions to regulation and sent it for review and discussion to the regional meetings for several years. At the Annual Meeting the Committee received comments from Ohio, Nebraska, Kansas, the Scale Manufacturers Association, and the Gasoline Pump Manufacturers Association concerning this item. Based on these comments, the Committee made editorial changes to improve the clarity of the revised regulation. The changes are presented in the revised NTEP regulation presented in Appendix B. Additions are presented as <u>underlines</u> and deletions are presented as ~~strikethroughs~~. Generally it was felt by the Committee that these changes were needed in order to strengthen the Regulation, and provide the States necessary latitude to deal with devices which do not have a Certificate of Conformance. The Committee believed the original intent of the regulation was maintained and recommended adoption of the revised Uniform National Type Evaluation Regulation as presented in Appendix B.

Recommendation: Adopt the amended Uniform Regulation for National Type Evaluation as presented in Appendix B.

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

237-1 I Define Grades for Diesel Fuel Based on Cetane Rating

The Southern Weights and Measures Association requested that the NCWM adopt a definition of "regular" diesel fuel (e.g., a cetane rating below 45) and "premium" diesel fuels (e.g., a cetane rating of 45 or more) so that these fuels can be accurately and clearly identified. Refiners have requested product registration from State Motor Fuel programs for diesel fuels that have been formulated to provide cleaner emissions or higher performance. Several refiners and marketers want to differentiate these grades of diesel fuels in the marketing process. A cetane rating could be an indicator of fuel quality similar (but not equal to) to the octane rating used for gasolines, and could serve to aid motorists in comparing the value and cost of the different "grades" of diesel fuels. The Petroleum Subcommittee was charged with investigating the means of defining these fuels. A Premium Diesel Work Group was formed and a work plan developed to address this issue. The work group consists of representatives of State petroleum programs, fuel producers, the fuel additive industry, and a representative from the Engine Manufacturer's Association (EMA).

At the Annual Meeting the Committee received a report on the Premium Diesel Work Group's activities from Randy Jennings, Chairman of the Petroleum Subcommittee. Based on Mr. Jenning's report it appears that a cooperative effort between the NCWM and the American Society for Testing and Materials (ASTM) will be the most effective and efficient means to resolving this issue. However, the Committee urges the Petroleum Subcommittee to complete its work on this issue within two years so that a proposal can be submitted to the NCWM for adoption at its 1998 Annual Meeting.

Premium Diesel Work Group Report

The Premium Diesel Work Group held its first meeting on May 21-22, 1996, in Nashville, Tennessee. At this meeting the work group identified individual characteristics that were regarded as enhancements to regular diesel fuel. Each characteristic was evaluated against test ability, regulatory enforce ability, and possible performance benefits to the customer. What was apparent to the work group was the fact that a definition for "Premium Diesel" would encompass more than just a cetane rating. However, the problem faced with some of the other characteristics is the lack of consensus test methods and/or precision values for test that are less than desirable for enforcement. The working group believes that several other factors including cetane, lubricity, detergency, low temperature, and API specific gravity must be considered in defining premium grade diesel fuels.

Prior to the formation of the work group the Petroleum Subcommittee was aware that work on the premium diesel issue was being conducted within American Society of Testing and Materials (ASTM). It was agreed that the ASTM work on the issue would be monitored in order to determine if the issue would progress at a rate that would offer a timely solution for the States. However, later in 1995, the work group contacted members of ASTM - D2, Subcommittee that sets diesel fuel specifications and learned that a resolution of the issue was not expected in the foreseeable future. In June of 1996 a session was held during ASTM - D2 subcommittee meetings in California on this issue. Most of the work group was present and the session proved an opportunity to get some valuable feedback from ASTM members. It was suggested that a joint NCWM /ASTM Task Force be formed to pursue a solution to the premium diesel issue. Reactions were mixed, but it appeared that a majority of those present felt that if a set of limits defining premium diesel fuels were to be developed, ASTM was the appropriate forum to move the issue forward. A joint task force would maintain the momentum that the work group has developed to resolve this issue, and keep the interests of the NCWM membership in the forefront. The work group is currently working on a "Research Report" it will provide to the Committee and ASTM - D2 Committee members. The goal is to produce a document that will provide background information, identify industry issues, and provide technical guidance in a format that will help explain the value of the enhanced characteristics that are commonly associated with premium diesel fuels. The work group is also discussing the possibility of recommending establishment of a special registration process that would allow marketers to disclose the properties that make their fuel "premium" and possible pump labeling that would allow the consumer to choose the appropriate fuel of their choice. The work group will keep the Committee informed as it makes additional progress on this issue.

237-2 V Gasoline-Oxygenate Blends

(This item was adopted.)

Background for the Interim Meeting: At the Interim Meetings the State of North Carolina and the Western and Southern Weights and Measures Associations submitted proposals to revise §2.20 Gasoline-Oxygenate Blends in the Uniform Regulation for the Method of Sale of Commodities and §3.26 and §3.27 of the Uniform Regulation for Engine Fuels, Petroleum Products, and Automotive Lubricants. When these sections were last amended in 1991, ethanol and MTBE were the predominant oxygenates then in use. With the implementation of the Clean Air Act Amendments of 1990 and the development of more sophisticated, cleaner-burning gasolines, other oxygenates have become more prevalent and will continue to be so. Oxygenates fall into two families: alcohols and ethers. Ethanol is the only member of the alcohol family currently receiving widespread use as an oxygenate or octane enhancer.

Compounding the quandary over combinations or mixtures of oxygenates was the fact that many of these blends are shipped through pipelines that operate on a fungible basis (fungible means that pipelines may combine or commingle shipments that meet the same product specifications.) This allows flexibility and lowers the cost of moving products from one point to another. For most eastern States, which are served by Colonial Pipeline, virtually all gasoline is shipped on a fungible basis. Members of the NCWM reported experiences during the past three oxygenated gasoline seasons that show a significant percentage of the gasolines sampled contained more than one oxygenate. Requiring retailers to label dispensers with the specific type of oxygenate or oxygenates in their gasoline creates situations that could result in retailers being subject to legal sanctions when no actual harm has come to consumers.

From a consumer information standpoint, there is no reason to differentiate between ethers for labeling purposes since their chemical characteristics are essentially the same. By using "contains ethers" or "with alcohol" on labels and supporting documentation, consumer needs are satisfied. Permitting such documentation and labeling requirements will provide much needed flexibility to refiners, pipeline operators, wholesalers and retailers in complying with any such requirements. Changes in specific ethers from one batch to the next or mixtures within pipeline or terminal systems would not require costly and time-consuming testing or necessitate changing documentation messages or dispenser labels. At the same time, because the chemical characteristics of the various ethers are essentially the same, the consumer's interests would not be compromised. As proposed, marketers could indicate the specific oxygenate being sold, if they chose to take that approach, or they can disclose the generic type.

Since the current regulations were adopted some years ago, much has been said about the effectiveness of the requirements. Now that oxygenated gasolines are in common use, a majority of the comments received by the Committee took the position that it was time to resolve the concerns which prevent all jurisdictions from adopting and enforcing the uniform regulations. The Committee believed the North Carolina proposal, which was developed in close cooperation with American Petroleum Institute (API) and the Renewable Fuels Association (RFA), provided the best compromise on this issue and recommended it as the basis for proposing amendments. The Committee believed that amending the uniform regulations as proposed would provide much needed flexibility to gasoline refiners, pipeline and terminal operators, wholesalers, and retailers in labeling gasoline-oxygenate blends while still providing adequate information to consumers. The Committee proposal required the identification of the predominant oxygenates but permitted wording such as "contains MTBE or other ethers" to provide the desired flexibility. The higher trigger level of 1.5 percent by mass oxygen eliminated many of the problems associated with smaller amounts of oxygenates often found in gasolines.

Background for the Annual Meeting. - Following the Interim Meeting the Central Weights and Measures Association voted to carry this item over for further study. This action was primarily, but not solely, based on the concerns raised by the State of Michigan over the fact that the original recommendation was not clear in defining what the predominant oxygenate is for labeling purposes. Also, the Committee's original recommendation, did not address any trigger levels for labeling methanol blends. At the Annual Meeting, the State of Michigan submitted a proposal to reduce the trigger level to 0.5 percent by mass but this proposal was not supported by other jurisdictions, industry, or the Committee. The Committee reminds jurisdictions they have the option of adopting a different trigger level if they can technically justify a different value. However, in the interest of national uniformity the Committee discourages such actions.

In response to the Central Association's action, Randy Jennings, Chairman of the Petroleum Subcommittee, worked with subcommittee members to develop revisions to the Committee recommendation so a proposal could be considered for adoption at the Annual Meeting. The Committee incorporated the changes proposed by the members of the Petroleum Subcommittee and distributed copies of the revised proposal to State Weights and Measures Directors and other interested parties prior to the Annual Meeting. At the Annual Meeting the Committee heard supporting comments from Mobil, American Automobile Manufacturers Association, the Renewable Fuels Association, the American Petroleum Institute, and the States of Illinois, New York, Connecticut, and Tennessee. The Committee supports adoption of the following revisions to the recommendation in Item 237-2 on pages 96-97 of NCWM Publication 16.

Revisions

1. A sentence was added to require methanol blends of more than 0.15 mass percent oxygen to be identified. This level was selected because it correlates to 0.3 volume percent, the maximum concentration level that does not require the addition of a co-solvent under the Environmental Protection Agency's Substantially Similar Rules.

2. The recommendation was revised to make it clear that "predominant" means the oxygenate that contributes the largest mass percent oxygen to the blend.

3. The labeling options for mixed ethers were clarified.

4. The term weight was changed to "mass" so that the requirement will be consistent with ASTM standards.

Other Comments

1. Petroleum Subcommittee members, including several motor vehicle manufacturers, continue to strongly support the 1.5 mass percent trigger level as presented in the original Committee recommendation. These members believe that consumers will be adequately informed and protected with the proposed trigger level.

2. Petroleum Subcommittee members believe that revising the requirements to base labeling on "mass" instead of "volume" will not complicate compliance or enforcement procedures.

Recommendation: Amend Section 3.2.6 and Section 3.2.7. in the Uniform Regulation for Engine Fuels, Petroleum Products, and Automotive Lubricants by adopting the following revisions.

> **3.2.6. Method of Retail Sale - Type of Oxygenate Must be Disclosed.** -- All automotive gasoline or automotive gasoline-oxygenate blends kept, offered, or exposed for sale, or sold, at retail containing at least ~~1~~ 1.5 **mass percent** ~~by volume of any~~ oxygen~~ate or combination of oxygenates~~ shall be identified as "with" or "containing" (or similar wording) the ~~specific~~ **predominant** ~~type of~~ oxygenate~~(s)~~ in the engine fuel. For example, the label may read "contains ethanol" or "with MTBE~~/ETBE~~." **The oxygenate contributing the largest mass percent oxygen to the blend shall be considered the predominant oxygenate. Where mixtures of only ethers are present, the retailer may post the predominant oxygenate followed by the phrase "or other ethers" or alternatively post the phrase "contains MTBE or other ethers." In addition, gasoline-methanol blend fuels containing more than 0.15 mass percent oxygen from methanol shall be identified as "with" or "containing" methanol.** This information shall be posted on the upper 50 percent of the dispenser front panel in a position clear and conspicuous from the driver's position in a type at least 12.7 mm (½ in) in height, 1.5 mm (1/16 in) stroke (width of type).

> **3.2.7. Documentation for Dispenser Labeling Purposes.** -- The retailer shall be provided, at the time of delivery of the fuel, on an invoice, bill of lading, shipping paper, or other documentation, a declaration of ~~any~~ **the predominant** oxygenate or combination of oxygenates present in concentrations ~~of at least 1 percent by volume~~ **sufficient to yield an oxygen content of at least 1.5 mass percent in the fuel. Where mixtures of only ethers are present, the fuel supplier may identify either the predominant oxygenate in the fuel (i.e., the oxygenate contributing the largest mass percent oxygen) or, alternatively, use the phrase "contains MTBE or other ethers." In addition, any gasoline containing more than 0.15 mass percent oxygen from methanol shall be identified as "with" or "containing" methanol.** This documentation is only for dispenser labeling purposes; it is the responsibility of any potential blender to determine the total oxygen content of the engine fuel before blending.

238 NIST Handbook 130 - Interpretations and Guidelines

238-1 VC Editorial Revisions

(This item was adopted as part of the consent calendar.)

Background: The Committee reviewed this section of Handbook 130 and identified several areas that are either out of date or were found in other NIST Handbooks. The Committee has identified the sections below along with the action it recommends that the NCWM take on the issue. The Committee is recommending that the items either be revised or deleted because many of the policies, guidelines, or interpretations have been addressed by the adoption of specific requirements.

Recommendation: Amend the Interpretations and Guidelines Section of NIST Handbook 130 by deleting or amending the following sections as indicated:

1.) 2.2.4. Net Contents Declarations (L&R, 1982, p. 147)

Item: this interpretation relates to declaring, converting, and rounding metric declarations.

Action: delete this section because specific requirements for metric labeling were incorporated in the Uniform Packaging and Labeling Regulation in 1993.

2. **2.3.10. Wiping Cloths (L&R, 1972, p. 146)**

Item: this interpretation related to the method of sale for wiping cloths

Action: delete this section because a specific method of sale for wiping cloths (§2.24) was adopted in 1991.

3. **2.3.14. Potpourri (L&R, 1983, p. 209)**

Item: this interpretation related to the method of sale for potpourri.

Action: delete this section because a specific method of sale for potpourri (§2.26) was adopted in 1992.

4. **2.3.17. Ready-to-Eat Food - Guideline on Selling Whole Chicken by Count (L&R, 1991,p. 212)**

Item: this guideline related to selling whole ready-to-eat chickens by count.

Action: delete this section because a specific method of sale for ready-to-eat food (§ 1.12) was adopted in 1993.

5. **2.5.1. Net Weight at Retail (P&C, 1977, p. 160)**

Item: this policy relates to net weight requirements at the time of sale but does not reflect the NCWM adoption of gray areas for dry petfood, flour, and some meat and poultry products.

Action: delete this section because the requirements for net weight are specified in the 3rd Edition of NIST Handbook 133 as amended in supplements 1 through 4.

6. **2.5.2. Bakery Products: Variations from Declared Net Weights (L&R, 1983, p. 153)**

Item: this guideline or interpretation relates to the Maximum Allowable Variations (MAVs) pemitted for bakery products.

Action: delete this section because the Maximum Allowable Variations in NIST Handbook 133 have been in use for more than 15 years and there has been no indication that there have been any problems with the existing values for the MAVs.

7. **2.5.3. Commodity Requirements, Flour (Exec, 1987, p. 64)**

Item: this policy relates to gray area moisture allowance for flour.

Action: delete this section because the requirements for recognizing moisture loss in flour are specified in in § 3.17 of the 3rd Edition of NIST Handbook 133 as amended in supplements 1 through 4.

8. **2.5.4. Wet Tare Tests on Packages from Federally Inspected Plants (Exec, 1988, p. 51)**

Item: this policy relates to gray area moisture allowance for use with meat and poultry products when wet tare testing is used.

Action: delete this section because the requirements for recognizing moisture loss in wet tare tests is specified in in §3.18 of the 3rd Edition of NIST Handbook 133 as amended in supplements 1 through 4.

9. **2.5.5. Model Agreement Between a State or Local Government and Food Safety and Inspection Service, U.S. Department of Agriculture, for the Determination of Net Contents of Federally Inspected Meat and Poultry Products (Exec, 1988, pp. 86-92)**

Action: according to the USDA this model can be deleted because the agency adopted NIST HB133 in 1992 and the 4th Supplement in 1995.

10. **2.6.5 Cereal Grains and Oil Seeds**

Action: Add a note to this section reflecting USDA adoption of regulations prohibiting the addition of water to grain.

250 NIST Handbook 133 "Checking the Net Contents of Packaged Goods"

250-1 I Status of NIST Handbook 133

Background: This was Item 240-2 in the Report of the 78th NCWM, 1993, (page 236) and Item 250-1 in the Report of the 79th NCWM, 1994 (page 222). In the NCWM's petition to the Food and Drug Administration (FDA) on November 9, 1992, States requested an exemption from preemption under Section 403 A(b) of the Federal Food, Drug, and Cosmetic Act to permit continued use of NIST Handbook 133, "Checking the Net Contents of Packaged Goods," for testing foods for the accuracy of their quantity declarations. Extensive revisions were made to the handbook at the 79th NCWM Annual Meeting, and were published in November 1994 in a 4th supplement to the handbook. The Office of Weights and Measures has provided several successful training classes on the 4th supplement since its adoption, and its acceptance and implementation are already underway in many States. As of 1996 Annual Meeting FDA had not responded to the NCWM proposal nor published proposed regulations to adopt NIST Handbook 133. The Committee has included a copy of the letter the food industry submitted to the Food and Drug Administration requesting publication of the proposal to adopt NIST Handbook 133 in Appendix G. The Committee appreciates the efforts of the food industry on this important issue. If the FDA publishes a proposal prior to the 1997 Interim Meeting, a presentation on the proposal will be made during the public session of the Committee's hearing.

NIST Handbook 133 Working Group

At the Annual Meeting the Committee received comments on the following items from the Grocery Manufacturers of America (GMA). The comments recommended several revisions that have been incorporated in each item. The changes are reflected in the documents presented in the appropriate appendix for each item.

The NIST Handbook 133 Working Group met in December at NIST in Gaithersburg, Maryland to finish work on several draft guidelines relating to package inspection at the point of pack and recommended due process procedures. The working group presented these proposed guidelines to the Committee for consideration at the 1996 Interim Meeting. The Committee agreed that the proposals should be distributed as information items for consideration by the NCWM over the next year. The draft guidelines were developed to provide information and assistance to weights and measure officials and industry on a variety of subjects related to net quantity of contents inspection procedures. The Committee would like to consider recommending the guidelines for NCWM adoption so that they can be included in the Interpretations and Guidelines section of NIST Handbook 130 or in an appendix in NIST Handbook 133.

Good Quantity Control Practices

In 12.1.1. Variations from Declared Net Quantity contained in the Uniform Packaging and Labeling Regulation are permitted from the declared net weight, measure, or count when caused by unavoidable deviations in weighing, measuring, or counting the contents of individual packages that occur in current good manufacturing practice. Up to now the term "good" has not been defined. In Appendix C, the Committee is presenting guidelines it believes will help weights and measures officials and industry define what procedures constitute "good" manufacturing practices related to net quantity so that it is clear that "variations" from the declared net quantity of contents are only permitted in circumstances where the packer has implemented "good" quantity control practices.

Point-of-Pack Inspection Procedures

As part of its agenda the NIST Handbook 133 Working Group explored the potential benefits of conducting net quantity of contents inspections at the point-of-pack. As the concept of in plant testing was discussed several jurisdictions that have not conducted inspections in manufacturing or packaging plants requested guidance on how to get the most out of the inspection. In response to these requests the working group, which includes both industry and regulatory members, developed the outline which is presented in Appendix D. The outline provides guidelines to assist the inspector in opening, conducting, and closing inspections. Tips on how to conduct a thorough inspection are also included. Recommended procedures for plant personnel are also provided. The Committee supports the working group's goal of increasing the use of point-of-pack inspections to improve the effectiveness of net quantity of contents enforcement and urges NCWM members to review the draft outline on point-of-pack inspection procedures and send comments and suggestions to the Committee.

Due Process Procedures

In the course of their work, weights and measures officials often take enforcement actions that prohibit the use of devices or sale of packaged goods (e.g., "stop-sale" or "off-sale" orders for packages and "stop-use" or "condemnation" tags issued on devices.) Improper actions, (e.g., not following prescribed test procedures, enforcing labeling requirements on exempted packages, or incorrectly citing someone for a "violation") place the official, or the jurisdiction in the position of being liable for the action if it results in lost business, or if it is found that the action was "illegal." In some cases the weights and measures jurisdiction could be ordered to pay monetary damages to compensate the affected party for the improper action. Recognizing these concerns the NIST Handbook 133 Working Group developed an outline of an administrative review procedure that is intended to ensure that persons affected by certain "inspection findings" (e.g., price misrepresentations or shortweight packages), or who are deprived of the use of their property (devices or packages placed under "stop" or "off-sale" order), have access to a timely independent review of the action. The Committee is presenting these guidelines in Appendix E for review and comment. The procedures outlined are based on New York State procedures that were implemented in 1990 following settlement of a case regarding "due process" in the U.S. District Court of New York. The procedures will enable them to provide evidence which could be relevant in determining whether the action was proper. The purpose of the procedure is to ensure that a person's ability to conduct business is not hindered by improper enforcement actions. These procedures would be used independently of any other action (e.g., administrative penalty actions) that may be taken by the enforcement agency.

250-2 I Moisture Loss for Pasta and Rice

Background for Pasta: See Item 240-5 in the Report of the 75th NCWM, 1990 (page 107); Item 240-4 in the Report of the 76th NCWM, 1991 (page 219); Item 240-4 in the Report of the 77th NCWM, 1992 (page 154); Item 240-3 in the Report of the 78th NCWM, 1993 (page 237); and Item 250-2 in the Report of the 79th NCWM, 1994, (page 225) for background. A field study protocol has been developed by the National Pasta Association (NPA) for nationwide study to determine the moisture losses on various pasta products in different packaging materials. The study will be used to develop a gray area proposal for pasta products which lose moisture to the atmosphere.

Background for Rice: This was Item 240-7 in the Report of the 76th NCWM, 1991, (pages 221-222); Item 240-5 in the Report of the 77th NCWM, 1992 (page 154); and Item 250-3 in the Report of the 79th NCWM, 1994 (page 225). The U.S.A. Rice Federation (Federation) (formerly known as the Rice Millers Association) has requested that the Conference address the moisture loss of packaged rice in a manner similar to that used for flour, namely, to establish a gray area for packaged rice. A field study protocol has been developed by the Federation for a nationwide study to determine the moisture losses of various rices in different packaging materials.

The Committee will delay action on these items until the Food and Drug Administration publishes a final regulation regarding net quantity of contents testing.

250-3 I Moisture Loss for Meat and Poultry Products

Background: See Item 240-7 on page 239 in the Report of the 78th NCWM for background on this issue. The Committee will develop a workplan to implement studies on ice packed poultry for the spring of 1996. Parties interested in participating in these studies should contact the Committee's Technical Advisor at the Office of Weights and Measures.

The Committee decided to provide support and resources to develop a gray area for ice-packed poultry since this commodity continues to be the subject of complaints about underweights from small retailers. The Committee will consider work in the other categories when resources permit.

1. Ice-packed bulk poultry
2. Raw meat products (chopped beef, ground beef, hamburger, and beef patties)
3. Cured pork products (hams, shoulders, and loins)
4. Cured beef products (corned beef, corned beef brisket, and tongues)
5. Ham patties, chopped ham, pressed ham, and similar products
6. Dry salami and other meat or poultry products that lose moisture to the atmosphere

250-4 I Maximum Allowable Variations for Count Declarations on Agricultural Seed

This issue relates to the values of the Maximum Allowable Variations appropriate for count declarations on packages of agricultural seed. The Committee has assigned this issue to the NIST Handbook 133 Working Group. The Working Group will cooperate with industry, trade associations, and other interested parties to develop a proposal for consideration by the NCWM at the appropriate time. The American Seed Trade Association (ASTA) has established a work group comprised of industry and government representatives to study this issue so that recommendations can be developed for consideration at the 1997 NCWM Interim Meeting. At the Annual Meeting, Leslie Cahill, Vice President, Government Affairs,of the American Seed Trade Association updated the Committee on the association's work with the United States Department of Agriculture to develop data to justify a revision to the Maximum Allowable Variation for items that include a declaration of count. The ASTA work is focusing on standardizing the procedures used to insure the accuracy of electronic seed counters, and on developing uniform operational procedures for their use. Another issue is the need to identify the impact of moisture loss on the accuracy of seed counts. Ms. Cahill advised the Committee that she will attend the 1997 Interim Meeting and bring the NCWM up-to-date on its efforts.

260 Other Items

260-1 VC Petroleum Products Sampling Procedures and Safety Manual

(This item was adopted as part of the consent calendar.)

The Petroleum Subcommittee developed and submitted a "Petroleum Products Sampling and Procedures and Safety Manual" for adoption by NCWM. The manual is intended for use by agencies that have petroleum inspection programs. The Committee reviewed the manual and agreed to recommend NCWM adoption at the 81st Annual Meeting of the NCWM so that it can be published and sold as a conference publication. A copy of the manual is presented in Appendix F. The Committee received comments at the Annual Meeting suggesting the manual be revised to make the references to security seals in Section F. Identifying Samples and Sealing Containers on page 123 of Publication 16 generic by eliminating references to lead and wire security seals. These changes are included in the manual presented in Appendix F.

Recommendation: Adopt the "Petroleum Products Sampling Procedures and Safety Manual" as presented in Appendix F as an NCWM Publication.

L. Straub, Maryland, Chairman

K. Angell, West Virginia
M. Pinagel, Michigan
S. Millay, Maine
S. Morrison, San Luis Obispo County, California

Industry Representative: Gale Prince, Krogers
NIST Handbook 133 Working Group: B. Bloch, California, Chairman
Petroleum Subcommittee: Randy Jennings, Tennessee, Chairman
Canadian Technical Advisors: G. Vinet and G. Jorowski

NIST Technical Advisors: K. Butcher and T. Coleman

Committee on Laws and Regulations

Appendix A
Uniform Unit Pricing Regulation

Section 1. Application

Except for random and uniform weight packages that clearly state the unit price in accord with existing regulations, any retail establishment providing unit price information for packaged commodities, in addition to the total price, shall provide the unit price information in the manner prescribed herein.

Section 2. Terms for Unit Pricing

The declaration of the unit price of a particular commodity in all package sizes offered for sale in a retail establishment shall be uniformly and consistently expressed in terms of:

1. price per kilogram or 100 grams, or price per pound or ounce if the net quantity of contents of the commodity is in terms of weight.

2. price per liter or 100 milliliters, or price per dry quart or dry pint if the net quantity of contents of the commodity is in terms of dry measure or volume.

3. price per liter or 100 milliliters, or price per gallon, quart, pint, or fluid ounce if the net quantity of contents of the commodity is in terms of liquid volume.

4. price per individual unit or multiple units, if the net quantity of contents of the commodity is in terms of count.

5. price per square meter, square decimeter, or square centimeter, or price per square yard, square foot, or square inch if the net quantity of contents of the commodity is in terms of area.

Section 3. Exemptions

(1) Small Packages

Commodities shall be exempt from these provisions when packaged in quantities of less than 28 g (1 ounce) or 29 ml (1 fluid ounce) or when the total retail price is 50 cents or less.

(2) Single Items

Commodities shall be exempt from these provisions when there is only one brand in only one size offered for sale in particular retail establishment.

(3) Infant Formula

For "infant formula" unit price information may be expressed based on the reconstituted volume. "Infant formula" means a food that is represented for special dietary use solely as a food for infants by reasons of its simulation of human milk or suitability as a complete or partial substitute for human milk.

(4) Variety and Combination Packages

Variety and Combination Packages as defined in §2.9 and §2.10 in the Uniform Packaging and Labeling Regulation[See Note 1] shall be exempt from these provisions.

Note 1: See NIST Handbook 130 "Uniform Packaging and Labeling Regulation."

Section 4. Pricing

(1) The unit price shall be to the nearest cent when a dollar or more.

(2) If the unit price is under a dollar, it shall be listed:

(a) to the tenth of a cent, or

(b) to the whole cent.

(c) the retail establishment shall have the option of using 2(a) or (b) but shall not implement both methods.

(d) the retail establishment shall accurately and consistently use the same method of rounding up or down to compute the price to the whole cent.

Section 5. Presentation of Price

(1) In any retail establishment in which the unit price information is provided in accordance with the provisions of this regulation, that information may be displayed by means of a sign that offers the unit price for one or more brands and/or sizes of a given commodity, by means of a sticker, stamp, sign, label, or tag affixed to the shelf upon which the commodity is displayed, or by means of a sticker, stamp, sign, able, or tag affixed to the consumer commodity.

(2) Where a sign providing unit price information for one or more sizes or brands of a given

commodity is used, that sign shall be clearly and in a nondeceptive manner in a central location as close as practical to all items to which the sign refers.

(3) If a single sign or tag includes the unit price information for more than one brand or size of a given commodity, then the following information shall be provided:

(a) the identity and the brand name of the commodity.

(b) the quantity of the packaged commodity if more than one package size per brand is displayed.

(c) the total retail sales price.

(d) the price per appropriate unit, in accordance with Section 2. Terms for Unit Pricing.

Section 6. Uniformity

(1) If different brands or package sizes of the same consumer commodity are expressed in more than one unit of measure (e.g., soft drinks are offered for sale in 2 liter bottles and 12 fl. oz. cans), the retail establishment shall unit price the items consistently.

(2) When metric units appear on the consumer commodity, in addition to the other units of measure, the retail establishment may include both units of measure on any stamps, tags, labels, signs, or lists.

Section 7. Effective Date

This regulation shall become effective on _____199_. Given under my hand and the seal of my office in the City of _______, on this ____ day of _______, 199_.

Appendix B.
Uniform Regulation for National Type Evaluation

Section 1. Application. -- This regulation shall apply to *[NOTE 1 see page 10]* ~~all~~ any type ~~classes~~ 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 does not apply. Additionally, a State can amend this section to allow it to conduct a type evaluation and issue a "Certificate of Approval." This approach should be limited to occasions where formal NTEP Type Evaluation criteria does 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. Certificate of Conformance. -- A National Type Evaluation Program Certificate of Conformance is a document issued by the Chief of the Office of Weights and Measures of the National Institute of Standards and Technology establishing that the ~~commercial weighing and measuring~~ device, based on testing by a Participating Laboratory, said document constituting evidence of conformance of a type with ~~meets~~ the requirements of National Institute of Standards and Technology Handbook 44 as demonstrated using the test procedures in National Conference on Weights and Measures, Publication 14, "National Type Evaluation Program, Administrative Procedures, Technical Policy, Checklists, and Test Procedures."

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 Institute of Standards and Technology, other Federal agencies, the National Conference on Weights and Measures, 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 device manufactured for sale that has been categorized and tested as a "one-of-a-kind" device. If the manufacturer constructs an additional device or devices, the device is no longer considered to be "one-of-a-kind." This definition also applies to any 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 the device in another State. In this case, the device must be traceable to a Certificate of Conformance, ~~the manufacturer must request an NTEP evaluation on the device through the normal application process,~~ unless NTEP decides that a Certificate of Conformance will not be required.

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, see page 18

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 ~~Commercial or Law Enforcement Equipment~~ to be traceable to ~~covered by~~ a Certificate of Conformance prior to its installation or use for commercial or law enforcement purposes.

Section 4. Certificate of Conformance; Specific Requirements.

(1) Except for a device exempted by this section, no person shall sell a ~~commercial weighing or measuring~~ device unless it is traceable to a Certificate of Conformance. ~~has been issued for the device.~~

(2) Except for a device exempted by subsection (3), (4), or (5) of this section, no person shall use a ~~commercial weighing or measuring~~ device unless it is traceable to a Certificate of Conformance. ~~has been issued for the device prior to use.~~

(3) ~~Commercial weighing or measuring~~ A device in service prior to __________, 19__, which 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 ~~be exempt from meeting the requirements for the~~ Certificate of Conformance.

(4) ~~Commercial weighing or measuring~~ A device in service prior to ______, 19__, removed from service by the owner or on which the department has issued a removal order after _________, 19__, 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 ~~as adopted by the Legislature,~~ effective on the date of the return to service. Such a ~~commercial weighing and measuring~~ device shall not be required to be traceable to ~~have~~ a Certificate of Conformance.

(5) ~~Commercial weighing or measuring~~ A device in service prior to _____,19__, which ~~are remanufactured, modified, or upgraded~~ is repaired after such date shall meet ~~all~~ the specifications, tolerances, and other technical requirements of National Institute of Standards and Technology Handbook 44 ~~adopted by the Legislature on the date of the modification or upgrading.~~ and shall not be required to be traceable to a Certificate of Conformance. ~~Such devices shall not be required to have a Certificate of Conformance.~~

(6) A device in service prior to ______, 19__, that is ~~are~~ still in use may be installed at another location in this State ~~and are no longer being manufactured may be sold to another jurisdiction,~~ provided the device meets requirements in effect as of the date of installation in the new location ~~jurisdiction~~; however, the device shall not be required to be traceable to a ~~no~~ Certificate of Conformance. ~~is required.~~

(7) A device in service in another State prior to _____,19__, 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 Certificate of Conformance.

(8) **One-of-a-kind Device.** -- A "one-of-a-kind device" is not required to be traceable to an Certificate of Conformance. However, if the manufacturer decides to make an additional device or devices, the device will no longer be considered to be "one-of-a-kind" and it shall be traceable to a Certificate of Conformance. ~~an NTEP evaluation must be conducted on the device~~. For scales, the load

cells and electronic indicators must be traceable to a ~~have a~~ Certificate of Conformance.

(9) **Repaired Device.** -- If a person ~~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 Certificate of Conformance.

(10) **Remanufactured Device.** -- If a person ~~company or individual~~ 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 Certificate of Conformance.

(11) **Copy of a Device.** -- The manufacturer ~~company~~ who copies the design of a device that is traceable to a ~~has a~~ Certificate of Conformance, but which is made by another company ~~for the device,~~ must ~~get~~ obtain a separate ~~its own~~ Certificate of Conformance for ~~type evaluation on~~ the device. The Certificate of Conformance for the original device shall not apply to the ~~device that is a~~ copy.

(12) **Device Components** ~~**Scale or Weighing System Components.**~~ -- If a person buys ~~NTEP~~ a load cell(s) and an ~~NTEP~~ indicating element, which are traceable to Certificates of Conformance, and then manufactures a device ~~scale or weighing system~~ from the parts, that person shall ~~must~~ obtain a Certificate of Conformance for the device. ~~the complete device must be submitted for type evaluation.~~

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 ~~commercial weighing and measuring~~ device in a commercial application unless a Certificate of Conformance has been issued for such device unless exempt in Section 4.

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

Section 7. 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. Effective Date

This regulation shall become effective on ________.

Appendix C
Good ~~Manufacturing Practices for~~ Quantity Control <u>Practices</u>

Good ~~Manufacturing Practices for~~ Quantity Control Practices means that the plant managers should take all reasonable precautions to ensure the following quantity control standards or their equivalent are met:

1. A formal quantity control function is in place with authority to review production processes and records, investigate possible errors, and approve, control, or reject lots.

2. Adequate facilities (e.g., equipment, standards and work areas) for conducting quantity control functions are provided and maintained.

3. A quantity control program (e.g., a system of statistical process control) is in place and maintained.

4. Sampling is conducted at a frequency appropriate to the product process to ensure that the data obtained is representative <u>of the production lot.</u>

5. Production records are maintained to provide a history of the filling and net content labeling of the product.

6. Each "production lot" contains on the average the labeled quantity and the number of packages exceeding the specified maximum allowable variation (MAV) value <u>in the inspection sample</u> shall be no more than permitted in Tables 2-1 and 2-2 in NIST Handbook 133.

7. Packaging practices are appropriate for specific products and measurement procedures (e.g., quantity sampling, density and tare determinations) and guidelines for recording and maintaining test results are documented.

8. Personnel responsible for quantity control follow written work instructions and are competent to perform their duties (e.g., background, education, experience and training). Training is conducted at sufficient intervals to ensure good practices.

9. Recognized procedures are used for the selection, maintenance, adjustment, and testing of filling equipment <u>to insure proper fill control</u>.

10. Measurement standards and <u>weighing and measuring</u> devices are suitable for their intended purpose and traceable to national standards. This includes a system of equipment maintenance and calibration to include recordkeeping procedures.

11. Controls over automated data systems and software used in quantity control ensures that information is accessible, but changeable only by authorized personnel.

12. Tare materials are monitored for variation. Label changes are controlled to ensure net quantity matches labeled declaration.

Appendix D
Point-of-Pack Inspection Guidelines

A. Weights and Measures Officials' Responsibilities

1. Conduct inspections during hours when the plant is normally open for business. Open the inspection by making contact with the plant manager or authorized representative (e.g., the quality assurance manager or the production manager.)

2. Present the proper credentials and explain the reason for the visit (e.g., routine or follow-up inspection or consumer complaint, etc.)

4. Request access to quantity measurement equipment in the packing room, moisture testing equipment in the laboratory or in the packing room, and to product packed on premise or stored in warehouse areas.

5. Do not use a tape recorder or a camera without prior authorization by plant representative.

6. Conduct inspection related activities in a professional and appropriate manner, and if possible work in an area that will not interfere with normal activities of the establishment

7. Abide by all the safety and sanitary requirements of the establishment, and clean the work area upon completion of the inspection/test. Return borrowed equipment and materials

8. To close the inspection recheck inspection reports in detail and ascertain that all information is complete and correct.

9. Sample questions and tasks for Inspectors

a. Inside Buildings and Equipment

(i)Is all filling and associated equipment in good repair?

(ii) Are net content measurement devices suitable for the purpose being used?

(iii) Are standards traceable to NIST used by the firm to verify device accuracy?

b. Packing Room Inspection

(i) Observe if the program for net quantity of content control in the packing room is actually being carried out.

(ii) Ensure the weighing systems are suitable and tare determination procedures are adequate. If there is any question regarding tare determination, weigh a representative number of tare and/or filled packages.

(iii) For products labeled and filled by volume and then checked by weight, insure proper density is used.

c. Warehouse Inspection

If a inspection is conducted:

(i) Select lot(s) to be evaluated.

(ii) Determine the number of samples to be inspected. Use the appropriate sampling plan as described in NIST Handbook 133.

(iii)Randomly select the number of samples or use a mutually agreed on plan for selecting the samples.

(iv) Determine the average net quantity of the sample and use the standard deviation factor to compute the Sample Error Limit (SEL) to evaluate the lot.

(v) Look for individual values that exceed the applicable Maximum Allowable Variation as found in NIST Handbook 133.

(vi) Apply moisture allowances, if applicable.

(vii) Review the general condition of the warehouse relevant to package integrity, good ~~manufacturing~~ <u>quantity control</u> and distribution practices.

(viii) Prepare an inspection report to detail findings and actions.

10. Closing the Inspection - Review findings with Plant Representative.

After the inspection meet with the management representative to discuss inspection findings and observations. Provide additional information as needed (e.g., information on laws and regulations or explanations of test procedures used in the inspection.) Be informative, courteous and responsive. If problems/violations are found during the inspection/test, bring this to the attention of the appropriate person.

B. Plant Management Responsibilities

1. Recognize inspectors are enforcing a <u>Federal</u>, State or Local law.

2. Assist the official in conducting inspection activities in a timely and efficient manner.

3. During the initial conference with the inspector, find out whether the inspection is routine, a follow-up or the result of a consumer complaint. If a complaint, obtain as much information as possible concerning the nature of the complaint, allowing for an appropriate response.

4. The plant manager, quality assurance manager, or any designated representative should accompany the inspector. ~~and witness the inspection and tests~~.

5. Plant personnel should take note of the inspectors comments during the inspection and prepare a detailed writeup as soon as the inspection is completed.

6. When an official presents an inspection report, discuss the observations and if possible provide explanations for any changes deemed necessary as a result of the inspection/test

Plant Management: information that must be shared with the Inspector.

1. Establishment name and address.

2. Type of firm and information on related firms or applicable information (e.g., sub contractor, servant or agent.)

3. General cescription and location of shipping and storage area.

4. Commodities manufactured by or stored at the facility.

5. Names of responsible plant officials.

Plant Management: information that may be shared with the Inspector.

1. Simple flow sheet of the filling process with appropriate net content control checkpoints.

2. Weighing or measuring device maintenance and calibration test records.

3. Type of quantity control tests and methods used.

4. Net content control charts for any lot, shipment, or delivery in question or lots which have previously been cited.

5. Method of date coding the product to include code interpretation.

6. Laboratory reports showing the moisture analysis of the products which are in question or have been previously cited.

7. Product volume of lot sizes or related information.

8. Distribution records related to a problem lots including names of customers.

Appendix E.
Due Process Procedures

A. Purpose.- These review procedures were developed to ensure that persons affected by "inspection findings" (e.g., price misrepresentations or shortweight packages), or who are deprived of the use of their property (devices or packages placed under "stop" or "off-sale" order), are provided a timely-independent review of the action. The procedures enable affected persons to provide evidence which could be relevant in determining whether the enforcement action was proper. The purpose of the procedure is to ensure that a person's ability to conduct business is not hindered by improper enforcement actions. These procedures are independent of any other action (e.g., administrative penalty actions) that may be taken by the enforcement agency.

B. Background.- In the course of their work, weights and measures officials take enforcement actions that may prohibit the use of devices or the sale of packaged goods (e.g., "stop-sale" or "off-sale" orders for packages and "stop-use" or "condemnation" tags issued on devices). Improper actions, (e.g., not following prescribed test procedures, enforcing labeling requirements on exempted packages, or incorrectly citing someone for a "violation") place the official, and the jurisdiction in the position of being liable for the action if it is found that the action was "illegal." In some cases weights and measures jurisdiction could be ordered to pay monetary damages to compensate the affected party for the improper action.

These procedures provide affected persons an opportunity to present evidence which may be relevant in determining whether the order or finding has been properly made to an independent party. The procedure enables business operators to obtain an independent review of orders or findings so that actions affecting their business can be evaluated administratively instead of through litigation. This ensures timely review, which is essential because of the impact that such actions may have on the ability of a business to operate, and in cases where perishable products may be lost.

C. Due Process Provisions. - Parties affected by enforcement actions must be given access to appeal enforcement actions. The following guidelines are provided to assist weights and measures programs in establishing an informal administrative review process.

- Inspectors are the primary contact with regulated firms and thus have the best opportunity to ensure the enforcement actions they take are "proper". "Proper" means that inspections are conducted, (1) within the scope of the authority granted by law, (2) according to recognized procedures and standards, and (3) that enforcement actions are lawful. The "burden" for proving actions are "proper" falls on the weights and measures program, not on regulated firms.

- Weights and measures officials are law enforcement officers. Therefore, they have the responsibility to exercise their authority within the "due process" provisions of the U.S. Constitution. As weights and measure programs carry-out their enforcement responsibilities in the future, more and more challenges to their actions and authority will occur. It is in the best interest of any program to establish strict operational procedures and standards of conduct to prevent the occurrence of improper actions which may place the jurisdiction in an untenable position in a court challenge of an enforcement action. The foundation for ensuring "proper" actions is training, clear and concise requirements, and adoption and strict adherence to uniform test procedures and legal procedures.

- Prior to taking enforcement actions the inspector should recheck test results and determine that the information on which the action will be taken is accurate.

- Inspections shall be conducted with the understanding that the findings will be clearly and plainly documented and reviewed with the store's representative.

- During the review of the findings with the firm's representative information may be provided by the representative which must be used by the inspector to resolve the problems and concerns before enforcement actions are taken. In some cases, relevant information may be provided which does not persuade the inspector to forego the action. In some cases the inspector and business representative may not understand the circumstances surrounding the violations or there may be a conflict between the parties that they cannot resolve. In other cases, the owner, or manufacturer may not find out that an enforcement action has occurred until long after the inspector leaves the establishment.

Steps:

1. Provide a framework that will help in resolving most of these situations where "due process" is of concern. <u>Make sure the responsible party on the package label is notified of violations and receives copies of inspection reports.</u> Establish standard operating procedures to ensure the affected party timely access to a representative of the weights and measures program so the firm can provide the relevant information or obtain clarification of legal requirements.

2. Make the process as simple and convenient as possible. Especially in distant or rural areas where there are no local offices, the review should be conducted by a supervisor of the official taking the action if agreed to by the person filing the request for review.

3. The process should include notice that the firm can seek review at a higher level in the weights and measures program or an independent review by a third party. The following procedures are recommended.

- Any owner, distributor, packager, or retailer of a device ordered out of service, or item or commodity ordered "off-sale" (or inspection finding e.g., a price misrepresentation or a shortweight lot of packages) shall be entitled within three (3) business days of the date of receipt of a written request for review of such order, to a prompt, impartial, administrative review of such off-sale order or finding.

The following notice should be included on all ~~inspection reports or official documents~~ orders or reports of findings or violations and should be communicated to both the retailer and responsible firm identified on the product label:

Notice

You have the right to Administrative Review of this order or finding. To obtain a review, contact the Director of Weights and Measures by telephone or send a written request (either postmarked, faxed, or hand delivered) to:

(Name, Address or Fax Number of the Director or other Designated Official)

Your request should ~~include~~ reference any information that you believe supports the withdrawal or modification of the order or finding.

-The administrative review shall be conducted by an independent party designated by the Director or before an independent hearing officer appointed by the Department. The officer shall not be a person responsible for weights and measures administration or enforcement.

- No fees should be imposed for the administrative review process.

- The firm responsible for the product or the retailer may introduce any record or other relevant evidence including, but not limited:

(i) Commodities subject to the off-sale action or other findings were produced, processed, packaged, priced, or labeled in accordance with applicable laws, regulations or requirements.

(ii) Devices subject to the "stop-use" order or "condemnation" were maintained in accordance with applicable laws, regulations or requirements.

(iii) Prescribed test procedures or sampling plans were not followed by the inspector.

(iv) Mitigating circumstances existed which should be considered.

- The reviewer must consider the inspector's report, findings, and actions as well as any evidence introduced by the owner, distributer, packager, or retailer as part of the review process.

- The reviewer must provide a written recommendation within five business days of the review unless additional time is agreed to by the department and the petitioner.

- The reviewer may recommend to the Department that an order be upheld, withdrawn or modified. If justified the reviewer may recommend other action including a reinspection of the device or commodity based upon information presented during the review.

- All actions should be documented and all parties advised in writing of the results of the review. The report of action should be detailed in that it provides the reasons for the decision.

Appendix F.
National Conference on Weights and Measures

Petroleum Products

Sampling Procedures and Safety Manual

NCWM Publication 20

October 1996

Safety Manual Contents

Petroleum Products
Sampling Procedures and Safety Manual

I. Purpose and Scope

This manual has been designed to assist you in conducting inspections of petroleum products. It contains procedures for:

- Handling Products and Safety
- Inspection
- Sampling
- Ordering Products Off-Sale

One purpose of the manual is to provide uniform inspection, sampling, and enforcement procedures for petroleum products in order to protect consumers and businesses from economic loss resulting from substandard products. The manual is also intended to help you avoid injury when you are handling petroleum products.

This manual does not purport to address all of the safety problems associated with the use of petroleum products. It is the responsibility of each agency to establish appropriate safety and health practices.

II. Petroleum Products Handling and Safety

A. Introduction

One of the primary considerations a person must have while at work is safety. Certain occupations carry varying degrees of potential hazards particular to the type of work, the tools involved, and the products encountered while at work. For individuals who sample and test petroleum products, the materials that may be encountered on a day-to-day basis not only may have potential toxic effects, but may be explosive and flammable.

The best protection is to learn and observe the correct safety rules for the job and to use common sense. This manual provides some guidelines for properly and safely conducting specific tasks. You also should know and follow the safety requirements established by your agency and the safety rules in effect at the location where you are testing.

B. Safety Equipment

The following is a list of some of the safety equipment that an inspector of petroleum products might use:

1. Eye-wash kit - filled with fresh water.
2. Eye protection - safety goggles.
3. Protective gloves - impervious to gasoline, diesel fuel, kerosene or fuel oil.
4. Fire extinguisher, dry chemical, rated for class "A", "B", and "C" fires, with current inspection tag - **Be sure you know how to use it!** Reference NFPA 10, "Portable Fire Extinguishers," for additional guidance on selection of an appropriate fire extinguisher.
5. Hazard reflector kit (plastic type, non-burning). **Do not** carry or use road flares.
6. Bag of absorbent material (e.g., sand, kitty litter) - to minimize flammability and environmental impact in the event of a petroleum product spill.
7. Barrier cream and waterless skin cleanser.
8. First-aid kit.
9. Reflective vest.
10. Flashlight - explosion proof; UL listed for Class I, Groups C & D.
11. Tools made of nonferrous materials.
12. Activated carbon canister respirator

You should ensure that your safety equipment is maintained in proper working order at all times. A safety equipment inspection form, such as the one shown in Appendix A, can be used to facilitate periodic evaluation of the condition of safety equipment. The form should be completed at least on a monthly basis and submitted to your supervisor or safety officer. Any problems with safety equipment should be noted on the form and corrective action taken immediately.

C. Gasoline - *General*

The primary petroleum product encountered in the field is gasoline. When you handle this product, remember the following.

1. Gasoline is Harmful or Fatal if Swallowed

- Never siphon gasoline by mouth.
- If someone swallows gasoline, do not induce vomiting - **Call a doctor immediately.**

2. Gasoline Vapor is Harmful; Long Term Exposure to Vapor Has Caused Cancer in Laboratory Animals

- Avoid prolonged breathing of gasoline vapor. Use gasoline only in an area where there is plenty of fresh air. When taking samples, place yourself up-wind so vapors are blown away from you. Keep your face away from any gasoline container opening.
- If you must work in a high vapor concentration situation, such as when you are emptying sample cans, wear a protective mask with an organic vapor cartridge. Masks should be available at each petroleum laboratory for use by petroleum personnel.
- Keep gasoline containers closed when not in use.
- Do not overfill or top off a gasoline tank. Make sure the cap is put back on when the gasoline tank has been filled.

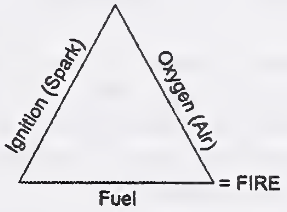
3. Avoid eye and skin contact

- Use of a barrier cream is advised.
- Have eye-wash bottles available in case petroleum products are splashed into your eyes. If you get gasoline in your eyes, flush them for 15 minutes with clean water. If irritation continues, see a doctor.
- Never use gasoline to wash your hands.
- Rubber or plastic gloves which are impervious to petroleum liquids should be worn.
- If you get gasoline on your skin, wash promptly and thoroughly with soap and water.
- Remove gasoline-soaked clothes, dry them in open air (away from heat sources), and then launder them before re-using.

4. Gasoline is extremely flammable

- *Use only as an engine fuel.* Do not use for cleaning, pressure appliance fuel, or any other such use.
- Do not use or store near flames, sparks, or hot surfaces.
- Keep containers closed - clean up spills immediately.
- Be aware that gasoline presents an extreme fire hazard. Liquid evaporates very quickly, even at low temperatures, and forms vapor (fumes) which can catch fire and burn with explosive violence.
- Realize that invisible fuel vapor is heavier than air and spreads easily and can be ignited by sources such as pilot lights, welding equipment, electric motors, and switches.

Remember the Fire Triangle:



Removing any side of the triangle will prevent or eliminate a fire.

D. Static Electricity

No safety manual regarding potentially explosive liquids would be complete unless this hazardous subject was addressed. Static electricity or any spark, regardless of its source, can ignite gasoline vapors, propane, and other volatile liquids and gases. This potential hazard should be kept in mind when sampling and handling these types of products.

Tank trucks and other rubber-tired vehicles are potential generators of static electricity. An accumulation of this static electricity is often demonstrated by electrical sparks when a person touches the body of the vehicle, or by a slight shock when entering or leaving the vehicle.

When sampling products described in this manual, always ensure that a solid metal-to-metal bond is made between a fill nozzle and your sample can to reduce the risk of this potential hazard. Do not fill the sample container while it is in contact with a plastic-lined pickup bed or the trunk of an automobile.

For a more detailed guide on the hazards of static electricity, refer to ASTM D 4865, "Standard Guide for Generation and Dissipation of Static Electricity in Petroleum Fuel Systems." This publication describes in detail how static electricity may be generated in petroleum fuel systems, the types of equipment conductive to charge generation, and methods for the safe dissipation of such charges. The guide is intended to increase awareness of potential operating problems resulting from electrostatic charge accumulation.

E. Recommended Safety Precautions for Transporting Petroleum Samples

1. Use suitable sample containers - Samples should be collected and transported in a suitable container which can be tightly closed. Sample containers should not be filled above 80 percent of capacity to allow for expansion of the liquid sample.

2. Do not transport samples in the passenger compartment of vehicles. Petroleum sample containers should be placed in a closed metal box and properly secured in the trunk of a sedan or bed of a pickup for transportation.

3. Have a suitable fire extinguisher available - A dry chemical type rated for class "A", "B", and "C" fires is the most effective extinguishing agent for flammable liquid fires.

4. Control accidental spills - Carrying sample containers in a metal box will contain a spill or accidental leak from a sample container.

5. In case of a collision or vehicle breakdown, do not use burning emergency flares. Emergency reflectors are recommended.

6. Store samples in fireproof cabinets away from sources of ignition.

7. Smoking in vehicles used to transport petroleum samples is not recommended.

F. Spills, Containment, and Clean Up

1. Gasoline - Eliminate all sources of ignition in the vicinity of the spill. Clean up small spills using appropriate techniques such as absorbent materials and/or suction pumps appropriate for liquid petroleum product clean up. Place recovered gasoline in approved container for proper disposal.

2. Diesel and Fuel Oil - Soak up residue with absorbent material such as clay, sand, or other suitable material. Place in non-leaking containers and seal tightly for proper disposal. Flush area with water to remove trace residue. Properly dispose of flush solution.

3. Kerosene - Take up with an absorbent material and place in a sealed container for proper disposal.

If product spills onto soil, where feasible and appropriate, remove contaminated soil and/or contact local environmental authorities.

G. Material Safety Data Sheets

Federal and State laws require vendors of hazardous products to provide purchasers with a Material Safety Data Sheet (MSDS) for any hazardous product purchased.

MSDS's provide valuable information about materials, ranging from general product data to specific details on the health hazards and first-aid procedures applicable in case of spills or exposure. They also contain reactivity data, which is important because many materials will react, sometimes violently, with other substances such as strong acids.

You should have copies of the MSDS's for use in the field. In addition, they should be kept in each petroleum laboratory for review when needed. The MSDS's should be neatly arranged in notebooks or files, and one individual should be given the responsibility of keeping the information up to date.

You should review the MSDS's at least semiannually (e.g., June and December). A record should be kept of this review on a form such as the one shown in Appendix B; you should initial and date the form when you complete your review. First-line supervisors or safety officers should have the responsibility of ensuring that the reviews are completed in a timely manner.

Listed below are materials found in the laboratory and in the field for which MSDS's should be obtained.

Materials Encountered in the Petroleum Laboratory

Acetone

Acetylene

t-amylmethylether (TAME)

Benzene

Buffer solution - 10 pH - sodium chloride, sodium tetraborate, potassium chloride and sodium glycinate

Buffer solution - 7 pH - dibasic sodium phosphate, monobasic potassium phosphate, dibasic potassium phosphate

Buffer solution - 4 pH - hydrochloric acid, potassium hydrogen phthalate, formaldehyde

Butyl alcohol, normal

sec-butyl alcohol

t-butyl alcohol

Calcium sulfate

Compressed air

Compressed Natural Gas (CNG)

Diesel fuel

Diisopropylether (DIPE)

1,2 Dimethoxyethane

Ethyl alcohol (Ethanol)

Ethyl *t*-butylether (ETBE)

Ethylene glycol

Fuel oil

Gasoline

Gasoline-oxygenated blend

Glycerin

Helium

Heptane, normal

Hexane, normal

t-hexylmethylether (THeME)

Hydrochloric acid

Hydrogen

Iodine

Isobutyl alcohol

Isooctane (2, 2, 4 trimethylpentane)

Isopropyl alcohol

Kerosene

Lead in reference fuel (tetraethyl-lead and 2,2,4 trimethylpentane)

Liquefied Natural Gas (LNG)

Mercury

Methyl alcohol (Methanol)

Methyl isobutyl ketone

Methyl *t*-butylether (MTBE)

Methylene chloride

Mineral oil

Nitric acid

Nitrogen (gas)

Nitrogen (liquid)

t-pentyl alcohol

Potassium dichromate

Potassium hydroxide

Precipitation naphtha (aliphatic hydrocarbons)

Pressure appliance fuel

Propylene glycol

Sodium hydroxide

Sulfuric acid

Toluene

Xylene

Materials Encountered During Field Work

Diesel Fuel

Gasoline

Kerosene

Compressed Natural Gas

Liquefied Natural Gas

Liquefied Petroleum Gas

Water Indicating Paste

Ethanol

Methanol

Fuel Oil

Pressure appliance fuel

III. Inspection Procedures

The suggested procedure for routine service station inspections is:

1. Identify yourself to the owner or manager and state the nature of your business.
2. Record the business name, address, and telephone number, and the name of the owner/operator.
3. Check the labeling on all petroleum product dispensers, containers, and storage tanks for diesel and gasoline.
4. Obtain all necessary evidence (such as photographs, drawings, samples, product level and totalizer readings, and statements) for use in any possible administrative or judicial proceeding.

The following is an example of an inspection check list:

CHECK LIST

____ Showed credentials?

____ Recorded information on business?

____ Checked for sign and label violations?

____ Diagram of dispensers?

____ Diagram of underground tank locations?

____ All dispensers inspected?

____ Samples collected?

____ Product level and totalizer readings taken?

____ Chain of custody procedures followed?

____ All relevant areas of sample form filled in?

____ Samples packed for transportation?

____ All samples paid for?

____ Copy of form left with someone at the site, if required?

____ Flushed gasoline returned to storage or placed into a vehicle?

IV. Sampling Procedures

Extreme care and good judgement are necessary to ensure samples are obtained that are representative of the product being sold.

It is necessary to protect all volatile samples of petroleum products from evaporation. In most circumstances, the product sampled should be put directly into a sample container as it is obtained. This is mandatory for vapor pressure samples. When it is necessary to obtain product with a sampling apparatus, such as from an underground storage tank, transfer the product to a sample container immediately. Keep the container closed except when material is being transferred. Never completely fill a sample container; allow adequate room for expansion. To prevent the loss of liquid and vapors during transport, **screw the caps of containers down tightly** and **check for leakage**. Label and seal the containers immediately after the sample is obtained.

A. Types of Samples

There are two reasons for obtaining samples:

1. Routine samples - these are samples collected in the normal course of business to verify compliance with established specifications.

2. Complaint samples - these are samples that are collected in response to a consumer or business complaint.

Samples can be obtained in one of two manners:

1. Open Samples - you enter the station and identify yourself, state the reason for being there and obtain the necessary sample(s).

2. Undercover Samples - you obtain a sample(s) of the product(s) in question without announcing yourself to the station operator/owner. This can be done by means of a "trap tank" in an undercover vehicle or by purchasing the product into a UL or FM listed, approved gasoline container as though it were for a lawn mower.

B. Types of Sample Containers

Sample containers may be clear or brown glass bottles, or metal cans. The clear bottle is advantageous because it may be examined visually for cleanliness, and also allows visual inspection of the sample for free water or solid impurities. The brown glass bottle affords some protection from light. Plastic coated bottles are available which provide protection against shattering. The only suitable metal cans are those with the seams soldered on the exterior surface with a flux of rosin in a suitable solvent that is easily removed with gasoline. NFPA 30A 9.2 (1994 edition) states "No delivery of any Class I or Class II liquid shall be made into portable containers unless the container is constructed of metal or is approved by the authority having jurisdiction, has a tight closure, and is fitted with a spout or is so designed that the contents can be poured without spilling." If a jurisdiction is operating in an area where NFPA requirements are adopted, this should be considered in selecting sample containers that will be used at retail locations.

Screw caps made of either plastic or metal may be used; the caps should provide a vapor tight closure seal. The screw caps must be protected with liners made of metal foil, teflon, polyethylene, or other material that will not be destroyed by or affect the sample product.

Sample containers can be cleaned and used repeatedly as long as they are still serviceable. The caps should be used once and then disposed of, this will help prevent leakage and loss of reliability of the sample.

C. Suggested Container Types and Minimum Sample Sizes

As a general rule, a sufficient amount of product should be collected to allow for the initial test, a repeat test, and retention of some product for evidence in a possible legal action. Some suggested container types and minimum sample sizes are listed below:

Product/Test	Container Type	Minimum Sample Size
Gasoline		
General	Glass or Metal	2 L
Alcohol/Ether	Glass	2 L
Vapor Pressure	Glass	1 L
Trace lead	Borosilicate Glass	1 L
Diesel Fuel		
General	Glass or Metal	2 L
Kerosene		
General	Glass or Metal	2 L
Fuel Oil		
General	Glass or Metal	2 L
Aviation Gasoline		
General	Glass or Metal	2 L
Aviation Turbine Fuel		
General	Glass or Metal	2 L
Liquefied Petroleum Gas (LPG)		
General	Floating piston	1 L cylinder

D. Collecting Samples

When collecting samples at a retail location, follow procedures in 40 CFR Part 80, Appendix D. At wholesale locations, collect samples in accordance with ASTM D 4057, "Standard Practice for Manual Sampling of Petroleum and Petroleum Products."

Use a sample container which is clean and free of water, dirt, lint, corrosion, rust or other visible contamination. Exercise care when obtaining samples to ensure that your sample is representative of the product to be tested. Sufficient product should be purged from the system to ensure that you are obtaining fresh product. The sample container should be rinsed with the product that will be sampled immediately prior to collecting the sample to ensure all possible contaminants are removed.

It is necessary to protect all volatile samples of petroleum products from evaporation. It is important that samples sensitive to light be kept in the dark. **Do not over fill** - allow room in the sample container for product expansion. As a general rule the container should be filled to no more than 80 percent of capacity. In 40 CFR Part 80, use of an extender tube to bottom fill the sample container is required in the case of samples that will be analyzed for vapor pressure.

Seal the sample container tightly, complete and attach the sample tag/chain of custody tag (if required to be attached) and affix the security seal. Use reasonable care to keep the sample container away from excessive heat and light.

Submit only samples collected by authorized personnel. Do not collect a sample for enforcement purposes from private storage, vehicle fuel tanks, etc. You can not attest to such sample as being truly representative of the product which is being sold.

E. Sampling From Blended Product Dispensers and Single Hose Multi-Product Dispensers

When taking gasoline samples from these dispensers, the samples should be collected after an observed sale of the particular grade or product to be tested, or sufficient product should be purged from the hose to ensure the sample is representative of the grade or product being sampled. The National Conference on Weights and Measures policy on procedures for taking samples for octane verification is as follows:

> **"A minimum of 1 liter (0.3 gallon) of engine fuel shall be flushed from the dispensers before taking a sample for octane verification. This flush shall be returned to the storage tank containing the lowest octane."**

The approximate volume of the listed hose sizes per 3 meters (10 feet) of hose is:

Inside diameter	Approx. Liters (gal)/3 m(10 ft)
13 mm (½ inch)	0.4 L (0.10 gallon)
16 mm (5/8 inch)	0.6 L (0.16 gallon)
19 mm (3/4 inch)	0.8 L (0.23 gallon)
25 mm (1 inch)	1.6 L (0.41 gallon)

F. Identifying Samples and Sealing Containers

You must be able to verify or authenticate your samples in court. A petroleum products sample tag should be completed for each sample and permanently affixed to the container (if required). Containers should be sealed as follows:

1. Metal cans with security seals - The top opening of the container should be closed tightly with a screw cap. The closure should then be sealed with a security seal should be attached as shown in Figure 1.

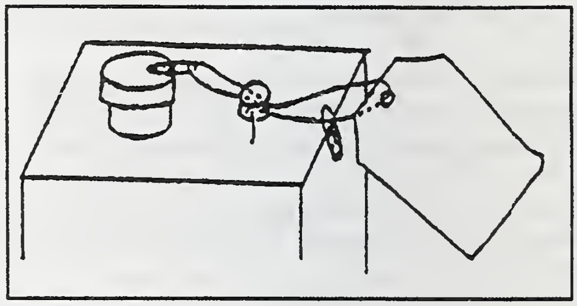


Figure 1. Attachment of Security Seal

The petroleum products sample tag should be attached to this side of the seal. All slack should be removed from the circuit prior to securing the seal. Check screw cap for tightness to ensure that there are no leaks. Pull security seal tight to secure it.

NOTE: Seals are attached in this manner so that they may be cut to permit laboratory analysis while the petroleum products sample tag will remain permanently affixed to the container.

2. Glass bottles with adhesive paper seals - The top opening of the container should be closed tightly with a screw cap. The closure should be sealed with an adhesive paper seal attached as shown in Figure 2:

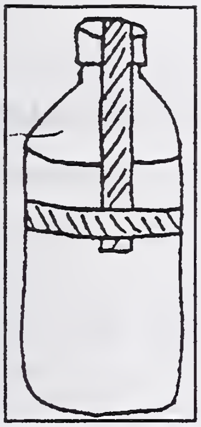


Figure 2. Attachment of Security Seal

The seal should be placed over the cap and down the sides of the bottle to seal the cap. One (or more if necessary) additional seals should be placed around the bottle overlapping the ends of the seal across the cap.

G. Procedure for Transmittal to Laboratory

Engine fuel samples should be shipped to the petroleum laboratory if delivery by program personnel is not practical. Department of Transportation (DOT) regulations regarding the shipment of hazardous substances should be consulted for proper packaging and labeling before shipment.

There will obviously be variants to any routine delivery system. However, in general, you need to make some definite arrangements for delivery.

Examples might be:

- Ask area official to pick up sample.
- Deliver sample via another program's personnel.
- Deliver sample to a certain pickup point.
- Ask State courier to pick up sample.
- Arrange for common carrier to pick up sample.

Some private carriers have requirements for shipping that are more restrictive than DOT regulations. These requirements could influence the type of sample containers that can be used, in addition to packing materials required. Additionally, some private carriers require that the individuals preparing and packaging the sample for shipment be trained and certified according to DOT criteria. If common carriers are used for shipment of samples, contact the individual company for specific packing and shipping requirements.

A sample left in an office or vehicle for any length of time has lost its reason for priority handling due to new deliveries having been made to the service station and other factors.

H. Chain of Custody (Possession) and Custody Transfer

Chain of Custody (Possession) is a record of each person who has come into possession of the sample from the time it is obtained until the time it is presented as evidence in an administrative or judicial proceeding. It may be the only way to prove that the sample presented in the proceeding is the one obtained at the location in question.

It becomes mandatory that a record be maintained which lists all those persons coming in contact with the evidence. This is particularly true when a scientific analysis of the sample is to be made. It must be proved that there was no tampering with, alteration of, or substitution of the sample between the time it was collected and the time the analysis was made by the laboratory. The burden of proof is on the party offering the sample into evidence.

Samples must be passed from the field person who obtained them to the laboratory personnel. When this takes place, the record must indicate to whom and when the sample was released. In other words, the chain of custody must be maintained. This means that the transfer of the sample must be documented each time, and that the record must remain with the sample. If this proof is not available, the sample and its analysis may be excluded from evidence.

Although an accurate and complete record is maintained of the chain of custody, it is still highly advisable that the samples go through as few people as possible. The fewer people involved, the less chance there is the sample may be tampered with, altered or lost. Also, fewer witnesses will be needed to be called to establish the fact that the sample analyzed is the sample collected at the location.

I. Timeliness of Samples

A sample that fails to arrive at the laboratory within 2 days for analysis is usually of little value in preventing low octane or contaminated engine fuel from being sold to the public. This is because of the fast turnover of dealers' inventories in today's market.

V. Off-Sale Procedures

A. Engine Fuel Off-Sale Guidelines

1. Upon notification from the laboratory that a product sample did not meet specifications, go to the location where the product was obtained and identify yourself to the manager or person in charge.

2. Explain what the test results on the sample were, what the specifications for that product are, and what action you are going to take. Refer questions on the test results to the appropriate laboratory or management personnel. **Do not** recommend how to correct or bring the bad product into specification.

3. Read the pump totalizers and determine the number of gallons in the storage tank from which the sample originally was collected; also check to see if there is water in the tank with water-finding paste and record the amount.

4. If additional product has been added to the storage tank since the sample was collected, resample the product, and properly label and seal it.

5. If no additional product has been added to the storage tank since the sample was collected, label and seal the storage tank fill pipe(s) and/or product dispenser(s) for the grade of product in question in accordance with the procedures in your jurisdiction.

6. Explain to the manager your jurisdiction's policy on the disposition of off-sale product. Leave a written copy of your instructions with the manager. (See Figure 3.)

7. When the storage tank(s) are to be pumped out, check the tags and seals to see that they are intact. Also check the totalizer readings and measure the amount of product in the tank to determine if product has been removed. Break the seals and allow the product to be pumped out of the storage tank. Have the lines and filters flushed with sufficient good product to assure all off-specification product is removed before releasing for sale.

8. Obtain a sample of replacement product from the delivery truck and of the new product through the dispenser after it has been dumped into the storage tank.

<u>Off Sale Product Disposition Letter</u>

In accordance with the provisions of Section _____ of the____________ ____________ Code, please be advised that on _____________ at ___ ________ o'clock, ____.m., I will be prepared to properly dispose of the products condemned and sealed by officials of the _____ Department of Weights and Measures on _________, at ___________,_____________.

I request that a representative of the _____ Department of Weights and Measures be present at the above noted address at the time specified to remove all seals and required sealing notices, and to supervise the removal and disposition of the condemned products.

Signed: _________________

Figure 3. Sample Off-Sale Disposition Letter

9. Take the appropriate enforcement action (issue a Notice of Violation, or citation, etc.) with a responsible party.

VI. Referenced Documents

The following documents are referenced in this manual:

ASTM D 4067, Standard Practice for Manual Sampling of Petroleum and Petroleum Products;

ASTM D 4865, Standard Guide for Generation and Dissipation of Static Electricity in Petroleum Fuel Systems;

40 CFR Part 80 (Vapor Pressure Control Standards issued by the U.S. EPA under the authority of the Clean Air Act);

NFPA 10, Portable Fire Extinguishers;

NFPA 30A, Automotive and Marine Service Station Code.

Safety Manual Appendix A.

Safety Equipment Inspection

TO: ______________________________ Date: ________________

Office: ______________________________

___ Absorbent Material

___ Eye Protection ______________________________

___ Eye-Wash Bottle - Date filled with clean water ________________

___ Fire Extinguisher ________________ Exp. Date: ____________

___ First-Aid Kit ______________________________

___ Replacement Items Required (First-Aid Kit) ______________________________

____

____

___ Gloves ____________ ___ Hazard Reflector Kit ____________

___ Barrier Cream ________ ___ Hand Cleaner ________________

___ Reflective Vest ________ ___ Vapor Proof Flash Light __________

Investigator's Signature: ____________________ Vehicle Lic. No.: ____________

Corrective Action Taken ______________________________

____

____

____

Investigator's Signature: ______________________________ Date: __________

Safety Manual Appendix B.

MSDS LOG

I have reviewed the enclosed Material Safety Data Sheets (MSDS) on the dates indicated by my initials.

NAME	DATE-INIT.	DATE-INIT.	DATE-INIT.	DATE-INIT.

Appendix G
Food Industry Letter to the Food and Drug Administration

June 5, 1996

William Schultz
Deputy Commissioner for Policy
Food and Drug Administration, HF-22
5600 Fishers Lane
Rockville, MD 20857

RE: Proposed Regulation on Net Quantity of Content Testing Procedures

We, the undersigned, request that FDA act on a matter of importance to our organizations, represented industries and the consumers of America – the development of a uniform, science-based standard for verifying the net contents of packaged goods. As manufacturers and marketers of packaged products, we strongly support truth and accuracy in labeling.

As you know, national uniformity of regulatory requirements at the federal, state and local levels is of extreme importance to the manufacturers of food and other consumer products. Differing and conflicting regulatory requirements and standards for compliance are burdensome to national manufacturers. Uniformity of regulation and enforcement creates a "level playing field" and is essential to fair competition.

The food industry has experienced a variation in the enforcement of net quantity of contents verification due to lack of uniformity between state and local regulators, resulting in an unnecessary burden on the food industry. This can be alleviated by the uniformity provisions of the Nutrition Labeling and Education Act of 1990, which we strongly advocated and continue to support.

We have been encouraged by the Agency's work with the National Institutes of Standards and Technology (NIST) to apply science-based procedures for checking net contents of packaged goods. When evenly applied, a science-based standard is in the best interest of consumers, regulators, wholesalers, retailers, and manufacturers.

We understand that FDA has prepared a proposed regulation on net quantity of contents testing procedures. We urge the Agency to publish this proposed rule as soon as possible, and, subsequently, to act as quickly as possible to finalize the regulation. We appreciate your consideration, and welcome any discussion that might assist the Agency in this area.

Respectfully submitted,

American Bakers Association
American Frozen Food Institute
Grocery Manufacturers of America
Food Marketing Institute
International Dairy Foods Association
National Fisheries Institute
National Pasta Association
National Food Processors Association
Pet Food Institute
Snack Food Association
USA Rice Federation

Report of the Committee on Specifications and Tolerances

Gary D. West, Chairman
Department of Agriculture
New Mexico

300 Introduction

This is the Report of the Committee on Specifications and Tolerances for the 81st Annual Meeting of the National Conference on Weights and Measures (NCWM). This report is based on the Interim Report offered in the Conference "Program and Committee Reports" (NCWM Publication 16), 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 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" after the item number. Consent calendar items are marked with a "VC." Items marked with an "I" after the reference key number are information items. The items marked with a "W" were withdrawn by the Committee. Items marked with a "W" generally will be referred back to the regional weights and measures associations because they either need additional development, analysis, and input, or did not have sufficient support of the Committee to bring them before the NCWM.

The attached Report contains many recommendations to revise or amend National Institute of Standards and Technology (NIST) Handbook 44, 1996 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~~ what is to be deleted, and underlining what is 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.

Table A
Index to Reference Key Items

Table A (Continued)

Appendices

Voting Results

Reference Key No.	House of State Representatives		House of Delegates		Results
	Yes	No	Yes	No	
360-4 (Motion to Hear Emergency Item)	43	0	56	0	Passed
360-4	44	0	58	0	Passed
Consent Calendar					Passed
320-2	40	4	57	3	Passed
320-6	43	0	60	0	Passed
330-1	44	0	61	0	Passed
332-1	42	0	55	0	Passed
330-5 (Motion to Remove from Consent Calendar)	43	0	61	0	Passed
330-5 (Motion to Table)	41	2	51	3	Passed
330-5 (Motion to Move to Remove from Table)	37	0	52	0	Passed
330-5 (Motion to Return to Information Status)	41	0	44	0	Passed
300 (Report in its Entirety)	44	0	51	0	Passed

Details of All Items

General Code

310-1 W User-Programmable Software; Manufacturer-Modified Software

(This item was withdrawn.)

Source: Carryover Item 310-2

Discussion: The Committee received few comments on this issue during the 1996 Interim Meeting and pending the outcome of the Software Working Group, made no recommendations on this item at that time.

The Committee recognizes the importance of resolving the many issues surrounding software and encourages a timely resolution to the issue, particularly as these issues relate to the field inspection of software- based weighing and measuring equipment. The Committee believes that this issue deserves the continued attention of the NCWM and fully supports the continued work of the Software Working Group. However, the Committee does not believe that there are areas in which the S&T Committee can contribute at this time. Consequently, the Committee is withdrawing the issue from its agenda.

Background The Executive Committee was questioned regarding the National Type Evaluation Program (NTEP) practice of issuing NTEP Certificates of Conformance for software that runs on PCS. Some software is programmable by the user; other software is not programmable by the user, but is routinely modified by the manufacturer. There are some in industry who are particularly concerned about software developed by "third parties," that is, software houses that develop software to interface directly with weighing/load-receiving elements. However, weights and measures cannot limit technology and how it is used in commercial weights and measures applications (as long as it complies with H44).

A meeting on software was held in conjunction with the December 1994 NTEP Weighing Sector meeting. Members from the NTEP Board of Governors, the Weighing Sector, and the Measuring Sector were present and discussed this item. Due to the complex nature of this issue, it was decided that a request should be made to the Board of Governors to form a working group to study this issue. Representatives of the Weighing and Measuring Sectors voted to continue the ongoing evaluation of software under NTEP, pending further recommendations by the proposed working group.

At the 1995 Interim Meeting, the Board of Governors agreed that NTEP should continue its evaluation of software and recognized the formation of a working group chaired by Michael Adams, Fairbanks Scales, including representatives from the weighing and measuring industries and at least one representative from a participating NTEP laboratory. Issues to be addressed by the group include the evaluation of software by NTEP as well as routine examinations conducted by weights and measures officials. The Software Working Group has had five meetings since its inception and while progress is being made, no formal recommendations have been put forth by the Working Group. A preliminary report was presented to the Executive Committee after the January 1996 meeting.

Canada established a work group to investigate issues related to the security of software and how to track the changes made to software used in commercial applications; they will collaborate with the NCWM work group on this issue.

Comments forwarded to the Committee on this issue have indicated support for the goals for program design and for identifying the metrologically significant portion of the software. It is believed that weights and measures officials need more extensive examination procedure outlines and field manuals for the inspector to identify those critical features and device operations that must be checked in the field to ensure compliance with Handbook 44 requirements. Many device parameters and features are selectable at the time of installation, but some are more critical than others. The most critical parameters and features should be checked during routine field inspections.

At the 1995 Annual Meeting, the Committee discussed concerns in several areas dealing with software. The Committee noted confusion on the part of some weights and measures officials and industry as to when an evaluation of software is subject to NTEP evaluation. Minimum standards are needed for the development of the metrological portion of software. NTEP evaluations encourage standardization of metrological information in the software and may provide a forum to communicate

Handbook 44 requirements to software programmers who are developing software for weights and measures device applications. The Committee recognizes that additional work may be needed to ensure that all NTEP laboratories are uniformly applying criteria to software and that this information is communicated to device manufacturers and software developers.

At the 1995 Annual Meeting, the committee discussed specific applications in which a manufacturer needs maximum flexibility for marketing a product and feels that the manufacturer should not be restricted to specific hardware if weights and measures can verify that the metrological portion of the software meets all applicable requirements of Handbook 44. Regardless of whether or not a decision is made to continue with the NTEP evaluation of software, the Committee recognizes a need to develop guidelines which will assist the field official in verifying that the software package is appropriate for the application, is set up to enable the weighing or measuring system to comply with Handbook 44, and, if NTEP evaluation of software is required, that the version in the field has not been metrologically modified from the version originally evaluated by NTEP. If NTEP discontinues evaluation of software, the Committee recognizes that a bigger burden may be placed on weights and measures officials to evaluate software and may encourage lack of uniformity in the development of software.

Isolation and physical or electronic sealing of the metrological portion of the software is an option that has been discussed in the past, and the Committee continues to favor such an approach.

Scales Code

320-1 VC Test Procedures for On-Board Weighing Systems

(This item was adopted as part of the consent calendar.)

Source: Carryover Item 320-5

Recommendation: Endorse the following test procedures for on-board weighing systems and use them as a basis for an examination procedure outline to be included in NCWM Publication 12.

Performance Tests for Electronic Vehicle On-Board Weighing Systems

Note: These tests apply to systems such as lift truck scales, scales mounted on refuse vehicles, etc. It has generally been agreed that scales with a capacity of 30 000 lb and less will be considered Class III since they would be used in a weighing operation where a Class III scale would normally be used. Likewise, scales with a capacity of more than 30 000 lb will be considered Class III L when they are used in a weighing operation where a Class III L scale would normally be used.

Field Testing

Because of the design of the device and/or abnormal test conditions, it may be necessary for the manufacturer, owner, or user to supply special testing apparatus (mounting frames, test baskets, etc.) for testing purposes. Likewise, a normal size commercial wood skid can be used as the load receiving element for a lift truck scale under evaluation. As much testing as possible may be performed in a stationary condition to save evaluation time and other possible hardships. In most cases, as-used testing will have to be conducted.

1. Initial Field Verification Test

1.1. Test Considerations

As-used testing is very important for vehicle on-board weighing systems to properly simulate actual use conditions. As-used conditions must be considered and tested when evaluating a system. Depending on the type of device, consider the following:

- Performance when the vehicle engine is running.
- Performance when the vehicle is moving.

- Test apparatus performance versus normal load receiver performance (e.g., test pan vs. refuse container). For ease and safety reasons test apparatus may be used, but like performance must be verified.
- Depending on the type of vehicle and mounting of the on-board weighing system, consider performance when the wheels are on unlevel terrain and the frame is under a twisting effect.
- It may not be possible or advisable to use known test weights, so pre-weighed loads of varying weights need to be used (e.g., a dynamic refuse dumping system).
- Load shift on dump systems such as refuse dumpers (pre-weighed sandbags may be used).
- It may not be possible to utilize known test weights to capacity or at all on some larger on-board systems (e.g., a 50 000-lb tank wagon). In these cases a platform scale, vehicle scale, or mass flow meter may need to be used.
- Locate a safe location for out-of-level testing (e.g., a remote ramp or parking lot).

1.2. Determine performance of the width of zero, center of zero, discrimination near zero, center of zero, discrimination near zero, and discrimination near capacity.

1.3. Increasing/Decreasing Load Test

Increasing/decreasing load tests shall be conducted using at least five test loads. When practical, these tests should include weights close to the upper range of each tolerance level.

Remember that decreasing load tests may be especially important for on-board weighing systems since they may be used to back-weigh.

1.5. Shift (off-center) Tests

1.5.1. Shift tests with one-half capacity test load centered in the center of each quadrant should be conducted.

1.5.2. Shift tests with one-quarter capacity test load placed on the corners should be conducted.

Note: The shift test for a vehicle on-board weighing system shall be conducted in a manner consistent with its normal use (N.1.3.7.). Normal shift tests, as described above, may not be practical for some on-board weighing systems (e.g., when the load-receiving element is a home refuse container). These systems may be susceptible to off-center loading or to load shifting, but it may be more practical to test for these circumstances during the as-used part of the evaluation.

1.6. Out-of-Level Tests

A vehicle on-board weighing system shall operate within tolerance when the weighing system is out of level up to 3 degrees (or 5%) (S.2.4.1.). The system is not prohibited from operating when out of level beyond 3 degrees (or 5%). However, beyond the 3 degrees (or 5%), if the accuracy of the system is affected by out-of-level conditions normal to the use of the device, the system shall be equipped with an out-of-level sensor that inhibits the weighing operation when the system is out of level to the extent that the accuracy limits are exceeded.

1.6.1. Place one side of the vehicle 3 degrees (or 5%) out-of-level. Conduct an increasing load test, decreasing load test, and shift test. Additional tests need to be conducted to the extent that the system continues to operate while out-of-level in this direction.

1.6.2. Place the opposite side of the vehicle out-of-level 3 degrees (or 5%) and to the extent that the system continues to operate. Perform tests.

1.6.3. Place the front of the vehicle out-of-level 3 degrees (or 5%) to the extent that the system continues to operate. Perform tests.

1.6.4. Place the back of the vehicle out-of-level 3 degrees (or 5%) and to the extent that the system continues to operate. Perform tests.

Discussion: No unfavorable comments were received on this issue and the Committee believes that the test procedures are ready to be included in NCWM Publication 12.

Based upon comments received from the regional associations, the Committee modified the test procedures originally considered to clarify the application of the procedures to both increasing and decreasing load tests. The Committee recognized that the test procedures must reflect the intended use of the device. For example, some on-board weighing systems may be used predominantly in a decreasing direction; the test procedures should include sufficient test points in the decreasing direction to ensure an adequate test.

320-2 V Concentrated Load Capacity; Declaration of Other Than Dual-Axle Configurations

(This item was adopted.)

Source: Carryover Item 320-8

Recommendation: Add a new paragraph, UR.3.2.1, to the Scales Code as follows:

UR.3.2.1. Maximum Loading for Vehicle Scales. - A vehicle scale shall not be used to weigh loads exceeding the maximum load capacity of its span as specified in Table UR.3.2.1.

Add a new table, Table UR.3.2.1., to the scales code as shown in Appendix A.

Discussion: The Committee reviewed an "r" factor proposal from Cardinal Scales. The Cardinal proposal is essentially the same as the original "r" factor proposal except that it simplifies the procedure by dividing the FHA Bridge Weight Formula table by 34 000 lb, thus eliminating a step to obtain the "r" factor.

The Committee supports the Cardinal proposal and believes that the determination of the maximum load of the span (distance between load bearing points) using table UR.3.2.1. will aid the user in selecting a suitable scale based on their weighing needs. Additionally, this approach should help prevent manufacturers from declaring a CLC that is not representative of the scale's actual weighing capability. The "r" factor will not be required to be marked on the scale since it is derived from the CLC and CLC is required to be marked on the scale; however, the table of multipliers will be included in Handbook 44 as a new table UR.3.2.1. (Note: The values in the third column with footnotes correspond to the maximum loads in which the inner bridge dimensions of 36, 37, and 38 ft are considered to be equivalent to 39 ft, allowing a weight of 68 000 lb on axles 2 through 5. The 48 ft and 53 ft vans are long enough to not require a bridge exception).

A proposal from Thurman Scale Company, which was previously reviewed by the Committee, was withdrawn by Thurman prior to the 1996 Interim Meeting and was not considered by the Committee.

Instructions for using Table UR.3.2.1

1. **Determine the scale's CLC.**

   For example, consider a scale with a CLC of 80 000 lb

2. **Count the number of axles on the vehicle in a given span and determine the distance in feet between the first and last axle in the span.**

   For example, 5 axles and 40 feet between axle 1 and axle 5

3. **Multiply the CLC by the corresponding multiplier in the table.**

   In our example, this would correspond to: 80 000 lb x 2.147 = 171 760 lb

4. The resulting number is the scale's maximum concentrated load for a single span based on the vehicle configuration.

At the 1996 Annual Meeting, the Committee considered other changes submitted by Scale Manufacturer's Association, including changes to paragraph N.1.3.4. and the addition of a definition for "r factor." However, the Committee felt that these changes were too significant to include in the Committee's recommendation without additional study and review by the NCWM membership.

Background information from past Committee discussions of this issue are included below for reference.

Background At the 1995 Annual meeting, the Committee considered two proposals for establishing the ratings of vehicle configurations other than dual axle load ratings: (1) The use of the FHA Bridge Gross Weight Formula B and an "r" factor as a means for establishing these ratings, as discussed in the Committee's 1994 Final Report; and (2) Permitting other axle configurations as a percentage of the declared CLC, as proposed by Thurman Scale in the Committee's 1995 Interim Agenda. The Committee heard a presentation from Bruce Reirson, Mettler-Toledo supporting the use of the FHA Bridge Gross Weight Formula and the "r" factor.

Comments during the open session indicated concern over the exaggeration of CLC ratings and ratings for other axle configurations in advertisements. Vehicle scale users indicated that they would like to have a meaningful way to equitably compare vehicle scales and determine whether or not the scale is suitable for the intended application. Some comments supported the use of the bridge formula and the "r" factor as a reasonable way for uniformly rating scales; other comments indicated that the bridge formula is not appropriately applied to the design of scales.

Group of Two Axles Provides Basis for Comparisons

For the 1994 Interim Meeting, the Committee received a proposal to relate axle loads and the different vehicle axle configurations through the Federal Highway Administration Bridge Gross Weight Formula B and an "r factor." The Committee received a second proposal suggesting that a separate definition for a dual axle rating be added to Handbook 44 and that the definition of CLC be modified so that it applied to only the test of a scale. The Committee opposed a separate definition for a dual axle rating because it had always intended for the CLC and axle-load ratings to be the same. However, since the definition of CLC did not address the various axle configurations, the Committee decided to specify in the definition that the CLC is to be established based upon a group of two axles with a specific spacing. This is an effort to provide a consistent basis for manufacturers to rate their scales. The axle spacing is for rating the scale with its CLC; it does not restrict the types of vehicles that may be weighed on the scale provided that the loading does not exceed the corresponding axle load weights computed from the Federal Highway Administration Bridge Gross Weight Formula B (see below).

Other Axle Configurations

The Committee concluded that the "r" factor had merit, but decided not to include it in Handbook 44 due to concern that it may be too complex for field enforcement and the ratings would be difficult to assess. However, the "r" factor may be a basis for scale purchasers to compare CLC ratings for vehicle scales and to relate the CLC to the types of vehicles and axle configurations that will be weighed by the scale owner. Since the factor and the Federal Highway Administration Bridge Gross Weight Formula B establishes a way to convert axle ratings for groups of more than two axles to an equivalent rating for a group of two axles, the Committee decided to specify that the CLC be based upon a group of two axles with the specified spacing. Consequently, scale companies may use the "r" factor to relate the CLC rating to vehicles with other axle configurations to aid the scale purchaser to select the appropriate scale for the application.

To make the relationship of the "r" factor available for comparison purposes, the relationship of the "r" factor and the Federal Highway Administration Bridge Gross Weight Formula B is stated below.

Scale Load Limits. - The manufacturer shall specify the scale load limits for consecutive vehicle axles according to the Federal Highway Administration Bridge Gross Weight Formula B, as modified by the "r" factor":

$$W = r \times 500\left[\left(\frac{LN}{N-1}\right) + 12N + 36\right]$$

where W is the maximum load in pounds carried on any group of two or more consecutive axles;
r is the factor assigned by the manufacturer that specifies the maximum load;

L is the distance in feet between the first and last axle of that group; and
N is the number of axles of that group, where $N \geq 2$.

For a single axle, the weight limit is W = r x 20 000.

320-3 W Markings on Load Cells

(This item was withdrawn.)

Source: Carryover Item 320-11

Discussion: The Committee reviewed a proposal to add the following sentence to Note 11 of Handbook 44 Scales Code Table S.6.3. (b):

> Effective January 1, 19XX, all required markings will be placed directly on the load cell. An accompanying document may no longer be substituted. Nonretroactive as of January 1, 19XX.

The Committee believes that requiring all marking requirements to be placed on the load cell is unreasonable due to the limited space on some load cells. Further, some scales cannot be designed to have the marking information on the load cells accessible, so marked information would not be available to the field inspector. Several States have indicated that the accompanying document is a necessary tool, especially in instances where inspectors are prohibited from entering scale pits due to safety rules and regulations and when the load cell marking information is not accessible due to the design of the scale. The proposal was submitted in part because the accompanying document is not always left at the scale site or is lost before the weights and measures inspection. The Committee recognizes this problem, but believes that the proposed requirement would not correct that situation. Consequently, the Committee has withdrawn this item from its agenda.

320-4 W Marking of Scale Multiples

(This item was withdrawn.)

Source: Carryover Item 320-12

Discussion: The Committee reviewed a proposal to add a nonretroactive requirement to specify that the scale multiple must be marked on the device if the multiple is greater than 1; this requirement would have been be added under the category of "Weighing and load-receiving element not permanently attached to indicating element."

Since the proposed requirement was nonretroactive, the proposal would not have required the multiple to be marked on devices already in service. Thus, it would not have solved the problem for which it was proposed. For this reason, the Committee withdrew the item from its agenda. The Committee suggests that weights and measures jurisdictions work with the service firms in their area to obtain the scale multiples when scales are converted from mechanical to electro-mechanical.

320-5 W UR.X. Position of Equipment - Indicating Element; Vehicle Scales

(This item was withdrawn.)

Source: Southern Weights and Measures Association

Discussion: A proposal was submitted to add a new user requirement to the Scales Code requiring the indicating element on vehicle scales used in direct sales to be visible from the driver's position.

This item was withdrawn by the Committee. The Committee supports the intent of the proposal, but feels that it is not necessary to create another requirement to address this issue. General Code requirement G-UR.3.3. Position of Equipment is applicable to vehicle scales and may be used to require the indicating element of a vehicle scale to be visible from a reasonable customer position. The customer position in most cases will be the driver's seat. Consequently, firms requiring the truck driver to remain in the truck during the weighing process and whose indicating element is not visible from the truck, may be required to use a remote indicating element (e.g., a scoreboard display). The Committee also recommends that the EPO's for vehicle scales be updated to reference G-UR. 3.3. Position of Equipment.

The Committee was asked whether or not a truck stop scale used to determine axle-weights is a direct sale and should have its indicating element visible to the truck driver during the weighing process. The Committee does not believe that type of weighing operation is a direct sale and because the weight of the truck is what is essentially being sold to the truck driver, it is not feasible to require that the indicating element be visible during the weighing operation.

320-6 V Amend S.5.4.'s to Exempt Complete Scales and Weighing Elements

(This item was adopted.)

Source: National Type Evaluation Technical Committee, Weighing Sector

Recommendation: Amend Section S.5.4. Relationship of Load Cell Verification Interval Value to the Scale Division, by adding the following additional paragraph after the formulae:

This requirement does not apply to complete scales and weighing elements which satisfy the following criteria:

(1) The device has been evaluated for compliance with T.N.8.1. Temperature under the National Type Evaluation Program (NTEP);

(2) The device has received an NTEP Certificate of Conformance; and

(3) The device must be equipped with an automatic zero-setting mechanism which cannot be made inoperative in the normal weighing mode. (A test mode which permits the disabling of the automatic zero-setting mechanism is permissible, provided the scale cannot function normally while in this mode.)

Discussion: The Committee supports the proposal as written. Part 3 of the proposal was changed at the Interim Meeting to clarify the intent of the Weighing Sector. Some additional changes were made at the Annual Meeting for further clarify the permissible operation of the device in the test mode. The original wording left some question as to whether or not the scale could have a feature that would allow the user to disable AZSM. The intent of the Weighing Sector was to have AZSM functioning at all times since this feature is used to enhance the performance of the load cell and disabling it may detrimentally affect the scale's performance. A test mode which permits the disabling of the AZSM is permissible, but the scale shall not function normally when in this mode.

The minimum load cell verification interval is a value determined by a load cell manufacturer for which its load cell will comply with the temperature effects on zero requirement (see item 320-7). Occasionally, NTEP will receive a request from a manufacturer for type evaluation of a complete scale or weighing element that does not comply with the formulae in the Handbook.

NTEP has required the scale manufacturer to use load cells that comply with the formulae because devices submitted to NTEP must comply with the applicable requirements of the Handbook. Scale manufacturers contend that the formulae should not be applied to complete devices or weighing elements undergoing type evaluation provided certain conditions are met. Their justification is: (1) that while they do not comply with the formulae, the device is tested for compliance with the temperature requirements to determine if it is accurate over the temperature range and that should be sufficient; (2) the use of an automatic zero-setting mechanism (AZSM) can be used to enhance the performance of the device in relation to the temperature effect on zero; and (3) the formulae are not applicable to devices using non-NTEP load cells since the v_{min} value is not required to be declared or marked on non-NTEP load cells.

NTEP believes these are valid arguments; however, since the Handbook does not currently make an exception for these devices neither can NTEP. The issue was put forth to the Weighing Sector whose members agreed that an exemption should be made for NTEP scales and weighing elements using an AZSM under the conditions specified in the proposal and asked that the S&T Committee consider amending the Handbook.

320-7 VC Definition for Load Cell Verification Division (v_{min})

(This item was adopted as part of the consent calendar.)

Source: National Type Evaluation Technical Committee, Weighing Sector

Recommendation: Add the following definitions of Load Cell Verification Interval and Minimum Load Cell Verification Interval (v_{min}) to the Definitions section of Handbook 44:

> <u>**load cell verification interval (v).** The load cell interval, expressed in units of mass, used in the test of the load cell for accuracy classification.[2.20, 2.21]</u>
>
> <u>**minimum load cell verification interval (v_{min}).** The smallest load cell verification interval into which the load cell measuring range can be divided. [2.20, 2.21]</u>

Discussion: The Committee supports this item, noting that the terms "v" and "v_{min}" are referenced in NIST Handbook 44 and NCWM Publication 14, but are not defined. The Committee believes that future consideration should be given to including the definitions for n_{max} and e_{min} and including cross references to the definitions for d, e, and n.

320-8 VC Amend UR.4.3 Scale Modification to Include Platform Thickness

(This item was adopted as part of the consent calendar.)

Source: National Type Evaluation Technical Committee, Weighing Sector

Recommendation: Amend UR.4.3. Scale Modification as follows to include the thickness of concrete scale platforms.

> **UR.4.3. Scale Modification.- The ~~length or the width~~ <u>dimensions (e.g., length, width, thickness, etc.)</u> of the load receiving element of a scale shall not be ~~increased~~ <u>changed</u> beyond the manufacturer's specifications ~~design dimensions~~, nor shall the capacity of a scale be increased beyond its design capacity by replacing or modifying the original primary indicating or recording element with one of a higher capacity, except when the modification has been approved by a competent engineering authority, preferably that of the engineering department of the manufacturer of the scale, and by the weights and measures authority having jurisdiction over the scale.**

Discussion: The Scale Manufacturers Association (SMA) supported this item at the Interim Meeting, but suggested different wording. The Committee supports the proposed language as amended by SMA. The Committee believes that the amended proposal meets the intent of the Weighing Sector and is clearer and simpler than the wording originally proposed.

The thickness of a concrete load-receiving element is sometimes changed from that which was submitted for the NTEP type evaluation to accommodate existing installations and different weighing applications. Scale manufacturers present at the fall NTETC Weighing Sector Meeting acknowledged this practice, but contend that it is necessary and that there is an acceptable range of platform thickness that can be tolerated without affecting the scale's structural integrity or performance. However, they also noted that changing the thickness beyond acceptable limits could adversely affect the scale.

While the manufacturer may be aware of the platform thickness limits of its scale, distributors, scale repair firms, and other parties who may be requested to alter the thickness might not be aware of these limits. Consequently, the Weighing Sector asked the S&T Committee to consider including platform thickness to UR.4.3 Scale Modification.

320-9 VC Amend N.1.3.6.1. In-Motion Monorail Scales

(This item was adopted as part of the consent calendar.)

Source: Central Weights and Measures Association

Recommendation: Add a test note as follows for In-Motion Monorail Scales:

N.1.3.6.1. In-Motion Monorail Scales.- Dynamic Tests with Livestock Carcasses: The dynamic test should be conducted to duplicate actual use conditions. No less than 20 carcasses of the type normally weighed should be used in the dynamic test; two additional carcasses may be included in the test run for use in the event that 1 or 2 carcasses are rendered unusable during the dynamic test. Prior to starting the dynamic test, the test carcasses must be positioned far enough ahead of the scale so that their swaying motion settles to duplicate the normal sway of a continuously-running plant chain. If the plant conveyor chain does not space or prevent the carcasses from touching one another, dynamic tests should not be conducted until this condition has been corrected.

All carcasses shall be individually weighed statically (after an accurate static test with test weights) on either the same scale being tested dynamically or another monorail scale with the same or smaller divisions and in close proximity. If multiple dynamic tests are conducted using the same carcasses, static weights should be obtained before and after the multiple dynamic tests. If a carcass changes weight between static tests, the amount of the weight change should be taken into account or the carcass should be disregarded for tolerance purposes. It is preferable to use the gross weight of the carcass and trolley for the dynamic test.

Discussion: The Committee supports this item. It was submitted because there is not a test procedure in the Handbook for in-motion monorail scales. In-motion monorail scales need to be tested as used because of the dynamic effects from weighing in motion. The test results from static testing do not reflect the actual performance of the device when it is used to weigh carcasses in motion. The addition of a test procedure to the Handbook will provide inspectors with a test procedure in a document that they already possess and ensure uniformity in test methods

The Committee recognizes that some existing scale systems cannot physically accommodate 20 carcasses at one time. In these cases the Committee suggests that the maximum number of carcasses that can be accommodated by the system be used until 20 weighments are achieved. This may entail, for example, using 4 groups of 5 carcasses or 5 carcasses 4 times to obtain the 20 weighments. Since the test procedure is designed to simulate actual use, consideration should be given to obtaining the 20 weighments without stopping and starting the system. Installations or existing installations which undergo major overhauls or renovations should be designed to accommodate at least 20 carcasses. A "rail-out and around" area with a checking scale installed is the preferred installation for in-motion monorail scales.

At the 1996 Annual Meeting the Committee made some additional changes to the proposed language based on written input received from the USDA Grain Inspection Packers & Stockyards Administration and comments received during the open hearings.

320-10 W Add S.1.1.1.(c) to Specifications Section

(This item was withdrawn.)

Source: Central Weights and Measures Association

Discussion: At the 1996 Interim Meeting, the Committee considered a proposal to place an identical requirement to T.N.8.1.4. in the Specifications section of the Scales Code numbering it as S.1.1.1. (c) as follows:

S.1.1.1. (c) Except for Class I and II devices, and indicating or recording element shall not display nor record any usable values until the operating temperature necessary for accurate weighing and a stable zero balance condition have been attained.

The original justification for moving T.N.8.1.4. from the T.N. section to the Specifications section was that it was a design requirement and not a performance requirement. The Committee did not agree and initially decided to withdraw the item and retain T.N.8.1.4. in the T.N. section. However, further justification was provided to the Committee which prompted it to propose adding an identical requirement to the Specifications section. The Committee was not unanimous in its decision to incorporate T.N.8.1.4. into the Specifications section.

The justification provided by the Central for adding an additional requirement to the Specifications section is that scales used at some fruit stands and livestock markets indicate usable, but out-of-tolerance, weight indications before they are at the proper operating temperature. Once the devices warm up they operate within tolerances. Since T.N.8. Influence Factors states that the requirements are to be conducted under controlled conditions only, the Weights and Measures Officials did not feel they could apply that section as a basis for rejecting the scales.

The Committee believes that the devices could be rejected for exceeding accuracy requirements, but understands the concern and confusion created by the situation. At the Interim Meeting, the Committee supported adding the requirement to the Specifications section to provide the weights and measures official with an additional tool for addressing the problem. However, the Committee at received comment at the Annual Meeting from the regional weights and measures association which originally submitted the proposal indicating that the regional association no longer supports the item. In addition, the Committee received no comments during its open hearing to support the item. Consequently, the Committee has withdrawn the item from its agenda.

Liquid-Measuring Devices

330-1 V T.2.3.4. Automatic Temperature Compensating Systems;

(This item was adopted.)

Source: Carryover Item 330-3A

Recommendation: Modify paragraph T.2.3.4. as follows to allow for the use of small volume provers in official tests:

T.2.3.4. Automatic Temperature Compensating Systems. - The difference between the meter error <u>(expressed as a percentage)</u> for results determined with and without the automatic temperature compensating system activated shall not exceed:

(a) 0.2 percent ~~of the test draft~~ for mechanical automatic temperature compensating systems; and

(b) 0.1 percent ~~of the test draft~~ for electronic automatic temperature compensating systems.

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

Discussion: The Committee received clarification from Mr. Chuck Michell, Shell Oil Company, on the original intent of paragraph T.2.3.4. for automatic temperature compensating systems. He noted that the requirement evolved because of the inability to obtain a representative temperature from a separate prover during the metering of large volumes of product in loading rack applications. Additionally, he noted that application of a tolerance with respect to the accuracy of the temperature probe is prohibited by what is often the absence of any visual means of reading a temperature probe. It was also pointed out the small volume prover has the capability to indicate both net and gross. It was noted that a temperature difference of as little as 1 °F between the small volume prover and the meter under test can give invalid test results. In such instances, the temperature and pressure of the small volume prover and the meter must be brought into equilibrium to ensure valid test results.

It was suggested that performing tests with and without the automatic temperature compensating system activated were nonessential in the evaluation of these devices. This proposal was supported with the argument that testing with these systems deactivated did not demonstrate an "as used" condition of the device. However, it was noted that this procedure had merit because it provided information on the meter performance and maintenance and whether or not the automatic temperature compensating system is being adjusted to correct for meter error.

The Committee's Canadian Technical Advisor noted that the Examination Procedure Outline (EPO) Number 25 describes test procedures with and without the automatic temperature compensating (ATC) system activated. It was also noted that there are numerous factors in these test procedures which account for a relatively high level of uncertainty, and thus require a larger tolerance for the ATC. Some examples of the factors which contribute to uncertainty are the inaccuracy of the ATC system, the meter's inability to repeat indications, temperature differences at the meter and prover, and systematic errors within the instrumentation for reading pressure, temperature and volume. It was pointed out that many electronic measuring devices or systems intended to be tested with small volume provers have the capability to display and print both compensated and uncompensated volume for a single run. The Committee heard the suggestion that the test procedure be revised to allow for a procedure in which both the compensated and uncompensated ATC tests are performed during one single run, thus reducing some of the uncertainties in the test method. It was felt that a tighter tolerance for ATC's may be achievable and warranted if some of the uncertainties of the test method are reduced.

After lengthy discussion, the Committee decided that the test for automatic compensating systems should be retained and that the requirement must be modified to address the applicable sections of NIST Handbook 44 on the special minimal size of the small volume prover test draft. Initial discussions focused on the small volume (e.g., 10 gallons) of each pass through the prover and determining a sufficient number of passes to be required by the prover in relation to the inconsistent amount of product the meter measures with each run. This generated a question as to which test draft amount should the tolerances be applied to in Liquefied Petroleum Gasoline Meter applications. It was noted that the current practice is to apply the tolerance to the indicated amount which yields the larger permissible tolerance to the meter. The Committee concluded that changes were needed in what defines a "test draft", not the "test draft" size, which is used the evaluation of a metering system. Based on meeting discussions the Committee decided the amended language should read "delivered quantity" which would cover all applications.

The tolerance specified in T.2.3.4. limits the difference in performance between a test with the automatic temperature compensator activated and a test with the automatic temperature compensator deactivated. It is important to eliminate other variables such as flow rate or test quantity so that differences observed are attributed to the effects of the temperature compensator.

The Committee received comments at the Annual Meeting indicating that some jurisdictions use two different size provers in the testing of a meter. (For example, two different size provers may be mounted on the same trailer and the jurisdiction uses both provers in the course of the test to minimize evaluation time.) Because of the importance of eliminating other variables in the test process, the Committee decided to recommend the addition of language to the paragraph to emphasize the need to keep the test quantities the same when comparing compensated and uncompensated runs.

Background The following discussion is excerpted from the 1994 S&T Committee's final report as background information.

The S&T Committee originally specified the tolerance for automatic temperature compensating systems in terms of the meter test results for compensated and uncompensated runs because the temperature probe is often at a considerable distance from the meter in many loading rack systems. In addition, many installations do not have a thermometer well adjacent to the temperature probe that can be used to compare the accuracy of the system temperature probe to a reference thermometer. The normal test draft for the application of the tolerance is a neck-type, large volume prover.

The Committee received comments indicating that the tolerance expressed in T.2.3.4. is not practical when small volume provers are used. The Committee understands the term "small volume prover" to refer to a compact prover rather than to a neck-type prover of a smaller capacity. Due to the small size of the test draft when small volume provers are used, the tolerance as a percentage of the test draft is too small to be used to check the accuracy of the temperature probe. The

Committee was asked to consider expressing the tolerance for a temperature probe in degrees, such as 1 °C (2 °F), particularly when small volume provers are used to test meters, and to consider specifying all tolerances for automatic temperature compensating systems as a temperature value instead of a deviation in the test results for the compensated and uncompensated test results.

Some members of industry expressed opposing views to these comments, indicating that evaluating the performance of the temperature probe alone and permitting a tolerance of 2 °F is excessive, suggesting that the proposal would inappropriately relax the tolerances. Comments at the Interim Meeting indicated that it is reasonable to specify a tolerance for the temperature probe, but the variance should be no more than 0.5 °C or 1 °F.

The API provided to the S&T Committee four sections from its <u>Manual of Petroleum Measurement Standards</u> to assist the Committee in its understanding of the design and use of small volume provers. The Committee received input concerning typical sizes of small volume provers and has identified typical configurations used in the applications addressed by paragraph T.2.3.4.

The Committee also received information from Mr. Chuck Michell, Shell Oil Company, concerning the potential difference in product temperature if the temperature probe for the metering system is not adjacent to the meter. He noted that API Chapter 7.2 indicated "Where it is impractical to mount the temperature sensor in the meter it should be installed either immediately downstream or upstream of the meter... Where several meters are manifolded in parallel, one temperature sensor located in the total liquid stream is acceptable,... providing the temperature agrees within 1.0 °F of the meter temperature."

330-2 VC Recognition of Small Volume Provers in Routine Field Testing

(This item was adopted as part of the consent calendar.)

Source: Carryover Item 330-3B

Amend paragraph N.3. as follows to recognize the minimal size of the small volume prover test draft:

N.3. Test Drafts.

N.3.5. Wholesale Devices. - ~~Test Drafts~~ <u>The delivered quantity</u> should be equal to at least the amount delivered by the device in 1 minute at its maximum discharge rate, and shall in no case be less than 200 L (50 gal). (Amended 1987 <u>and 1996</u>)

Discussion: At the Interim Meeting, the Committee agreed that the recognition of the small volume prover was a separate issue from the determination of tolerances for systems equipped with temperature compensation. Consequently, a proposed definition for "small volume prover" was moved from item 330-1 and originally included in this item; this definition was modified from the version originally considered based upon comments made by Brooks Instruments to include small volume provers with a volume between detectors *equal* to 100 gallons and to recognize metric equivalents. Although the Committee originally considered adding this definition for "small volume prover" to the Definitions section of Handbook 44, the Committee's final recommendation to modify paragraph N.3.5. did not contain a reference to the term "small volume prover." Consequently, the Committee deleted the proposed definition from its recommendation at the Annual Meeting.

Comments received at the Interim Meeting on this issue did include numerous cautions on the importance of establishing good maintenance, training, and operating procedures for these devices. Overall, comments to the Committee on the issue of small volume prover performance and test data were generally in favor of recognizing this device in routine field testing operations. S&T Committee members who have witnessed several small volume prover tests and demonstrations also had favorable comments.

At the Interim Meeting, the Committee expressed a desire to move forward in its recommendation that the small volume prover be recognized for field testing at the 1996 NCWM Annual Meeting. The Committee noted that a draft version of NIST Handbook 105-7 (Specifications and Tolerances for Reference Standards and Field Standard Weights and Measures 7.

Specifications and Tolerances for Small Volume Prover Field Standards), revisions to NIST Handbook 145 (Handbook for the Quality Assurance of Metrological Measurements), and Examination Procedure Outline Number 25 for Loading Rack Meters, which collectively establish the criteria necessary to small volume prover recognition as a traceable standard and as a guide in field operation, are under review by the Metrologist's Group and the S&T Committee. The Committee expressed hope that a final review of the device will be completed prior to the Annual Meeting, and noted that, if that review is favorable, the Committee will proceed with its recommendation at that time.

The Office of Weights and Measures prepared a report in June 1996 analyzing the use of the small volume prover. This report is included as part of the Metrologists's Report. The Committee wants to thank Georgia Harris for preparing this comprehensive and thorough report. The Committee appreciates the time that Georgia and the Metrologists Group as well as representatives from Brooks Instruments; members of the S&T Committee; the technical advisors from NIST OWM; and the many others who have contributed thier time, effort, and devotion to this project.

The Committee urges all NCWM members and particularly the Executive Committee to review the report prepared by OWM and to give particular attention to the special considerations listed in the report. Of significant concern is the need to devote attention to the training of inspectors testing meters with all types of provers and to the laboratory equipment needs required to maintain traceability of small volume provers and other test standards.

Background The following discussion is excerpted from the 1995 S&T Committee's final report as additional background information on this issue.

This item was added to Committee's agenda as a result of discussion during the 1995 Interim Meeting. This item is related to the work in conjunction with 330-3A and was added as a separate item to highlight work on comparing the performance of small volume provers with that of volumetric neck-type provers. Since this may result in the recommendation to revise Handbook 44 to recognize the use of small volume provers in routine field testing, the Committee wanted to inform NCWM members and provide a forum reporting progress.

The issue of small volume provers was discussed at the October 1993 meeting of the National Type Evaluation Technical Committee (NTETC) Measuring Sector. Mr. Tim Scott, Brooks Instruments, is working on a project to compare the performance of a small volume prover with that of a conventional neck-type prover. It is expected that some of the difficulties that might typically be encountered in the testing of temperature compensating systems when using a small volume prover might be observed during this testing. It is noted that these devices are currently accepted for use in routine field tests by industry and in NTEP evaluations, and some weights and measures jurisdictions currently permit use of small volume provers when witnessing tests of larger meters or meters that are used to deliver certain products. Mr. Scott seeks eventual NCWM acceptance through the NCWM Metrologists' Group.

Comparison testing performed by Brooks Instruments has been witnessed by representative from Florida Weights and Measures and also by Ron Murdock and other representative of North Carolina Division of Standards. These tests compared the performance of small volume provers relative to the volumetric neck-type prover.

The calibration procedures for small volume provers must be done very carefully to obtain a valid calibration; proper operation of small volume provers is very operator-dependent. Dr. George Mattingly, NIST, has said that companies manufacturing small volume provers (piston provers) must participate in a round robin calibration to verify that the design and calibrations of their small volume provers are correct.

330-3 I S.1.6.4.1. Unit Price Exceptions; Exclusions for Fleet Sales, Other Price Contract Sales and Truck Refueling Dispensers

Source: Central Weights and Measures Association/Southern Weights and Measures Association

Recommendation: The Committee is considering a recommendation to amend paragraph S.1.6.4.1. as follows to correct inconsistencies between the exclusion of fleet and price contract sales in the unit price posting requirements and other requirements in the Liquid-Measuring Devices Code:

S.1.6.4.1. Unit Price. -

(b) *Except for dispensers used exclusively for fleet sales, other price contract sales, or truck refueling (e.g., truck stop dispensers used only to refuel trucks), if 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.*
(Effective and nonretroactive as of January 1, 1991.)
(Amended 1989 and 1996)

Discussion: In 1991, the NCWM amended paragraph S.1.6.5.4. to exempt dispensers used exclusively for truck refueling from the requirement for user-activated controls. The rationale given for this decision was that there does not appear to be a strong demand for user-activated controls on dispensers installed at truck stops. It should be noted that part of past S&T Committee discussions of S.1.6.5. considered that truck stop dispensers had to compute at the unit prices at which the products are offered for sale; however, the unit price selection did not have to be made through controls on the dispenser. The console operator could select the unit price and transmit the information to the dispenser for the purpose of computing the total price for the transaction. This discussion also applies to UR.3.2. which currently requires posting of unit prices.

Not all truck refueling is limited to fleet sales or prearranged price contracts, nor are all fleet sales or contract sales for truck refueling. It is suggested that the same requirements and exemptions should apply to fleet sales, contract sales, and truck stop dispensers used exclusively for refueling trucks, all of which serve similar customers.

The Committee received several proposals to amend the unit price requirements in the Liquid-Measuring Device Code Sections. The Committee supports the Southern recommendation for changes to paragraph S.1.6.4.1.

The Southern noted the original intent of past modifications to the unit pricing requirements in the Liquid-Measuring Devices Code were made based on cash/credit pricing and the posting, selection, and display of unit prices on retail motor-fuel devices. Additionally, some of these same paragraphs have exemptions for fleet and other price contract sales applications. The Southern felt this has created confusion for weights and measures officials enforcing these requirements collectively. The Southern recommendation received support from the American Petroleum Institute (API) and the Gasoline Pump Manufacturers Association (GPMA).

The Central indicated there are inconsistencies in NIST Handbook 44 requirements for the display and computation of unit price in retail motor-fuel dispenser applications. The Central proposed an exemption to paragraph S.1.6.4.1. for truck stop dispensers used solely to refuel trucks. It was felt the exemption would allow sufficient time for manufacturers to design dispensers for truck stop operations that are not required to display multi-unit pricing information. The exclusion would also allow oral communication as a method of unit price selection. The Central acknowledged this may necessitate a new requirement for these dispensers to be marked with a limitation of use to truck refueling only.

A third recommendation from Wisconsin Weights and Measures was to amend paragraph S.1.6.4.1.(b) to exclude fleet and price contract sales operations until *January 1, 1999* and to allow that same exclusion in paragraphs UR.3.2.(a)(1) and S.1.6.5.4. to remain in effect until January 1, 1999. This change would ensure uniform application of the exclusion to all retail motor-fuel dispensers until paragraph UR.3.3.(b) (which requires computing devices to be used only for sales in which the device computes and displays the sales price for that transaction) becomes effective and retroactive on January 1, 1999.

The Committee also heard a suggestion to modify the language to include posting of the highest sales price.

Comments received during the 1996 Annual Meeting indicate that including the exemption to "truck refueling" in paragraph S.1.6.4.1. (b) would conflict with the intent of paragraph UR.3.3.(d). (Paragraph UR.3.3.(d) requires that a truck stop dispenser used exclusively for refueling trucks either comply with the requirements of paragraph S.1.6.4.1. or post the highest price on the dispenser.) The Committee was not able to reach a clear consensus on whether or not a conflict actually exists and whether or not an exemption from both S.1.6.4.1.(b) and UR.3.3.(d) should be given to truck stop dispensers used exclusively for refueling trucks.

Since the NCWM specifically voted in 1993 to include UR.3.3.(d), the Committee was reluctant to add language to S.1.6.4.1.(b) which might create a conflict. Therefore, the Committee changed the status of this item to "Informational" status until further study of the issue can be made and additional input obtained from NCWM members on whether or not such an exemption would be appropriate. The Committee encourages input on this issue from the regional associations and from manufacturers and users of the equipment.

330-4 VC S.1.6.5.4. Selection of Unit Price, S.1.6.5.5. Display of Quantity and Total Price; User-Activated Controls

(This item was adopted as part of the consent calendar.)

Source: Western Weights and Measures Association

Recommendation: Change "user-activated" to "customer-activated" in paragraphs S.1.6.5.4. and S.1.6.5.5 as follows:

> ***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 ~~user-activated~~ <u>customer-activated</u> 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~~, and~~ 1993 <u>and 1996</u>)**
>
> ***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 ~~user-activated~~ <u>customer-activated</u> controls.***
> ***[Effective and nonretroactive as of January 1, 1994.]***
> **(Added 1992)<u>(Amended 1996)</u>**

Discussions: The amendment to the paragraph is proposed to clarify that the "controls" pertain to those utilized by the customer and not the owner or operator.

During the Interim Meeting, Gilbarco acknowledged in a majority of cases, Handbook 44 users understood the term "user-activated"; however, it was noted that the current language in paragraphs S.1.6.5.4. and S.1.6.5.5. requiring "user-activated" controls may be misinterpreted to apply to the owner or operator based on current references to "user requirements" in Handbook 44. Paragraphs S.1.6.5.4. and S.1.6.5.5. relate to the design of a device; therefore, clarity in their application is important to equipment manufacturers.

The Committee confirmed that part of the original intent of paragraphs S.1.6.5.4. and S.1.6.5.5. was to help ensure that, for dispensers capable of multi-tier pricing, the customer using the device will be made aware of the unit price at which the device is set to compute; the paragraph requires that the device be equipped with controls through which the *customer* selects the unit price prior to the delivery. Paragraph S.1.6.5.5. was intended to further reduce the potential for fraud by requiring the dispenser to display that information for five minutes or until the next transaction is initiated, thus, giving the customer additional time to gather transaction information.

The Committee also heard a suggestion that the term "customer" may need to be defined; however, the Committee felt that adding an additional definition was not warranted at this time.

330-5 I UR.3.4.X. Printed Ticket; Cash-, Credit Card-, or Debit Card- Activated Retail Motor-Fuel Dispenser

Source: Central Weights and Measures Association

Recommendation: The Committee is considering the addition of a new paragraph as follows to require dispensers which accept bank cards and/or cash to issue a printed ticket:

<u>UR.3.4.1. Ticket Requirement. - A device which is card and/or cash-activated shall be equipped with a ticket printer. Except for fleet sales and other price contract sales, a printed receipt providing the following information shall be available for all transactions:</u>

<u>(a) the total volume/quantity of the delivery,</u>

<u>(b) the unit price,</u>

<u>(c) the total computed price,</u>

<u>(d) the product identity by name, symbol, abbreviation, or code number,</u>

<u>(e) the date of the transaction,</u>

<u>(f) the identity of the seller, and</u>

<u>(g) except for cash-activated sales, the identity of the purchaser</u>

Discussion: This proposal would establish requirements for a recording element and the specific transaction information to be recorded by retail motor-fuel dispensers which accept cash, credit cards and debit cards. The NTETC Measuring Sector has required a receipt for some time for card- and cash-activated retail motor-fuel dispensers. The existing criteria in Publication 14 for evaluation of cash-operated systems addresses attended locations only.

Weights and Measures officials indicate consumer complaints result when there is no record of the transaction to compare with the credit card company billing statement. In the event of a cash transaction the consumer is left with no record to verify any portion of the transaction.

The S&T Committee acknowledged the requirement for a record of sales information at card-activated dispensers installed at unattended locations has not been addressed. The absence of an operator in unattended locations hinders the resolution of monetary discrepancies for the customer. It was suggested that the proposed requirements be incorporated into paragraph S.1.6.7.; however, it was pointed out that, consistent with Vehicle-Tank Meter Code, ticket requirements and other invoice code sections are found in the "User Requirements."

Comments received during the Interim Meeting from GPMA and a weights and measures representative, indicate that this requirement should apply to all installations regardless of whether the payment acceptor location is attended or unattended. A second recommendation was to include an additional requirement to identify the specific dispenser in the recorded information. Based upon suggestions made at the Interim Meeting, the Committee modified section (a) of the proposed paragraph to cover quantity of product delivered in alternative fueling operations.

Based upon its review of this issue at the 1996 Annual Meeting, the Committee felt that the requirements in UR.3.4.1. should be consistent with the criteria in NCWM Publication 14 (NTEP Checklist). Consequently the list of parameters required to be printed was expanded to include date, identity of seller and, in the case of credit sales, the purchaser.

At the Annual Meeting, the Committee also discussed the possibility of addressing these issues by modifying S.1.6.7. rather than UR.3.4.1.; however, the Committee did not believe that it was appropriate to modify a different section of the Handbook without circulating the issue before the regional associations and industry. The Committee plans to include an issue on its agenda for next year to explore similar modifications to S.1.6.7.

The Committee acknowledged that there is difficulty in verifying this requirement during field testing because jurisdictions do not possess "test" credit cards or debit cards. It was suggested that upon proper identification to the customer, officials may then review a copy of the customer's receipt.

Industry expressed concern that the proposed language might by interpreted as requiring each device to be equipped with a separate ticket printer. In addition, the Committee was advised there may be a conflict with UR.3.3. (c). UR.3.3. (c) states that truck stop dispensers used exclusively for refueling trucks are exempt from the requirement which states that devices are to be used only in sales for which the device computes and displays the sales price, provided that if all purchases are accompanied by a printed receipt containing the applicable price per gallon, total gallons delivered, and total price of the sale. The Committee also heard additional comments that this requirement is more appropriate as a specification rather than a user requirement. This issue was tabled for a period during the Committees voting session to enable the Committee to address these concerns. After lengthy discussion the Committee found no conflict with UR.3.3. (c). However, it could not reach a clear consensus on the appropriate language which would clarify the exemptions to the requirement. Consequently, the NCWM voted to give this item informational status to allow additional study of the item.

330-6 VC S.3.1. Diversion Prohibited; Exception for Agri-Chemical Applications

(This item was adopted as part of the consent calendar.)

Source: Central Weights and Measures Association

Recommendation: Amend paragraph S.3.1.(b) as follows to include an exception for agri-chemicals:

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.

(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 <u>or for recirculating product in suspension</u> shall be permitted only when the system is measuring food products <u>or agri-chemicals</u>. 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, ~~and~~ 1995, <u>and 1996</u>)

Discussion: At the 1995 NCWM Annual Meeting the Committee agreed to revisit paragraph S.3.1. by adding specific product applications if they received adequate justification. Comments from the Central indicate that clay-based pesticides in the marketplace are routinely recirculated to keep their active ingredient in the proper suspension. Because Handbook 44 requirements prohibit diversion of product, operators maintain product suspension by placing the delivery nozzle in the product tank and running product through the meter. This practice may necessitate the need for a longer hose to place the nozzle into the tank. In addition to the need for special hoses, this procedure creates a potential safety hazard by requiring the operator to climb to reach the tank opening and increasing the operator's exposure to hazardous chemicals.

During discussions at the Interim Meeting, some concern was expressed at the prospect of the list of products granted an exception to S.3.1. requirements becoming unwieldy. An additional comment was that perhaps this may be an issue that should be addressed at the jurisdictional level. The Committee expressed a continued interest in establishing a definition for agri-chemical products. It was noted these substances often have multipurpose industrial uses which are determined by the product formulation. One point that was under consideration was that in paragraph S.3.2.(b) the exception for discharge outlets 1.5 inches in diameter may already address agri-chemical applications. However, it was noted that many agri-chemical operations did not fall into this category nor did this exemption exist in the Vehicle-Tank Meter Code. The Meter Manufacturers Association supported the proposed changes to paragraph S.3.1. The Committee agreed agri-chemicals be considered as an exception to paragraph S.3.1.

Liquefied Petroleum Gas and Anhydrous Ammonia
Liquid-Measuring Devices

332-1 V T.4. Automatic Temperature Compensating Systems

(This item was adopted.)

Source: Carryover Item 332-1

Recommendation: Modify paragraph T.4. of the LPG and Anhydrous Ammonia Code as follows to address the application of tolerance when a small volume prover is used.

T.4. Automatic Temperature Compensating Systems. - The difference between the meter error <u>(expressed as a percentage)</u> for results determined with and without the automatic temperature compensating system activated shall not exceed:

(a) 0.5 percent ~~of the test draft~~ for mechanical automatic temperature compensating systems; and

(b) 0.25 percent ~~of the test draft~~ for electronic automatic temperature compensating systems.

<u>The delivered quantities for each test shall be approximately the same size</u>. The results of each test shall be within the applicable acceptance or maintenance tolerance.
(Added 1991)(Amended 1992 <u>and 1996</u>)

Discussion: The proposed modifications to this paragraph will align the "test draft" requirements in the LMD and LPG and Anhydrous Ammonia Code Sections to accommodate small volume prover applications. (See Item 330-1 for additional discussion on this item.)

The tolerance specified in T.4. limits the difference in performance between a test with the automatic temperature compensator activated and a test with the automatic temperature compensator deactivated. It is important to eliminate other variables such as flow rate or test quantity so that differences observed are attributed to the effects of the temperature compensator.

The Committee received comments during the 1996 Annual Meeting indicating that some jurisdictions use two different size provers in the testing of a meter. (For example, two different size provers may be mounted on the same trailer and the jurisdiction uses both provers in the course of the test to minimize evaluation time.) Because of the importance of eliminating other variables in the test process, the Committee decided to recommend the addition of language to the paragraph to emphasize the need to keep the test quantities the same when comparing compensated and uncompensated runs.

See also additional discussion in Item 330-1 concerning the report prepared on the issue of small volume provers.

332-2 I T.4. Automatic Temperature Compensating Systems

Source: Southern Weights and Measures Association

Recommendation: The Committee is considering a recommendation to modify paragraph T.4. to change the difference between the meter error from 0.5 percent and 0.25 percent to 1.0 percent and 0.5 percent, respectively, for automatic temperature-compensating systems. (Note: The Committee recommended changes to paragraph T.4. to accommodate tests performed with small volume provers under agenda Item 332-1.)

T.4. Automatic Temperature Compensating Systems. - The difference between the meter error for results determined with and without the automatic temperature compensating system activated shall not exceed:

(a) ~~0.5~~ 1.0 percent of the test draft for mechanical automatic temperature compensating systems; and

(b) ~~0.25~~ 0.5 percent of the test draft for electronic automatic temperature compensating systems.

The results of each test shall be within the applicable acceptance or maintenance tolerance.
(Added 1991)(Amended 1992 and 1996)

Discussion: Maryland Weights and Measures reports that its records indicate a 100 percent increase in the failure rate for liquefied petroleum gas liquid-measuring devices after the implementation of the 0.5 percent and 0.25 percent requirement. In addition, Maryland noted the unstable nature of the product propane and the inherent uncertainties within the testing procedure make these tolerances too stringent. The example cited was a test using a 100-gallon standard with meter errors of +0.3 gallons and -0.3 gallons for temperature-compensated and non-temperature-compensated tests; these runs would meet the acceptance tolerance for a normal test (0.6 percent or 0.6 gallons), but would fail T.4.

Past tolerances adopted by the Committee were adjusted proportionately to meter tolerances for the compensated and uncompensated applications. Originally the intent was to limit the amount of error in an automatic temperature compensating system without creating a separate test on the temperature probe. This established error was equivalent to an acceptable corresponding temperature error in the temperature probe. Eventually in 1992, the Committee adopted tolerances which aligned Handbook 44 with Canadian and OIML requirements. These new tolerances were tighter because they reflected the more stringent Canada/OIML requirements for temperature sensors.

Additionally, it is recommended that this paragraph be amended to accommodate the special minimal size of the small volume prover test draft. (See Item 330-1 for additional discussion of this issue.)

Comments submitted to the Committee by weights and measures officials did not indicate a clear consensus on the ability of these devices to attain the tolerances in T.4. In its review of this item the Committee considered the device performance characteristics and that the performance of the device is operator dependent. The Committee also discussed a suggestion made at the Interim Meeting to use a single, tighter tolerance for both mechanical and electronic automatic temperature compensating systems, respectively; however, the Committee anticipates mechanical devices may have difficulty in meeting the tighter tolerances, and a single tolerance for all devices would, therefore, not be practical. In light of the comments received at the Interim Meeting and the predisposition of devices to underegister on delivery the Committee originally decided to support the proposed changes to T.4.

Comments during the open hearing at the 1996 Annual Meeting indicated that a clear lack of consensus still exists on this issue among NCWM members. Several jurisdictions agreed to conduct further studies to determine if there are variables which influence a meter's ability to attain the 0.5 percent and 0.25 percent maintenance and acceptance tolerances, respectively. Pending additional study by the weights and measures jurisdictions of California, Maryland, and other interested states the Committee has given this item informational status. The Committee encourages participation in this study by other jurisdictions and interested parties.

Mass Flow Meters

337-1 I UR.3.7. Return of Product to Storage; Compressed Natural Gas Dispensers

Source: Carryover Item 337-4

Recommendation: The Committee is considering the addition of a new paragraph to the Mass Flow Meters Code as follows:

UR.3.7. Return of Product to Storage, Retail Compressed Natural Gas Dispensers. - Provisions shall be made for returning product to storage during testing operations.

Discussion: At the Interim Meeting, the committee expressed its belief that this item is a safety concern to weights and measures officials and industry representatives and therefore, should receive priority status. It also believes the technology already exists to permit return of CNG product after completion of the testing process. The method for return of product should be determined by the user. Because the Committee was unanimous in its concern for this requirement, it originally recommended this item become a retroactive requirement.

Comments indicate that the Western supported the proposal as a retroactive requirement. The Southern supported this item as proposed, however, it was suggested the proposal be given informational status pending additional studies which can identify methods for return of CNG product to storage.

During the Interim Meetings, the Committee was advised that a subgroup from the NTETC Measuring Sector is currently reviewing a proposed procedure to address the return of product during the testing of compressed natural gas meters. The proposed procedures will be reviewed by the Committee prior to the Annual meeting.

Annual Meeting: In June 1996, the National Gas Vehicle Coalition (NGVC) sponsored a meeting to develop field test procedures for compressed natural gas dispensers and to discuss Item 337-1 on the S&T Committee's agenda. The meeting was attended by the Chairman of the S&T Committee in addition to weights and measures officials, members of industry, and users of compressed natural gas dispensers. At that meeting, a consensus could not be reached on how best to address the issue of returning product to storage. It was noted that a number of possible methods exist and that different methods may be used at different installations. The group expressed a particular concern about the safety issues surrounding this issue and emphasized the importance of establishing procedures which will not create unsafe conditions nor create environmental issues. Industry representatives in the group noted the importance of ensuring that each site is evaluated by a regulatory agency such as the fire marshal's office to ensure that all safety issues have been addressed for the specific installation. Weights and measures officials expressed concern that safety evaluations of these installations by such agencies is often delayed well past the date that the devices are placed into service because of the heavy workload of these agencies. Since the NGVC's Technical Committee NGV4 is planning to meet at the end of July 1996, it was suggested that this group might be better able to refine the possible approaches to safely discharge the product after testing since the group is very familiar with the technology and the restrictions to be addressed when working with the product.

The Committee received a letter from National Gas Vehicle Coalition (NGVC) affirming that the Coalition's Technical Subcommittee NGV4 plans to discuss the return to storage issue at its meeting at the end of July 1996. The NGVC committee asked the Committee to consider returning the issue to an informational status pending this meeting. The NGVC believe that they can develop safe, cost-effective, and technically sound solutions for dealing with this issue from a systems approach.

The S&T Committee heard testimony from several weights and measures jurisdictions emphasizing the safety concerns surrounding this issue and these jurisdictions voiced the need to move forward as quickly as possible to prevent injury to the field official. While the Committee was reluctant to delay the issue further, the Committee was uncertain whether or not the proposed change to UR.3.7. would fully address the safety concerns as it is currently written. Consequently, the Committee decided to return the item to "Informational" status to allow the NGVC Subcommittee additional time to develop an alternate proposal. The Committee takes this action with the understanding that the Subcommittee will return to the NCWM soon after their July 1996 meeting with possible solutions to be circulated among the regional weights and measures associations and possibly included in a draft examination procedure outline for trial use by field staff.

Background. The following excerpts from the 1995 S& T Committee final report are included for background information on this item:

In 1994, the NCWM adopted requirements to address the sale and delivery of compressed natural gas (CNG). At that time, the Laws and Regulation Committee suggested that a user requirement be added to Handbook 44 for provisions to be made for returning product used in testing to storage at all retail CNG locations. Weights and measures officials now encounter installations without a way to return product to storage once cylinders have been filled during the testing process. In some cases, device owners and servicepersons vent the product into the atmosphere to empty the cylinder used in the testing process. Weights and measures officials have expressed concern over the safety and environmental impact of this practice;

however, there are no Handbook 44 requirements to require means to return product to storage. The L&R Committee noted that the Environmental Protection Agency has no specific regulation requiring the return of CNG test product to storage, although air quality can be preserved only by eliminating venting to the atmosphere. Initial discussions with the Natural Gas Vehicle Coalition indicates that similar concerns may be shared by their members and that no significant opposition to such a proposal is anticipated.

The 1995 NCWM Annual Meeting concluded with recommendations from industry and weights and measures officials that additional study was needed to identify how the product will be returned to storage and what restrictions such as pressure might prove to create problems in returning product to storage.

Grain Moisture Meters

356-1 VC Elimination of Retroactive Dates; Effective for Devices Placed into Service after January 1, 1998

(This item was adopted as part of the consent calendar.)

Source: National Type Evaluation Technical Committee, Grain Moisture Meter Sector

Recommendation: Reorganize Section 5.56 Grain Moisture Meters as shown in Appendices C and D into (1) Section 5.56(a) to address NTEP grain moisture meters and any grain moisture meter manufactured or placed into service after January 1, 1998; and (2) Section 5.56(b) to address all non-NTEP grain moisture meters manufactured or placed into service prior to January 1, 1998.

Discussion: At its September 1995 meeting, the Grain Moisture Meter Sector notes that with retroactive dates removed in 1995, the Code is very hard to interpret and seems to contain contradictory requirements in many areas. It was generally agreed that even with editorial "patches" to these areas, the resulting code would be very confusing and difficult to interpret properly. The Sector suggested that the code be reorganized into two sections, one applicable to meters placed into service before January 1, 1998 (other than those certified as meeting NTEP requirements), and another applicable to NTEP meters and to all other meters placed into service after January 1, 1998. The Sector asked the S&T Committee to consider the reorganization of the code and to allow the Sector editorial review of those changes.

The Committee has heard no opposition to the proposed reorganization of the code. The Committee agrees with the Sector's recommendation to reorganize the Grain Moisture Meter Code to ensure these requirements will be properly applied to the appropriate generation of meters in commercial operations. NIST Technical Advisors agreed to submit a draft code for review at the Sectors' 1996 March Meeting, in anticipation of having proposed language for a vote at the 1996 NCWM Annual Meeting.

The reorganization of the code into the two parts considered by the Committee at the Annual Meeting, consisted of largely editorial changes to separate the code into two parts. However, there were a small number of changes which were more than strictly editorial in nature. For the convenience of NCWM members in their review of the two separate codes, the Committee has highlighted these additional changes in the following two tables.

The Committee also considered a suggestion from the Sector to change the sentence in Section S.1.3.(d) of 5.56(a) reading " The minimum temperature difference shall be 10 °C (degree Celsius)" to read "The minimum temperature difference shall be 10 Celsius degrees." The Committee decided not to make this change because: (1) NIST Special Publication 811 "Guide for the Use of the International System of Units (SI)" recommends the use of degree Celsius (°C) for a temperature interval or a temperature difference; and (2) this would not be consistent with existing NIST HB 44 language.

NIST Handbook 44 Section 5.56(a) Grain Moisture Meters Additional Comments on Editorial Changes		
No	**Location of Change**	**Comments**
1	New Section S.1.2. Grain or Seed Kind and Class Selection and Recording	▸ A HB 44 editorial comment was submitted to NIST, OWM that pointed out a conflict in the existing Code. Old Section S.1.6.1 (New S.1.2.) and the associated tables are in conflict. The code states "... using a minimum of four characters .. " the table gives examples of three characters. An editorial change was made to eliminate this conflict.
2	New Section S.1.4. Design of Measuring Elements	▸ Recommended changes in this Section state that the display on commercial moisture meters shall be 0.1 percent. ▸ The previous Code wording did not restrict the display of commercial moisture meters to 0.1 percent, but stated that the meter could not display greater than 0.1 percent.
3	New Section S.1.5. (old Section S.1.10) Operating Temperature	▸ Additional changes are proposed for new Section S.1.5 (old Section S.1.10) (a) and (c) as per NCWM S&T agenda Item 356-2.
4	Section S.3.2. Thermometers and Other Temperature Sensing Equipment	▸ Section S.3.2 was removed and placed in Code 5.56(b) because it applies to external thermometers used with non-NTEP meters. Thermometers on NTEP meters are built into the device; no external thermometers are used with NTEP grain moisture meters.
5	Section S.4(e). Operating Instructions and Use Limitations	▸ Section S.1.3(d) states that the maximum allowable meter/grain temperature difference shall be specified. ▸ Section S.4(e) was edited to require that this information be specified in the operating instructions.
6	Section UR.1.1. Value of the Smallest Unit on Primary Indicating and Recording Elements	▸ The text in section UR.1.1 was edited for clarity and to agree with the new Section S.1.4. ▸ The edited text specifies that the meter display (minimum indication) of commercial moisture meters shall be 0.1 percent. ▸ The term "Display Resolution" is used in the edited text. This term is consistent with the proposed NIR code but not consistent with other NIST HB 44 language. ▸ The following is additional wording that can be considered for Section UR.1.1 which does not restrict the minimum indication (display resolution) of Commercial meters to 0.1 and agrees with the previous language of old Section S.1.6.4 (new Section S.1.4) ▸ **UR.1.1. Value of the Smallest Unit on Primary Indicating and Recording Elements.** - The value of the smallest unit on a moisture meter~~, whether the moisture meter reads directly in terms of moisture content, or when the conventional scale unit is converted or corrected to moisture content,~~ shall be equal to or less than ~~one-half the value of the minimum acceptance tolerance.~~ <u>0.1 percent.</u>
7	UR.3.9. Operating Limitation	▸ Section UR.3.9 was removed because it is redundant. The requirement is covered by new Section S.1.3(d)
8	Removal of Effective Dates at the End of Each Section	▸ It was suggested at the Sector meeting that the effective dates be place in the new section for enforcement purposes. Effective dates are not included in this section because this section applies and must be enforced for all NTEP devices and moisture meters manufactured or placed into service after January 1, 1998.

Note: Each "Location of Change" on this list corresponds to the revised Code 5.56(a) and is identified in the revised Code with a check mark (✔).

NIST Handbook Section 5.56 (b) Grain Moisture Meters Additional Comments on Editorial Changes		
No	**Location of Change**	**Comments**
1	UR.1.1. Value of the Smallest Unit on Primary Indicating and Recording Elements	Current wording in this section conflicts with new Section S.1.6.3. The following is additional wording that can be considered for Section UR.1.1. which would be consistent with new Section S.1.6.3. UR.1.1. Value of the Smallest Unit on Primary Indicating and Recording Elements. The value of the smallest unit on a moisture meter, whether the meter reads directly in terms of moisture content, or when the conventional scale unit is converted or corrected to moisture content, shall be equal to or less than ~~one-half the value of the minimum acceptance tolerance~~ <u>0.1 percent</u>.

356-2 VC S.1.10. Operating Temperature

(This item was adopted as part of the consent calendar.)

Source: National Type Evaluation Technical Committee, Grain Moisture Meter Sector

Recommendation: Modify paragraph S.1.10. as follows to clarify the intent of the marking requirements for the temperature operating range:

S.1.10. Operating Temperature.

(a) ***~~A meter~~ <u>Warm up Period: When a meter is turned on</u> it shall not display or record any usable values until the operating temperature necessary for accurate determination has been attained, or the meter shall bear a conspicuous statement adjacent to the indication stating that the meter shall be turned on for a time period specified by the manufacturer prior to use.***

(b) ***A meter shall meet the requirements of T.2.. - Tolerance Values when operated in the temperature range of 10 °C to 30 °C (50 °F to 86 °F) or within the range specified by the meter manufacturer.***

(c) ***If the manufacturer specifies a temperature range, the range shall be at least 20 °C (36 °F) ~~and shall be marked on the device~~.***

[Nonretroactive and effective as of January 1, 1998.]
(Added 1993)(Amended 1995 <u>and 1996</u>)

Discussion: The Grain Moisture Meter Sector examined paragraph S.1.10.(c) requirements of marking the temperature range information for devices in which the manufacturer specifies an operating range outside of 10 °C to 30 °C. Similar marking requirements do not appear in the Near-Infrared Grain Analyzer Code. It was suggested that the marking requirements for temperature range information did not apply because the design of the device does not permit displaying or recording of usable values until the device has reached the temperature necessary for accurate determination. These devices could not display a moisture value and would indicate an error message when outside the specified temperature operating range. It was noted the original intent of this paragraph was to be applied to the device's warm up period.

Based on the Sector's comments on paragraph S.1.10. the Committee believes these proposed changes will bring the code into alignment with the original intent of the operating temperature requirements for grain moisture meters. Consequently, the Committee supports the Sector's proposal to modify paragraph S.1.10.

Near -Infrared Grain Analyzers

357-1 W S.2.2.1. Power Supply, Voltage, and Frequency

(This item was withdrawn.)

Source: National Type Evaluation Technical Committee, Near-Infrared Protein Analyzer Sector

Recommendation: Amend S.2.2.1. as follows to narrow the voltage range of the power supply:

S.2.2.1. Power Supply, Voltage and Frequency. - An analyzer that operates using alternating current must perform within tolerance requirements over the line voltage range ~~100~~ 105 V to ~~130~~ 129 V and over the frequency range of 59.5 Hz to 60.5 Hz.
[Nonretroactive and effective as of January 1, 2000. To become retroactive as of January 1, 2005.]

Discussion: At the conclusion of the Near-Infrared Protein Sector's 1994 Meeting, the members agreed that the voltage range referenced in paragraph S.2.2.1. should be narrowed from 100-130 volts to 105-129 volts for near-infrared (NIR) protein analyzers to correspond to voltage ranges applied during NTEP testing. This proposal would bring Publication 14 and Handbook 44 requirements into agreement. The 105-129 voltage range is typical of the operational environment for NIR protein analyzers; it reflects actual line voltage available in the United States, which is not subject to wide fluctuations; and it is more symmetrical (e.g., 117 ± percent).

Although this item was originally submitted by the Near-Infrared Grain Sector, the Committee received a report from the Sector following the Interim Meeting indicating that not all Sector members continued to support this item. Some concern was expressed that the difference between the range listed in Handbook 44 and that listed in NCWM Publication 14 may have arisen from the request of one meter manufacturer who had older ground grain analyzers in use in the field. It was noted that it is anticipated that most NIR devices submitted for NTEP evaluation will also be submitted for evaluation as grain moisture meters; this would mean that the devices must meet the wider range of 100 V to 130 V. Consequently, the variance in range in the NIR Code may not be required. Some concern was expressed at the regional weights and measures association meetings over creating an exception to accommodate a single manufacturer without adequate technical reason.

A letter ballot was distributed to Sector members to ask whether or not the issue should continue to be supported by the Sector. Based upon the results of the letter ballot, the S&T Committee was asked by the Sector to consider withdrawing the item. Consequently, the Committee decided to withdraw the item from its agenda. The Committee notes that the Sector needs to take steps at its next meeting to modify the checklist for NIR grain analyzers in NCWM Publication 14 to be consistent with the language in Handbook 44.

Other Items

360-1 W Change in Tolerance Determination for All Metering Devices

(This item was withdrawn.)

Source: Western Weights and Measures Association

Discussion: The Committee reviewed a proposal to change the tolerance determination procedure for all metering devices to be consistent with the scale code.

The Western believes that present procedures for determining tolerances for metering devices are inconsistent with application of tolerances to weighing devices. Changes to the existing procedures were suggested after a review of Handbook 44 indicated that what appears to be an inconsistency between the application of tolerances to the indications of a liquefied propane gas (LPG) meter and the application of tolerances which occurs during scale testing procedures. Additionally, it has been suggested that tolerance procedures in a number of the liquid-measuring device codes sections, be changed to specifically state that tolerances are determined based on "measured volume or mass".

An opposing argument for consideration is that tolerances are established based on the inherent nature of the measurement system and testing equipment available. A tolerance may be expressed in terms of three types of units: (1) the appropriate unit of weight or measure (e.g., cubic inches for retail liquid-measuring devices; inches for fabric meters); (2) percentage of test quantity (e.g., LPG meters in terms of the indicated quantity; taximeters in terms of the interval under test); and (3) relative units (e.g., scales in terms of numbers of scale divisions). In testing a closed measuring system such as the LPG meter, officials are prevented from adding or subtracting product in a manner similar to that which is used to determine the error for a mechanical scale with error weights or labeled net contents of packaged liquid commodities with glass volumetric standards. However, the principal does not change because the tolerance is the allowable error or departure from true performance or value (e.g., graduations, indications) of the equipment under test.

While the method of applying tolerances to a scale versus a measuring device are different, the fundamental principle of tolerance application are essentially the same. Most inspectors test a scale using direct readings from the scale to determine the device error. The following examples are provided for consideration.

Automatic-Indicating Scale: A 5-lb weight is placed on an automatic-indicating scale and the scale indicates 5.01 lb. The tolerance is based upon the test load or amount of standards added to the scale, in this case, 5 lb.

For one method of testing the error is determined to be 0.01 lb by reading it directly from the scale instead of using error weights to determine the exact error. Using another method of testing, "error weight testing," standards are added to or removed from the test load (in this case, 0.01 lb would be removed from the scale) until the scale indicates a quantity equal to the original test load (in this case 5.00 lb). The error is determined based upon the difference between the original test load (5.00 lb) and the standards on the scale (4.99). However, it should be noted that the test load represents the original amount of standards added to the scale before the error determination and the "test load" for purposes of tolerance determination is equal to the amount indicated on the scale.

A Non-Automatic Indicating Scale. For a scale such as a beam scale, the scale is made to indicate an amount of weight using a poise or other means, and standards equal to the indicated amount are added to the scale. Standards or "error weights" are then removed from or added to the scale until the scale indicates a balance condition, and the error is determined based on the difference between the standards on the scale and the scale indication. The tolerance in this case is applied to the "test load." However, it should be noted that the test load represents the amount of standards added to the scale before the error determination (not the total amount of standards after error weights were added or removed) and the "test load" for purposes of tolerance determination is usually equal to the amount indicated on the scale.

Liquid-Measuring Devices - Retail Motor-Fuel Dispenser. When an inspector tests a retail motor-fuel dispenser with a 5-gallon test measure, the inspector typically stops the indication on 5 gallons and reads the neck gauge on the prover. As specified in paragraph T.2., the tolerance is applied to the indicated amount of 5 gallons rather than to the amount actually delivered.

In considering this issue, it should be noted that the inspector typically attempts to stop the meter indication at a convenient quantity indication on the device under test; since the inspector tries to duplicate the indication for each test run, the tolerance may not change from test run to test run. In contrast, determining tolerances as proposed in the recommendation (based on measured volume or mass) would require that the inspector calculates a different tolerance for each run since the measured volume or mass typically differs for each test run.

Comments received indicated the suggested change in tolerance procedure applications would necessitate changes to current examination procedures, which would encumber field testing procedures. The Committee concluded that some valid points have been raised in the discussion of this issue; however, the Committee does not feel that sufficient justification has been provided to warrant altering existing tolerance application in the measuring devices code sections. Consequently, the Committee has withdrawn this item from its agenda.

360-2 VC Proposed Carbon Dioxide Liquid-Measuring Devices Code

(This item was adopted as part of the consent calendar.)

At the Annual Meeting, the Committee added text to the beginning of the code to identify the code as tentative in status.

This tentative code has only a trial or experimental status and is not intended to be enforced. The requirements are designed for study prior to the development and adoption of a final code for Carbon Dioxide Liquid-Measuring Devices.

Source: California/Western Weights and Measures Association

Recommendation: Add a tentative code to NIST Handbook 44 for Carbon Dioxide Liquid-Measuring Devices as shown in Appendix B.

Discussion: Although, carbon dioxide liquid-measuring operations are becoming prevalent, there is no code to address this application in NIST Handbook 44. Following discussions at the Interim Meeting, the Committee recognized the need to address this application and recommends the proposed Carbon Dioxide Liquid-Measuring Devices Code be voted on as a tentative code.

In the past, the S&T Committee has considered incorporating requirements for carbon dioxide liquid-measuring devices into the Cryogenic Liquid-Measuring Devices Code since many of the carbon dioxide applications were similar to the existing code for cryogenic liquid measuring devices; however, it was noted that carbon dioxide is not truly a cryogenic product due to its boiling point. Additionally, industry noted that carbon dioxide deliveries required substantially different equipment than other cryogenic liquid products. The Committee was also advised that industry had requested a separate code because a separate code would be more easily understood and applied.

The Meter Manufacturers Association suggested that the tolerances should be tightened as the technology becomes available. The Committee received no unfavorable comments on the proposed code.

360-3 I OIML Report

The following information was provided by Mr. O. K. Warnlof, Standards Management Program, NIST, on OIML activities of significant importance to the NCWM. It is a list of the International Recommendations (R), Documents (D), and International (IWG) and National Working Group Meetings (NWG) that are of interest to the NCWM members and are generally within the purview of the S & T Committee:

OIML INTERNATIONAL RECOMMENDATIONS FOR LIQUID MEASUREMENT (TC 8)

* R 49 Water meters intended for the metering of cold water (under revision)
* R 63 Petroleum measurement tables (1994)
* R 71 Fixed storage tanks. General requirements (1985)
* R 72 Hot water meters (1985)
* R 80 Road and rail tankers (1989)
* R 81 Measuring systems for cryogenic liquids (3rd CD Revision, February, 1996)

* R 85 Automatic level gauges for measuring the level of liquid in fixed storage tanks (1989)

* R 86 Drum meters for alcohol and their supplementary devices (1989)

* R 96 Measuring container bottles (1990)

* R 105 Direct mass flow measuring systems for quantities of liquids (1993)
  Annex - Test report format (being printed)

* R 117 Measuring assemblies for liquids other than water (1995)

* R 118 Testing procedures for pattern examination of fuel dispensers for motor vehicles (1995)

* R 119 Pipe provers for testing of measuring systems for liquids other than water (1996)

* R 120 Characteristics of standard capacity measures and test methods for measuring systems for liquids other than water (1996)

* D 7 The evaluation of flow standards and facilities used for testing water meters (1984)

* D 26 Glass delivery measures - Automatic pipettes (being printed)

OIML INTERNATIONAL RECOMMENDATIONS FOR WEIGHING INSTRUMENTS (TC 9)

* R 47 Standard weights for testing high capacity weighing machines (1979)

* R 50 Continuous totalizing automatic weighing instruments (Belt Weighers) (1994) Test procedures (1995)
  Report forms (1995)

* R 51-1 Automatic Catchweighing Instruments. Par 1: Metrological and technical requirements - Tests (1996)

* R 51-2 Automatic Catchweighing Instruments. Part 2: Test report format. (1996)

* R 60 Metrological regulation for load cells (1991)
  Annex - Test report format for the evaluation of load cells (1993)

* R 61 Automatic gravimetric filling instruments (being printed)
  Test procedures (being printed)
  Report forms (being printed)

* R 76-1 Nonautomatic weighing instruments Part 1: Metrological and technical requirements -Tests (1992)
  Amendment No. 1 (1994)

* R 76-2 Nonautomatic weighing instruments Part 2: Pattern evaluation report (1993)
  Amendment No. 1 (1995)

* R 106 Automatic rail-weighbridges (1993)
  Test procedures (being printed)
  Report forms (being printed)

* R 107 Discontinuous totalizing automatic weighing instruments (totalizing hopper weighers) (1993)
  Test procedures (being printed)
  Report forms (being printed)

* R 111 Weights of classes E_1, E_2, F_1, F_2, M_1, M_2, M_3 (1994)

OTHERS

* OIML CERTIFICATE SYSTEM FOR MEASURING INSTRUMENTS (1995)

INTERNATIONAL WORKING GROUP MEETINGS
1996

TC 9 "Instruments for measuring mass and density" (responsibility U.S.), May 20-22, Germany
Revision of R 60 "Metrological regulation for load cells."

TC9/SC2 "Automatic weighing instruments" (responsibility U.K.), May 22-24, Germany
2nd CD R "Automatic road weighbridges."

TC8\SC6 "Measurement of cryogenic liquids" (responsibility U.S.), May 13-15, Germany
3rd CD Revision R 81 "Measuring systems for cryogenic liquids."

TC7/SC5 "Dimensional measuring instruments" (responsibility Australia), October 28-30, NIST, USA
3rd CD R "Multi-Dimensional measuring instruments."

TAG_{cert} "Technical Advisory Group on Certification" (responsibility U.S.), February 19-20, Paris

OIML "Tenth OIML International Conference," November 3-8, Vancouver, BC, Canada.

NATIONAL WORKING GROUP MEETINGS
1996

TC 9 "Instruments for measuring mass and density" (responsibility U.S.), January 23, Florida
Revision of R 60 "Metrological regulation for load cells."

TC9/SC2 "Automatic weighing instruments" (responsibility U.K.), April, Gaithersburg (provisional)
2nd CD R "Automatic road weighbridges."

TC7/SC5 "Dimensional measuring instruments" (responsibility Australia), October 28, 1996, Gaithersburg
3rd CD R "Multi-Dimensional measuring instruments."

TAG_{cert} "Technical Advisory Group on Certification (responsibility U.S.), July 21, New Orleans
Revision of "OIML Certificate System."

TC 9 "Instruments for measuring mass and density" (responsibility U.S.), July 22, New Orleans
Revision of R 60 "Metrological regulation for load cells."

TC 9 "Workshop on Practical test procedures for Weights of classes E_1, E_2, F_1, F_2, M_1, M_2, M_3," October 2-4, SP, Boras, Sweden

360-4 V Clarification of Handbook Application, Emergency Action Item

(This item was adopted.)

Source: Emergency Action Item Submitted by the State of Illinois

Discussion: The S&T Committee was asked to consider addressing as an emergency item the addition of text to the Introduction Section of Handbook 44 to clarify the intent of the application of the various requirements in Handbook 44. While the S&T Committee believes that it is essential that due process be preserved in all issues brought before the NCWM as does the jurisdiction presenting the item, it recognized the urgency of the situation for the jurisdiction which submitted the emergency item.

The State of Illinois reported that an overweight truck case was heard in the city of Chicago; in this case, the defense argued that unless a jurisdiction applies all requirements in NIST Handbook 44, the jurisdiction could not certify that device. Questions were specifically raised over whether or not testing must be performed over a range of temperature and barometric pressure during a field test. The court's decision supported the defense's argument and extends beyond the scale involved in the case to other types of devices tested by the jurisdiction. The case was appealed and the decision of the lower court upheld.

The State enlisted the support of NIST and well as industry members in providing written interpretation of how Handbook 44 paragraphs are intended to be applied, but this correspondence was not successful in overcoming the arguments presented in the court. Illinois also attempted to amend their State Law to clarify the intent of Handbook 44's application; however, concerns were raised over the proposed action by the legislative committee who questioned whether the amendment would create non-uniformity with other jurisdictions enforcing Handbook 44. Meanwhile, Illinois is unable to try overweight truck cases and there is concern that this interpretation may spread, not only to other areas of their State, but to other States as well.

Since the attempt to work through their individual State legal system has been unsuccessful, Illinois is turning to the NCWM to clarify the intent of the Handbook's application. The S&T Committee considered several proposals submitted prior to and following the open hearing in which this issue was raised. The Committee concluded that the issue would best be addressed in an area of the Handbook that would enable the philosophy to apply to all devices which fall under Handbook 44. Consequently, the Committee is recommending that language be added to the Introduction Section of Handbook 44.

The Committee recognizes that many tests in Handbook 44 are intended to be conducted only under controlled conditions such as those found in a laboratory environment and a number of paragraphs in Handbook 44 already include language emphasizing the conditions under which these tests are to be conducted. Some tests require special equipment not available in the field while others can be conducted in the field only if specific conditions exist which enable the test to be performed; to expect the owner to duplicate such conditions or for the inspector to conduct all tests under such circumstances is not realistic.

If the Conference agrees to discuss this emergency item, the following recommendation will be presented for a vote.

Recommendation: The Committee recommends the following be added to the end of Section 6, Introduction of Handbook 44:

It is the intention of this Handbook to supply criteria which enables the inspector to determine the suitability, accuracy, and repetitive consistency of a weighing or measuring device, both in the laboratory and in the field. However, not all code sections can be appropriately applied in both settings. Some sections are designed to be applied specifically to tests performed under laboratory conditions, and it would be impractical or unrealistic to apply those sections to field tests. Not all tests described in the "Notes" section of the Handbook are required to be performed in the field as an official test. An inspector may officially approve a device which has been tested in accordance with those sections applicable to the type of test being conducted.

Gary D. West Chairman

Darryl L. Brown, Iowa
Ronald D. Murdock, North Carolina
Monty H. Hopper, Kern County, CA
Allan M. Nelson, Connecticut

Renald Marceau, Canada, Technical Advisor
Juana Williams, NIST, Technical Advisor
Tina G. Butcher, NIST, Techincal Advisor

Committee on Specifications and Tolerances

Table UR.3.2.1
Span Maximum Load

Distance in feet between the extremes of any group of 2 or more consecutive axles	Ratio of CLC to maximum load ("r" factor) carried on any group of 2 or more consecutive axles							
	2 axles	3 axles	4 axles	5 axles	6 axles	7 axles	8 axles	9 axles
4[1]	1.000							
5[1]	1.000							
6[1]	1.000							
7[1]	1.000							
8 and less[1]	1.000	1.000						
More than 8[1]	1.118	1.235						
9	1.147	1.250						
10	1.176	1.279						
11		1.294						
12		1.324	1.471					
13		1.338	1.485					
14		1.368	1.515					
15		1.382	1.529					
16		1.412	1.544	1.706				
17		1.426	1.574	1.721				
18		1.456	1.588	1.735				
19		1.471	1.603	1.765				
20		1.500	1.632	1.779	1.941			
21		1.515	1.647	1.794	1.956			
22		1.544	1.662	1.809	1.956			
23		1.559	1.691	1.838	2.000			
24		1.588	1.706	1.853	2.015	2.176		
25		1.603	1.721	1.868	2.029	2.191		
26		1.632	1.750	1.882	2.044	2.206		
27		1.647	1.765	1.912	2.059	2.221		
28		1.676	1.779	1.927	2.088	2.250	2.412	
29		1.691	1.809	1.941	2.103	2.265	2.426	
30		1.721	1.824	1.956	2.118	2.279	2.441	
31		1.735	1.838	1.985	2.132	2.294	2.456	
32		1.765	1.868	2.000	2.147	2.309	2.485	2.647
33			1.882	2.015	2.176	2.324	2.500	2.662
34			1.897	2.029	2.191	2.353	2.515	2.676
35			1.926	2.059	2.206	2.368	2.529	2.691
36			1.941[2]	2.074	2.221	2.382	2.544	2.706
37			1.956[2]	2.088	2.235	2.397	2.559	2.735
38			1.985[2]	2.103	2.265	2.412	2.574	2.750
39			2.000	2.132	2.279	2.427	2.603	2.765
40			2.015	2.147	2.294	2.456	2.618	2.779
41			2.044	2.162	2.309	2.471	2.632	2.794
42			2.059	2.176	2.324	2.485	2.647	2.809
43			2.074	2.206	2.353	2.500	2.662	2.824
44			2.103	2.221	2.368	2.515	2.676	2.838
45			2.118	2.235	2.382	2.529	2.691	2.868
46			2.132	2.250	2.397	2.559	2.721	2.882
47			2.162	2.279	2.412	2.574	2.735	2.897
48			2.176	2.294	2.441	2.588	2.750	2.912
49			2.191	2.309	2.456	2.603	2.765	2.926
50			2.221	2.324	2.471	2.618	2.779	2.941

INSTRUCTIONS:

1. Determine the scale's CLC.
2. Count the number of axles on the vehicle in a given span and determine the distance in feet between the first and last axle in the span.
3. Multiply the CLC by the corresponding multiplier in the table*.
4. The resulting number is the scale's maximum concentrated load for a single span based on the vehicle configuration.

*See note and formula on next page.

Table UR.3.2.1 Span Maximum Load								
Distance in feet between the extremes of any group of 2 or more consecutive axles	**Ratio of CLC to maximum load ("r" factor) carried on any group of 2 or more consecutive axles**							
	2 axles	3 axles	4 axles	5 axles	6 axles	7 axles	8 axles	9 axles
51			2.235	2.353	2.485	2.632	2.794	2.956
52			2.250	2.368	2.500	2.662	2.809	2.971
53			2.279	2.382	2.529	2.676	2.838	3.000
54			2.294	2.397	2.544	2.691	2.853	3.015
55			2.309	2.426	2.559	2.706	2.868	3.029
56			2.338	2.441	2.574	2.721	2.882	3.044
57			2.353[3]	2.456	2.588	2.735	2.897	3.059
58				2.471	2.618	2.765	2.912	3.074
59				2.500	2.632	2.779	2.926	3.088
60				2.515	2.647	2.794	2.956	3.103

*Note: This table was developed based upon the following formula. Values may be rounded in some cases for ease of use.

$$W = r \times 500\left[\left(\frac{LN}{N-1}\right) + 12N + 36\right]$$

[1] Tandem Axle Weight.

[2] Exception - These values in the third column correspond to the maximum loads in which the inner bridge dimensions of 36, 37, and 38 feet are considered to be equivalent to 39 feet. This allows a weight of 68 000 lb on axles 2 through 5.

[3] Corresponds to the Interstate Gross Weight Limit.

Appendix B (Item 360-2)

Section 3.38. Proposed Carbon Dioxide Liquid-Measuring Device - Tentative Code

This tentative code has only a trial or experimental status and is not intended to be enforced. The requirements are designed for study prior to the development and adoption of a final code for Carbon Dioxide Liquid-Measuring Devices. (Tentative Code Added 1996)

A. Application

A.1. This code applies to carbon dioxide liquid measuring devices used for the measurement of liquid carbon dioxide.

A.2. This code does not apply to devices used solely for dispensing a product in connection with operations in which the amount dispensed does not affect customer charges.

A.3. See also, Sec. 1.10; General Code requirements.

S. Specifications

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

S.1.1. Primary Elements. -

S.1.1.1. General. - A device shall be equipped with a primary indicating element and may also be equipped with a primary recording element.

S.1.1.2. Units. - A device shall indicate and record, if equipped to record, its deliveries in terms of pounds or kilograms; or decimal subdivisions or multiples thereof.

S.1.1.3. 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) for small delivery devices:

(1) one kilogram (1 kg), or
(2) one pound (1 lb)

(b) for large delivery devices:

(1) ten kilograms (10 kg), or
(2) ten pounds (10 lb)

S.1.1.4. Advancement of Indicating and Recording Elements. - Primary indicating and recording elements shall be susceptible of advancement only by the normal operation of the device. However, a device may be cleared by advancing its elements to zero, but only if:

(a) the advancing movement, once started, cannot be stopped until zero is reached, or

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

S.1.1.5. Return to Zero. - Primary indicating and recording elements shall be readily returnable to a definite zero indication. Means shall be provided to prevent the return of primary indicating elements and of primary recording elements beyond their correct zero position.

S.1.2. Graduations. -

S.1.2.1. Length. - Graduations shall be so varied in length that they may be conveniently read.

S.1.2.2. Width. - In any series of graduations, the width of a graduation shall in no case be greater than the width of the minimum clear interval between graduations. The width of main graduations shall be not more than 50 percent greater than the width of subordinate graduations. Graduations shall in no case be less than 0.2 mm (0.008 in) in width.

S.1.2.3. Clear Interval Between Graduations. - The clear interval 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 relative movement between the graduations at the end of the indicator, or

(b) if the indicator is continuous, at the point of widest separation of the graduations.

(See also S.1.3.6.)

S.1.3. Indicators. -

S.1.3.1. Symmetry. - The index of an indicator shall be of the same shape as the graduations at least throughout that portion of its length associated with the graduations.

S.1.3.2. Length. - The index of an indicator shall reach to the finest graduations with which it is used, unless the indicator and the graduations are in the same plane, in which case the distance between the end 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.1.3.3. Width. - The width of the index of the indicator in relation to the series of graduations with which it is used shall be not greater than:

(a) the width of the widest graduation, and

(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.

S.1.3.4. Clearance. - The clearance between the index of an indicator and the graduations shall in no case be more than 1.5 mm (0.06 in).

S.1.3.5. Parallax. - Parallax effects shall be reduced to the practicable minimum.

S.1.3.6. Travel of Indicator. - If the most sensitive element of the primary indicating element utilizes an indicator and graduations, the relative movement of these parts corresponding to the smallest indicated value shall be no less than 5 mm (0.20 in).

S.1.4. Computing-Type Devices. -

S.1.4.1. Printed Ticket. - Any printed ticket issued by a device of the computing type on which there is printed the total computed price shall have printed clearly thereon also the total quantity of the delivery and the price per unit.

S.1.4.2. Money-Value Computations. - Money-value computations shall be of the full-computing type in which the money value at a single unit price, or at each of a series of unit prices, shall be computed for every delivery within either the range of measurement of the device or the range of the computing elements, whichever is less.

The total price shall be computed on the basis of the quantity indicated when the value of the smallest division indicated is equal to or less than the value specified in S.1.1.3.

S.1.4.3. 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. Design of Measuring Elements.

S.2.1. Vapor Elimination. - A measuring system shall be equipped with an effective vapor eliminator or other effective means to prevent the measurement of vapor that will cause errors in excess of the applicable tolerances.

S.2.2. Reverse Flow Measurement. - Effective means, automatic in operation, shall be installed to prevent reverse flow measurement.

S.2.3. Maintenance of Liquid State. - A device shall be so designed that the product being measured will remain in a liquid state during passage through the device.

S.2.4. Automatic Temperature or Density Compensation. - A volumetric device shall be equipped with automatic means for adjusting the indication and recorded representation of the measured quantity of the product to indicate or record the quantity of the product measured in terms of pounds.

S.2.5. Provision for Sealing. - Adequate provision shall be made for 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

(c) any automatic temperature or density compensating system.

Any adjusting mechanism shall be readily accessible for purposes of affixing a security seal.

S.3. Design of Discharge Lines and Discharge Line 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 device or the discharge line therefrom, except that a manually controlled outlet that may be opened for purging or draining the measuring system shall be permitted. Effective means shall be provided to prevent the passage of liquid through any such outlet during normal operation of the device and to indicate clearly and unmistakably when the valve controls are so set as to permit passage of liquid through such outlet.

S.3.2. Discharge Hose. - The discharge hose of a measuring system shall be of a wet hose type with a shutoff valve at its outlet end.

S.4. Marking Requirements.

S.4.1. Limitation of Use . - If a measuring system is intended to measure accurately only liquids having particular properties, or to measure accurately only under specific installation or operating conditions, or to measure accurately only when used in conjunction with specific accessory equipment, these limitations shall be clearly and permanently marked on the device.

S.4.2. Discharge Rates. - A meter shall be marked to show its designed maximum and minimum discharge rates. The marked minimum discharge rate shall not exceed 20 percent of the maximum discharge rate.

S.5. Level Condition, On-Board Weighing Systems. - Provision shall be made for automatically inhibiting the delivery of liquid carbon dioxide when the vehicle is out of level beyond the limit required for the performance to be within the applicable tolerances.

N. Notes

N.1. Test Liquid. - The test liquid shall be carbon dioxide in a compressed liquid state.

N.2. Vaporization and Volume Change. - Care shall be exercised to reduce vaporization and volume changes to a minimum. When testing by weight, the weigh tank and transfer systems shall be precooled to liquid temperature prior to the start of the test to avoid the venting of vapor from the vessel being weighed.

N.3. Test Drafts.

N.3.1. Gravimetric Test. - Weight test drafts shall be equal to at least the amount delivered by the device in two minutes at its maximum discharge rate.

N.3.2. Transfer Standard Test. - When comparing a meter with a calibrated transfer standard, the test draft shall be equal to at least the amount delivered by the device in two minutes at its maximum discharge rate.

N.3.3. Volumetric Prover Test Drafts. - Test drafts shall be equal to at least the amount delivered in one minute at normal discharge rate.

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.

N.4.2. Special Tests. - Any test except as set forth in N.4.1. shall be considered a special test. Tests shall be conducted, if possible, to evaluate any special elements or accessories attached to or associated with the device. A device shall be tested at a minimum discharge rate of:

(a) not less than the minimum rated capacity or 20 percent of the maximum rated discharge rate of the device, whichever is less, or

(b) the lowest discharge rate practicable under the conditions of installation.

"Special" tests may be conducted to develop any characteristics of the device anticipated under the conditions of installation as circumstances require.

N.4.3. Density. - Temperature and pressure of the metered test liquid shall be measured during the test for the determination of density or volume correction when applicable. Table 1, contained in this Article, shall apply.

N.4.4. Automatic Temperature or Density Compensation. - If a device is equipped with an automatic temperature or density compensator, the compensator shall be tested by comparing the quantity indicated or recorded by the device (with the compensator connected and operating) with the actual delivered quantity. Table 1, contained in this Article, shall apply.

T. Tolerances

T.1. Application.

T.1.1. To Underregistration and to Overregistration. - The tolerances hereinafter prescribed shall be applied to errors of underregistration and errors of overregistration.

T.2. Tolerance Values.

T.2.1. On Normal Tests. - The maintenance tolerance on "normal" tests shall be two and one-half percent (2.6%) of the indicated quantity. The acceptance tolerances shall be one and one-half percent (1.5%) of the indicated quantity.

T.2.2. On Special Tests. - The maintenance and acceptance tolerance on "special" tests shall be two and one-half percent (2.5%) of the indicated quantity.

T.3. On Tests Using Transfer Standards. - To the basic tolerance values that would otherwise be applied, there shall be added an amount equal to two times the standard deviation of the applicable transfer standard when compared to a basic reference standard.

UR. User Requirements

UR.1. Installation Requirements.

UR.1.1. Discharge Rate. - A device shall be so installed that the actual maximum discharge rate will not exceed the rated maximum discharge rate. If necessary, means for flow regulation shall be incorporated in the installation.

UR.1.2. Length of Discharge Hose. - The discharge hose shall be of such a length and design as to keep vaporization of the liquid to a minimum.

UR.1.3. Maintenance of Liquid State. - A device shall be so installed and operated that the product being measured shall remain in the liquid state during passage through the meter.

UR.2. Use Requirements.

UR.2.1. Return of Indicating and Recording Elements to Zero. - The primary indicating elements (visual) and the primary recording elements shall be returned to zero immediately before each delivery.

UR.2.2. Condition of Discharge System. - The discharge hose, up to the valve at the end of the discharge hose, shall be completely filled and precooled to liquid temperatures before a "zero" condition is established and prior to the start of a commercial delivery. Means shall be provided to fill the discharge hose with liquid prior to the start of a delivery.

UR.2.3. Vapor Equalization Line. - A vapor equalization line shall not be used during a metered delivery unless the quantity of vapor displaced from the buyer's tank to the seller's tank is deducted from the metered quantity. Table 1, contained in this Article, shall apply.

UR.2.4. Temperature or Density Compensation.

UR.2.4.1. Use of Automatic Temperature or Density Compensators. - Devices equipped with an automatic temperature or density compensator shall have the compensator connected, operable, and in use at all times. Such automatic temperature or density compensator may not be removed.

UR.2.4.2. Tickets or Invoices. - Any written invoice or printed ticket based on a reading of a device that is equipped with an automatic temperature or density compensator shall have shown thereon that the quantity delivered has been temperature or density compensated.

UR.2.5. Ticket in Printing Device. - A ticket shall not be inserted into a device equipped with a ticket printer until immediately before a delivery is begun, and in no case shall a ticket be in the device when the vehicle is in motion while on a public street, highway, or thoroughfare.

UR.2.6. Sale by Weight. - All quantity determinations shall be made by means of an approved and sealed weighing or measuring device. All sales shall be stated in kilograms or pounds.

D. Definitions of Terms

The terms defined here have a special and technical meaning when used in the Code for Carbon Dioxide Liquid-Measuring Devices.

automatic temperature or density compensation. The use of integrated or ancillary equipment to obtain, from the output of a volumetric meter, an equivalent mass indication.

carbon dioxide liquid-measuring device. A system including a mechanism or machine of (a) the meter or (b) a weighing type of device mounted on a vehicle designed to measure and deliver liquid carbon dioxide. Means may be provided to indicate automatically, for one of a series of unit prices, the total money value of the quantity measured.

large-delivery devices. Devices used primarily for single deliveries greater than 1000 pounds or 500 kilograms.

small-delivery device. Any device other than a large-delivery device.

transfer standard. A measurement system designed for use in proving and testing carbon dioxide liquid-measuring devices.

vapor equalization credit. The quantity deducted from the metered quantity of liquid carbon dioxide when a vapor equalizing line is used to facilitate the transfer of liquid during a metered delivery.

vapor equalization line. A hose or pipe connected from the vapor space of the seller's tank to the vapor space of the buyer's tank that is used to equalize the pressure during a delivery.

wet-hose type. A type of device in which it is intended that the discharge hose be completely filled prior to each commercial delivery.

Table 1

Temp Deg F	Pressure		Liquid Density		Vapor Density		Vap Dis %
	PSIA	PSIG	lb/gal	(lb-oz)/gal	lb/cu ft	lb/gal	
- 30.00	177.89	163.19	9.127	9 - 2.0	1.989	0.266	2.9
- 29.75	178.75	164.05	9.122	9 - 2.0	1.999	0.267	2.9
- 29.50	179.62	164.92	9.117	9 - 1.9	2.008	0.268	2.9
- 29.25	180.49	165.79	9.113	9 - 1.8	2.018	0.270	3.0
- 29.00	181.36	166.67	9.108	9 - 1.7	2.028	0.271	3.0
- 28.75	182.24	167.54	9.103	9 - 1.7	2.038	0.272	3.0
- 28.50	183.12	168.42	9.098	9 - 1.6	2.048	0.274	3.0
- 28.25	184.00	169.31	9.094	9 - 1.5	2.058	0.275	3.0
- 28.00	184.89	170.19	9.089	9 - 1.4	2.067	0.276	3.0
- 27.75	185.78	171.08	9.084	9 - 1.3	2.077	0.278	3.1
- 27.50	186.67	171.98	9.080	9 - 1.3	2.087	0.279	3.1
- 27.25	187.57	172.87	9.075	9 - 1.2	2.098	0.280	3.1
- 27.00	188.47	173.77	9.070	9 - 1.1	2.108	0.282	3.1
- 26.75	189.37	174.67	9.065	9 - 1.0	2.118	0.283	3.1
- 26.50	190.28	175.58	9.061	9 - 1.0	2.128	0.284	3.1
- 26.25	191.18	176.49	9.056	9 - 0.9	2.138	0.286	3.2
- 26.00	192.10	177.40	9.051	9 - 0.8	2.148	0.287	3.2
- 25.75	193.01	178.32	9.046	9 - 0.7	2.159	0.289	3.2
- 25.50	193.93	179.23	9.041	9 - 0.7	2.169	0.290	3.2
- 25.25	194.85	180.16	9.037	9 - 0.5	2.179	0.291	3.2
- 25.00	195.78	181.08	9.032	9 - 0.5	2.190	0.293	3.2
- 24.75	195.78	182.01	9.027	9 - 0.4	2.200	0.296	3.3
- 24.50	197.64	182.94	9.022	9 - 0.4	2.211	0.296	3.3
- 24.25	198.57	183.87	9.017	9 - 0.3	2.221	0.298	3.3
- 24.00	199.51	184.81	9.013	9 - 0.2	2.232	0.298	3.3
- 24.75	200.45	185.75	9.008	9 - 0.1	2.243	0.300	3.3
- 23.50	201.39	186.70	9.003	9 - 0.0	2.253	0.300	3.3
- 23.25	202.34	187.64	8.998	9 - 0.0	2.264	0.303	3.4

Table 1							
Temp Deg F	Pressure		Liquid Density		Vapor Density		Vap Dis %
	PSIA	PSIG	lb/gal	(lb-oz)/gal	lb/cu ft	lb/gal	
- 23.00	203.29	188.60	8.993	8 - 15.9	2.275	0.304	3.4
- 22.75	204.25	189.55	8.989	8 - 15.8	2.286	0.306	3.4
- 22.50	205.20	190.51	8.984	8 - 15.7	2.296	0.307	3.4
- 22.25	206.16	191.47	8.979	8 - 15.7	2.307	0.308	3.4
- 22.00	207.13	192.43	8.974	8 - 15.6	2.318	0.310	3.5
- 21.75	208.09	193.40	8.969	8 - 15.5	2.329	0.311	3.5
- 21.50	209.06	194.37	8.964	8 - 15.4	2.340	0.313	3.5
- 21.25	210.04	195.34	8.959	8 - 15.4	2.351	0.314	3.5
- 21.00	211.02	196.32	8.955	8 - 15.3	2.362	0.316	3.5
- 20.75	212.00	197.30	8.950	8 - 15.2	2.374	0.317	3.5
- 20.50	212.98	198.28	8.945	8 - 15.1	2.385	0.319	3.6
- 20.25	213.97	199.27	8.940	8 - 15.0	2.396	0.320	3.6
- 20.00	214.96	206.28	8.935	8 - 15.0	2.407	0.322	3.6
- 19.75	215.95	201.26	8.935	8 - 14.9	2.488	0.323	3.6
- 19.50	216.95	202.25	8.925	8 - 14.8	2.488	0.325	3.6
- 19.25	219.96	203.25	8.920	8 - 14.4	2.441	0.326	3.7
- 19.50	215.95	206.28	8.915	8 - 14.6	2.453	0.325	3.7
- 18.75	219.96	205.27	8.901	8 - 14.6	2.464	0.323	3.7
- 18.50	220.97	206.28	8.906	8 - 14.5	2.476	0.331	3.7
- 18.25	221.99	207.29	8.901	8 - 14.4	2.488	0.333	3.7
- 18.00	223.01	208.31	8.896	8 - 14.3	2.499	0.334	3.8
- 17.75	224.03	209.33	8.891	8 - 14.3	2.511	0.336	3.8
- 17.50	225.05	210.36	8.886	8 - 14.2	2.523	0.337	3.8
- 17.25	226.08	211.38	8.881	8 - 14.1	2.534	0.339	3.8
- 17.00	227.11	212.42	8.876	8 - 14.0	2.546	0.340	3.8
- 16.75	228.15	213.45	8.871	8 - 13.9	2.558	0.342	3.9
- 16.50	229.18	214.49	8.866	8 - 13.9	2.570	0.344	3.9
- 16.25	230.23	215.53	8.861	8 - 13.8	2.582	0.345	3.9

Table 1

Temp Deg F	Pressure		Liquid Density		Vapor Density		Vap Dis %
	PSIA	PSIG	lb/gal	(lb-oz)/gal	lb/cu ft	lb/gal	
- 16.00	231.27	216.58	8.856	8 - 13.7	2.594	0.347	3.9
- 15.75	232.32	217.62	8.851	8 - 13.6	2.606	0.348	3.9
- 15.50	233.37	218.68	8.846	8 - 13.5	2.618	0.350	4.0
- 15.25	234.43	219.73	8.841	8 - 13.5	2.630	0.352	4.0
- 15.00	235.49	220.79	8.836	8 - 13.4	2.643	0.353	4.0
- 14.75	236.55	221.86	8.831	8 - 13.3	2.655	0.355	4.0
- 14.50	237.62	222.92	8.826	8 - 13.2	2.667	0.357	4.0
- 14.25	238.69	223.99	8.821	8 - 13.1	2.680	0.358	4.1
- 14.00	239.76	225.07	8.816	8 - 13.1	2.692	0.360	4.1
- 13.75	240.84	226.14	8.811	8 - 13.0	2.704	0.362	4.1
- 13.50	241.92	227.22	8.806	8 - 12.9	2.717	0.363	4.1
- 13.25	243.00	228.31	8.801	8 - 12.8	2.729	0.365	4.1
- 13.00	244.09	229.39	8.796	8 - 12.7	2.742	0.367	4.2
- 12.75	245.18	230.49	8.791	8 - 12.7	2.755	0.368	4.2
- 12.50	246.28	231.58	8.786	8 - 12.6	2.767	0.370	4.2
- 12.25	247.37	232.68	8.781	8 - 12.5	2.780	0.372	4.2
- 12.00	248.48	233.78	8.740	8 - 12.4	2.793	0.380	4.3
- 11.75	249.58	234.89	8.771	8 - 12.3	2.809	0.375	4.3
- 11.50	250.69	236.00	8.755	8 - 12.2	2.819	0.377	4.3
- 11.25	251.80	237.11	8.760	8 - 12.2	2.832	0.379	4.3
- 11.50	252.92	238.22	8.755	8 - 12.1	2.845	0.380	4.3
- 10.75	254.04	239.34	8.755	8 - 12.3	2.858	0.382	4.3
- 10.50	255.16	240.47	8.740	8 - 11.9	2.871	0.389	4.3
- 10.25	256.29	241.60	8.740	8 - 11.8	2.884	0.386	4.3
- 10.00	257.42	242.73	8.735	8 - 11.8	2.897	0.387	4.3
- 9.75	258.56	243.86	8.730	8 - 11.7	2.911	0.389	4.5
- 9.50	259.70	245.00	8.725	8 - 11.6	2.924	0.391	4.5
- 9.25	260.84	246.14	8.719	8 - 11.5	2.937	0.393	4.5

Table 1							
Temp Deg F	**Pressure**		**Liquid Density**		**Vapor Density**		**Vap Dis %**
	PSIA	**PSIG**	**lb/gal**	**(lb-oz)/gal**	**lb/cu ft**	**lb/gal**	
- 9.00	261.98	247.29	8.714	8 - 11.4	2.951	0.394	4.5
- 8.75	263.13	248.44	8.709	8 - 11.3	2.964	0.396	4.5
- 8.50	264.29	249.59	8.704	8 - 11.3	2.978	0.398	4.6
- 8.25	265.44	250.75	8.699	8 - 11.2	2.991	0.400	4.6
- 8.00	266.60	251.91	8.694	8 - 11.1	3.005	0.402	4.6
- 7.75	267.77	253.07	8.688	8 - 11.0	3.019	0.404	4.6
- 7.50	268.93	254.24	8.683	8 - 10.9	3.032	0.405	4.7
- 7.25	270.11	255.41	8.678	8 - 10.8	3.046	0.407	4.7
- 7.00	271.28	256.59	8.673	8 - 10.8	3.060	0.409	4.7
- 6.75	272.46	257.76	8.668	8 - 10.7	3.074	0.411	4.7
- 6.50	273.64	258.95	8.662	8 - 10.6	3.088	0.413	4.8
- 6.25	274.83	260.13	8.657	8 - 10.5	3.102	0.415	4.8
- 6.00	276.02	261.32	8.652	8 - 10.4	3.116	0.417	4.8
- 5.75	277.21	262.52	8.647	8 - 10.3	3.130	0.418	4.8
- 5.50	278.41	263.72	8.641	8 - 10.3	3.144	0.420	4.9
- 5.25	279.61	264.92	8.636	8 - 10.2	3.159	0.422	4.9
- 5.00	280.82	266.12	8.631	8 - 10.1	3.173	0.424	4.9
- 4.75	282.03	267.33	8.620	8 - 10.0	3.187	0.426	4.9
- 4.50	283.24	268.55	8.620	8 - 9.9	3.202	0.428	5.0
- 4.25	284.46	269.76	8.615	8- 9.8	3.216	0.430	5.0
- 4.00	285.68	270.98	8.610	8 - 9.8	3.231	0.442	5.0
- 3.75	286.90	272.21	8.604	8 - 9.4	3.245	0.444	5.0
- 4.50	288.13	273.44	8.599	8 - 9.6	3.260	0.440	5.1
- 3.25	289.37	274.67	8.594	8 - 9.5	3.275	0.448	5.[illegible]
- 3.00	290.60	275.91	8.589	8 - 9.4	3.289	0.440	5.1
- 2.75	291.84	277.15	8.583	8 - 9.9	3.304	0.442	5.[illegible]
- 2.50	293.09	278.39	8.578	8 - 9.2	3.3[illegible]4	0.444	5.2
- 2.25	294.33	279.64	8.573	8 - 9.2	3.334	0.446	5.2

Table 1

Temp Deg F	Pressure		Liquid Density		Vapor Density		Vap Dis %
	PSIA	PSIG	lb/gal	(lb-oz)/gal	lb/cu ft	lb/gal	
- 2.00	295.58	280.89	8.567	8 - 9.1	3.349	0.448	5.2
- 1.75	296.84	282.14	8.562	8 - 9.0	3.364	0.450	5.3
- 1.50	298.10	283.40	8.556	8 - 8.9	3.379	0.452	5.3
- 1.25	299.36	284.67	8.551	8 - 8.8	3.395	0.454	5.3
- 1.00	300.63	285.93	8.546	8 - 8.7	3.410	0.456	5.3
- 0.75	301.90	287.21	8.540	8 - 8.6	3.425	0.458	5.4
- 0.50	303.18	288.48	8.535	8 - 8.6	3.440	0.460	5.4
- 0.25	304.46	289.76	8.530	8 - 8.5	3.456	0.462	5.4
0.00	305.74	291.74	8.524	8 - 8.4	3.471	0.464	5.4
0.25	307.03	292.33	8.519	8 - 8.3	3.487	0.466	5.5
0.50	308.32	293.62	8.513	8 - 8.2	3.503	0.468	5.5
0.75	309.61	294.92	8.508	8 - 8.1	3.518	0.470	5.5
1.00	310.91	296.21	8.502	8 - 8.0	3.534	0.472	5.6
1.25	312.21	297.52	8.497	8 - 8.0	3.550	0.475	5.6
1.50	313.52	298.82	8.491	8 - 7.9	3.566	0.477	5.6
1.75	314.83	300.13	8.486	8 - 7.8	3.582	0.479	5.6
2.00	316.15	301.45	8.480	8 - 7.7	3.598	0.481	5.7
2.25	317.46	302.77	8.475	8 - 7.5	3.614	0.483	5.7
2.50	318.79	304.09	8.469	8 - 7.5	3.630	0.485	5.7
2.75	320.11	305.42	8.464	8 - 7.7	3.646	0.487	5.8
3.00	321.45	306.75	8.458	8 - 7.3	3.662	0.490	5.8
3.25	322.78	308.08	8.453	8 - 7.2	3.679	0.492	5.8
3.50	324.12	309.42	8.464	8 - 7.2	3.630	0.494	5.8
3.75	325.46	310.77	8.442	8 - 7.1	3.712	0.496	5.9
4.00	326.81	312.11	8.436	8 - 7.0	3.728	0.490	5.9
4.25	328.16	313.46	8.431	8 - 6.9	3.745	0.501	5.9
4.50	329.52	314.82	8.425	8 - 6.8	3.761	0.503	6.0
4.75	330.88	316.18	8.420	8 - 6.7	3.778	0.505	6.0

Table 1							
Temp Deg F	Pressure		Liquid Density		Vapor Density		Vap Dis %
	PSIA	PSIG	lb/gal	(lb-oz)/gal	lb/cu ft	lb/gal	
5.00	332.24	317.54	8.414	8 - 6.6	3.795	0.507	6.0
5.25	333.61	318.91	8.408	8 - 6.5	3.812	0.510	6.1
5.50	334.98	320.28	8.403	8 - 6.4	3.829	0.512	6.1
5.75	336.35	321.66	8.397	8 - 6.4	3.846	0.514	6.1
6.00	337.73	323.04	8.392	8 - 6.3	3.863	0.516	6.2
6.25	339.12	324.42	8.386	8 - 6.2	3.880	0.519	6.2
6.50	340.51	325.81	8.380	8 - 6.1	3.897	0.521	6.2
6.75	341.90	327.20	8.375	8 - 6.0	3.915	0.523	6.3
7.00	343.30	328.60	8.369	8 - 5.9	3.932	0.526	6.3
7.25	344.70	330.00	8.363	8 - 5.8	3.949	0.528	6.3
7.50	346.10	331.41	8.358	8 - 5.7	3.967	0.530	6.3
7.75	347.51	332.82	8.352	8 - 5.6	3.984	0.533	6.4
8.00	348.92	334.23	8.346	8 - 5.5	4.002	0.535	6.4
8.25	350.34	335.65	8.341	8 - 5.4	4.020	0.537	6.4
8.50	351.76	337.07	8.335	8 - 5.4	4.038	0.540	6.5
8.75	353.19	338.49	8.335	8-5.4	4.038	0.540	6.5
9.00	354.62	339.92	8.323	8 - 5.2	4.073	0.545	6.5
9.25	356.06	341.36	8.318	8 - 5.1	4.091	0.547	6.6
9.50	357.49	342.80	8.312	8 - 5.0	4.110	0.549	6.6
9.75	358.94	344.24	8.306	8 - 4.9	4.128	0.552	6.6
10.00	360.38	345.69	8.300	8 - 4.8	4.146	0.554	6.7
10.25	361.84	347.14	8.295	8 - 4.7	4.164	0.557	6.7
10.50	363.29	348.60	8.289	8 - 4.6	4.183	0.559	6.7
10.75	364.75	350.06	8.283	8 - 4.5	4.201	0.562	6.8
11.00	366.22	351.52	8.277	8 - 4.4	4.220	0.564	6.8
11.25	367.68	352.99	8.271	8 - 4.3	4.238	0.567	6.8
11.50	369.16	354.46	8.266	8 - 4.2	4.257	0.569	6.9

Table 1							
Temp Deg F	Pressure		Liquid Density		Vapor Density		Vap Dis %
	PSIA	PSIG	lb/gal	(lb-oz)/gal	lb/cu ft	lb/gal	
11.75	370.64	355.94	8.260	8 - 4.2	4.276	0.572	6.9
12.00	372.12	357.42	8.254	8 - 4.1	4.295	0.574	7.0
12.25	373.60	358.91	8.248	8 - 4.0	4.314	0.577	7.0
12.50	375.09	360.40	8.242	8 - 3.9	4.333	0.579	7.0
12.75	376.59	361.89	8.236	8 - 3.8	4.352	0.582	7.1
13.00	378.09	363.39	8.230	8 - 3.7	4.371	0.584	7.1
13.25	379.59	364.89	8.224	8 - 3.6	4.390	0.587	7.1
13.50	381.10	366.40	8.219	8 - 3.5	4.410	0.589	7.2
13.75	382.61	367.91	8.213	8 - 3.4	4.429	0.592	7.2
14.00	384.13	369.43	8.207	8 - 3.3	4.449	0.595	7.2
14.25	385.65	370.95	8.201	8 - 3.2	4.468	0.597	7.3
14.50	387.17	372.48	8.195	8 - 3.1	4.488	0.600	7.3
14.75	388.70	374.01	8.189	8 - 3.0	4.508	0.603	7.4
15.00	390.24	375.54	8.183	8 - 2.9	4.527	0.605	7.4
15.25	391.78	377.08	8.177	8 - 2.8	4.547	0.608	7.4
15.50	393.32	378.62	8.171	8 - 2.7	4.567	0.611	7.5
15.75	394.87	380.17	8.165	8 - 2.6	4.587	0.613	7.5
16.00	396.42	381.72	8.159	8 - 2.5	4.608	0.616	7.5
16.25	397.98	383.28	8.153	8 - 2.4	4.628	0.619	7.6
16.50	399.54	384.84	8.147	8 - 2.3	4.648	0.621	7.6
16.75	401.10	386.41	8.141	8 - 2.2	4.669	0.624	7.7
17.00	402.67	387.98	8.134	8 - 2.2	4.689	0.627	7.7
17.25	404.25	389.55	8.128	8 - 2.1	4.710	0.630	7.7
17.50	405.82	391.13	8.122	8 - 2.0	4.731	0.632	7.8
17.75	407.41	392.71	8.116	8 - 1.9	4.751	0.635	7.8
18.00	409.00	394.30	8.110	8 - 1.8	4.772	0.638	7.9
18.25	410.59	395.89	8.104	8 - 1.7	4.793	0.641	7.9

Table 1							
Temp Deg F	**Pressure**		**Liquid Density**		**Vapor Density**		**Vap Dis %**
	PSIA	**PSIG**	**lb/gal**	**(lb-oz)/gal**	**lb/cu ft**	**lb/gal**	
18.50	412.19	397.49	8.098	8 - 1.6	4.814	0.644	7.9
18.75	413.79	399.09	8.092	8 - 1.5	4.835	0.646	8.0
19.00	415.39	400.70	8.085	8 - 1.4	4.857	0.649	8.0
19.25	417.00	402.31	8.079	8 - 1.3	4.878	0.652	8.1
19.50	418.62	403.92	8.073	8 - 1.2	4.900	0.655	8.1
19.75	420.24	405.54	8.067	8 - 1.1	4.921	0.658	8.2
20.00	421.86	407.17	8.061	8 - 1.0	4.943	0.661	8.2

Appendix C (Item 356-1)
Sec. 5.56.(a) Grain Moisture Meters

Section 5.56 has been reorganized into two sections. This Section, 5.56(a), is applicable to all NTEP grain moisture meters. It is also applicable to any grain moisture meter manufactured or placed into service after January 1, 1998. [Code reorganized and renumbered 1996]

A. Application

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.

A.2. - This code does not apply to devices used for in-motion measurement of grain moisture content or seed moisture content.

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, 1998.~~ this code. State enforcement will be based upon the effective dates identified with each requirement when specific dates are shown.
(Added 1993)
(Note: Edited because the entire code is applicable to NTEP meters and meters manufactured or placed into service after January 1, 1998)

A.4. - See also Sec. 1.10; General Code requirements.

S. Specifications

S.1. Design of Indicating, ~~and~~ Recording ~~Elements~~, and ~~of Recorded Representations~~ Measuring Elements.

~~**S.1.1. Primary Elements, General.** - A meter shall be equipped with a primary indicating element and may also be equipped with a primary recording element. If the meter indicates directly and/or is equipped to record, the meter shall indicate and/or record its measurements in terms of percent moisture content, wet basis. {Subdivisions of this unit shall be in terms of decimal subdivisions (not fractions)}.~~ (NOTE: This portion in brackets {}, moved to new Section S.1.1(e)) ~~If the meter indicates in the conventional scale and requires conversion or correction tables, the resulting values after use of such tables shall be in terms of percent moisture content, wet basis. Subdivisions of this unit shall be in terms of decimal subdivisions (not fractions).~~

~~**S.1.2. Digital Indications.**~~

~~**S.1.2.1. Measurement Completion.** - A digital indicating element shall not display any values (either moisture content or conventional scale) before the end of the measurement cycle.~~
(Note: Old Section S.1.2 and S.1.2.1 removed, and covered in new Section S.1.1(d).)

~~**S.1.2.2**~~ **S.1.1. Digital Indications and Recording Elements.**

(a) Meters shall be equipped with a digital indicating element.

(b) The minimum height for the digits used to display moisture content shall be 10 mm.

(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, and calibration version identification.

(d) A digital indicating element shall not display, and a recording element shall not record, any moisture content values before the end of the measurement cycle.

(e) Moisture content results shall be displayed and recorded as percent moisture content, wet basis. Subdivisions of this unit shall be in terms of decimal subdivisions (not fractions).

(f) A meter shall not display or record any moisture content values when the moisture content of the grain sample is beyond the operating range of the device, unless the moisture representation includes a clear error indication (and recorded error message with the recorded representation).

(g) On multi-constituent meters (e.g., meters which also measure grain protein), provision shall be made for displaying and recording the constituent label (such as moist, protein, etc.) to make it clear which constituent is associated with each of the displayed and recorded values. (Added 1995)

(Added 1993)(Amended 1994 and 1995)
(Note: Section S.1.2.2 renumbered and moved to new Section S.1.1. New Section S.1.1(e) contains noted portion of old S.1.1)

✔ ~~S.1.6.1~~ S.1.2. **Grain or Seed Kind and Class Selection and Recording.** - Provision shall be made for selecting and recording~~, if equipped to record,~~ the kind and class (as appropriate) of grain or seed to be measured. The means to select the kind and class of grain or seed shall be readily visible and the kind and class of grain or seed selected shall be clearly and definitely identified.~~ in letters (such as Wheat or WHT, HRWW, etc.).~~ Meters ~~shall be capable~~ must have the capability of indicating the grain type using a minimum of four characters. Abbreviations for grain types indicated on the meter must meet the minimum acceptable abbreviations ~~are~~ listed in Table ~~S.1.6.1.~~ S.1.2.
(Amended 1993 and 1995)
(Note: Section S.1.6.1 renumbered to new Section S.1.2. See attached comments on editorial changes.)

~~S.1.3. Graduations.~~

~~S.1.3.1. Length. - Graduations shall be so varied in length that they may be conveniently read.~~

~~S.1.3.2. Width. - In any series of graduations, the width of a graduation shall in no case be greater than the width of the minimum clear interval between graduations, and the width of the main graduations shall be not more than 50 percent greater than the width of subordinate graduations. Graduations shall in no case be less than 0.2 mm (0.008 in) in width.~~

~~S.1.3.3. Clear Interval Between Graduations. - The clear interval shall be not less than 0.75 mm (0.03 in) between graduations. If the graduations are not parallel, the measurement shall be made:~~

~~(a) along the line of relative movement between the graduations at the end of the indicator, or~~

~~(b) if the indicator is continuous, at the point of widest separation of the graduations.~~

(Note: Old Section S.1.3 removed, and covered in Code 5.56(b), which is applicable to non-NTEP meters manufactured or placed into service before January 1, 1998.)

~~S.1.6.3.~~ 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:

(a) Temperature Range of the Meter
The temperature range over which the meter 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 moisture value may be displayed when the temperature range is exceeded. An appropriate error message shall be displayed when the temperature of the meter is outside its specified operating range.

(b) Temperature Range of each Grain or Seed
The temperature range for each grain or seed for which the meter is to be used shall be specified. The minimum temperature range for each grain shall be 0 °C to 40 °C. No moisture value may be displayed when the temperature range is exceeded. An appropriate error message shall be displayed when the temperature of the grain sample exceeds the specified temperature range for the grain.

(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 value may be displayed when the moisture range is exceeded if accompanied by a clear indication that the moisture range has been exceeded.

✔ (d) Maximum Allowable Meter/Grain Temperature Difference
The maximum allowable difference in temperature between the meter and the sample for which an accurate moisture determination can be made shall be specified. The minimum temperature difference shall be 10 °C. No moisture value may be displayed when the maximum allowable temperature difference is exceeded. An appropriate error message shall be displayed when the difference in temperature

between the meter and the sample exceeds the specified difference.
(Added 1993)(Amended 1995)

(Note: Section S.1.6.3 renumbered, titles added to each paragraph (a) - (d), and moved to new Section S.1.3. See additional comments on suggested sentence change for New section S.1.3(d).)

~~**S.1.4. Indicators.**~~

~~**S.1.4.1. Symmetry.** - The index of an indicator shall be symmetrical with respect to the graduations, at least throughout that portion of its length associated with the graduations.~~

~~**S.1.4.2. Length.** - The index of an indicator shall reach to the finest graduations with which it is used, unless the indicator and the graduations are in the same plane, in which case the distance between the end 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.1.4.3. Width.** - The width of the index of an indicator in relation to the series of graduations with which it is used shall be not greater than:~~

~~(a) the width of the widest graduation, nor~~

~~(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 as the graduation throughout the length of the index that coincides with the graduation.~~

~~**S.1.4.4. Clearance.** - The clearance between the index of an indicator and the graduations shall in no case be more than 1.5 mm (0.06 in).~~

~~**S.1.4.5. Parallax.** - Parallax effects shall be reduced to the practicable minimum.~~

(Note: Old Section S.1.4 removed, and covered in Code 5.56(b), which is applicable to non-NTEP meters manufactured or placed into service before January 1, 1998.)

✔ ~~**S.1.6.4**~~ **S.1.4.** ~~**Value of the Indications.**~~ Design of Measuring Elements. - The display shall permit constituent 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.

~~(a) The value of the minimum indicated or recorded moisture indication shall not be greater than 0.1 percent.~~

~~(b) For the purposes of type evaluation, the maximum value for the moisture indication shall be 0.01 percent.~~
(Added 1988) (Amended 1993 and 1995)

(Note: Section S.1.6.4 renumbered and moved to new Section S.1.4. with editorial changes. See attached comments on editorial changes.)

~~**S.1.5. Recording Elements.**~~

~~**S.1.5.1. General.** - If a meter is equipped with a recording element, it shall record in terms of percent moisture content, wet basis only, and not in terms of conventional scale.~~

~~**S.1.5.2. Measurement Completion.** - A recording element shall not record any values before the end of the measurement cycle.~~

~~**S.1.5.3. Range of Moisture Content.** - A recording element shall not record any values when the moisture content of the grain sample is beyond the operating range of the device.~~

(Note: Old Section S.1.5. removed; Covered in New Section S.1.1. d, e and f.)

✔ ~~**S.1.10.**~~ **S.1.5. Operating Temperature.**

(a) ~~A meter~~ warm up period: when a meter is turned on it shall not display or record any usable values until the operating temperature necessary for accurate determination has been attained, or the meter shall bear a conspicuous statement adjacent to the indication stating that the meter shall be turned on for a time period specified by the manufacturer prior to use.

(b) A meter shall meet the requirements of T.2. - Tolerance Values when operated in the temperature range of 10 °C to 30 °C (50 °F to 86 °F) or within the range specified by the meter manufacturer.

(c) If the manufacturer specifies a temperature range, the range shall be at least 20 °C (36 °F)~~ and shall be marked on the device.~~
(Added 1993)(Amended 1995)

(Note: Section S.1.10 renumbered and moved to new Section S.1.5. See additional comments on other proposed editorial changes.)

~~**S.1.6. Design of Direct Reading Grain Moisture Meters.**~~

~~**S.1.6.1 Grain or Seed Kind and Class Selection and Recording.** – Provision shall be made for selecting and recording, if equipped to record, the kind and class (as appropriate) of grain or seed to be measured. The means to select the kind and class of grain or seed shall be readily visible and the kind and class of grain or seed selected shall be clearly and definitely identified in letters (such as Wheat or WHT, HRWW, etc.).~~ ~~*Meters shall be capable of indicating the grain type using a minimum of four characters. Minimum acceptable abbreviations are listed in Table S.1.6.1. [Nonretroactive and effective as of January 1, 1998.]*~~
~~(Amended 1993 and 1995)~~

(Note: Section S.1.6 covered as new S.1. Section S.1.6.1 renumbered and moved to new Section S.1.2.)

~~*S.1.6.2. Operating Range. – A meter shall automatically and clearly indicate when the operating range of the meter has been exceeded or the manufacturer shall:*~~

~~*(a) clearly and conspicuously mark the operating ranges on the meter; or*~~

~~*(b) furnish the operating ranges of the meter and the means to clearly and conspicuously display this information on or immediately adjacent to the device.*~~

~~*The operating range shall specify the following:*~~

~~*(a) the temperature range over which the meter may be used and still comply with the applicable requirements;*~~

~~*(b) the moisture range for each grain or seed for which the meter is to be used;*~~

~~*(c) the temperature range for each grain or seed for which the meter is to be used; and*~~

~~*(d) the maximum allowable difference in temperature between the meter and the sample for which an accurate moisture determination can be made.*~~

~~*Examples of clearly indicating these conditions include an error indication, flashing the displayed moisture value, or blanking the display. [Nonretroactive as of January 1, 1989]*~~
~~(Amended 1986 and 1988)~~

(Note: Section S.1.6.2 removed and covered in Code 5.56(b), which is applicable to non-NTEP meters manufactured or placed into service before January 1, 1998)

~~**S.1.6.3. 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:*~~

~~*(a) The temperature range over which the meter 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 moisture value may be displayed when the temperature range is exceeded. An appropriate error message shall be displayed when the temperature of the meter is outside its specified operating range.*~~

~~*(b) The moisture range for each grain or seed for which the meter is to be used shall be specified. A moisture value may be displayed when the moisture range is exceeded if accompanied by a clear indication that the moisture range has been exceeded.*~~

~~*(c) The temperature range for each grain or seed for which the meter is to be used shall be specified. The minimum temperature range for each grain shall be 0 °C to 40 °C. No moisture value may be displayed when the temperature range is exceeded. An appropriate error message shall be displayed when the temperature of the grain sample exceeds the specified temperature range for the grain.*~~

~~*(d) The maximum allowable difference in temperature between the meter and the sample*~~

~~*for which an accurate moisture determination can be made shall be specified. The minimum temperature difference shall be 10 °C. No moisture value may be displayed when the maximum allowable temperature difference is exceeded. An appropriate error message shall be displayed when the difference in temperature between the meter and the sample exceeds the specified difference.*~~
~~*[Nonretroactive and effective as of January 1, 1998.]*~~
~~(Added 1993)(Amended 1995)~~
(Note: Section S.1.6.3. renumbered and moved to new Section S.1.3.)

~~**S.1.6.4 Value of Minimum Indication.**~~

~~(a) The value of the minimum indicated or recorded moisture indication shall not be greater than 0.1 percent.~~

~~*(b) For the purposes of type evaluation, the maximum value for the moisture indication shall be 0.01 percent.*~~
~~*[Nonretroactive and effective as of January 1, 1998.]*~~
~~(Added 1988) (Amended 1993 and 1995)~~
Note: (Section S.1.6.4. renumbered and moved to new Section S.1.4.)

~~**S.1.7 Electric Power Supply.**~~

~~**S.1.7.1. Power Supply, Voltage and Frequency.**~~

~~*(a) A meter that operates using alternating current must perform within the tolerances defined in Section T.2. Tolerance Values over the line voltage range 100 V to 130 V, or 200 V to 250 V rms as designed, and over the frequency range of 59.5 Hz to 60.5 Hz.*~~

~~*(b) Battery-operated instruments shall not indicate or record values outside the applicable tolerance limits when battery power output is excessive or deficient.*~~
~~*[Nonretroactive as of January 1, 1989]*~~

~~**S.1.7.2. Power Interruption.** *A power interruption shall not cause an indicating or recording element to display or record any values outside the applicable tolerance limits.*~~
~~*[Nonretroactive as of January 1, 1989]*~~

~~(Added 1988)~~
(Note: Section S.1.7, S.1.7.1., S.1.7.2., renumbered and moved to new Section S.2.2., S.2.2.1., S.2.2.2.)

~~**S.1.8 Level Indicating Means.** *A meter shall be equipped with a level indicator and leveling adjustments if its performance is changed by an amount greater than the applicable tolerance when the meter is moved from a level position to a position that is out of level in any upright direction by up to 5 percent (approximately 3 degrees).*~~

~~*The level-indicating means shall be readable without removing any meter parts requiring a tool.*~~
~~*[Nonretroactive as of January 1, 1989]*~~
~~(Added 1988) (Amended 1994)~~
(Note: Section S.1.8. renumbered and moved to new Section S.2.3.)

~~***S.1.9. Operating Temperature.***~~

~~*(a) A meter shall not display or record any usable values until the operating temperature necessary for accurate determination has been attained, or the meter shall bear a conspicuous statement adjacent to the indication stating that the meter shall be turned on for a time period specified by the manufacturer prior to use.*~~

~~*(b) A meter shall meet the requirements of T.2. Tolerance Values when operated in the temperature range of 2 °C to 40 °C (35 °F to 104 °F) or within the range specified by the meter manufacturer.*~~

~~*(c) If the manufacturer specifies a temperature range, the range shall be at least 10 °C (20 °F) and shall be marked on the device.*~~
~~*[Nonretroactive as of January 1, 1989]*~~
~~(Added 1988)~~
(Note: Section S.1.9 removed and covered in Code 5.56(b), which is applicable to non-NTEP meters manufactured or placed into service before January 1, 1998)

~~**S.1.10 Operating Temperature.**~~

~~*(a) A meter shall not display or record any usable values until the operating temperature necessary for accurate determination has been attained, or the meter shall bear a conspicuous statement adjacent to the indication stating that the meter*~~

~~*shall be turned on for a time period specified by the manufacturer prior to use.*~~

~~*(b) A meter shall meet the requirements of T.2. Tolerance Values when operated in the temperature range of 10 °C to 30 °C (50 °F to 86 °F) or within the range specified by the meter manufacturer.*~~

~~*(c) If the manufacturer specifies a temperature range, the range shall be at least 20 °C (36 °F) and shall be marked on the device.*~~

~~*[Nonretroactive and effective as of January 1, 1998.*~~

~~(Added 1993)(Amended 1995)~~

(Note: Section S.1.10 renumbered and moved to new Section S.1.5.)

~~**S.2 Design of Measuring Elements.**~~

~~**S.2.1. Design of Zero-Setting and Test Point Mechanisms.** - If a grain moisture meter is equipped with a zero setting and/or test point mechanism(s), this (these) mechanism(s) shall be adjustable only with a tool outside and entirely separate from this mechanism or enclosed in a cabinet. This requirement shall not apply to manual operations that the operator must make (following operating instructions) in order to obtain a meter reading on a grain sample.~~

~~**S.2.2. Provision for Sealing.** - Provision shall be made for applying a security seal in a manner that requires the security seal to be broken before an adjustment can be made to any component of the grain moisture meter that is set by the manufacturer or authorized service representative and not intended to be adjusted by the user.~~

(Note: Old Section S.2, S.2.1., S.2.2. removed, and covered in Code 5.56(b), which is applicable to non-NTEP meters manufactured or placed into service before January 1, 1998.)

~~**S.2.3 Provisions for Sealing.**~~

~~*a. Provision shall be made for applying a security seal in a manner that requires the security seal to be broken, or for using other approved means of providing security (e.g., audit trail available at the time of inspection as defined in part (b)), before any change that affects the metrological integrity of the device can be made to any mechanism.*~~

~~*b. If the operator is able to make changes that affect the metro logical integrity of the device (e.g., slope, bias, etc.) in normal operation, the device shall use an audit trail. The minimum form of the audit trail shall be an event logger and shall include:*~~

- ~~*An event counter (000 to 999),*~~
- ~~*the parameter ID,*~~
- ~~*the date and time of the change, and*~~
- ~~*the new value of the parameter (for calibration changes consisting of multiple constants, the calibration version number is to be used rather than the calibration constants.)*~~

~~*(Paragraph Added 1995)*~~

~~*The device is not required to display this information, but a printed copy of the information must be available through another on-site device. The event logger shall have a capacity to retain records equal to twenty-five (25) times the number of sealable parameters in the device, but not more than 1000 records are required. (Note: Does not require 1000 changes to be stored for each parameter.)*~~

~~*[Nonretroactive and effective as of January 1, 1998.]*~~

~~*[Note: Zero-setting and test point adjustments are considered to affect metro logical characteristics and must be sealed.]*~~

~~(Added 1993)(Amended 1995)~~

(Note: Old Section S.2.3. renumbered and moved to new S.2.5.)

~~**S.2.4 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.*~~

~~*[Non-retroactive as of January 1, 1998.]*~~

~~(Added 1994)(Amended 1995~~)

(Note: Old Section S.2.4. renumbered and moved to new Section S.2.6.)

S.2. Design of Grain Moisture Meters

~~*S.4.*~~ ***S.2.1. Minimum Sample Size.*** - Meters shall be designed to measure the moisture content of representative-size grain samples. The minimum allowable sample size used in analysis shall be 100 g or 400 kernels or seeds, whichever is smaller.

(Added 1993)(Amended 1995)

(Note: Old Section S.4 renumbered and moved to new Section S.2.1)

~~S.1.7.~~ S.2.2. Electric Power Supply.

~~S.1.7.1.~~ S.2.2.1. Power Supply, Voltage and Frequency.

(a) A meter that operates using alternating current must perform within the tolerances defined in Section T.2. - Tolerance Values over the line voltage range 100 V to 130 V, or 200 V to 250 V rms as designed, and over the frequency range of 59.5 Hz to 60.5 Hz.

(b) Battery-operated instruments shall not indicate or record values outside the applicable tolerance limits when battery power output is excessive or deficient.

~~S.1.7.2.~~ S.2.2.2. Power Interruption. - A power interruption shall not cause an indicating or recording element to display or record any values outside the applicable tolerance limits.
(Added 1988)
(Note: Section S.1.7, S.1.7.1, and S.1.7.2 renumbered and moved to S.2.2, S.2.2.1, and S.2.2.2.)

~~S.1.8.~~ S.2.3 Level Indicating Means. A meter shall be equipped with a level indicator and leveling adjustments if its performance is changed by an amount greater than the applicable tolerance when the meter is moved from a level position to a position that is out of level in any upright direction by up to 5 percent (approximately 3 degrees).

The level-indicating means shall be readable without removing any meter parts requiring a tool.
(Added 1988) (Amended 1994)
(Note: Section S.1.8 renumbered and moved to new Section S.2.3)

~~S.5.~~ S.2.4. Calibration Integrity

~~S.5.1.~~ 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 determinations.
(Added 1993)(Amended 1995)

~~S.5.2.~~ S.2.4.2. Calibration Corruption. - If calibration constants are digitally stored in an electronically alterable form, the meter shall be designed to make automatic checks to detect corruption of calibration constants. An error message must be displayed if calibration constants have been electronically altered.
(Added 1993)(Amended 1995)

~~S.5.3.~~ S.2.4.3. 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 adjustments on moisture meters and, except for instrument failure and repair, only at 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 his designated service agency.
(Added 1994)
(Note: Old Sections S.5, S.5.1, S.5.2, and S.5.3, renumbered and moved to new Sections S.2.4, S.2.4.1, S.2.4.2, and S.2.4.3)

~~S.2.3.~~ S.2.5. Provision for Sealing

(a) Provision shall be made for applying a security seal in a manner that requires the security seal to be broken, or for using other approved means of providing security (e.g., audit trail available at the time of inspection as defined in part (b)), before any change that affects the metrological integrity of the device can be made to any mechanism.

(b) If the operator is able to make changes that affect the metrological integrity of the device (e.g., slope, bias, etc.) in normal operation, the device shall use an audit trail. The minimum form of the audit trail shall be an event logger and shall include:

- An event counter (000 to 999),
- the parameter ID,
- the date and time of the change, and
- the new value of the parameter (for calibration changes consisting of multiple constants, the calibration version number is to be used rather than the calibration constants.)
(Paragraph Added 1995)

The device is not required to display this information, but a printed copy of the information must be available through another on-site device. The event logger shall have a capacity to retain records equal to twenty-five (25) times the number of sealable parameters in the device, but not more than 1000 records are required. (Note: Does not require 1000 changes to be stored for each parameter.)

[Note: Zero-setting and test point adjustments are considered to affect metrological characteristics and must be sealed.]
(Added 1993)(Amended 1995)
(Note: Old Section S.2.3 renumbered and moved to new Section S.2.5.)

~~S.2.4.~~ 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.
(Added 1994)(Amended 1995)
(Note: Old Section S.2.4 renumbered and moved to new Section S.2.6.)

S.3. **Accessory Equipment** - When the operating instructions for a moisture meter require accessory equipment separate from and external to the moisture meter, such equipment shall be appropriate and complete for the measurement.
(Note: No change to Section S.3)

~~S.3.1. Grain Test Scale. - If the moisture meter requires the weighing of the grain sample, the weighing device shall meet the requirements of the General Code and those applicable portions of the Scales Code.~~

✔ ~~S.3.2. Thermometers or Other Temperature Sensing Equipment. -~~

~~(a) The temperature sensing equipment or thermometer shall be designed to be in direct contact with a grain sample in a closed container. It is acceptable to insert thermometer through a small hole in the lid of the container used to hold the grain sample.~~

~~(b) A separate thermometer or other temperature sensing equipment shall have temperature divisions not greater than the temperature increments used by the manufacturer in the correction table.~~
~~(Amended 1988)~~

~~S.3.3. Conversion and Correction Tables. - Conversion and correction tables, charts, graphs, slide rules, or other apparatus to convert the conventional scale values read from a moisture meter to moisture content values, if such apparatus is required, shall be appropriate and correct for the moisture meter being used and shall be marked with the following information:~~

~~(a) name and address or trademark of the manufacturer;~~

~~(b) the type or design of the device with which it is intended to be used;~~

~~(c) date of issue;~~

~~(d) the kind or classes of grain or seed for which the device is designed to measure moisture content;~~

~~(e) the limitations of use, including but not confined to the moisture measurement range, grain or seed temperature, kind or class of grain or seed, moisture meter temperature, voltage and frequency ranges, electromagnetic interferences, and necessary accessory equipment; but~~

~~(f) values exceeding any measurement range shall not be included.~~
~~(Added 1984)~~

(Note: Section S.3.1, S.3.2, and S.3.3 removed and covered in Code 5.56(b), which is applicable to non-NTEP meters manufacturered or placed into service before January 1, 1998. Section S.3.3 (a - f) renumbered, edited and moved to new Section S.4. (a - e). See attached comments on editorial changes to S.3.2.)

~~S.3.4. Operating Instructions and Use Limitations. - Operating instructions shall be furnished by the manufacturer with each device with all of the information required by paragraph S.3.3. Complete information concerning the accuracy, sensitivity, and use of accessory equipment (e.g., test weight per bushel equipment, thermometer, etc.) necessary in obtaining a moisture content shall be included.~~
(Note: Old Section S.3.4 renumbered and moved to new Section S.4.)

~~S.4 Minimum Sample Size.~~ ~~*Meters shall be designed to measure the moisture content of representative size grain samples. The minimum allowable sample size used in analysis shall be 100 g or 400 kernels or seeds, whichever is smaller.*~~
~~*[Nonretroactive and effective as of January 1, 1998.]*~~
~~(Added 1993)(Amended 1995)~~

(Note: Old Section S.4 renumbered and moved to new Section S.2.1.)

~~S.3.4.~~ S.4. Operating Instructions and Use Limitations. - The manufacturer shall furnish operating instructions ~~shall be furnished by the manufacturer with each device with all of the information required by paragraph S.3.3.~~ for the device and accessories that include complete information concerning the accuracy, sensitivity, and use of accessory equipment ~~(e.g., test weight per bushel equipment, thermometer, etc.)~~ necessary in obtaining a moisture content ~~shall be included~~. Operating instructions shall include the following information:

(a) name and address or trademark of the manufacturer;

(b) the type or design of the device with which it is intended to be used;

(c) date of issue;

(d) the kind or classes of grain or seed for which the device is designed to measure moisture content;

✔(e) the limitations of use, including but not confined to the moisture measurement 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.~~;~~ ~~but~~

~~(f) values exceeding any measurement range shall not be included.~~

(Added 1984)

(Note: Old Section S.3.4 renumbered and moved to new Section S.4. Old Section S.3.3(a - f) renumbered, edited and moved to new Section S.4(a - e).) Section S.4(f) removed and covered in Code 5.56(b) which is applicable to moisture meters manufactured and placed into service before January 1, 1998. This Section relates to meters used with charts and corrections.)

~~***S.5. Calibration Integrity.***~~

~~***S.5.1. 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 determinations.*~~

~~*[Nonretroactive and effective as of January 1, 1998.]*~~

~~(Added 1993)(Amended 1995)~~

~~***S.5.2. Calibration Corruption.*** *- If calibration constants are digitally stored in an electronically alterable form, the meter shall be designed to make automatic checks to detect corruption of calibration constants. An error message must be displayed if calibration constants have been electronically altered.*~~

~~*[Nonretroactive and effective as of January 1, 1998.]*~~

~~(Added 1993)(Amended 1995)~~

~~**S.5.3. 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 adjustments on moisture meters and, except for instrument failure and repair, only at 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 his designated service agency.~~

~~(Added 1994)~~

(Note: Old S.5, S.5.1, S.5.2, S.5.3 renumbered and moved to new Section S.2.4, S.2.4.1, S.2.4.2, and S.2.4.3)

[1] The U.S. Department of Agriculture, ~~Federal Grain Inspection Service (FGIS)~~ 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. The ~~FGIS~~ GIPSA uses a hierarchical series of meter-to-meter intercomparisons to determine whether its field meters are operating within acceptable tolerances ($\pm 0.2\%$ with respect to standard meters). It has been shown that field meters checked by ~~FGIS~~ GIPSA procedures perform within H-44 maintenance tolerances (T.2.) when tested (N.1.) using official grain samples. 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.

N. Notes

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).
(Amended 1992)

N.1.2. Minimum Test.[1 (see next page)] - 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.

(Amended 1986, 1989)
(Note: No changes to Section N.1, N.1.1, and N.1.2)

~~**N.1.3. Temperature Measuring Equipment.** - The accuracy of accessory temperature measuring equipment shall be determined by comparison with a calibrated temperature sensor, such as a total immersion thermometer with 0.1 °C (0.2 °F) subdivisions, indicating over a range of from 0 °C to 40 °C (32 °F to 104 °F) with a maximum error of ±0.1 °C (0.2 °F). Tests shall be conducted at two temperatures using liquid baths (e.g., ice water and room temperature water). The two temperatures selected shall not exceed the range of temperatures identified in the moisture meter operating instructions.~~
~~(Amended 1988)~~
(Note: Section N.1.3 removed, and covered in Code 5.56(b) which is applicable to non-NTEP meters manufactured or placed into service before January 1, 1998.)

T. Tolerances[2]

T.1. To Underregistration and to Overregistration. - The tolerances hereinafter prescribed shall be applied to errors of under registration and errors of overregistration.

T.2. Tolerance Values. - Maintenance and acceptance tolerances shall be as shown in Table T.2. Tolerances are expressed as a fraction of the percent moisture content of the official grain sample, together with a minimum tolerance.

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 ~~FGIS~~ GIPSA.
(Amended 1992)
(Note: No change to Section T.1, T.2. Section T.3 edited to reflect change in agency name.)

~~**T.4. Thermometers or Other Temperature Sensing Equipment.** - The tolerance for a separate thermometer or temperature sensing equipment used to determine the temperature of grain samples for the purpose of making temperature corrections in moisture determinations shall be ±0.5 °C (1 °F).~~
~~(Added 1988)~~
(Note: Section T.4 removed, and covered in Code 5.56(b), which is applicable to non-NTEP meters manufacturered or placed into service before January 1, 1998.)

UR. User Requirements

UR.1. Selection Requirements.

✔ **UR.1.1. Value of the Smallest Unit on Primary Indicating and Recording Elements.** - The value of the smallest unit on a moisture meter, whether the moisture meter reads directly in terms of moisture content, or when the conventional scale unit is converted or corrected to moisture content, shall be equal to or less than ~~one-half the value of the minimum acceptance tolerance.~~ 0.1 percent

Display Resolution - the resolution of the moisture meter display shall be 0.1 percent moisture during commercial use.
(Note: Section UR.1.1 edited. See attached comments on editorial changes.)

UR.1.2. See G-UR.1.2.

UR.2. Installation Requirements. - The grain moisture meter shall be installed in an environment within the range of temperature and/or other environmental factors specified ~~(a)~~ in the operating ~~manual~~ instructions.~~, and (b) on the~~

~~conversion or correction tables if such tables are necessary for the operation of the device.~~
(Note: Section UR.2(b) removed, covered in Code 5.56(b), which is applicable to non-NTEP manufacturered or placed into service before January 1, 1998.)

UR.3. Use Requirements.

UR.3.1. Operating Instructions. - The operating instructions for the use of the grain moisture meter 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 ~~, conversion charts if any are required to obtain moisture content values,~~ and the kinds of grain or seed to be measured with the moisture meter.
(Amended 1988)
(Note: Strickout portion of Section UR.3.1 removed, covered in Code 5.56(b), which is applicable to non-NTEP meters manufactured or placed into service before January 1, 1998.)

UR.3.2. Other Devices not used for Commercial Measurement. - If there are other moisture meters 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.3.3. Maintaining Integrity of Grain Samples. - - Whenever there is a time lapse (temperature change) between taking the sample and testing the sample, means to prevent condensation of moisture or loss of moisture from grain samples shall be used. For example, a cold grain sample may be kept in a closed container in order to permit the cold grain to come to the operating temperature range of the meter before the grain moisture measurements are made.

UR.3.4. Printed Tickets.

(a) Printed tickets shall be free from any previous indication of moisture content or type of grain or seed selected.

(b) The customer shall be given a printed ticket showing the date, grain type, grain moisture results, and calibration version identification. The ticket shall be generated by the grain moisture meter system.
(Amended 1993 and 1995)

UR.3.5. Accessory Devices. - Accessory devices, if necessary in the determination of a moisture content value, shall be in close proximity to the moisture meter and allow immediate use.

UR.3.6. Sampling. - A grain sample 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 grain sample shall be taken such that it is representative of the lot.

UR.3.7. Location. - See G-UR.3.3.

UR.3.8. Level Condition. - If equipped with a level indicator, a meter shall be maintained in a level condition.
(Added 1988)
(Note: No change to Sections UR.3.2. through UR.3.8.)

✔ ~~**UR.3.9. Operating Limitation.** - Unless otherwise specified by the meter manufacturer, moisture determinations shall not be made when the difference in temperatures between the grain sample and the meter exceeds 10 °C (20 °F). (Added 1988)~~
(Note: Section UR.3.9 removed, covered in Code 5.56(b), applicable to non-NTEP meters manufactured or placed into service before January 1, 1998. Section S.1.3(d) of the new code states this requirement for NTEP meters. See attached comments on editorial changes.)

~~**UR.3.10.**~~ **UR.3.9. Current Calibration** ~~**Chart or**~~ **Data.** - Grain moisture determinations shall be made using only the most recently published ~~calibration charts or~~ calibration data.
(Added 1988)
(Note: Section UR.3.10. Renumbered and edited as UR.3.9.)

~~**UR.3.11.**~~ **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:

(a) The temperature range over which the meter may be used and still comply with the applicable

[2] These tolerances do not apply to tests in which grain moisture meters are the transfer standards.

requirements. If the temperature range varies for different grains or seed, the range shall be specified for each.

(b) The moisture range for each grain or seed for which the meter is to be used.

(c) The temperature range for each grain or seed for which the meter is to be used.

(d) The maximum allowable difference in temperature that may exist between the meter and the sample for which an accurate moisture determination can be made. (Added 1988)

(Note: Section UR.3.11 renumbered as UR.3.10)

Table ~~S.1.6.1.~~ S.1.2. Grain Types Considered for Type Evaluation and Calibration and Minimum Acceptable Abbreviations			
Grain Type	*Minimum Acceptable Abbreviation*	*Grain Type*	*Minimum Acceptable Abbreviation*
Corn	*CORN*	*Soybeans*	*SOYB*
Durum Wheat *Eastern White Wheat* *Western White Wheat* *Hard Red Spring Wheat* *Hard Red Winter Wheat* *Soft Red Winter Wheat* *Hard White Wheat*	*DURW* *EWW* *WWW* *HRSW* *HRWW* *SRWW* *HDWW*	*Two-rowed Barley* *Six-rowed Barley* *Oats*	*TRB* *SRB* *OATS*
Sunflower seed (Oil)	*SUNF*	*Long Grain Rough Rice* *Medium Grain Rough Rice*	*LGRR* *MGRR*
Grain Sorghum	*SORG* or *MILO*	*Small oil seeds (under consideration)*	

(Table Added 1993)
(Note: Table S.1.6.1 renumbered as S.1.2 to reflect change in numbering of the Code)

Table T.2. Acceptance and Maintenance Tolerances for Grain Moisture Meters		
Type of grain or 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

Appendix D (Item 356-1)
Sec. 5.56.(b) Grain Moisture Meters

<u>Section 5.56 has been reorganized into two Sections. This Section, 5.56(b) is applicable to all non-NTEP grain moisture meters manufactured or placed into service before January 1, 1998. [Code reorganized and renumbered 1996]</u>

A. Application

A.1. - This code applies to grain moisture meters; that is, devices used to indicate directly or through conversion and/or correction tables 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.

A.2. - This code does not apply to devices used for in-motion measurement of grain moisture content or seed moisture content.
(Note: No change to Section A.1 or A.2.)

~~A.3. - 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, 1998. State enforcement will be based upon the effective dates identified with each requirement when specific dates are shown.~~
~~(Added 1993)~~
(Note: Old Section A.3 removed, and covered in Code 5.56(a), which is applicable to NTEP meters and meters manufactured or placed into service after January 1, 1998.)

~~A.4.~~ <u>A.3.</u> - See also Sec. 1.10; General Code requirements.
(Note: Section A.4 renumbered as A.3)

S. Specifications

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

S.1.1. Primary Elements, General. - A meter shall be equipped with a primary indicating element and may also be equipped with a primary recording element. If the meter indicates directly and/or is equipped to record, the meter shall indicate and/or record its measurements in terms of percent moisture content, wet basis. Subdivisions of this unit shall be in terms of decimal subdivisions (not fractions). If the meter indicates in the conventional scale and requires conversion or correction tables, the resulting values after use of such tables shall be in terms of percent moisture content, wet basis. Subdivisions of this unit shall be in terms of decimal subdivisions (not fractions).

S.1.2. Digital Indications.

S.1.2.1. Measurement Completion. - A digital indicating element shall not display any values (either moisture content or conventional scale) before the end of the measurement cycle.
(Note: No change to Section S.1, S.1.1, S.1.2, S.1.2.1.)

~~*S.1.2.2. Digital Indications and Recording Elements.*~~

~~*(a) Meters shall be equipped with a digital indicating element.*~~

~~*(b) The minimum height for the digits used to display moisture content shall be 10 mm.*~~

~~*(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, and calibration version identification.*~~

~~*(d) A digital indicating element shall not display, and a recording element shall not record, any moisture content values before the end of the measurement cycle.*~~

~~*(e) Moisture content results shall be displayed and recorded as percent moisture content, wet basis.*~~

~~*(f) A meter shall not display or record any moisture content values when the moisture content of the grain sample is beyond the operating range of the device, unless the moisture representation includes a clear error indication (and recorded error message with the recorded representation).*~~

~~*(g) On multi-constituent meters (e.g., meters which also measure grain protein), provision shall be made for displaying and recording the constituent label (such as moist, prot, etc.) to make it clear*~~

~~which constituent is associated with each of the displayed and recorded values.~~
~~[Nonretroactive and effective January 1, 1998]~~
~~(Added 1993) (Amended 1994 and 1995)~~
(Note: Section S.1.2.2. removed, and covered in Code 5.56(a), which is applicable to NTEP meters manufactured or placed into service after January 1, 1998.)

S.1.3. Graduations.

S.1.3.1. Length. - Graduations shall be so varied in length that they may be conveniently read.

S.1.3.2. Width. - In any series of graduations, the width of a graduation shall in no case be greater than the width of the minimum clear interval between graduations, and the width of the main graduations shall be not more than 50 percent greater than the width of subordinate graduations. Graduations shall in no case be less than 0.2 mm (0.008 in) in width.

S.1.3.3. Clear Interval Between Graduations. - The clear interval shall be not less than 0.75 mm (0.03 in) between graduations. If the graduations are not parallel, the measurement shall be made:

(a) along the line of relative movement between the graduations at the end of the indicator, or

(b) if the indicator is continuous, at the point of widest separation of the graduations.

(Note: No change to Section S.1.3)

S.1.4. Indicators.

S.1.4.1. Symmetry. - The index of an indicator shall be symmetrical with respect to the graduations, at least throughout that portion of its length associated with the graduations.

S.1.4.2. Length. - The index of an indicator shall reach to the finest graduations with which it is used, unless the indicator and the graduations are in the same plane, in which case the distance between the end 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.1.4.3. Width. - The width of the index of an indicator in relation to the series of graduations with which it is used shall be not greater than:

(a) the width of the widest graduation, nor

(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 as the graduation throughout the length of the index that coincides with the graduation.

S.1.4.4. Clearance. - The clearance between the index of an indicator and the graduations shall in no case be more than 1.5 mm (0.06 in).

S.1.4.5. Parallax. - Parallax effects shall be reduced to the practicable minimum.
(Note: No change to Section S.1.4)

S.1.5. Recording Elements.

S.1.5.1. General. - If a meter is equipped with a recording element, it shall record in terms of percent moisture content, wet basis only, and not in terms of conventional scale.

S.1.5.2. Measurement Completion. - A recording element shall not record any values before the end of the measurement cycle.

S.1.5.3. Range of Moisture Content. - A recording element shall not record any values when the moisture content of the grain sample is beyond the operating range of the device.
(Note: No change to Section S.1.5.)

S.1.6. Design of Direct Reading Grain Moisture Meters.

S.1.6.1. Grain or Seed Kind and Class Selection and Recording. - Provision shall be made for selecting and recording, if equipped to record, the kind and class (as appropriate) of grain or seed to be measured. The means to select the kind and class of grain or seed shall be readily visible and the kind and class of grain or seed selected shall be clearly and definitely identified in letters (such as Wheat or WHT, HRWW, etc.). ~~Meters shall be capable of indicating the grain type using a minimum of four characters. Minimum acceptable abbreviations are listed in Table S.1.6.1.~~

(Note: Strikeout text in Section S.1.6.1 removed, and covered in Code 5.56(a), which is applicable to NTEP meters and meters manufactured or placed into service after January 1, 1998.)

*S.1.6.2. **Operating Range.** - A meter shall automatically and clearly indicate when the operating range of the meter has been exceeded or the manufacturer shall:*

(a) clearly and conspicuously mark the operating ranges on the meter; or

(b) furnish the operating ranges of the meter and the means to clearly and conspicuously display this information on or immediately adjacent to the device.

The operating range shall specify the following:

(a) the temperature range over which the meter may be used and still comply with the applicable requirements;

(b) the moisture range for each grain or seed for which the meter is to be used;

(c) the temperature range for each grain or seed for which the meter is to be used; and

(d) the maximum allowable difference in temperature between the meter and the sample for which an accurate moisture determination can be made.

Examples of clearly indicating these conditions include an error indication, flashing the displayed moisture value, or blanking the display. [Nonretroactive as of January 1, 1989]

(Amended 1986 and 1988)

(Note: No change in Section S.1.6.2.)

~~*S.1.6.3. 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.*~~

~~*(a) The temperature range over which the meter 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 moisture value may be displayed when the temperature range is exceeded. An appropriate error message shall be displayed when the temperature of the meter is outside its specified operating range.*~~

~~*(b) The moisture range for each grain or seed for which the meter is to be used shall be specified. A moisture value may be displayed when the moisture range is exceeded if accompanied by a clear indication that the moisture range has been exceeded.*~~

~~*(c) The temperature range for each grain or seed for which the meter is to be used shall be specified. The minimum temperature range for each grain shall be 0 °C to 40 °C. No moisture value may be displayed when the temperature range is exceeded. An appropriate error message shall be displayed when the temperature of the grain sample exceeds the specified temperature range for the grain.*~~

~~*(d) The maximum allowable difference in temperature between the meter and the sample for which an accurate moisture determination can be made shall be specified. The minimum temperature difference shall be 10 °C. No moisture value may be displayed when the maximum allowable temperature difference is exceeded. An appropriate error message shall be displayed when the difference in temperature between the meter and the sample exceeds the specified difference.*~~

~~*Nonretroactive and effective as of January 1, 1998*~~

~~*(Added 1993) (Amended 1995)*~~

(Note: Old Section S.1.6.3 removed, and covered in Code 5.56(a), which is applicable to NTEP meters and meters manufactured or placed into service after January 1, 1998.)

~~S.1.6.4.~~ S.1.6.3. Value of Minimum Indication.

(a) The value of the minimum indicated or recorded moisture indication shall not be greater than 0.1 percent.

~~*(b) For the purposes of type evaluation, the maximum value for the moisture indication shall be 0.01 percent.*~~

~~*[Nonretroactive and effective as of January 1, 1998.]*~~

(Added 1988) (Amended 1993 and 1995)

(Note: Section S.1.6.4 renumbered as new Section S.1.6.3. Part (b) removed and covered in Code

5.56(a), which is applicable to NTEP meters and meters manufactured or placed into service after January 1, 1998.)

S.1.7. Electric Power Supply.

S.1.7.1. Power Supply, Voltage and Frequency.

(a) A meter that operates using alternating current must perform within the tolerances defined in Section T.2. - Tolerance Values over the line voltage range 100 V to 130 V, or 200 V to 250 V rms as designed, and over the frequency range of 59.5 Hz to 60.5 Hz.

(b) Battery-operated instruments shall not indicate or record values outside the applicable tolerance limits when battery power output is excessive or deficient.
[Nonretroactive as of January 1, 1989]

***S.1.7.2. Power Interruption.** - A power interruption shall not cause an indicating or recording element to display or record any values outside the applicable tolerance limits.*
[Nonretroactive as of January 1, 1989]
(Added 1988)
(Note: No change to Section S.1.7.)

***S.1.8. Level Indicating Means.** A meter shall be equipped with a level indicator and leveling adjustments if its performance is changed by an amount greater than the applicable tolerance when the meter is moved from a level position to a position that is out of level in any upright direction by up to 5 percent (approximately 3 °).*

The level-indicating means shall be readable without removing any meter parts requiring a tool.
[Nonretroactive as of January 1, 1989]
(Added 1988) (Amended 1994)
(Note: No change to Section S.1.8.)

S.1.9. Operating Temperature.

(a) A meter shall not display or record any usable values until the operating temperature necessary for accurate determination has been attained, or the meter shall bear a conspicuous statement adjacent to the indication stating that the meter shall be turned on for a time period specified by the manufacturer prior to use.

(b) A meter shall meet the requirements of T.2. - Tolerance Values when operated in the temperature range of 2 °C to 40 °C (35 °F to 104 °F) or within the range specified by the meter manufacturer.

(c) If the manufacturer specifies a temperature range, the range shall be at least 10 °C (20 °F) and shall be marked on the device.
[Nonretroactive as of January 1, 1989]
(Added 1988)
(Note: No change to Section S.1.9.)

~~*S.1.10. Operating Temperature.*~~

~~*(a) A meter shall not display or record any usable values until the operating temperature necessary for accurate determination has been attained, or the meter shall bear a conspicuous statement adjacent to the indication stating that the meter shall be turned on for a time period specified by the manufacturer prior to use.*~~

~~*(b) A meter shall meet the requirements of T.2. - Tolerance Values when operated in the temperature range of 10 °C to 30 °C (50 °F to 86 °F) or within the range specified by the meter manufacturer.*~~

~~*(c) If the manufacturer specifies a temperature range, the range shall be at least 20 °C (36 °F) and shall be marked on the device.*~~
~~*[Nonretroactive and effective as of January 1, 1998.*~~
~~(Added 1993)(Amended 1995~~)
(Note: Section S.1.10 removed and covered in Code 5.56(a), which is applicable to NTEP meters and meters manufactured or placed into service after January 1, 1998.)

S.2. Design of Measuring Elements.

S.2.1. Design of Zero-Setting and Test Point Mechanisms. - If a grain moisture meter is equipped with a zero setting and/or test point mechanism(s), this (these) mechanism(s) shall be adjustable only with a tool outside and entirely separate from this mechanism or enclosed in a cabinet. This requirement shall not apply to manual operations that the operator must make (following operating instructions) in order to obtain a meter reading on a grain sample.

S.2.2. Provision for Sealing. - Provision shall be made for applying a security seal in a manner that requires the security seal to be broken before an adjustment can be made to any component of the grain moisture meter that is set by the manufacturer or authorized service representative and not intended to be adjusted by the user.

(Note: No change to Section S.2, S.2.1, and S.2.2)

~~*S.2.3. Provision for Sealing*~~

~~*(a) Provision shall be made for applying a security seal in a manner that requires the security seal to be broken, or for using other approved means of providing security (e.g., audit trail available at the time of inspection as defined in part (b)), before any change that affects the metrological integrity of the device can be made to any mechanism.*~~

~~*(b) If the operator is able to make changes that affect the metrological integrity of the device (e.g., slope, bias, etc.) in normal operation, the device shall use an audit trail. The minimum form of the audit trail shall be an event logger and shall include:*~~

- ~~*An event counter (000 to 999),*~~
- ~~*the parameter ID,*~~
- ~~*the date and time of the change, and*~~
- ~~*the new value of the parameter (for calibration changes consisting of multiple constants, the calibration version number is to be used rather than the calibration constants.)*~~

~~*(Paragraph Added 1995)*~~

~~*The device is not required to display this information, but a printed copy of the information must be available through another on-site device. The event logger shall have a capacity to retain records equal to twenty-five (25) times the number of sealable parameters in the device, but not more than 1000 records are required. (Note: Does not require 1000 changes to be stored for each parameter.)*~~

~~*[Nonretroactive and effective as of January 1, 1998.]*~~

~~*[Note: Zero-setting and test point adjustments are considered to affect metrological characteristics and must be sealed.]*~~

~~(Added 1993)(Amended 1995)~~

(Note: Section S.2.3 removed and covered in Code 5.56(a), which is applicable to NTEP meters and meters manufactured or placed into service after January 1, 1998.)

~~*S.2.4. 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.*~~

~~*[Non-retroactive as of January 1, 1998.]*~~

~~(Added 1994)(Amended 1995)~~

(Note: Section S.2.4 removed and covered in Code 5.56(a), which is applicable to NTEP meters and meters manufactured or placed into service after January 1, 1998.)

S.3. Accessory Equipment. - When the operating instructions for a moisture meter require accessory equipment separate from and external to the moisture meter, such equipment shall be appropriate and complete for the measurement.

S.3.1. Grain-Test Scale. - If the moisture meter requires the weighing of the grain sample, the weighing device shall meet the requirements of the General Code and those applicable portions of the Scales Code.

S.3.2. Thermometers or Other Temperature Sensing Equipment. -

(a) The temperature sensing equipment or thermometer shall be designed to be in direct contact with a grain sample in a closed container. It is acceptable to insert thermometer through a small hole in the lid of the container used to hold the grain sample.

(b) A separate thermometer or other temperature sensing equipment shall have temperature divisions not greater than the temperature increments used by the manufacturer in the correction table.

(Amended 1988)

S.3.3. Conversion and Correction Tables. - Conversion and correction tables, charts, graphs, slide rules, or other apparatus to convert the conventional scale values read from a moisture meter to moisture content values, if such apparatus is required, shall be appropriate and correct for the moisture meter being used and shall be marked with the following information:

(a) name and address or trademark of the manufacturer;

(b) the type or design of the device with which it is intended to be used;

(c) date of issue;

(d) the kind or classes of grain or seed for which the device is designed to measure moisture content;

(e) the limitations of use, including but not confined to the moisture measurement range, grain or seed temperature, kind or class of grain or seed, moisture meter temperature, voltage and frequency ranges, electromagnetic interferences, and necessary accessory equipment; but

(f) values exceeding any measurement range shall not be included.

(Added 1984)

S.3.4. Operating Instructions and Use Limitations. - Operating instructions shall be furnished by the manufacturer with each device with all of the information required by paragraph S.3.3. Complete information concerning the accuracy, sensitivity, and use of accessory equipment (e.g., test weight per bushel equipment, thermometer, etc.) necessary in obtaining a moisture content shall be included.

(Note: No change to Section S.3.)

~~*S.4. Minimum Sample Size. - Meters shall be designed to measure the moisture content of representative-size grain samples. The minimum allowable sample size used in analysis shall be 100 g or 400 kernels or seeds, whichever is smaller.*~~

~~*[Nonretroactive and effective as of January 1, 1998.]*~~

~~(Added 1993)(Amended 1995)~~

(Note: Section S.4 removed and covered in Code 5.56(a), which is applicable to NTEP meters and meters manufactured or placed into service after January 1, 1998.)

~~*S.5. Calibration Integrity*~~

~~*S.5.1. 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 determinations.*~~

~~*[Nonretroactive and effective as of January 1, 1998.]*~~

~~(Added 1993)(Amended 1995)~~

~~*S.5.2. Calibration Corruption. - If calibration constants are digitally stored in an electronically alterable form, the meter shall be designed to make automatic checks to detect corruption of calibration constants. An error message must be displayed if calibration constants have been electronically altered.*~~

~~*[Nonretroactive and effective as of January 1, 1998.]*~~

~~(Added 1993)(Amended 1995)~~

~~**S.5.3. 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.~~

~~(Amended 1993)~~

~~Note: Only the manufacturer or the manufacturer's designated service agency may make calibration transfer adjustments on moisture meters and, except for instrument failure and repair, only at 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 his designated service agency.~~

~~(Added 1994)~~

(Note: Section S.5 removed and covered in Code 5.56(a), which is applicable to NTEP meters and meters manufactured or placed into service after January 1, 1998.)

N. Notes

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 FGIS. 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 [see next page]] - 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.

(Amended 1986, 1989)

N.1.3. Temperature Measuring Equipment. - The accuracy of accessory temperature measuring equipment shall be determined by comparison with a calibrated temperature sensor, such as a total immersion thermometer with 0.1 °C (0.2 °F) subdivisions, indicating over a range of from 0 °C to 40 °C (32 °F to 104 °F) with a maximum error of ±0.1 °C (0.2 °F). Tests shall be conducted at two temperatures using liquid baths (e.g., ice water and room temperature water). The two temperatures selected shall not exceed the range of temperatures identified in the moisture meter operating instructions.
(Amended 1988) (Note: No change to Section N.1.)

T. Tolerances[2]

T.1. To Underregistration and to Overregistration. - The tolerances hereinafter prescribed shall be applied to errors of under registration and errors of overregistration.

T.2. Tolerance Values. - Maintenance and acceptance tolerances shall be as shown in Table T.2. Tolerances are expressed as a fraction of the percent moisture content of the official grain sample, together with a minimum tolerance.

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 ~~FGIS~~ GIPSA.
(Amended 1992)

T.4. Thermometers or Other Temperature Sensing Equipment.- The tolerance for a separate thermometer or temperature sensing equipment used to determine the temperature of grain samples for the purpose of making temperature corrections in moisture determinations shall be ±0.5 °C (1 °F). (Added 1988) (Note: No change to Section T.1, T.2, T.4. Section T.3 edited to reflect a change in agency name.)

UR. User Requirements

UR.1. Selection Requirements.

✔ **UR.1.1. Value of the Smallest Unit on Primary Indicating and Recording Elements.** - The value of the smallest unit on a moisture meter, whether the moisture meter reads directly in terms of moisture content, or when the conventional scale unit is converted or corrected to moisture content, shall be equal to or less than one-half the value of the minimum acceptance tolerance.
(Note: See additional comments on Section UR.1.1.)

UR.1.2. See G-UR.1.2.
(Note: No change to Section UR.1.2.)

UR.2. Installation Requirements. - The grain moisture meter shall be installed in an environment within the range of temperature and/or other environmental factors specified (a) in the operating manual, and (b) on the conversion or correction tables if such tables are necessary for the operation of the device.
(Note: No change to Section UR.2.)

UR.3. Use Requirements.

UR.3.1. Operating Instructions. - The operating instructions for the use of the grain moisture meter 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, conversion and correction charts if any are required to obtain moisture content values, and the kinds of grain or seed to be measured with the moisture meter.
(Amended 1988)

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[1] The U.S. Department of Agriculture, ~~Federal Grain Inspection Service (FGIS)~~ Grain Inspection, Packers and Stockyard 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. The ~~FGIS~~ 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 ~~FGIS~~ GIPSA procedures perform within H-44 maintenance tolerances (T.2.) when tested (N.1.) using official grain samples. 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.

[2] These tolerances do not apply to tests in which grain moisture meters are the transfer standards.

UR.3.2. Other Devices not used for Commercial Measurement. - If there are other moisture meters 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.3.3. Maintaining Integrity of Grain Samples. - - Whenever there is a time lapse (temperature change) between taking the sample and testing the sample, means to prevent condensation of moisture or loss of moisture from grain samples shall be used. For example, a cold grain sample may be kept in a closed container in order to permit the cold grain to come to the operating temperature range of the meter before the grain moisture measurements are made.
(Note: No change to Section UR.3, UR.3.1, UR.3.2, and UR.3.3.)

UR.3.4. Printed Tickets.

(a) Printed tickets shall be free from any previous indication of moisture content or type of grain or seed selected.

~~(b) The customer shall be given a printed ticket showing the date, grain type, grain moisture results, and calibration version identification. The ticket shall be generated by the grain moisture meter system. [Nonretroactive and effective as of January 1, 1998.]~~
~~(Amended 1993 and 1995)~~
(Note: No change to Section UR.3.4(a). Section UR.3.4(b) removed and covered in Code 5.56(a), which is applicable to NTEP meters and meters manufactured or placed into service after January 1, 1998.)

UR.3.5. Accessory Devices. - Accessory devices, if necessary in the determination of a moisture content value, shall be in close proximity to the moisture meter and allow immediate use.
(Note: No change to UR.3.5.)

UR.3.6. Sampling. - A grain sample 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 grain sample shall be taken such that it is representative of the lot.
(Note: No change to UR.3.6.)

UR.3.7. Location. - See G-UR.3.3.
(Note: No change to UR.3.7.)

UR.3.8. Level Condition. - If equipped with a level indicator, a meter shall be maintained in a level condition.
(Added 1988)
(Note: No change to UR.3.8.)

UR.3.9. Operating Limitation. - Unless otherwise specified by the meter manufacturer, moisture determinations shall not be made when the difference in temperatures between the grain sample and the meter exceeds 10 °C (20 °F).
(Added 1988)
(Note: No change to UR.3.9.)

UR.3.10. Current Calibration Chart or Data. - Grain moisture determinations shall be made using only the most recently published calibration charts or calibration data.
(Added 1988)
(Note: No change to UR.3.10.)

UR.3.11. 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:

(a) The temperature range over which the meter may be used and still comply with the applicable requirements. If the temperature range varies for different grains or seed, the range shall be specified for each.

(b) The moisture range for each grain or seed for which the meter is to be used.

(c) The temperature range for each grain or seed for which the meter is to be used.

(d) The maximum allowable difference in temperature that may exist between the meter and the sample for which an accurate moisture determination can be made.

(Added 1988)
(Note: No change to UR.3.11.)

5.56.(b) Grain Moisture Meters

~~Table S.1.6.1. Grain Types Considered for Type Evaluation and Calibration and Minimum Acceptable Abbreviations~~			
~~Grain Type~~	~~Minimum Acceptable Abbreviation~~	~~Grain Type~~	~~Minimum Acceptable Abbreviation~~
~~Corn~~	~~CORN~~	~~Soybeans~~	~~SOYB~~
~~Durum Wheat~~ ~~Eastern White Wheat~~ ~~Western White Wheat~~ ~~Hard Red Spring Wheat~~ ~~Hard Red Winter Wheat~~ ~~Soft Red Winter Wheat~~ ~~Hard White Wheat~~	~~DURW~~ ~~EWW~~ ~~WWW~~ ~~HRSW~~ ~~HRWW~~ ~~SRWW~~ ~~HDWW~~	~~Two-rowed Barley~~ ~~Six-rowed Barley~~ ~~Oats~~	~~TRB~~ ~~SRB~~ ~~OATS~~
~~Sunflower seed (Oil)~~	~~SUNF~~	~~Long Grain Rough Rice~~ ~~Medium Grain Rough Rice~~	~~LGRR~~ ~~MGRR~~
~~Grain Sorghum~~	~~SORG or MILO~~	~~Small oil seeds (under consideration)~~	

~~[Nonretroactive and effective as of January 1, 1998.] (Table Added 1993)~~

(Note: Table S.1.6.1 removed and covered in Code 5.56(a), which is applicable to NTEP meters and meters manufactured or place into service after January 1, 1998.)

Table T.2. Acceptance and Maintenance Tolerances for Grain Moisture Meters		
Type of grain or 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

Report of the Committee on Administration and Public Affairs

Barbara J. DeSalvo, Chairman
Supervisor, Weights and Measures
Ohio Department of Agriculture

Introduction

This Report of the Committee on Administration and Public Affairs (A&P) for the 81st Annual Meeting of the National Conference on Weights and Measures consists of the Interim Report offered in the NCWM Publication 16, "Program and Committee Reports," as amended by the Addendum Sheets issued during the Annual Meeting.

Table A identifies all of the issues contained in the Report by Reference Key Number, Item Title, and Page Number. All items are informational and are indicated by the suffix I.

Table B lists the appendices to the report, and Table C provides a summary of the results of the voting on the Committee's report in its entirety.

Table A
Index to Reference Key Items

Table A (Continued)
Index to Reference Key Items

In addition, the Report contains several appendices that are related to specific Reference Key Numbers as follows:

Table B
Appendices

Table C
Voting Results

Reference Key No.	House of State Representatives		House of Delegates		Results
	Yes	No	Yes	No	
400 (Report in its Entirety)	41	0	64	0	Passed

Details of All Items

(In order of Reference Key Number)

400 I Regional Weights and Measures Activities

The Committee reviewed and discussed the following:

1. The final report of the Annual Meeting of the Central Weights and Measures Association (May 1996).

2. The final report of the Annual Meeting of the Northeastern Weights and Measures Association (May 1996).

3. The final report of the Administration and Public Affairs Committee to the 38th Annual Technical Meeting of the Western Weights and Measures Association Conference (September 1995).

4. The final report of the Administration and Public Affairs Committee to the 50th Annual Southern Weights and Measures Association Conference (October 1995).

5. Committee responsibilities to the regional associations were discussed.

The positions taken by the regional associations on specific items appearing in this report are noted as part of the discussion of the items. The Committee would like to thank all of the regional associations for their invaluable input and expressions of support for the work of this Committee.

401 I Program Evaluation Work Group

The Program Evaluation Work Group (PEWG) had its last meeting at the Interim Meeting in January 1996, in Fort Lauderdale, Florida. Since then, work has continued to develop code for the collection of data for the pilot data management system and to develop interactive access to the system via the Internet. There will be a meeting August 19-21, 1996, to be held at NIST in Gaithersburg, Maryland. (See Appendix A for a summary of the January 1996 meeting.)

Gilles Vinet, Industry Canada, presented an overview of his organization's project to automate weights and measures program information. This Canadian effort complements the activities of the Program Evaluation Working Group on which Mr. Vinet participates. Management and justification of our weights and measures efforts continue to be a challenge. Mr. Vinet provided a window to view possible approaches for meeting the challenges.

402 I National Training Program (NTP)

A summary of current participation by individual jurisdictions in the NTP Certification Program is provided in Appendix B. Appendix C contains a summary of activity and information in the NTP Registry from 1985 through 1996.

The status of the funds remaining under the second grant provided by the National Institute of Standards and Technology (NIST) to the NCWM for the development of training materials for weights and measures officials is as follows (as of June 30, 1996):

Net outlays to date:	$ 84,115.72
Total grant funds authorized:	180,000.00
Total unliquidated obligations	7,100.00
Balance of funds:	$ 88,784.28

Gilbert M. Ugiansky, Ph.D., Chief of the NIST Office of Weights and Measures and Executive Secretary of the NCWM, participated in a discussion regarding the status of carryover grant funds. The Committee is investigating options available for the most effective use of remaining grant funds. Areas under consideration include: redesign of NTP's training on scales (see Item 402-2); development of short courses, correspondence courses, interactive videos, and CD-ROMs; maintenance and updating of existing training materials; updating NCWM Publication 12, Examination Procedure Outlines (EPOs) (a contract for which is in progress); sponsoring additional instructor training courses (see Item 402-6).

402-1 I Associate Membership Scholarship Fund-Training Delivery

The Committee received a report covering the awarding of 20 $500 scholarships provided by the Associate Membership Committee (AMC) to U.S. weights and measures officials. The scholarships were authorized for use during the period August 1, 1995, through July 31, 1996; that activity is shown in Appendix D. All scholarship funds for this period were committed.

With participation from the Associate Membership Committee, the A&P Committee discussed the success of the scholarship program and explored avenues for continuing the project. The Committee expressed appreciation to the Associate Membership Committee, as well as gratitude to all industry members for their support of the scholarship program.

The Associate Membership Committee (AMC) continues its commitment to training of weights and measures personnel. During the 81st Annual Meeting, the Associate Membership provided four $5,000 grants, one to each region, for the following purposes, all undertakings to be completed by July 31, 1997:

- media or public relations training (the A&P Committee is to be given the opportunity review the course outline and credentials of any proposed trainer);
- printing and/or mailing expenses related to regional newsletters; or
- as $500 scholarships for field training.

A standard Application for Grant/Scholarship Fund, Request for Disbursement, and Reimbursement Voucher have been developed by the Committee and are in Appendix E.

402-2 I Redesign of the NTP's Training on Scales

The Committee has submitted a proposal to the Executive Committee requesting that a Training Advisory Work Group be established (see Item 402-7). Part of the mission of this group is to identify resources and a process for the redesign of training courses, including the five current scales training classes, namely: retail computing, medium-capacity, vehicle and axle-load, meat beam and monorail, and livestock and animal scales. This item will not be pursued at this time and other avenues are being explored.

402-3 I NCWM Training Materials Update and Maintenance

The chart on the following page presents a summary of the revision status of all currently published NCWM training materials; the chart also reflects the new course numbering system, approved by the 80th NCWM for implementation on January 1, 1996. The Committee proposed and the 80th NCWM adopted the following system which is similar in format to the order of the sections in Handbook 44 and allows for expansion of course activity:

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.)

Commodities: **Level 600**

601	Checking the Net Contents of Packaged Goods
602	Commodity Regulations

Revision Status of NCWM Training Materials
(As of June 30, 1996)

New Course Numbers (Module Numbers Appear in Parentheses)	Date of Publication	Date of Last Revision	Revision Status*	Comments
103-Intro to Electronic Weighing and Measuring Systems (27)	1/28/85	5/95	N	Revision has been completed and copies sent to the States on 5/1/95.
601-Checking the Net Contents of Packaged Goods (10)	11/29/85	9/90	R	The Committee is planning to split the course into two segments. The NCWM NIST Handbook 133 Work Group will assist in the revision of the training materials.
202-Retail Computing Scales-Electronic (2 and 1)	2/26/86	5/94	C	K. Butcher, OWM, has updated the Inspector's Manual for changes to Handbook 44
302-Retail Motor-Fuel Dispensers and Consoles (8)	7/14/86	9/90	U	T. Butcher & J. Williams, OWM, are updating the Inspector's Manual for changes to Handbook 44.
206-Vehicle and Axle-Load Scales (5)	10/17/86	12/91	U	OWM has updated the Inspector's Manual for changes to Handbook 44. It is being reviewed by the A&P Committee.
303-Vehicle-Tank Meters (20)	10/31/86	12/91	U	J. Williams of OWM has completed an update of the Inspector's Manual.
205-Meat Beams and Monorail Scales (6)	4/3/87		U	Revision is underway by Jim Vanderwielen, USDA/GIPSA
204-Livestock and Animal Scales (7)	5/27/87		U	Paul Peterson, USDA/GIPSA, has submitted a second draft of the Inspector's Manual.
305-Liquefied Petroleum Gas Liquid-Measuring Devices (21)	8/5/87		U	T. Butcher & J. Williams, OWM, have completed an update of the Inspector's Manual for changes to Handbook 44.
203-Medium-Capacity Scales (4)	6/22/88	10/92	N	
102-Introduction to NIST Handbook 44 (24)	5/18/89	6/93	U	J. Mindte, OWM, has updated the materials for changes to Handbook 44, 1996-edition; materials are being reviewed by OWM.
602-Commodity Regulations (22)	6/8/90		N	
304-Loading-Rack Meters (19)	7/18/90		N	
101-W & M Regulation in the U.S. (23)	6/14/93		N	

*Key to revision status abbreviations:

N = No revision planned in 1996
U = Revision is underway
R = Revision is planned for 1996

402-4 I Organization and Utilization of Certified Trainers

As of June 1996, the following 10 individuals have attained the status of National Training Program (NTP) Certified Trainer: Ken Butcher, NIST/OWM; Barbara J. DeSalvo, Ohio; Frank W. Forrest, Connecticut; Paul Peterson, USDA/GIPSA; Richard L. Philmon, Illinois; Thomas M. Stabler, STR, Inc.; Richard C. Suiter, Nebraska; José A. Torres-Ferrer, Puerto Rico; James A. Vanderwielen, USDA/GIPSA, and Kenneth A. Wheeler, Ohio.

The Central Weights and Measures Association (CWMA) has identified as one of its goals the attainment of one Certified Trainer in each of its member States. There are four Certified Trainers from CWMA (representing States) and three additional individuals are continuing to progress toward trainer certification. It is envisioned that each of the identified trainers will participate in a mentoring program to assist others through the certification process.

402-5 I Industry Training

The Committee reviewed training materials provided by Giant Food, Inc., entitled, "The Weighting Game, A Guide to Weights and Measures." The material is distributed to Giant Food employees as part of the company's ongoing Quality Assurance Program. The Committee agreed that this information is a valuable training resource. Copies are available by request to the Committee's technical advisor.

The Committee discussed the ongoing education and training partnership projects with the Associate Membership, including the Food Marketing Institute, The Pet Food Institute, The Pennsylvania Food Merchants Association, The Kroger Company, International Dairy Food Association, Construction and Agricultural Film Manufacturers Association (CAFMA), The Central Illinois Public Service Company (belt-conveyer scales), as well as the U.S. Department of Agriculture. The Committee viewed and commented on a videotape covering testing of polyethylene sheeting, which is currently in production by CAFMA.

The Committee has developed a tri-fold weights and measures brochure entitled: "Quality Weights and Measures for Industry." Electronic templates of the document were made available to Conference members during the Annual Conference in July. The material is designed to be used to promote weights and measures services to industry. The material can be used in its original form or may be customized to the needs of individual jurisdictions. The tri-fold brochures are available either on discs (send two 3-1/2" formatted discs) or by e-mail. The brochures may also be added to the NCWM Fax-On-Demand system.

402-6 I Instructor Training

The National Conference on Weights and Measures continues to emphasize the need for experienced, qualified personnel to maintain and develop new methods of training delivery in response to the numerous requests for training and education. The A&P Committee endorses the need for increased training. In response to the demand for more efficient methods of training delivery, NCWM and NIST sponsored two NIST Handbook 133 Instructor Training courses during 1995. Both classes were conducted at the Maryland State Weights and Measures facilities in Annapolis, Maryland. Participants were selected from jurisdictions agreeing to the following conditions:

- to fully implement the NIST Handbook 133 provisions in their State or jurisdiction within 3 months of completing the course;
- to use the class participant as an instructor to provide Handbook 133 training to officials in their State or jurisdiction within 3 months of completion of the course; and
- to permit the participant to serve as a trainer for the Office of Weights and Measures (OWM) in other regions of the country.

This method of training delivery has proven to be extremely successful. The core group of Handbook 133 instructors which resulted from conduct of the two courses during 1995 had trained in excess of 1500 officials prior to the 81st NCWM Annual Meeting in July 1996.

The A&P Committee strongly supports the NIST Training Academy/Instructor Training concept. As a result of the success of this program, the A&P Committee recommended that $50,000 of the remaining funds from the second training grant from NIST (subject of Item 402) be designated to provide two Instructor Training classes during 1996. Four additional classes have been planned for 1996.

402-7 I Training Advisory Work Group

A proposal to establish a National Training Program (NTP) Training Advisory Work Group has been submitted to the Executive Committee. The A&P Committee has requested approval of this project so that members may be appointed and a meeting may be held prior to the 81st Annual Conference, with funding to be allocated from the current A&P budget.

The objective of the Training Advisory Work Group will be to organize trainers and other interested parties to address national training issues. If this proposal is approved, five members will be appointed to the group: one from each of the regional associations (one of the regional representatives to be a metrologist), and one representative from the Associate Membership.

Issues to be addressed by the Training Advisory Work Group will include but not be limited to the following:

- Training material updates;
- Identify incentives for becoming NCWM Certified Trainers;
- Make recommendations for development of Voluntary Training Standards;
- Mentoring and assisting trainers in the certification process;
- Training delivery;
- Field Certification of inspectors;
- Redesign of NTP's training on scales;
- Instructor training;
- Customized training;
- Evaluation of computer-based training and other state-of-the-art training techniques and self-study programs;
- Development of CD-ROMs; and
- Redesign of Examination Procedure Outlines (EPOs).

Organization of this group will not be pursued at this time.

403 I Legislative Strategy

There was extended discussion by the Committee regarding development of proactive strategies for use by weights and measures administrators in dealing with legislators at the local, State, and national levels. The Committee reviewed materials prepared by members Richard Greek and Bruce Martell.

The Committee previously sent a survey to the major weights and measures jurisdictions to elicit information regarding individual experiences in dealing with legislatures on such issues as how budgets are justified, the results of which were published in the Proceedings of the 80th Annual Meeting in Portland, Maine. The survey indicates four legislative-related priorities:

(1) general guidelines;
(2) cost-effectiveness;
(3) laboratory development; and
(4) fee implementation.

Draft Legislative Guidelines were forwarded to the Executive Committee for review and use in developing long-range plans. The A&P Committee's goal is to publish the resource guide and distribute it to the 1997 Conference attendees, so that all State, local, and regional persons with leadership roles in weights and measures will have a viable tool to assist in networking with legislators at all levels.

Committee member Richard Greek will provide feedback to those jurisdictions expressing an interest in the identified legislative-related priorities.

404 I Weights and Measures Round Tables

There was agreement that the A&P Committee member in each of the regions would continue to work with the individual association chairs to discuss items at the Directors' Round Tables. Suggested items for the next regional meetings include: Assessing Training Needs of Local Officials and Program Evaluation Data Collection.

405 Public Affairs

405-1 I Industry Relations

The Committee examined education and training partnership projects with associate members, such as the Food Marketing Institute, International Mass Retailers, and the Pennsylvania Food Merchants Association.

405-2 I Public Relations

The Committee previously reviewed and commented upon the incorporation of weights and measures functions in "Measurement in the Classroom, an Elementary School Curriculum" (formerly entitled "Ag in the Classroom"). This document was finalized and copies were made available to interested parties at the NCWM Annual Meeting in July 1996 (see also Item 402-5). It is suggested that State Directors tailor the document for use in their individual State and local jurisdictions. The document can serve as a stand-alone weights and measures handout and is designed to be used in conjunction with the "Getting What You Pay For" brochure. The Committee acknowledges the need to educate today's young people who will become tomorrow's consumers. The material is an educational unit designed to help young children understand measurement. Lesson Plans include teacher background information and resources, student information, activities, and worksheets.

The Committee has developed three tri-fold weights and measures pamphlets entitled: "How to Avoid Getting Burned," "Quality Weights and Measures for Industry" (see Item No. 402-5), and "Providing Quality Services to Consumers." The Committee made the brochures available during the Annual Meeting and will make electronic templates of the latter two documents available to Conference members upon request.

As part of the Committee's discussion, comments about the NCWM W&M Week 1996 information packets were positive and were followed by general dialogue regarding topics suitable for inclusion in the 1997 W&M Week material. The Committee encourages NCWM members to use these materials along with those included in NCWM Publication 7, "Weights and Measures Week Guide" throughout the year as public relations tools.

As part of the Committee's Open Session, an educational forum was held during the 81st Annual Meeting. Brian Callaghan of Commcore, a 20-year veteran of the Washington press corps and communications consultant, provided insight and advice about media skills. Mr. Callaghan has worked extensively as a television correspondent, written and produced news documentaries, as well as developed news and arts programming for public television. As a media advisor and consultant, he has served IBM, Bell Atlantic, Johnson & Johnson, and the Federal Aviation Administration, to name a few.

The Committee's Open Session also included a presentation by Gilles Vinet, Industry Canada, which gave an overview of their project to automate weights and measures program information. The Canadian effort complements the work of the Program Evaluation Work Group in which Mr. Vinet participates.

405-3 I Marketing Weights and Measures in the United States

The A&P Committee proposes to establish a pilot public information officer project to run from January 1, 1997, through December 31, 1997.

In recognition of the need to publicize the impact of the work of weights and measures, the A&P Committee has been and will continue to identify methods and means to implement an ongoing public relations effort. To that end, the Committee intends to implement a continuing national public relations effort for weights and measures using the experience and expertise of a public information officer.

Items to be accomplished by implementation of the pilot project:

- Preparation and provision of up-to-date fact sheets for the media dealing with the effects of weights and measures programs on consumers and industry;
- Provision of support to States and local jurisdictions for their public relations efforts;
- Provision of a centralized contact for media requests;
- Arranging for needed public relations and media coverage for the 1997 Weights and Measures Week;
- Establishment of a preliminary network with other public relations professionals, associate members, and Federal, State, and local jurisdictions, and industry;
- Identification and establishment of projects for utilization of interns (college students);
- Initial review of the Program Evaluation Work Group data from a PR perspective;
- Coordination of national media coverage for the 1997 NCWM Annual Meeting; and
- Other duties as assigned.

This item is discussed in the Executive Committee Report under Item 101-7, wherein it is reported that the Executive Committee decided not to fund the part-time public information officer project. Therefore, this project will not be pursued at this time.

405-4 I Advertisement of the 81st NCWM 1996 - New Orleans, Louisiana

The A&P Committee worked with the Louisiana Department of Agriculture's press secretary to promote the 81st NCWM. The NCWM Standing Committees supplied briefs of current weights and measures issues affecting industry and consumers to Press Secretary Michaud for his incorporation into press releases covering meeting agendas and contact information. Mr. Michaud disseminated the press releases to newspapers, magazines, television, and radio media throughout the State of Louisiana.

In addition, the NIST Public Affairs Office issued its customary press releases nationwide.

The Committee will explore avenues for promoting the 82nd Annual Meeting to be held in Chicago, July 20-24, 1997.

405-5 I NCWM Communication Processes

The Committee met with the Executive Committee to clarify priorities, mission, and goals. The presentation prepared for the Executive Committee was also presented to the membership during the Committee's Open Session.

406 I Administrative Priorities and Budget

The Committee, in a continuing effort to evaluate its priorities and resources while meeting the highest needs of the Conference membership, working in conjunction with the long-range plan being developed by the Executive Committee, identifies and recommends the following administrative priorities:

- To partner with NIST to coordinate maximum benefit from instructor training and to streamline, update, and maintain training materials;

- To continue to develop and implement Public Relations efforts for the benefit of the NCWM, weights and measures jurisdictions, industry, and consumers; and
- To manage and support the Program Evaluation Work Group to insure the maximum utility of their results and recommendations.

407 I Safety Information Clearinghouse

The A&P Committee has as one of its responsibilities the establishment of a clearinghouse for the collection and publication of reports of incidents involving State and local weights and measures officials. The Committee has worked with NCWM Chairman and Safety Liaison Charles A. Gardner to finalize the Incident/Accident Summary form (Appendix F).

The form, which has been sent to all State Directors, is designed to further the prevention of avoidable accidents and incidents in the weights and measures environment. To date, there have been 13 responses from the States. It is suggested that States and local jurisdictions incorporate this summary into their own safety program documentation procedures. Completion and return of the report will allow NCWM to alert organizations and jurisdictions to the existence of hazards, as well as possible solutions to problems and corrective actions. The completed form is designed to be returned unsigned. The jurisdiction, organization, and individual may be assured of remaining anonymous.

It is planned that the safety reporting form will be accessible through the Weights & Measures 24-Hour Fax-Line (telephone: 1-800-925-2453). Ultimately, the information received will be made part of the national database under development.

B. DeSalvo, Ohio, Chairman

R. Greek, San Luis Obispo County, California
N. Kranker, Dutchess County, New York
B. Martell, Vermont
E. Price, Texas

Industry Representative: Chris Guay, Procter and Gamble

C. Gardner, Suffolk County, New York, Safety Liaison

T. Coleman, NIST, Technical Advisor
J. Mindte, NIST, Technical Advisor

Committee on Administration and Public Affairs

Appendix A

Meeting Report
Program Evaluation Work Group to the
Committee on Administration and Public Affairs

The third meeting of the Program Evaluation Work Group was held on January 26, 1996 at the Radisson Bahia Mar Hotel in Fort Lauderdale, Florida. The next meeting is tentatively set for August 19-21, 1996 at the National Institute of Standards and Technology (NIST), Gaithersburg, Maryland.

The Attendees

Mike Belue, Belue Associates
Bill Corey, American Frozen Foods
Richard Greek, California
Darrell Guensler, California (Chairman)
Sid Colbrook, Illinois
Allan Nelson, Connecticut
Ed Price, Texas
Debbie Ripley, NIST, Office of Weights & Measures
Daryl Tonini, SMA
Gilles Vinet, Canada
Bob Williams, Tennessee

Background

NCWM Chairman Jim Truex, at the recommendation of the Privatization Work Group (1992-1994), appointed the Program Evaluation Work Group in April of 1994. The work group's mission is to assist the Committee on Administration and Public Affairs in establishing a standard core of national data to be collected which would provide measures:

- to determine the effectiveness of weights and measures programs
- to determine whether changes in programs or processes were effective
- to share information and data thus enabling jurisdictions to make marketplace and cost/benefit analysis

In its review of recent attempts to privatize weights and measures functions, the group recognized that there was an absence of usable data needed to justify programs and demonstrate the full scope and merit of weights and measures' activities.

Endorsements for establishing a national database and computerizing some field inspection procedures were the result of earlier subcommittee studies on future challenges to Weights and Measures (W&M) and the National Conference on Weights and Measures (NCWM). The Task Force on Planning for the 21st Century (also known as "The Blue Sky Task Force") (1990-1992) recognized the advantages of developing an electronic communication information system and network. This infrastructure would benefit the program areas of education, administration, and in the uniform interpretation of regulations. The task force noted that this communication ability would aid in increasing program effectiveness and impact by avoiding the delays created by paper trails. It would eliminate a large portion of time-consuming standardized administrative tasks involved in the record management of field data. Additionally, and most important, the task force felt that computerization would help field inspectors in their documentation of reports. These inspection reports would provide data that could be compared and used to determine program effectiveness and efficiency, to justify program functions, and to demonstrate where to allocate resources.

Meeting Summary

- The welcome and agenda review were given by Chairman Guensler. The Chairman noted that Illinois has joined the working group and will be partaking in the pilot program.

- OWM Report Status of Work on National Database:

  OWM/NIST gave a status report on the national database pilot program. As part of the presentation two areas were defined: the proposed uniform codes and the proposed pilot database. At the last meeting in August, 1995 NIST was tasked to: contact the State database administrators; develop draft standards for a pilot program; develop data/file transfer protocol; establish a data collection point; determine the network and the server needs; and, issue a Request for Proposal (RFP) to develop a database. System administrators from the pilot States have been contacted. Information on each system has been collected and compiled. The design data of each database system was requested from each State. The data/file transfer protocol consists of two variations. The data collection point is to be at NIST. Network and server needs have been established and were discussed at this meeting. It was agreed that issuing an RFP at this time would be premature.

For the proposed pilot program, draft codes and draft fields were developed. There are two options for the network and server: purchase a server and network system or utilize the services of NIST'S Information Technology Laboratory (ITL) and the Internet. To purchase a server (i.e., a Pentium Processor with 128 MB RAM, 2 GB hard drive (min), NIC, modem, tape backup and UPS, MS Windows NTAS, MS Access (front-end), MS Access or Oracle (NIST Standard for back-end), and an independent telephone line) the cost would be approximately $30,000. If ITL's service are used, using their IBM Risc 6000, UNIX Operating system, the WWW Interface as the front-end, Oracle or MS Access as the back-end, 24 hr/day maintenance available, already connected to Internet, the cost is virtually free. Since this system is available immediately, as well as the services of Tom Kurihara, a Computer Specialist from ITL, to assist in the development of the database, development can begin immediately and possibly have a July startup date.

The issues that need to be considered are the diversity of systems in pilot and economics. The program requires minimal cost to States participating in pilot and minimal cost to NIST. Therefore, the recommendation is to initiate a pilot program on ITL's system where there will be minimal cost and a tentative July, 1996 startup date for the alpha phase of the program. Assessment of the program and modification will be handled as needed. The plan is to run the alpha phase for one year before proceeding into the beta phase. Each State would send its file directly to NIST monthly, via e-mail or physical disk, to be appended to the main database, or they could access it from the WWW and enter the data manually.

- Review of the meeting summary report of August 1995 meeting:

  The meeting summary report of the August, 1995 meeting was reviewed. There were no comments by the Committee or modifications to Core Data Requirements in the report. The Industry Committee on Packaging and Labeling received a copy of core data requirements and output. Concern was expressed as to how closely the data collected would match the reports in NIST Handbook 133. The importance of accuracy was also expressed by the Committee. There was also concern expressed that now this will be public information. Much of the data to be collected will be the same as that contained in the reports in HB 133; although, there will be some new information required to support the database.

- Feedback from reports given at WWMA & SWMA:

  One concern was in the sampling. When you take a sample and extrapolate 100 percent over the entire market, your data would be skewed. This is true if you are sampling only problem areas. Another area of concern is with totalizer readings. The length of time between test and gross count may cause a skewed result. Overall response was positive. Several members said they were encouraged by the progress the group had made on the project.

- Code uniformity/conformity and Standards of Pilot Program:

  Several tables of codes and draft field data were presented, discussed and modified to suit the needs of the pilot program. Copies of the revised tables are in an Appendix format and are available upon request. At design time, there could be some modifications to these tables in order to accommodate the database management system utilized for the pilot program. The participants are to develop jurisdictional codes for their areas and will be responsible for getting them to NIST.

- Current status of each pilot State (i.e., readiness to begin pilot):

  California has adopted NIST HB133 and is ready in the package inspection area. Presently, they are purchasing WinWam weights and measure software for package inspection to implement the project. They are not ready on retail motor fuel except by manually entered data. Presently, California plans to have 15 laptops spread out to counties so they may partake in the pilot. Kern County hopes to be ready by July. Connecticut is fine with packaging and is still working on retail motor fuel; however, they plan to be ready by July. Texas has adequate hardware and plans to have five inspectors to partake in the pilot program. Presently, there is no automation but the information could be put in some software for both programs. Tennessee has no laptops at the present time but plans to send the data in the proper format on disk. Illinois plans to enter data into their personal computers (pc) and send a disk to NIST. Nebraska currently has no computers in the field and their database does not currently capture several of the required fields for the pilot program. Tentative plans are to utilize one inspector to get the data to NIST either through a physical disk or e-mail.

COMMODITY CLASSIFICATIONS LIST INDEX

1.00 CONFECTION, FLAVORINGS AND SEASONINGS
1.01 - Penny Goods
1.02 - Bar Goods
1.03 - Confectionery-type Chocolate
1.04 - Chocolate Coatings and Syrups
1.05 - Other Flavoring Agents
1.06 - Packaged Goods
1.07 - Bulk Goods
1.08 - Nutmeats and Seeds
1.09 - Sweetening Syrups and Molasses
1.10 - Flavoring Extracts, Emul., other Flavorings
1.11 - Salt
1.12 - Pepper
1.13 - Sugar and Sweeteners
1.14 - Herbs, Spices and Seasoning Mixes
1.15 - Baking Powder and Yeast
1.16 - Tenderizers
1.40 - Confections and Flavorings, N.E.C.
1.50 - Confections, Flavorings
2.00 DAIRY-TYPE PRODUCTS
2.01 - Eggs, including Liquid, Dried and Frozen
2.02 - Creamery Butter
2.03 - Margarine
2.04 - Natural Cheese except Cottage Cheese
2.05 - Processed Cheese and Related Products
2.06 - Cottage Cheese

2.07 - Sour Cream and Yogurts, including Imitations
2.08 - Ice Cream and Ices
2.09 - Ice Cream Mix and Ice Milk Mix
2.10 - Bars, Popsicle, Ice Cream, Ices, Fruit
2.11 - Cannd and Evaporated Milk
2.12 - Dry Milk Prods. & Non-Dairy Cream
2.13 - Packaged Milk and Cream
2.14 - Buttermilk, Choc. Drink, other Milk Drinks
2.15 - Other Dairy Drinks
2.16 - Puddings, Toppings, & Instant Brkf.
2.17 - Dips and Salads
2.40 - Dairy-Type Products, N.E.C.
2.50 - Prepackaged Dairy-Type Products
3.00 BAKERY GOODS - CANNED, FRESH, OR FROZEN
3.01 - Bread and Bread-Type Rolls
3.02 - Breading, Crumbs, Croutons, and Dressing
3.03 - Soft Cakes
3.04 - Pies
3.05 - Doughnuts
3.06 - Pastries and Cookies
3.07 - Sweet Rolls and Coffee Cake
3.08 - Biscuits, Crackers, and Pretzels
3.09 - Other Dry Bakery Products
3.10 - Chips, Potato, Corn, etc.
3.11 - Tortillas and Allied Products
3.12 - Sandwiches

3.13 - Meat, Fish or Poultry Pies
3.40 - Bakery Goods, N.E.C.
3.50 - Prepackaged Bakery Goods (Audits)
4.00 MEAT, FISH, POULTRY
4.01 - Canned Packaged Fish and other Seafood
4.02 - Frozen Packaged Fish and other Seafood
4.03 - Fresh Packaged Fish and other Seafood
4.04 - Canned Meats
4.05 - Beef, Fresh and Frozen
4.06 - Veal, Fresh and Frozen
4.07 - Pork, Fresh and Frozen
4.08 - Lamb, Mutton, Fresh and Frozen
4.09 - Processed Pork (Ham, Bacon, Etc.)
4.10 - Sausage, Luncheon, and other
4.11 - Canned Poultry
4.12 - Chickens, Fresh and Frozen
4.13 - Turkeys, Fresh and Frozen
4.14 - Other Poultry and Small Game
4.40 - Meat, Fish, Poultry, N.E.C.
4.50 - Prepackaged Meats (Audits)
5.00 COOKING OILS, SALAD DRESSINGS, CONDIMENTS
5.01 - Soy Sauce, Teriyaki
5.02 - Olive Oil
5.03 - Peanut Butter Oils
5.04 - Other Vegetable Oils

5.05 - Other Vegetable Oil Products
5.06 - Animal and Marine Oil Products
5.07 - Shortening and Cooking Oils
5.08 - Salad Dressings, Mayonnaise, Sandwich Spreads
5.09 - Meat Sauces, Hot Sauces
5.10 - Vinegar and Cider
5.40 - Cooking Oils, Salad Dressings, Condiments, N.E.C.
5.50 - Cooking Oils, Salad Dressings, Condiments (Audits)
6.00 MILLING PRODUCTS
6.01 - Cereals, Breakfast Foods
6.02 - Bran, Middlings, Wheat Germ
6.03 - Corn Meal
6.04 - Wet Corn Meal Mush
6.05 - Milled Rice and By-Products
6.06 - Prepared Flour and Flour Mixes
6.07 - Grain Mill Products, N.E.C.
6.08 - Macaroni and Allied Foods
6.09 - Popcorn
6.40 - Milling Products, N.E.C.
6.50 - Milling Products (Audits)
7.00 PRODUCE
7.01 - Dried and Dehydrated Fruits and Vegetables
7.02 - Canned Fruits and Vegetables, N.E.C.
7.03 - Frozen Fruits and Vegetables
7.04 - Fresh Fruits and Vegetables
7.05 - Nuts in Shells
7.06 - Mushrooms, All Forms

7.40 - Produce, N.E.C.
7.50 - Prepackaged Fruits and Vegetables (Audits)
8.00 OTHER FOOD PREPARATIONS
8.01 - Jams, Jellies, & Preserves
8.02 - Peanut Butter & P. Butter Mixes
8.03 - Honey & Honey Mixes
8.04 - Pickles & other Pickle Products
8.05 - Soup Mixes
8.06 - Canned Soups
8.07 - Frozen Soups
8.08 - Frozen Dinners
8.09 - Catsup & other Tomato Sauces
8.10 - Canned Baby Food, Except Meat
8.11 - Other Canned Specialties
8.12 - Desserts, Ready-to-Mix
8.13 - Health Foods
8.40 - Other Food Preparations, N.E.C.
8.50 - Other Food Preparations (Audits)
9.00 BEVERAGES
9.01 - Malt Liquors & Brewing By-Products
9.02 - Wine, Brandy, & Brandy Spirits
9.03 - Bottled Liquors
9.04 - Pack, Ready-to-Serve Mixed Drinks
9.05 - Packaged Soft Drinks
9.06 - Flavoring Syrups, Soft Drinks
9.07 - Beverage Bases except Syrups, Concentrated Juices
9.08 - Frozen Fruit Juices and Ades

9.09 - Canned or Bottled Fruit Juices
9.10 - Roasted Coffee, Whole Bean or Ground
9.11 - Concentrated Coffee
9.12 - Coffee Substitutes
9.13 - Tea, Leaf Form
9.14 - Concentrated Tea
9.15 - Canned or Bottled Vegetable Juices
9.16 - Canned or Bottled Water
9.17 - Choc. and Cocoa Products, not confections
9.18 - Manufactured Ice
9.40 - Beverages, N.E.C.
9.50 - Beverages (Audits)
10.00 PHARMACY PRODUCTS
10.01 - Prescription Drugs
10.02 - Packaged Medications, N.E.C.
10.03 - Internal Analgesics (a remedy that lessens or removes pain)
10.04 - Ext. Analgesics and Antiseptics
10.05 - Congh and Cold Items
10.06 - Laxatives
10.07 - Vitamins and Food Supplements
10.08 - Dentifrices, Including Mouthwashes, Gargles, and Rinses
10.09 - Shaving Preparations
10.10 - Razor Blades and Razors, not Electric
10.11 - Perfumes, Toilet Water, Colognes
10.12 - Other Cosmetic and Toilet Preparations
10.13 - Hair Preparations, Including Shampoos
10.14 - Body Powder and Related products

10.15 - Oils and Lotions
10.16 - Medical Adhesive Tape
10.17 - Adhesive Bandages and Compresses
10.18 - Cotton, Medical
10.19 - Devices, Medical
10.40 - Pharmacy Products, N.E.C.
10.50 - Pharmacy Products (Audits)
11.00 GARDEN, FARM, PET SUPPLIES
11.01 - Charcoal
11.02 - Hickory and Other Wood Chips
11.03 - B-B-Q Starters and Matches
11.04 - Firewood, Kindling and Manufactured Logs
11.05 - Household Insecticides and Repellents
11.06 - Economic Poisons, N.E.C.
11.07 - Superphosphate and Phosphatic Fertilizer
11.08 - Mixed Fertilizer, Fertilizer of Organic Origin
11.09 - Peat Moss, Bark, Mulches, Soil Conditioners
11.10 - Poultry Feeds
11.11 - Livestock Feeds Including Salt Licks
11.12 - Dog and Cat Foods
11.13 - Other Prepared Animal Feeds
11.14 - Pet and Animal Supplies, N.E.C.
11.15 - Vegetable and Agricultural Seeds
11.16 - Flower Seeds, Bulbs, Plants and Grass Seeds
11.17 - Rock, Sand, and Gravel
11.18 - Garden Tools & Related Products
11.19 - Herbicides
11.40 - Garden, Farm, Pet Supplies, N.E.C.

11.50 - Garden, Farm, Pet Supplies (Audit)
12.00 HARDWARE AND BUILDING MATERIALS
12.01 - Nails, Tacks, Brads, and Rivets
12.02 - Bolts, Nuts, Washers, and Screws
12.03 - Furniture Hardware
12.04 - Builders Hardware
12.05 - Other Hardware
12.06 - Electrical Equip. and Supplies
12.07 - Plumbing Equip. and Supplies
12.08 - Tile and Tile Supplies
12.09 - Lime and Fireclay
12.10 - Cement, Stucco, Plaster, and Cement Color
12.11 - Dry Mortar and Concrete Mix
12.12 - Flooring Products, Except Rugs and Linoleum
12.13 - Linolenm
12.14 - Doors and Windows
12.15 - Moulding and Lumber
12.16 - Sheeting Panels, Paneling and Wallboard
12.17 - Building Paper, Felt and Plastic Coverings
12.18 - Starter Rolls, Rolled Roofing, Composition Shingles
12.19 - Wood Shingles, Shakes and Accessory Supplies
12.20 - Metal Roofing Products
12.21 - Fiberglass Roofing, Sheets, and Rolls
12.22 - Wire Products, Fencing, Posts, and Flashings
12.40 - Hardware and Building Materials, N.E.C.
12.50 - Hardware and Building Materials (Audits)

13.00 PAINT AND ALLIED PRODUCTS
13.01 - Internal and External Oil-Type Paints, Including Tint Bases
13.02 - Internal and External Water-Type Paints, Including Tint Bases
13.03 - Lacquers
13.04 - Varnish Stains and Varnishes
13.05 - Wood Stains
13.06 - Rust Prevent. and Solvents
13.07 - Wood Preservatives
13.08 - Putty, Fillers, Caulking Compounds, Allied Products
13.09 - Glues, Adhesives, Sizes
13.10 - Adhesive Tapes, N.E.C.
13.11 - Linseed Oil
13.12 - Softwood Distillation Products and Turpentine
13.13 - Other Gum & Wood Chemicals
13.14 - Wallpaper
13.15 - Painters' Equipment and Supplies
13.40 - Paint and Allied Products, N.E.C.
13.50 - Paint and Allied Products (Audits)
14.00 MAINTENANCE SUPPLIES
14.01 - Bleaches and Bluing
14.02 - Starch
14.03 - Packaged Soap
14.04 - Packaged Synthetic
14.05 - Alkaline Detergent and Acid-type Cleaners
14.06 - Specialty Cleaning and Sanitary Products
14.07 - Polishing Preparation and Related Products

14.08 - Glycerine
14.09 - Dyes
14.10 - Sawdust and Shavings
14.11 - Oil or Grease Absorbents
14.12 - Rags, Chamois, Polishing Cloths
14.13 - Swimming Pool Equipment, and Supplies
14.40 - Maintenance Supplies, N.E.C.
14.50 - Maintenance Supplies (Audits)
15.00 PAPER AND PLASTIC PRODUCTS
15.01 - Grocers, Variety, Paper Bags
15.02 - Specialty Bags and Liners School and Office Supplies
15.03 - Wrapping Products, Gift Wrap, Ribbon
15.04 - Rope, Cordage, and Twine
15.05 - Adhesive and Pressure-Sensitive Tapes
15.06 - Party Favors, Toothpicks, Supplies, Novelties, and Decorations
15.07 - Paper Bedding, Towels and Wash Cloths, Table Covers and Linens, Wearing Apparel
15.08 - Sanitary Food Containers and Picnic Supplies
15.09 - Sanitary Napkins and Tampons
15.10 - Paper Towels, Napkins, Toilet and Tissue Products
15.11 - Foil and Plastic Wrap
15.12 - Oiled, Waxed and Wax Laminated Paper
15.13 - Stationery, Envelopes, Tablets, School and Office Supplies, Related Products
15.14 - Photographic Film and Paper
15.15 - Artists Materials and Supplies
15.40 - Paper Products, N.E.C.

15.50 - Paper & Plastic Products (Audits)
16.00 - TEXTILE PRODUCTS
16.01 - Bedspreads and Bed Sets
16.02 - Sheets and Pillow Cases
16.03 - Towels and Wash Cloths
16.04 - Table Covers and Linens
16.05 - Curtains and Draperies
16.06 - Carpets and Rugs
16.07 - Carpet and Rug Padding
16.08 - Apparel
16.09 - Yardage Goods, Bolt, Roll or Package
16.10 - Thread and Yark, Sewing, Basting, Mending Darning, Crocheting, Tatting, Hand Knitting, Embroidery
16.11 - Needles, Pins, Fasteners, Similar Notions
16.12 - Buttons, Parts, Except of Precious Metals
16.13 - Zippers and Slide Fasteners
16.14 - Agri. Bag Sewing Threads, Twines, and Yarn
16.15 - Upholstery Supplies
16.16 - Sleeping Bags and Mattresses
16.17 - Tents and Tarps
16.40 - Textile Products, N.E.C.
16.50 - Textile Products (Audits)
17.00 MISCELLANEOUS
17.01 - Cigarettes
17.02 - Cigars
17.03 - Chewing, Smoking Tobacco, Snuff

17.04 - Other Smoking Equipment Supplies
17.05 - Fishing Tackle and Equipment
17.06 - Firearms, Hunting Equipment and Supplies
17.07 - Other Sporting and Athletic Goods .
17.08 - Explosives, Fireworks and Supplies
17.09 - Toys and Children's Items
17.10 - Hobby, Handicraft Equipment and Supplies
17.11 - Soldering Equipment and Supplies
17.12 - Welding Equipment and Supplies
17.13 - Tools, Shop Equipment and Supplies
17.14 - Extinguishers, Safety Products and Supplies
17.15 - Chemicals, General, N.E.C.
17.16 - Pressurized Gases
17.17 - Automatic Transmission Fluids and Motor Oil
17.18 - Lubricating Oils, N.E.C.
17.19 - Lubricating Greases
17.20 - Brake Fluid
17.21 - Antifreeze
17.22 - Automotive Window Washer Cleaners
17.23 - Transportation Equipment Hardware
17.24 - Automotive Products, N.E.C.
17.40 - Miscellaneous, N.E.C.
17.50 - Miscellaneous (Audits)
N.E.C. - Not Elsewhere Classified

DISPOSITION CODES

Result Codes	
P	Pass
Result Failure Codes	
F1	Accuracy
F2	other

Result Codes for Package Inspection	
P	Pass
Result Failure Codes	
F1	package label
F2	package fail for MAV
F3	package fail for Avg

Device Codes	
0	No Device Type
1	RMFD

Motor/Fuel Grade Codes	
RU	Regular unleaded
MG	Mid-grade unleaded
PU	Premium unleaded

Inspection Type Codes	
I1	Routine
I2	Follow-up/Recheck
I3	Consumer complaint/Special Request
I4	Placed In Service (New Installation)
I5	Other

Business Codes	
R	Retail
W	Wholesale
P	Packer

ESTABLISHMENT TYPES TABLE**

Establishment Types			
Code	**Establishment Type**	**Code**	**Establishment Type**
	SECTOR 01 : FOOD		**SECTOR 05 : SERVICES**
0101	Groceries	0501	Post Offices
0103	Bakeries and Baked Goods	0503	Government Agencies
0105	Confectionaries and Nuts	0505	Cleaning and Laundry
0107	Fruit and Vegetables	0507	Cartage and Moving (including scale at the airport)
0109	Meat - Retail	0509	Restaurant/Cafeteria
0110	Meat - Wholesale	0511	Waste/Dump/Recycling
		0599	Other
0111	Delicatessens		**SECTOR 06 : METAL**
0114	Dairies	0602	Mining
0115	Fish - Retail	0604	Metal - Processed
0116	Fish - Processing and Wholesaling	0606	Metal - Scrap (Cars)
0120	Beverage	0607	Metal - Precious
		0699	Other
0122	Food - Canning and Processing (non-meat)		**SECTOR 07 : FORESTRY**
0199	Other food (Health Food Stores)	0702	Forestry (logging)
		0704	Pulp and Paper
	SECTOR 02 : PETROLEUM	0799	Other
0201	Service Station		**SECTOR 08 : CONSTRUCTION**
0204	Liquefied Gases	0802	Road Construction
0205	Marinas	0804	Rock, Fill and Gravel
0208	Bulk	0806	Concrete
0210	Refineries	0808	Building Materials
0212	Aircraft refueling	0809	Hardware
0299	Other	0899	Other
	SECTOR 03 : AGRICULTURE		**SECTOR 09 : CHEMICAL AND PHARMACEUTICAL**
0302	Livestock	0901	Drugs and Cosmetics
0304	Grain Elevator	0904	Chemical and Industrial
0306	Feeds	0999	Other
0308	Seeds		**SECTOR 10 : GENERAL MERCHANDISE**
0310	Fertilizer	1001	Department Stores
0312	Pest Control Product	1003	Piece Goods and Textiles
0399	Other Agricultural Products	1005	General Stores
		1099	Other
	SECTOR 04 : DEVICES		**SECTOR 11 : MANUFACTURING**
0402	Device Manufacturing	1102	Manufacturing - General
0404	Device Repair/Rental		
0406	Accredited Company		**SECTOR 99 : OTHER**
0499	Other	9999	Other

**Courtesy of Industry Canada, "STARS"

Manufacturer Code Table

	A
A&D	A&D Engineering Inc.
ABA	Abacus Scales
ABC	Advanced Business Concepts
ABS	Absco Scale Co.
AMS	Accurate Metering Systems, Inc.
ACR	ACR Systems, Inc.
ACT	Automated Controls Technology
ASM	ACTIVE Scale Manufacturing, Inc.
ADM	Asphalt Drum Mixers, Inc.
ASC	Advance Scale Company
AGS	Agri Systems
AES	Agri-Electronic Systems, Inc.
AHE	A.H. Emery Company
AIM	AIM Systems
AWI	Air-Weigh Inc.
ASM	Airway Scale and Mfg Co., Inc.
ALC	Alcoa Recycling Machinery Services
ALK	Alkon Corporation
ALL	Allegany Technology Inc.
AEI	Allied Electronics, Inc.
AIL	Amber Instruments Ltd.
AME	Ameacon, Inc.
ANA	Analogic Corporation
ANG	Automotive Natural Gas, Inc.
AMI	Antonson/Meto, Inc.
APP	Applied Technology
AFC	Applied Forces Corporation
APS	A.P.S. - Petroleum Equipment
ARB	ARBA Retail Systems Corporation
ARG	Argo Instruments, Inc.
ART	Artech Industries, Inc.
ASA	ASAM International
ASC	Ascom Hasler Mailing Systems, Inc.
ASI	Advanced Systems Interfacing, Inc.
AST	Astec
ATT	AT&T Global Information Solutions
ATC	ATCO Industries Limited
ACD	Auto-Control Division
AGS	AutoGas Systems, Inc.
AGS	AutoGas Systems
ASI	Automation Services Inc.
AUT	Autoweigh
AWT	Avery Weighing Technology
	B
BTK	B-Tek, Inc.
BNA	Baader North America Corp.
BAL	Balcrank Products, Inc.
BCE	B.C.E. Technologies

BEF	Befour, Incorporated
BEK	Beket Corporation
BPC	Bennett Pump Company
BEO	Beowulf Corporation
BER	Berkel Incorporated
BES	BESSER APPCO
BIZ1	Bizerba Canada, Inc.
BIZ2	Bizerba United States, Inc.
BLH	BLH Electronics, Inc.
BOL	Bolet Industries Limited
BON	Bongshin Loadcell Co., Ltd.
BRE	Brechbuhler Scales, Inc.
BI1	Brooks Instrument
BID	Brooks Instrument Division
BUS	Business Technologies, Inc.
	C
C&A	C & A Scale Service, Inc.
CWM	California Weighing & Measurement
CAM	CAM Data Systems, Inc
CSW	Cambridge Scale Works, Inc.
CRS	Canmax Retail Systems, Inc.
CDS	Cardinal/Detecto Scale Mfgr. Co.
CAR	Carolina Software
CAS1	CAS (USA) Corporation
CAS2	CAS Corporation
CSI	CASIO, INC.
CAT	CAT Scale Company
CCE	Consolidated Controls, Eaton Corp
CCI	CCi Scale Company
CEC	Cech Corporation
CED	Cedarapids, Inc.
CEL	Celtron Technologies, Inc.
CCA	Centrodyne Corporation of America
CER	Certified Scale Co.
CTS	Challenger Truck Scales
CSL	Champion Scale Ltd.
CHA1	Chatillon
CHA2	John Chatillon & Sons, Inc.
CHR	Chronos Richardson
CFT	Clean Fueling Technologies, Inc.
CMI	CMI Weighing Equipment
CDI1	Command Data Incorporated
CDI2	Command Data
CMT	COMPTROL Computer Control Inc.
COM	CompuWeigh
COA	Computer Advice
CEC	Concrete Equipment Co. Inc.
CCC	Condec Consolidated Controls

CON	CONFLOW TECHNOLOGIES INC.
CTL	Control Technology
CLC	Control Logic Corporation
CIS	Creative Information Systems, Inc.
CSC	CSC Scientific Company, Inc.
CSI	Control Systems International
CST	CST/AUTOWEIGH Company
CED	Custom Equipment Design, Inc.
	D
DII	Daniel Industries, Inc.
DFP	Daniel Flow Products, Inc.
DEM	Demeter Inc.
DIC	Denver Instrument Company
DHP	DH Print
DCS	Diamond Control Systems
DJC	DICKEY-john Corporation
DMI	Digi Matex, Inc.
DPC	Digi Postal Corporation
DIV	Division Systems
DSI	Doran Scales, Inc.
OPW	OPW Fueling Components
DRA	Drafto Corp.
DRB	DRB Systems
DUL	Dultmeier Sales
DDD	Dunn & Dunn Data Systems, Inc.
DUR	Duratron Corporation
DSM	Durline Scales and Mfg., Inc.
	E
ESI	Easy Systems Inc.
EAT	Eaton Corporation
ECR	ECR Software Corporation
EDL	Edlund Company
EDO	EDO ANGI
ELE	Electroscale Corporation
EMA	Emark Corporation
EEC	Emerson Electric Co.
EWS	Emery Winslow Scale Company
ESI	Engineered Systems, Inc. (ESI)
ENS	Ensign Systems, Inc.
EII	Epelsa International, Inc.
E&Y	Ernst & Young
EMI	ESCO Manufacturing, Inc.
ESI	Electronic Scales International
ESS	Esselte Meto
EEC	Exact Equipment Corporation
EZT	EZ Technologies, Inc.
	F
FAB	Fabricated Systems

FBS	Fairbanks Scales
FES	Fargo Electronic Services Inc.
FAR	Farmchem Corp.
FHM	Faure Herman Meter Incorporated
FII	Ferguson Industries, Inc.
FSC	Filing Scale Company
FIR	FIRST-Weigh
FSI	Fiscal Systems, Inc.
FPC	Fisher & Porter Company
FLA	Flagship Corporation
FWC	Flex-Weigh Corporation
FLI	Flintab, Inc.
FJI	Flying J Inc
FMI	Force Measurements, Inc.
FFT	Foss Food Technology Corp
FOX	Foxboro Company
FRA	Franklin Electric
FRI	Friden Alcatel
F-N	Friden-Neopost
FIS	Fujitsu-ICL Systems Inc.
FWC	fwc
	G
G/H	G/H Products Corporation
GII	Gasboy International, Inc.
GEC	General Electrodynamics Corp.
GED	Gedge Systems
GII	Gencor Industries Inc.
GSC	Gerhart Scale Corporation
GES	General Electronic Systems, Inc.
GIL	Gilbarco, Inc.
GEM	Global Equipment Marketing, Inc.
GLO	Global O.T.C.F.
GII	Globimpex, Inc.
G&C	Grace
WRG	W.R. Grace & Co.
GRA	Graco, Inc.
GTI	Griffin Technology Inc.
GFT	Group-Four Transducers Inc.
GSE	GSE Scale Systems
GUL	Gull Inc.
	H
HAL	Halda, Inc.
HIC	Hana Inst. Co./Hain Co.
HAR	Hardin Industries
HII	Hardy Instruments, Inc.
HAS	Harry Asher Sales
HTI	Hasstech, Inc.
HAU	Hauck Engineering
HBM1	Hottinger Baldwin Measurements, Inc
HBM2	Hottinger Baldwin Messtechnik GMBH
HOM	Health o meter, Inc.
HSI	Healy Systems, Inc.
HEC	Hecon Corporation
HOB	Hobart Corporation
HFC	Hoffer Flow Controls, Inc.
HSE	Holtgreven Scale & Electronics Corp
HMI	Honeyville Metal, Inc.
HRD1	Howe Richardson Division
HSD	Howe Scale Div., C. Richardson, Inc.
HSI	Hugin Sweda, Inc.
HUS	Husky Corporation
HYD	Hydroscale, Inc.
	I
IBM	IBM Corporation
ICL	ICL, Inc.
IDS	Industrial Data Systems, Inc.
IMS	International Mailing Systems, Inc.
ISC	Indiana Scale Company Inc.
IDS	Industrial Data Systems, Inc.
ISI	Information Systems, Inc.
ICC	Innovax Concepts Corporation
ICS	Instant Card Systems
INC	Intercomp Corporation
IFI	Interface, Inc.
ISI	Intersystems, Inc.
ISH1	Ishida Co. Ltd.
ISH2	Ishida Scales Mfg. Co., Ltd.
ISH3	Ishida U.S.A. Inc.
IVE	Ivex Corporation
IWS	Int. Weighing Systems, Inc
	J
J&S	J&S Scale Company
JBS	JB Scale Mfg.
JCM	JCM American Corporation
JON	Jonel Engineering
JCI	Junge Control, Inc.
JWS1	JWS CORPORATION
JWS2	JWS Corp./Roberts & Schaefer Co.
	K
KFI	ABB K-Flow Inc.
KSI	K-Scale, Inc.
KTN	K-Tron
KAH	Kahler Automation
KSS	Kanawha Scales & Systems, Inc.
KOL	Koltek, Inc.
KAF	Kraus Alternate Fuels Inc.
KAI	Krohne America, Inc.
KUB	Kubota Corporation
	L
LCC	Load Cell Central
LCT	Liquid Controls Corporation
LSM	Leading Systems Management
LTC	Liqua-Tech Corporation
LMS	Livestock Marketing Services Corp.
LSC	Livingston Seed Company
LSM	Loadmaster Scale Manufacturing
LOA	Loadometer Corporation
LOD	LODEC
LOG	Logtech, Inc.
LTS	LTS Scale
	M
M&R	M-R Brand Scale Mfg., Inc.
MBE	MAIL BOXES ETC.
MII	Mantle Industries inc.
MFS	Marcum Fuel Systems, Inc.
MSI	Marsh Scale, Inc.
MAS	Masstron Scale, Inc.
MRM	Mathews Ready Mix Inc.
MMI	Matrix Master, Inc.
MTM	McNeilus Truck & Mfg. Inc.
MEA	Measurement Specialists
MSE	Meier Sales and Engineering, Inc.
MER	Merrick Corporation
MEC	Metro Equipment Corporation
MET	Metrometer, Inc.
MTI1	Mettler-Toledo, Inc.
MIC	Micro General
MMI	Micro Motion, Inc.
MSI	Micros Systems, Inc.
MAS	Mid-America Scale Company
MCR	Midwest Computer Register Corp.
MIL	Milltronics Inc.
MBA	MOBBA
MOB	Mobile Computing Corporation
MOL	Molen
MWS	Morrison Weighing Systems, Inc.
MOS	MOS Scale International, Ltd.
MOT	MOTOMCO, Ins.
MAI	MPAQ Automation, Inc.
MSI	Measurement Systems Internationa
MEI	Murray Equipment Inc.
	N
NAT	National Semiconductor
NCR	National Cash Register
NMS	National Meters
NSR	National Scale and Repair
NFC	Natural Fuels Corporation
NBI	New Brunswick International, Inc.
NCI	National Controls, Inc.
NCR	NCR Corporation
NEO	Neopost
NWI	N.E.S.C. Williams, Inc.
NDC	Network Data Corporation
NEEI	Newport Electronics, Inc.
NMB	NMB Technologies Incorporated
NEL	Norfin Equipment Ltd
NRI	National Register Incorporated
NVT	NV Technology, Inc.
	O
OCS	OCS Technologies - National Scale Di
OMS	Ogden Martin Systems of Montgomery
OHA	Ohaus Corporation

OVS	Ohio Valley Scale & Equipment Corp
OME	OMEGA
OSA	Omron Systems of America
ONE	oneWeigh
OWP	One Way A Partnership
OPW	OPW Fueling Components
ORI	Orion Scale
	P
PSC	Pennsylvania Scale Company
PSI	Pacific Scale Co., Inc.
PCC	Pacific Coast Cement
PCS	Panasonic Communications & Systems
PAP	Paper Company
PAR	PAR Microsystems
PAT	Parcom Technologies
PEC	PAT Equipment Corporation
PAU	Paul Scales
PCS	PC Synergy
PSC	Pelouze Scale Company
PER	Perkins Scale Corporation
PAI	Perstorp Analytical, Inc.
PER	Pertech
PVI	Petro Vend Inc.
PIT	Pitney Bowes
PMI	PMI
POM	P.O.M. Incorporated
POS	POS Data Products, Inc.
POW	Powell All-Steel Scales, Inc.
PRI	PRIME WEIGH
PSI	PSI/Command Data
PTC	PTC Electronics, Inc.
PTS	Pulsar Technology Systems, Inc.
	Q
QUA	Quantronix, Inc.
QUI	QuikTech
	R
R&W	R&W Specialty Mfg. Corp.
RTI	Ramsey Technology Inc.
REI	Record Electronics Inc.
REV	Revere Corp.
RLW	Rice Lake Weighing Systems
RHC	Rite-Hite Corporation
RMI	RMI Taxi Meters
ROB	Robinair Division, SPX Corporation
RSS	Rockwell Scale Service
ROL	The Rolfes Company
RSB	RSB Engineers/Planners, Inc.
RSM	RSM Technology, Inc.
RTI	Revere Transducers, Inc.
RMI	Rudda Meter Inc.
RWS	Rusty's Weigh Scales & Service, Inc.
	S
SEC	Saber Equipment Corp.
SWT	Salter Weigh-Tronix Limited
SSC	Samson Scale Co. Inc.
SCR	San Diego Cash Register, Inc.
SSC	Santa Rosa Scale Company
SAN	Sanyo Fisher (USA) Corporation
SAR	Sartorius Corporation
SAS	Stores Automated Systems, Inc.
SSA	Scaime S.A.
SSI	Scale Systems, Inc.
SCA	Scale Store
STC	Scale Technology Corp.
SDS	Scale Data Systems
SPI	Scale People, Inc.
SUI	Scales Unlimited Inc.
SWS	Schenck Weighing Systems
SCH	Schlumberger Industries
STI	Schlumberger Technologies, Inc.
SEL	Schmidt Electronic Laboratories Pty.
SCI	Scientech, Inc.
SLG	SCOOP Logic Group
SEC	Seca Corporation
SEC	Seedburo Equipment Company
SEL	Seltec Corporation
SEN	Sensortronics
SLG	Shared Logic Group, Inc.
SEC	Sharp Electronics Corporation
SES	Shekel Electronic Scales
SIL	SI-LODEC
SJS	S. Jacobs Scale Company
SMI	Smith Meter Inc.
SCP	Softsense Computer Products
SWT	Solid Waste Technologies, Inc.
SSI	Sooner Scale, Inc.
SPC	Southwest Pump Company
SSC	Southwestern Scale Co., Inc.
SPS	SP Systems, Incorporated
STI	Special Teams, Inc.
SPE	Spectra Physics
SSC	Sterling Scale Company, Inc.
STI	Stress-Tek, Incorporated
SII	Structural Instrumentation, Inc.
SUL	Sulzer Canada, Inc.
SEC	Sun Electric Corporation
SRM	Sun Refining and Marketing Co.
SSI	Sun Scale Inc.
STG	Suntronic Technology Group
SLC	Superior Load Cell
SGI	Sweda Group Inc.
SWI	Swintec Corporation
STI	Symbol Technologies, Inc.
SSC	Syracuse Scale Co, Inc.
SYS	SYSCOM Inc.
SAI	Systems Associates, Incorporated
SDR	Systems Datar
	T
TAN	Tanita Corporation
TAS	Tara Systems
TAR	TARE Incorporated
TEC	TEC America, Inc.
TEH	Tech 21
TCS	TechLink Control Sys., Inc.
TII	Technetics Industries,Inc.
TED1	Tedea Huntleigh International Ltd.
TED2	Tedea Inc.
TED3	Tedea-Huntleigh Europe Limited
TEK	Tektra International
TWI	Tele-Weight, Inc.
TGT	Tulsa Gas Technologies, Inc.
TSC	Thurman Scale Company
TII	Titan Industries, Inc.
TOK	Tokheim Corporation
MTI2	Mettler-Toledo Inc.
MTI3	Mettler-Toledo, Inc.
TSI	Toptech Systems, Inc.
TOR	Fabricantes de Basculas Torrey SA
TOT	Totalcomp, Inc.
TTI	Transcell Technology, Inc.
TRA	Transducers, Inc.
TSC	Transtronic Scale Co.
TCI	Tri-Coastal Industries
TMI	Triangle Microsystems, Inc.
TRI	TriCo Farm Service, Inc.
TSM	Triner Scale & Manufacturing
TAS	Triple A Scale
TRO	Troemner, Inc.
TTD	Tru-Test Distributors Ltd.
TUT	Tuthill Corporation
TVK	TVK Corporation
TYR	Tyrel Corporation
	U
UHL	UHL Scale Service, Inc.
UBS	UniBridge Scale Systems
UNI	Unipulse Corporation
UWS	Universal Weigh Systems of Santa Ro
UEI	Universel Epsco, Inc.
USD	U.S. Durum Milling
	V
VBS	Vande Berg Scales, Inc.
VRC	Veeder-Root Co
VFI2	VeriFone, Inc.
VFI2	VeriFone, Inc.
VII	Vertex Industries, Inc.
VSI	Vertical Software Inc.
	W
WCC	Waugh Controls Corporation
WAY	Wayne Division
WEB	Webb Corporation
WSI	Webster Scale, Inc.
WTI1	Weigh-Tronix, Inc.

WTI2	Weigh-Tronix, Inc.
WMI	WeighMaster International
WEL	Weldotron Corporation
WTS	Weldtec Scales
WSC	Western Scale Company Limited
WPC	Weyerhauser Paper Company
WMW	William M. Wilson's Sons, Inc.
WTI	Wilson Technologies, Inc.
WIL	Wilson
WSC	Winslow Scale Company
WEM	Wisconsin Electrical Mfgr. Co., Inc
WRG	W.R. Grace & Co.
	Y
YAM	Yamato Corporation
	Z
ZEL	Zeltex Inc.
	Others
XXX	Manufacturer Unknown
OTH	Other (Grandfathered)

RETAIL MOTOR/FUEL DISPENSERS				
Field No.	Field Name	Type	Width	Description
1	Inspection ID	Counter	4	Inspection ID
2	Inspection Type	Character	2	Type of inspection being performed
3	State	Character	2	State entering data
4	Date	Character	6	Date of inspection (mo/da/yr)
5	Sample Size	Character	3	Total number of items inspected
6	Business Location	Character	30	Name of business where device is located
7	Address	Character	30	Street Address of where device is to located
8	City	Character	20	City
9	State	Character	2	State where business is located
10	Manufacturer Code	Character	10	Code for the manufacturer of the device. Point to database of manufacturers.
11	Device Type	Character	1	Type of device being inspected. Currently, only RMFD = 1 or NONE=0. Point to separate tables for Model/SN
12	Device Model	Character	15	Model number of the device being inspected. Separate table (More than one model number per inspection)
13	Device SN	Character	15	Serial Number of the device being inspected. Separate table (More than one serial number per model number)
	CC Number	Character	8	NTEP CC Number (Associated with each model number)
16	Company Code	Character	2	Oil Company Code (EXX=Exxon; MOB=Mobile; TEX=Texaco; SHE=Shell; BPE=British Petroleum; GUL=Gulf; CHE=Chevron
17	Grade Code	Character	2	Grade Code of the product (Associated with each serial number)
18	Price Gal	Character	5	price per gallon (Associated with each serial number)
19	Prover Vol	Numeric	4	prover volume (25, 50, 100, 1000 gal)
20	Result of Inspection	Character	2	Result of inspection P or Failure Code (Associated with each serial number)
21	Norm Test	Numeric	5	"+/- in cubic inches
22	Special Test	Numeric	5	"+/- in terms of cubic inches"
23	Error % Norm	Numeric	3	error in % volume for normal test (Norm Test/Prover Vol x 231) x 100%
24	Error % Special	Numeric	3	error in % volume for normal test (Special Test/Prover Vol x 231) x 100% (Associated with each serial number)
25	Totalizer Reading	Numeric	10	Volume since last test (odometer reading). Actual --lookup for delta (Associated with each serial number)
26	Number of Locations	Numeric	6	Number of Locations
27	Number of Meters	Numeric	6	Number of meters
28	Annual Vol Sales	Numeric	12	Annual sales volume by product
29	Number of Inspectors	Numeric	3	Number of Inspectors by PY
30	Cost	Numeric	6	Program cost per hour
31	Time	Numeric	3	Total time spent on retail meters (travel, training)
32	Jurisdiction Code	Character	2	Jurisdictional Code (need to be defined)

PACKAGE INSPECTION

HB133 Standard Pack Report Form Field	Field No.	Field Name	Type	Width	Description
	1	Inspection ID	Counter	3	Counter assigned by system
added	2	Inspection Type	Character	2	Type of inspection being performed
added	3	State	Character	2	State entering data
Date	4	Date	Character	4	Date of inspection
Location (Name, Address) ☐Retailer (R) ☐Wholesaler (W) ☐Packer (P)	5	Inspection Location	Character	30	Name of location where inspection is taken place (mandatory)
	6	Address	Character	30	Street Address of where inspection is taking place
	7	City	Character	20	City
	8	State	Character	2	State
	9	Business Code	Character	2	Code for the type of Business (R, W, P)
added	10	Trade Sector Code	Character	4	Trade Sector Code
added	11	Commodity Classification	Character	4	Commodity Classification Code
	12	Specific Commodity	Character	30	specific commodity being inspected (I.e. whole milk)
	13	Brand Name	Character	20	packer or brand name of commodity being inspected (I.e. Bordens)
Lot Code(s)	15	Date code	Character	15	date code on package being inspected (lot codes)
	16	OT Codes	Character	15	other identification codes (packer codes)
Container Description	17	Tare Description	Character	12	type of package I.e. box, can
1	18	Labeled Quantity	Character	8	standard or random pack
2	19	Unit Meas	Character	15	.001 lb or drams (Need to ask if solid or liquid)
5	20	Lot Size	Numeric	6	lot size of packages available for inspection
6	21	Sample Size	Numeric	6	total number of items inspected (12, 24, 48)
13	22	Avg Tare	Numeric	4	average tare weight
13a	23	Moisture Loss	Character	1	Is Moisture loss a consideration? Y/N
18	24	Avg Error %	Numeric	9	percent error
19	25	Avg Error Unit	Numeric	9	error per unit of measure (If liquid use dram; If solid use .001 lb)
21	26	Std Dev	Numeric	6	Standard Deviation
24/25	27	Result	Character	1	Result of Inspection Pass or Failure. If Failure use failure code
	28	Surveillance	Character	1	Is Surveillance requested? Y/N
	29	Number of Inspectors	Numeric	3	Number of Inspectors by PY
	30	Cost	Numeric	7	Program cost per hour
	31	Time	Numeric	4	Total time spent on package inspections(travel, training)
	32	Jurisdiction Code	Character	2	Jurisdiction code - needs to be defined

Appendix B

Certification Summary

(As of June 30, 1996)

State	Total No. of Certif.	Total No. of People	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	24		14	12	5			12				
AK	23	13		7				1	10				5
AZ	28	28		28									
AR	129	42	20	19		9		10	40	16		2	12
CO	7	7				7							
CT	86	30		19	19			2	20	3	6	2	15
DE	5	5											5
DC	4	3							3		1		
FL	99	80	6	8	3	2		7	44	7	6		16
GA	29	24				4		8	17				
HI	94	12		11	12	10	10	11	8	10	10		8
IA	1	1				1							
ID	8	8							8				
IL	17	17		8				9					
IN	50	44						29		21			
KS	28	15	7	7				4	1				9
LA	9	9				8							1
MD	70	37				6			27	33	4		
ME	2	3				2		1					
MI	42	14				12		9		14		7	
MN	15	15							15				
MO	40	39							21				19
MT	7	7				7							
NE	42	19		2		7		7	15				11
NV	13	11		1		1		1	9			1	
NH	32	8	6	5	5			2	6	8			
NM	32	22		9					13			10	
NC	39	35							20				19
ND	3	3							3				
OH	248	96		46	26	24		33	51	47		7	16
OR	54	18	16	15				5	10		1	1	6
PA	108	56		26	4	7		8	27	18			18
PR	91	49		33					33				25
SD	28	13			7			12	8				1
TN	40	29				6		5	29				
UT	66	17	16	15		4		6	13			1	11
VT	23	9	4		2	3		5	8		1		1
VI	6	6						6					
VA	3	3				1						2	
WA	21	16		5					15			1	
WI	4	4										4	
Other													
GIPSA**	48	41				29	14	6					
Totals	1,737	932	75	278	90	155	24	187	486	177	29	38	198

* NTP Module 1 was incorporated in Module 2, now Course No. 202 (May 1994)

**USDA Grain Inspection/Packers and Stockyards Administration

Appendix C

Data as of June 30, 1996	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Annual Total	168	722	1,017	760	892	953	528	309	373	290	548	90
Cumulative Total	168	890	1,907	2,667	3,559	4,584	5,112	5,421	5,794	6,084	6,632	6722

NATIONAL TRAINING PROGRAM REGISTRY
SUMMARY OF ACTIVITY

(As of June 30, 1996)

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.)

Commodities: Level 600
601 Checking the Net Contents of Packaged Goods
602 Commodity Regulations

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. 601 Module 10	Course No. 602 Module 22	
AL			12	26	15	12	4		4	32						105
AK					7				1	10				12		30
AZ					51		30			23			25	17	1	147
AR	20		13		20		8		10	42	17		3	12		145
CA							1									1
CO							11			1				1		13
CT					31	20			2	28	6	12	2	18	26	145
DE						1	5				2			5		13

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. 601 Module 10	Course No. 602 Module 22	
DC	4				4					3		1				12
FL	13		43	41	24	15	10		13	70	8	8		39		284
GA				7		11	4		8	17						47
HI				4	12	12	10	10	11	11	10	10		20	6	116
ID				8	9		10		39	10			10		10	97
IL					8	1	1		9	23				2	1	45
IN			48	48	43	46	20		42	84	44		2		27	404
IA							5		17	4					2	28
KS	9		3	8	10	14	6		5	18	2			32		107
KY	8				8	1			5	19				16		57
LA							8							1		9
ME				4		3	2		11	14			6			40
MD			6		29		6			28	33	4			4	110
MA				12	23	4			7	16	31	2	4	3	1	103
MI			94	53	50		19		13	2	22		13	29		295
MN							1			12		2	2		1	18
MS						2	3		3							8
MO		3	63	22		13	2			40				27		170
MT				8		5	7		10	6			1			37
NE		14	17	27	17	4	7	14	30	24			2	18		189
NV			11	8	1		1		1	12			1		15	35
NH	6			6	5	7			3	7	8		2			44
NJ				172	21	21				108	109					431
NM					20		13			21			13	25		92
NY					74											175

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. 601 Module 10	Course No. 602 Module 22	
NC							2			18				19	16	57
ND				12				2		3		3	3			21
OH		36	66	103	74	47	45	4	53	65	64		10	56	12	635
OK			17	2		2			4	5				22		52
OR	18		23	16	17				8	12	13	1	16	16	12	152
PA	34		27	82	96	51	8		8	147	25		1	58	19	505
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	3	15	17	20	12	5		11	17			1	14		132
VT	6			5		3	3		9	11		1		1	2	43
VI		5							6	6			2	6		23
VA		39	9	43		24	5		16	26	25		4	38		229
WA	13		12	16	8				16	16			1		14	96
WV							3									3
WI	56		25	65	61				19	40	26		10	43		345
WY			11	3		11				16			10			51

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. 601 Module 10	Course No. 602 Module 22	
Other																
Associate Members										6		8	3	10		30
FGIS*				13												13
GIPSA				3			28	9	2							42
Total Trained	204	100	561	869	868	349	320	39	427	1147	446	52	161	686	176	6408
Percent of Total Certified[1]	37%	N/A	N/A	N/A	32%	25%	48%	61%	44%	42%	39%	56%	23%	29%	NA	27%

* Federal Grain Inspection Service

** USDA Grain Inspection/Packers and Stockyards Administration

[1]A total of 1,737 certificates have been awarded to 932 individuals under the NTP Certification Program.

***Module 1 was incorporated in Course 202 in 1994.

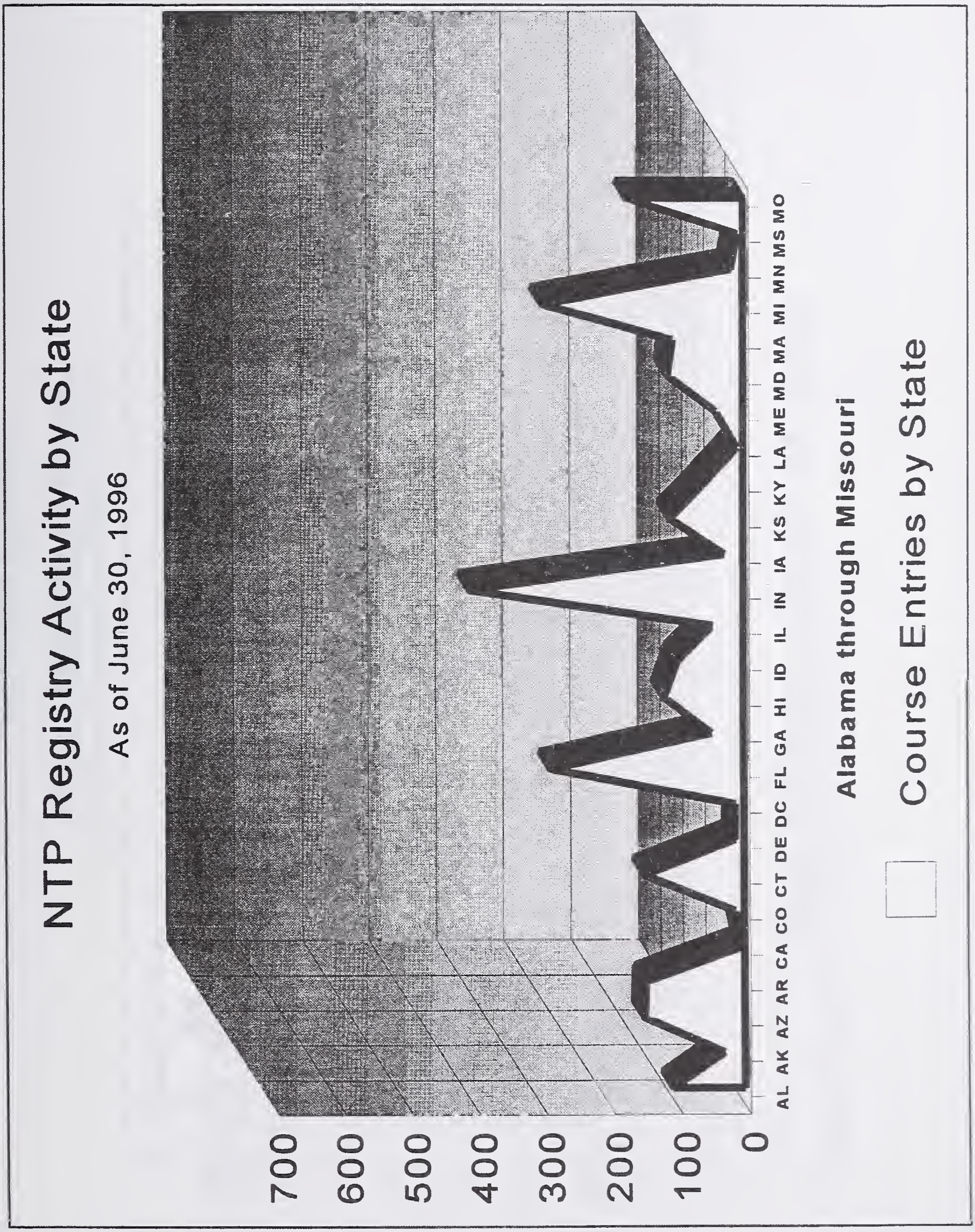
NATIONAL TRAINING PROGRAM REGISTRY
SUMMARY OF METROLOGY SEMINAR ACTIVITY
(As of June 30, 1996)

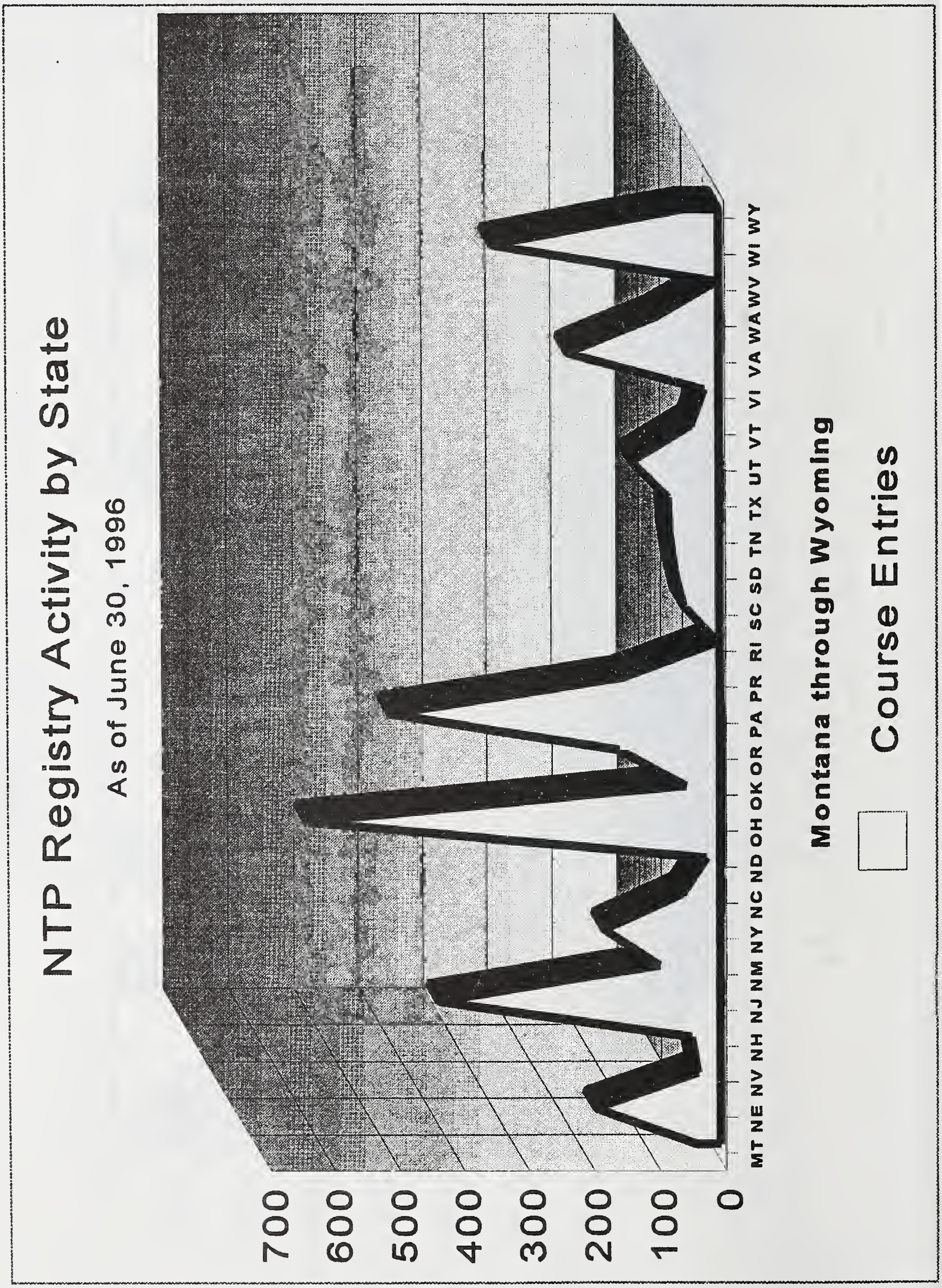
Courses Listed in the NTP Registry:

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			1
AK	1	2	1		4
AZ	3	3	3	1	10
CA			1	1	2
CO	2	2	1		5
CT			2		2
DE	1	1	2	1	5
FL	4	4			8
GA	1	1	1		3
HI	2	2			4
ID	1	1	1		3
IL	4	4	1		9
IN	1	1	2		4
IA	1	1	1		3
KS	2	2	2	1	7
KY	2	2			4
ME	2	2			4
MD	6	6	8		20
MA	1	1			2
MI	1	1	3		5
MS	1	1	1		3
MO	1	1	1		3
NE			2		2
NV	1	1			2
NH	1	1	1		3
NJ			1		1

Individuals Trained by Course					
	Course No.				
State	201	202	203	204	Totals
NY	2	2	2		6
NC	7	7	4	1	19
ND	2	2	2		6
OH	2	2	1		5
OK			1	2	3
OR	1	1			2
PA	1	1	2		4
PR	2	2	5		9
RI	1	3			4
SC	1	1			2
SD	1	1			2
TN	3	3	1		7
TX	3	3	2		8
UT		1			1
VA	3	3	3		9
WV	2	2	1		5
WI			2		2
Other					
Canada			2		2
Associate Members	47	17	16	12	92
GIPSA	1				1
Totals	120	93	82	19	314


NTP Registry Activity by State
As of June 30, 1996
700
600
500
400
300
200
100
0
AL AK AZ AR CA CO CT DE DC FL GA HI ID IL IN IA KS KY LA ME MD MA MI MN MS MO
Alabama through Missouri
Course Entries by State


NTP Registry Activity by State
As of June 30, 1996
700
600
500
400
300
200
100
0
MT NE NV NH NJ NM NY NC ND OH OK OR PA PR RI SC SD TN TX UT VT VI VA WA WV WI WY
Montana through Wyoming
Course Entries

Continuing Education Units (CEU's) Awarded By the National Conference on Weights and Measures (As of June 30, 1996)

Module Number	CEU's	No. of Participants	1985 Total	1986 Total	1987 Total	1988 Total	1989 Total	1990 Total	1991 Total	1992 Total	1993 Total	1994 Total	1995 Total	1996 Total	Grand Total
1	3.1	204		306.90	77.50	117.80	99.20	24.80		3.10	3.10				632.40
2.	3.1**	868		65.10	857.90	759.50	173.60	244.90	31.00	297.60	3.10	12.40	164.30		2609.40
4	3.1	349				492.90	198.40	170.50	145.70				74.40		1081.90
5	3.1	427			96.10	133.30	381.30	217.00	220.10	18.60	52.70	55.80	89.90	47.70	1312.50
6	3.1	39			12.40			55.80		15.50	6.20		31.00		120.90
7	3.1	320			12.40		248.00	117.80	80.60	80.60	130.20	43.40	179.80	99.20	992.00
8	2.8	1147		288.40	856.80	260.40	739.20	324.80	112.00	156.80	252.00	50.40	170.80		3211.60
10	2.8	686	75.60	372.40	302.40	128.80	417.20	120.40	148.40	123.20	177.20	27.70	16.80	11.20	1921.30
19	3.5	52						59.50	49.00	38.50			21.00	14.00	182.00
20	2.8	446			156.80	109.20	109.20	338.80	92.40			254.80	176.40	11.20	1248.80
21	3.5	161			105.00	129.50	147.00	52.50	31.50		42.00	52.50	3.50		563.50
22	2.45	179						230.30	191.10	2.45			14.70		438.55
23	1.00	100									57.00	36.00	6.00	1.00	100.00
24	1.5	561					15.00	402.00	156.00	34.50	34.50	84.00	93.10	15.00	834.10
27	1.1	857	155.10	402.60	165.00	88.00	36.30	22.00		24.20	53.90	18.50	1.10		942.70
Totals		6 396	230.70	1435.40	2642.30	2197.40	2564.40	2381.10	1257.80	795.05	811.90	633.50	1042.8	199.30	16200.65

**One Module 2 class with 74 participants was given only 2.00 CEU's.

* One CEU is equivalent to 10 contact hours of participation in an organized continuing education experience under responsible sponsorship, capable direction, and qualified instruction.

Continuing Education Units (CEUs) Awarded
By the National Conference on Weights and Measures
For Attendance at OWM Metrology Seminars
(June 30, 1996)

Course No.*	No. of CEUs**	Participants	1990 Total	1991 Total	1992 Total	1993 Total	1994 Total	1995 Total	1996 Total	Grand Totals
201	3.60	120	97.20	54.00	7.20	28.80		244.30		431.50
202	3.50	03	101.50	52.50	14.00	28.00		129.50		325.50
203	3.10	84	49.60	40.30	37.60	6.20		127.10		260.80
204	2.50	19				5.00		42.50		47.50
Totals		316	248.30	146.80	58.80	68.00	None	543.40	None	1,065.30

* Course No. 201: Basic Metrology I
Course No. 202: Basic Metrology II
Course No. 203: Intermediate Metrology
Course No. 204: Advanced Metrology

** One CEU is equivalent to 10 contact hours of participation in an organized continuing education experience under responsible sponsorship, capable direction, and qualified instruction.

Appendix D

Associate Membership Training Scholarships (0696)
(July 1, 1997 - June 30, 1996)

State	Region	Date of Request *	Scholar-ships Request ed	Scholar-ships Allotted	Type of Training	Use Planned	Status
AK	W	08/27/95	2	1	Modules 2 & 8 August, 1996 (maximum 20 students, Tom Stabler instructor)	Trainer expenses	Completion after 7/31/96 approved by AMC Chair
AZ	W	08/03/95	1	1	Module 10, Checking the Net Contents of Packaged Goods 1/96 (20 students, Barbara DeSalvo instructor)	Trainer expenses	Unable to use funds
CA	W	09/19/95	5	1	HB 133 (10 modules, 8 hours each requested, goal to train 200 inspectors, Dec 1995-Jan 1996, CA staff instructors)	Student expenses	Completed (approved for payment 01/18/96)
GA	S	09/27/95	2	1	Basic Scale & Petroleum, Spring 1996 (2 classes, 3 days each, Martin Coile & Curtis Williams instructors, 12 students each class)	Materials, travel, lodging per diem	Unable to use funds
IL	C	09/29/95	2+	1	Inspector training to implement uniform device inspection, 12/95 (21 students)	Student expenses (estimated at $5,817)	Completed (approved by payment 07/21/96)
IN	C	08/02/95	2	1	Module 7, Livestock and Animal Scales 11/27-12/1/95 (2 classes, 25 each, Jim Vanderwielen one instructor)	Student and trainer expenses	Completed (approved for payment 12/11/95)

Associate Membership Training Scholarships (0696)

(July 1, 1997 - June 30, 1996)

State	Region	Date of Request *	Scholar-ships Requested	Scholar-ships Allotted	Type of Training	Use Planned	Status
KY	S	09/11/95	1	1	Module 8, RMFD (25 students, Nov 1-5, 1995, Barbara DeSalvo instructor) did not take place	Trainer expenses	Session to be completed by 07/31/96)
MA	NE	08/18/95	1	1	Testing Vehicle Scales 1-day 6-hour course, Western MA W&M Assoc sponsor (50 students, C. Carroll & S. Berard instructors) W&M Admin & Maintaining database of work performed, 2/7/96, C Carrolll instructor. Handbook 133, 1-day, 2/26/96 (25 students, S. Berard Instructor)	Student and trainer expenses Meeting room rental	Completed (approved for $250 payment 02/27/96) Completed (approved for $250 payment 07/12/96)
ME	NE	09/25/95	1	1	HB 133(1 class, Feb 6-8, 1996, 19 inspectors, open to VT, NH, etc. Conrad Brown, instructor)	Training site expenses	Completed (approved for payment 03/06/96)
MI	C	09/28/95	5	1	Advanced W&M Admin, NTEP App in Field, HB 44 & Audit Trails (1 class, Feb 13-14, 1996, 60 students, Tom Stabler instructor)	Instructor and student expenses	Completed (approved for payment 03/06/96)
MN	C	09/29/95	1	1	Module 2 or Module 8 (1 class, Jan-May 1996, MN and outside State field staff, service agencies, Bruce Adams & Sherill Mullenmaster instructors)	Student expenses	Unable to complete (illness)
MO	C	08/28/95	2	1	Course 200, Intermediate W&M Admin, 10/16-20/95 (27 students, Tom Stabler instructor)	Student and trainer expenses	Completed (approved for payment 11/7/95)

Associate Membership Training Scholarships (0696)

(July 1, 1997 - June 30, 1996)

State	Region	Date of Request *	Scholar-ships Request ed	Scholar-ships Allotted	Type of Training	Use Planned	Status
MT	W	09/22/95	2	1	Module 21, LPG (Dec 1995, MT and contiguous States, Ken Wheeler instructor)	Trainer expenses	Completed (approved for payment 02/06/96)
NH	NE	08/03/95	1	Denied	Northeastern Measurement Assurance Program 9/25-29/95 (2 metrologists)	Expenses of metrologists (Request denied; did not meet intent of AMC for training of W&M field staff)	Denied
OH	C	08/17/95	1	1	How to Train Adults Seminar 11/7-8/95 (1 student, Ken Wheeler, Mary Weber, AMA, instructor)	Tuition and expenses	Completed ($395 tuition only claimed, approved for payment 11/27/95))
PA Bucks County	NE	09/13/95	2	1	HB 133 (2 Bucks Co sealers, NEWMA Conf May 20-23, 1996, Tom Coleman instructor)	Student expenses	Unable to use
PA	NE	08/10/95	1	1	7 regional 1-day 6-hour sessions on HBS 44 & 133, EPO's (100 students, Dean Ely, Rick Fogal, Don McGowan instructors)	Meeting rooms/course materials	Completed (approved for payment 8/17/96)
TX	S	09/29/95	1	1	HB 133 and LP Gas (2 classes, 32 hours each, dates TBD, 40 inspectors, Bobby Jackson & Harvey Fischer instructors)	Student expenses	Unable to use (Industry training rather than TX staff trained, expenses paid by TX Dept of Agriculture)

Associate Membership Training Scholarships (0696)

(July 1, 1997 - June 30, 1996)

State	Region	Date of Request *	Scholar-ships Request ed	Scholar-ships Allotted	Type of Training	Use Planned	Status
VA	S	08/04/95	4	1	HB 133 Supplement 4 during period 9/95-12/95 (32 w&m officials in 4 regions, Wes Diggs instructor)	Expenses of students	Completed (approved for payment 12/08/95)
VT	NE	09/25/95	1	1	HB 133 (2 students to attend NEWMA May 1996 conference, Tom Coleman instructor)	Student expenses	Completed (1 student only) $330.33 approved 07/12/96
WI	C	09/27/95	1	1	HB 133 (2 classes minimum, early 1996, total 38 State & local inspectors, Kathy Dresser instructor)	Student expenses, destructive package testing, instructor travel	Completed (approved 08/09/96)
Total	**S: 4 W: 4 C: 7 NE:5**		**39**	**20 $500 Scholar-ships**			

*The State of Utah's request for one scholarship was received after October 1, 1995, the date established by the Committee on Administration and Public Affairs for receipt of proposals to use scholarship funds.

Appendix E
Application for Associate Membership Scholarship/Grant Funds

The Associate Membership Committee (AMC) continues its commitment to training of weights and measures personnel. During the 81st Annual Meeting, the Associate Membership provided four $5,000 grants, one to each region, for the following purposes, all undertakings to be completed by July 31, 1997:

- media or public relations training (the A&P Committee is to be given the opportunity review the course outline and credentials of any proposed trainer);
- printing and/or mailing expenses related to regional newsletters; or
- as $500 scholarships for field training.

Purpose of request:
Dates of event:
Instructor(s) if appropriate:
Total number to be trained:

Estimate of Expenses

Instructor Fee(s)	Travel	Lodging	Meals	Other (identify)	Total
$	$	$	$	$	$

✓Signed: ______________________________ Date: ______________

Applicant

(Please print or type) Name/Title:
Agency/Organization:
Mailing Address:
City/State/Zip:
Telephone: Fax: E-Mail:

Please mail completed form to:

Tom Coleman/Joan Mindte
NCWM
Post Office Box 4025
Gaithersburg, MD 20885

NCWM Committee on Administration and Public Affairs
Associate Membership Grant/Scholarship Fund
Request for Disbursement of Grant/Scholarship Funds

Please provide the following information upon completion of training:

Type of training	
Dates	
Location	
Instructor(s)	
Total # in the Class	*Please return completed participant evaluations*

Summary

Date	Instructor Fee(s)	Travel	Lodging	Meals	Total
	$	$	$	$	$
Total Grant to each Region: $5,000 Note:Each scholarship is limited to $500 *(Receipts are required for all items claimed)*					

I hereby certify that the expenses listed are true and accurate.

Signed: ______________________ Date: ______________________

Claimant ______________________ Approved ______________________
NCWM Executive Secretary

Make check payable to: ______________________

Mail to: ______________________

____

Please mail completed form and vouchers to:
Tom Coleman/Joan Mindte
NCWM, Post Office Box 4025
Gaithersburg, MD 20885
Telephone 301-975-4868/301-975-4003

Appendix F
Incident/Accident Summary
(Thirteen forms have been completed and received as of June 30, 1996)

*The purpose of this form is **accident prevention**. Please incorporate this summary into your safety program documentation procedures. Completing this brief report will allow NCWM to alert other organizations and jurisdictions of hazards and possible corrective actions.*

1. What weights and measures function was the employee performing, where, and when?

Responses:

a. Routine small scale inspection in grocery store.
b. Using bottle cage & bottle to retrieve tank samples at coastal fuel facility.
c. Employee was exiting K-Mart following package inspection.
d. Inspector opened lower cabinet panel to inspect security seals, etc.; gust of wind blew dirt particles into eye.
e. Cleaning the floor drain in calibration bay in metrology lab.
f-1 Testing gas pumps.
f-2 Testing gas pumps.
f-3 Testing livestock scalae - with cart.
f-4 Testing bulk oil meter.
g. Driving weight truck.
h. Personal injury in performance of employee's job.
i. Two employees were inspecting marina gasoline pumps.
j. Employee involved in vehicle accident resulting in personal injury.

2. Briefly describe the incident.

a. Carried 30 lb. Weight kit, slipped on a wet surface (did not fall).
b. Employee extended arms & equipment in front of himself to lower into tank opening. The fuel terminal policy requires inspector to stand on walkway above the tank opening and not on the floating tank top.
c. Inspector stepped off curb, twisted ankle, landed on right knee.
d. Gasoline pump inspection at oil company.
e. Employee was picking up debris covering floor drain to allow water used in prover calibration to drain out of area.
f-1 Carrying 2 five-gallon test measures over uneven terrain; strained neck.
f-2 Carrying 2 empty five-gallon test measures down incline; severe ankle sprain.
f-3 Moving weight cart with handle in folded position; hand cut when cart whipped.
f-4 After weighing full 55 gallon barrel of oil, moving off scale, barrel slipped; employee grabbed it to keep from falling and strained sphincter muscle.
g. Rounded bend in road on foggy day; 500 lb. weight slid out of carrying compartment and fell off truck, bouncing on pavement into oncoming lane and across (no cars were in opposite lane).
h. Slipped on wet spot on floor while wearing steel-toed safety shoes.
i. Flash fire of gas vapor at fill box and opening of 6000 gallon fiberglass tank reported to fire marshal, who stated there was no fire; that a vapor fire extinguished itself. Ignition sources sought.
j. Employee was using seat belts; there was no mechanical or system failure.

3. **Contributing factors (check all that are appropriate):**

□ inexperience
□ lack of training
f-3 employee error
f-4 insufficient personnel
□ haste

d. g. weather conditions
□ equipment failure
□ failure to follow procedures
□ job fatigue
a. f-1 f-2 i. environmental conditions

□ improper equipment
e. lack of protective gear
i. hazardous materials
c. unsafe work surface
e. housekeeping
b.d. other

Comments:

c. Crack and hole in the road.
d. Incident could occur in number of outdoor work environments; employee wears corrective glasses; short of wearing safety shield, accident was unavoidable.
g. Installed a better compartment for carrying weights.
i. Potential of static ignition present when: low humidity, static charge potential on one or two surfaces, spark discharge of adequate energy, ignitable vapor to air mixtures, and means to generate static charge.
j. No preventive action taken, planned, or needed to prevent recurrence.

4. **Recommendations for corrective action:**

a. Use non-skid shoes, watch for wet areas.
b. Request assistance when sampling this type of tank.
c. Get in shape and start a daily exercise routine.
d. None at this time.
e. Employees will be advised to wear protective gloves when picking up debris
f. In testing gas pumps, if uneven surface, only carry one (1) can at a time; only move weight cart with handle extended; directive to staff: companies are to provide personnel to handle 55 gallon drums.
g. Install better compartments for carrying weights; possible regulation for carrying mass standards on highways (i.e., chaining in).
I. Investigate for potential source(s) of ignition of gasoline vapor; full inspection by gasoline pump service organization for electrical connections to tank and dispenser; fire marshal suggests bond and ground wires from funnel to gasoline container, and the funnel to available ground.

A blank summary form follows for your use.

Incident/Accident Summary

(To be completed & submitted unsigned, anonymously)

The purpose of this form is ***accident prevention****. Please incorporate this summary into your safety program documentation procedures. Completing this brief report will allow NCWM to alert other organizations and jurisdictions of hazards and possible corrective actions.*

1. What weights & measures function was the employee performing, where, and when?

____

____

____

____

____

2. Briefly describe the incident.

____

____

____

____

____

3. Contributing factors (check all that are appropriate):

- ☐ inexperience
- ☐ lack of training
- ☐ employee error
- ☐ insufficient personnel
- ☐ haste
- ☐ weather conditions
- ☐ equipment failure
- ☐ failure to follow procedures
- ☐ job fatigue
- ☐ environmental conditions
- ☐ other
- ☐ improper equipment
- ☐ lack of protective gear
- ☐ hazardous materials
- ☐ unsafe work surface
- ☐ housekeeping

Comments:

____

____

____

____

____

4. Recommendations for corrective action:

____

____

____

____

You may continue your comments on the back of this sheet

Please mail completed form to: Tom Coleman/Joan Mindte, NCWM, Post Office Box 4025, Gaithersburg, MD 20855 (telephone: 301-975-4868 or 301-975-4003))

Continuation of Comments on Numbered Items

1.

2.

3.

4.

Miscellaneous remarks:

The NCWM Committee on Education, Administration, and Consumer Affairs greatly appreciates your making the effort to complete and return this information for inclusion in the planned Safety Information Clearinghouse.

Metrology Subcommittee & Metrology Meetings

L.F. Eason, Chairman
North Carolina

Subcommittee Activities

Organization, Vision, Goals, and Strategy

The subcommittee was recently formed in response to the perceived need for communication between the Executive Committee and the metrology group. The group will have regional representation as appointed by the NCWM Chairman with a subcommittee chairman voted on by the group. The group discussed the mechanism for selection of the chairman, and decided that the position will be a 2-year rotation, selected by the group, with a vice chairman working closely with the chairman. L. F. Eason will continue as the Chairman of the Subcommittee for 2 years, and Ron Balaze will be the Vice Chairman. The subcommittee will focus efforts on issues that affect the entire NCWM and communication issues that affect all State laboratories and programs.

Small Volume Prover Evaluation

The Metrology Subcommittee reviewed the OWM Technical Evaluation and voted in support of changes to Handbook 44 that allow use of the small volume prover in meter testing. See the attached report in Appendix B. The section on Special Considerations is of particular concern.

Recommendations for Handbook 130

The Metrology Subcommittee reviewed drafts of Handbook 130, Uniform Weights and Measures Law, and Uniform Regulation for the Voluntary Registration of Servicepersons and Service Agencies for Commercial Weighing and Measuring Devices. Updates are being proposed to add definitions and changes in support of laboratory accreditation. The current language addresses the issue of maintaining traceability. Proposed language recognizes laboratory accreditation as the mechanism for ensuring traceability at the laboratory level. The second draft will be circulated to all metrologists for comment prior to submission to the Laws and Regulations Committee in the fall of 1996.

Status of Publications: Handbooks 105-2, 105-3, 105-4, 105-5, 105-6, 105-7

Handbook 105-2 regarding field standard glass flasks was published in June 1996. A final draft of Handbook 105-7 on small volume provers was circulated at the meeting. Expected publication dates for Handbook 105-7, Handbook 105-4 on LPG and Anhydrous Ammonia Provers, and Handbook 105-3 on Graduated Neck Type Provers are set for September. Handbooks 105-5 on timing devices and 105-6 on temperature measuring devices are expected in either September or October. OWM hopes to have all publications updated by the 1996 Combined Regional Metrology Meeting.

Regional Group Reports & Concerns

Regional reports were presented for the regional measurement assurance groups by the individuals listed below. Items of concern included past or current round robin activities, summary of past meetings, and plans for the 1996 Combined Regional Metrology Meeting or the dates and locations of the 1997 meetings.

- Western Regional Assurance Program (WRAP) - Joe Rothleder, CA
- Southeastern Measurement Assurance Program (SEMAP) - L. F. Eason, NC
- Northeastern Measurement Assurance Program (NEMAP) - Ron Balaze, MI
- MidAmerica Measurement Assurance Program (MidMAP) - James Akey, WI
- Southwest Assurance Program (SWAP) - Herb Eskew, TX
- Caribbean Measurement Assurance Program (MidMAP) - (José Torres, PR) presented by Archie Corbitt, USVI
- Industry Representative - Rick Calkins, Rice Lake Weighing Systems.

OWM Activities

State Laboratory Needs Assessment

Appendix A to this report lists a number of ideas obtained during a brainstorming session on State laboratory needs. The session focused on what NIST and OWM are doing or can do to support State weights and measures laboratories.

Draft Standard Administrative Procedures

Draft Standards Administrative Procedures were distributed for comment and discussion. Administrative procedures were intended for inclusion in NIST Handbook 145; however, based on input, the procedures will likely be published in a separate publication since laboratories will need to modify the procedures for their specific applications rather than simply adopt them.

Laboratory Accreditation & Traceability Panel

A laboratory accreditation panel was held during the General Session to provide an overview of traceability and laboratory accreditation. The session provided an opportunity for questions and answers regarding the direction of laboratory accreditation. The following people presented topics during the session:

- Opening Remarks, L. F. Eason, NC
- Traceability, Georgia Harris, OWM
- Mutual Recognition Agreements, Status of State Applications, Jim Cigler, NVLAP
- MN Laboratory Accreditation, Mike Blacik, MN
- CT Laboratory Accreditation, Mike Dynia, CT
- NIST Handbook 143, Georgia Harris, OWM

Status of NCSL Recommended Practice on Interlaboratory Comparisons

Process Measurement Improvement and alternative mechanisms for the conduct of interlaboratory comparisons and round robins were discussed. Input was provided for inclusion to the NCSL Recommended Practice.

Status of Publication Updates: Handbooks 143 & 145

NIST Handbook 143, Program Handbook, was published in June 1996 and advance copies were made available during the Laboratory Accreditation Panel. The updated Handbook 145 is still in draft form.

Appendix A
State Laboratory Support from NIST and OWM

The following list of items was obtained during a brainstorming session on OWM and NIST support for State Laboratories. Ideas were categorized in nine areas as follows.

1. **International Recognition of State Measurements**
   - needed, based on customer requests;
   - costs the State for NVLAP; possibility for incremental fee; long-term possibility of Congressional set aside?
   - costs in time for documenting and implementing; and
   - time: it is a real issue; labs must prioritize and put first things first.

2. **Accreditation**
   - training on interpretation of Handbook 143;
   - assistance in documenting "what is done";
   - documenting uncertainties;
   - training - demonstration of modifying documents;
   - training - implementation of documents; and
   - feedback on quality manuals.

3. **Survey**
   - needed to determine State lab workload - support for weights and measures activities vs. economic growth for businesses;
   - What do the States need? What is the payback on investments?
   - What is the foundation for measurements?
   - Estimates of workload:

   NC, MI, OK estimate: 5 percent to 25 percent legal metrology (internal staff and registered agents); estimates for registered agents are 10 percent to 25 percent of their work is in legal metrology; 75 percent + for support to industry: pharmaceutical, nuclear, health, environmental.
   CA estimates: 75 percent weights and measures, 25 percent industry [lab is shut down].
   CT estimates 25 percent internal staff, 25 percent registered agents, 50 percent industry.

[Support for legal metrology includes commercial weights and measures to fulfill Constitutional requirements and high level measurements to ensure traceability of laboratory standards and standards used in Federally regulated applications, e.g., DOD, DOE, FAA, NRC, FDA, USDA, and EPA.]

   - Need information to help influence NIST priorities (with Peter Heydemann's support);
   - Write to NIST requesting support; and
   - Evaluate what NIST does not need to do; what States do not need to do.

4. **Training**
   - uncertainties;
   - operation of new mass comparators;
   - standard deviations, between-time standard deviations [attend Advanced Mass Hands-On class];
   - automation [attend Advanced Mass Hands-On class];
   - Andy's software support - good;
   - Calibration intervals - getting data;
   - new handbook review; and
   - interpretation of HB 143.

5. **Software**
   - update current spreadsheets;
   - automation and interfacing;
   - current de facto software memo; and
   - number who have e-mail and Web access (5).

6. **Consultation Services**
   - NIST focus on training and consultation - changes over the years;
   - new laboratory and updated laboratory design review;
   - contact and consultation with calibration services to resolve problems;
   - get calibration staff to professional meetings for interaction;
   - e-mail, Web support;
   - fax-on-demand service; and
   - define questions collectively among the labs to get: write-ups, manuals, tech notes, software.

7. **Other NIST Support**
   - free/reduced calibrations;
   - equipment;
   - on-site assessments, training, consultation, support; and
   - current NIST focus with Omnibus Trade Act is on industry, instead of basic measurements, yet measurement supports industry.

8. **Calibration Intervals**
   - Workload adjustment - proper setting of calibration intervals and discussion [collect data, provide education].

9. **Federal Agency Auditor Requirements**
   - ICSP, ACIL laboratory accreditation and uniform standards requirements (contact Belinda Collins, Pat Cook);
   - Education of customers; and
   - Training for auditors.

Appendix B
NIST Technical Evaluation on
the Use of the Small Volume Prover as a Field Standard

Submitted by: Georgia L. Harris, Tina G. Butcher, and Juana S. Williams

Objective

Brooks Instruments has requested that the Small Volume Prover be recognized as a field standard for weights and measures meter verification activities in the United States. The only standard previously recognized has been the field standard test measure identified by NIST Handbook 105-3. Therefore, the objective of the technical evaluation was to determine the acceptability of the small volume prover as a standard and to evaluate the comparability of meter testing measurement results.

Recommendation

The NIST Office of Weights and Measures recommends that the dynamic small volume prover be recognized as a field standard for use by weights and measures officials in the official examination and verification of liquid metering devices. Based on data from laboratory tests, field tests, and associated measurement uncertainties due to known factors, the dynamic small volume prover has shown sufficient comparability to neck-type field standard provers and it operates adequately to meet the tolerance requirements of NIST Handbook 44. OWM concerns regarding the tests and practical implementation of the standard are addressed in the Special Considerations section.

Summary of Tests and Data Used in this Evaluation

The following lists include test data reviewed as a part of this evaluation of the small volume prover.

Calibration of the Small Volume Prover

(all witnessed by weights and measures officials)

• North Carolina Standards Laboratory	February 1994
• Florida Weights and Measures Laboratory	June 1994
• Brooks Instruments Facility (Statesboro, GA)	May 1996

Field Test Comparisons of Field Standard Test Measures and the Small Volume Prover

(all witnessed by weights and measures officials; testing a variety of meters and products)

• STAR Enterprise, Apex, NC	March 1994
• Southern Facilities, Selma, NC	September 1994
• Chevron, Jacksonville, FL	October 1995
• Amoco, Doraville, GA	May 1996
• Brooks, Statesboro, GA	June/July 1996 (not witnessed)

Existing Approvals and Countries Using the Brooks Compact Prover

(by foreign weights and measures authorities)

• Germany	1982
• Canada	1982
• Netherlands (Van Swinden Laboratorium)	1983
• Norway	1987
• Australia	1988
• Malaysia	1990
• Netherlands (NMI)	1987, 1990, 1991, 1992
• Japan	1991
• Sweden, Denmark, Hungary, Scotland	currently used for verification activities

Special Considerations

This section includes comments on the following issues:

- Traceability
- Publications
- Laboratory Equipment, Standards, and Training
- Field Operations
- Economics
- Opportunity for Improvements

• Traceability

Evaluation and acceptance of new standards must include a technical evaluation of the entire measurement process to ensure that technical decisions are based on valid data. Using an accredited laboratory for the evaluation of the standard does not provide evidence as to the validity of measurements made beyond the laboratory. Therefore, until evidence of accuracy and traceability has been verified throughout the entire system, all data must be thoroughly evaluated. Accreditation criteria, used to evaluate laboratories for the capability of making accurate and traceable measurements can be used to evaluate the measurement system beyond the laboratory. Laboratory accreditation requirements were established to ensure that a laboratory has the capability to make traceable measurements and proficiency tests are used to ensure that traceable measurements are made. Acceptable measurements at all levels require 1) the presence of suitable starting standards with verifiable traceability and sufficiently small uncertainties and 2) appropriate and documented procedures in which staff have received training. Proper use of the standards and proper adherence to the procedures is critical.

When evaluating this measurement data and its validity, the factors described below are considered departures from recommended practices and contribute additional uncertainties to the measurement process.

1. None of the field standard test measures used in field tests against the small volume prover met the specifications of NIST Handbook 105-3, 1979 edition.
2. Field standard test measures compared in field tests against the small volume prover were not all tested by accredited laboratories.
3. Based on training data in NCWM Publication 16, 1996, of the three States where field tests were conducted only one has completed training in Module 19 [now Course Number 304].
4. Field tests were not consistently performed in accordance with the Examination Procedure for Loading Rack Meters in NCWM Publication 12 (or the modified version of this submitted by Brooks in September 1993). For example, a slow flow test was not performed in all cases to enable analysis of the results over a range of flow rates. This was possibly due to a lack of standardized protocol for the comparison test and/or an unfamiliarity with the established test procedure in the EPO. None of the field tests included a slow flow test until specifically requested by NIST during the Doraville, GA tests on May 30, 1996.
5. Differences between laboratory calibration methods (gravity drain) and field testing applications (pump drain) for graduated neck-type provers add to the bias observed in these tests.

• Publications

A number of publications or draft modifications to current publications have been prepared by Brooks Instruments. These publications address each level of the measurement system - from calibration to field test of meters and training. The following handbooks are at various stages of development and must be published to fully implement the use of the small volume prover as a weights and measures field standard:

- American Petroleum Institute (API) Publications: API has had publications addressing the design and use of small volume provers since the 1980's; these publications are referenced as appropriate in the other drafts.
- Handbook 44, Specifications and Tolerances: Modifications are proposed to Handbook 44 by the NCWM S&T Committee as a voting item in 1996.
- Handbook 105-7, Specifications and Tolerances for Small Volume Provers: This draft handbook was prepared and circulated for comment in 1994 throughout the metrology laboratories and industry (through the API). It was presented at the 1994 NCWM Meeting in San Diego. It is expected to be published in 1996.
- Handbook 145, Draft SOP 26, Standard Operating Procedure for the Calibration of Small Volume Provers: This draft procedure was prepared and circulated for comment in 1994 throughout the metrology laboratories and industry (through the API). It was presented at the 1994 SEMAP metrology meeting in Richmond, VA, and the NCWM Meeting in San Diego. A calibration video was shown at the SEMAP meeting as well. It is expected

to be published in 1996 with the Handbook 145 update. Uncertainties may be further improved by gravimetric calibration of these devices.

- Publication 12, Examination Procedures Outline: Draft modifications were prepared in 1994.
- Training Course Number 304 (Module 19): Draft modifications were prepared in 1994.

• Laboratory Equipment, Standards, and Training

Metrologists will need specialized training on the operation of these unique devices since the procedure is different from routine volume transfer methods. The procedure was presented at the 1994 SEMAP and NCWM meetings. It will also be presented at the 1996 Combined Regional Metrology Meeting. Based on the complexity of the tests, it is recommended that hands-on training and interlaboratory comparisons be conducted to ensure proficiency.

State laboratories do not have suitable equipment and standards to test small volume provers. A list of equipment and estimates have been requested from Brooks. Laboratories will need a large water storage tank with suitable plumbing, valves, and pumps. Volumetric standards are currently used to test small volume provers. Manufacturers of small volume provers manufacture various size provers, which all require different size test standards. There is no uniformity between the manufacturers regarding the standards which would be needed in the laboratory as noted in the examples shown below.

Brooks	20 L (5 gal)	40 L (10 gal)	60 L (15 gal)	120 L (30 gal)	250 L (65 gal)	650 L (170 gal)	
Smith			57 L (15 gal)	159 L (42 gal)	318 L (84 gal)		

A "calibration kit" consisting of valves and connections can already be purchased with a small volume prover. Until laboratories are established to conduct this test, weights and measures jurisdictions will have no local source for calibration. It is recommended that laboratories be established for testing small volume provers on a regional basis, based on current large volume calibration capabilities, staffing, and likelihood of support and maintenance for such a program.

Improvements in the uncertainties associated with the calibration of small volume provers could be achieved through gravimetric calibration. This would require a suitable scale and mass standards rather than various size laboratory standards as noted above and may be less expensive. A gravimetric procedure has not been developed for laboratory calibration.

• Field Operation

• Stability

Until recently, no data was available to evaluate how long a small volume prover might remain stable in field applications. The Brooks Compact Prover that has been used for collecting field data in the United States has been in service for 6 years and was rebuilt in June 1996 (seals were replaced). The prover was rebuilt as a result of inconsistencies between fast flow and slow flow tests observed in May 1996. The calibration history for this small volume prover shows relatively good stability over time. A 6-month calibration cycle is recommended for new devices until the device has shown values repeating within the measurement uncertainty over three consecutive tests. At that time, the calibration interval may be extended to a 1-year cycle. Based on the operation of most weights and measures jurisdictions, where a prover is not in continuous use, it is recommended that the small volume prover be calibrated prior to a test and verification cycle.

• Maintenance and Care

Only one small volume prover has been used for collecting data in this report; it is a Brooks 12" model. A number of other small volume provers are in use by industry for in-line applications. Under these conditions, the provers are in constant use and are maintained in a "wet" condition. Small volume provers in weights and measures enforcement applications will likely be maintained similar to other large volume field standards; that is, provers will alternatively be used and stored, in wet and dry conditions where the seals have an opportunity to dry out.

• Training

The small volume prover technology is quite different from the neck-type large volume prover. Therefore, specialized training is critical for proper operation and use as a field standard. Publication modifications for training materials have already been prepared. As was recommended with the calibration of this device, it is expected that hands-on training is the only way to ensure proficiency in the use of a new standard with this level of complexity.

- **Economics**

The cost of a small volume prover system regarding purchase, maintenance, vehicles, laboratory setup, and training for both laboratory and field staff should be compared to field standard test measures and large volume provers. Establishing a network of calibration laboratories and jurisdictions using small volume provers, sufficient training for laboratory and field personnel, and obtaining adequate equipment and standards will be quite expensive.

The current calibration facilities, training (for laboratory and field staff), and traceability to NIST for the use of current volumetric standards is inadequate and resources must be devoted to improve these areas. Detailed evaluation of laboratories testing large volume provers indicated a number of deficiencies which will be addressed individually with each laboratory.

- **Opportunities for Improvement in the Volumetric Measurement System**

The implementation of the small volume prover as a field standard provides a number of opportunities for improvement in the volumetric measurement system:

- Test data from the fuel oil tests at Apex, NC showed the potential for adjusting meter linearity based on the flow rates. This is not possible with neck type large volume provers.
- Elimination of a meniscus reading will improve measurement uncertainties.
- The small volume prover is a closed system. Therefore, vaporization is minimized. Also, other products can be measured: viscous, toxic, cryogenic, LPG.
- During follow up tests at Brooks on the small volume prover, some discrepancies between the neck-type provers and the small volume provers were identified based on drain times on the neck-type prover. Discussion over how the laboratory should test the neck-type provers have been ongoing. The current procedure requires emptying by gravity rather than by pump; since the provers are used with a pump, discrepancies have been suspected. Since the small volume prover must be tested in the same manner it is used, then this discrepancy should also be eliminated.
- It has already been recommended that a gravimetric calibration procedure be developed to minimize calibration uncertainties.

Data Analysis

Many of the tests evaluated in this report were conducted with the idea that they were a "demonstration" for weights and measures officials rather than as a method to carefully collect data that would be evaluated at a later date. A strict test protocol was not developed and observed for most tests. Specific details and data are maintained in the NIST Office of Weights and Measures.

- **Laboratory Calibration**

Tests were conducted at the following laboratory facilities:

• North Carolina Standards Laboratory	February 1994
• Florida Weights and Measures Laboratory	June 1994
• Brooks Instruments Division (Statesboro, GA)	May 1996

Table 1 contains a summary of calibration data for the water draw calibration of the small volume prover. Both Brooks and NIST have developed spreadsheets (Quattro Pro and Excel) to handle the numerous calculations involved in the laboratory calibration of the small volume prover. Data is now available for the development of data sets that can be used at various laboratories to validate software prior to use. Review of calibrations using these spreadsheets revealed calculation errors from the field tests. The development of these spreadsheets should assist with uniform calculations and the minimization of calculation errors. The spreadsheets will be made available to State laboratories choosing to develop small volume prover calibration capabilities.

Table 1. Summary of Water Draw Calibration Data

Test No.	Location	Repeatability %	Standard Deviation (gal)
1	FL 1 Downstream	0.03380	0.00255
	FL 1 Upstream	0.03254	0.00262
2	FL 2 Downstream	0.00896	0.00073
	FL 2 Upstream	0.01011	0.00078
3	NC Downstream	0.01574	0.00128
	NC Upstream	0.00589	0.00045
4	Brooks 1 Downstream	0.00896	0.00012
	Brooks 1 Upstream	0.01105	0.00091
5	Brooks 2 Downstream	0.00631	0.00050
	Brooks 2 Upstream	0.02756	0.00232
	Average All	0.01536	0.00122
	Average Downstream	0.01328	0.00103
	Average Upstream	0.01743	0.00141

Laboratory calibration of the small volume prover was conducted using a 15-gallon neck-type prover which has been calibrated at NIST (with the exception of a neck calibration). Brooks has a documented procedure for calibration of the small volume prover in their facility. The water draw calibration was observed in the Brooks' facility in May 1996 and evaluated against the documented procedure. No significant technical concerns were raised; however, several sections of the procedure will be revised since they are used for construction of a small volume prover rather than for routine calibration.

Metrology staff in the North Carolina and Florida laboratories observed water draw calibrations in their facilities with numerous suggestions, particularly in Florida. The test reports indicated a number of concerns that were corrected in the second set of Florida data.

There was not a statistically significant difference in repeatability between the upstream and downstream operations. The overall repeatability using API methods was 0.015 percent. The overall standard deviation of the calibration process was 0.00122 gal (0.282 in^3). Using this standard deviation for the process and an uncertainty of 0.416 in^3 for the standard (the 1-sigma value for the 15-gallon standard from the NIST calibration report) according to the ISO Guide to the Expression of Uncertainty in Measurement (GUM), the root-sum-square uncertainty with a k-factor of 2 (for 95%) is at least $\pm$ 1.01 in^3, or 0.029 percent.

Additional components of uncertainty have been theoretically evaluated by Brooks and include:

- calibration of the standard prover (included);
- measurement process variability (included);
- corrections for temperature on the prover, measure, and water (calibrated and traceable equipment is used with suitable uncertainties; however, this does not account for possible errors or variability in use; storage and use of water temperature close to the reference temperature will minimize uncertainties);
- coefficient of expansions (for all materials);
- corrections for pressure (pressure gauges are calibrated with suitable uncertainties however this does not account for variability in the expansion of the prover under pressure); and
- compressibility of water used as a calibration medium.

Theoretical analyses (conducted prior to the GUM) show an estimate of 0.028 percent for the systematic error in the transfer of the laboratory standard to the small volume prover at reference conditions which is fully consistent with these initial observations. Additional data from interlaboratory comparisons is needed to fully evaluate the presence of errors or bias that will contribute to variability in the measurement system.

- **Field Tests**

Comparison tests between the small volume prover and graduated neck-type provers were conducted at the locations noted below. Data was collected for a variety of products and both turbine and positive displacement meters. A description of the tests that were conducted at each facility is described later.

- STAR Enterprise, Apex, NC — March 1994
- Southern Facilities, Selma, NC — September 1994
- Chevron, Jacksonville, FL — October 1995
- Amoco, Doraville, GA — May 1996
- Brooks, Statesboro, GA — June/July 1996 (not witnessed)

Table 2 contains a summary of results for meter testing using both the small volume prover and a graduated neck-type large volume prover. Figure 1 is a graph of the differences showing the relation to the acceptance tolerance and 1/3 of the acceptance tolerance as specified by NIST Handbook 44. The repeatability values noted in Table 2 for both the neck-type prover and the small volume prover for the seven data points evaluated were slightly less than one-third of the tolerance (0.067 %). Data shown in the summary table is an evaluation of the repeatability of meter factors for the entire set of data over time. The actual data for the small volume prover is collected in sets of 3 passes during the collection of product in the graduated neck-type prover. Agreement of the data for the individual passes is usually within 0.02 percent.

The overall comparability (bias) between the neck-type field standard and the small volume prover was within one-third of the NIST Handbook 44 acceptance tolerances and within the repeatability values for the tests. The agreement between the standards was less than 0.02 percent, which is very good considering all of the components of measurement uncertainty mentioned previously.

Observed discrepancies were noted during the Apex, NC, test due to meter linearity problems. Discrepancies were also noted in the Doraville, GA, slow flow test and later due to seal leakage in the small volume prover which was corrected by rebuilding the standard. It should be noted that even with leakage in the system, the results agreed to within one-half the acceptance tolerance. Another significant discrepancy was noted between the small volume prover and the neck-type standard due to drain times during follow up testing done at Brooks' facility in Statesboro, GA.

In evaluating the measurement uncertainty determined by combining the uncertainty for the calibration of the standards and the variability observed in use, both standards exceed one-third of the NIST Handbook 44 acceptance tolerance of 0.2 percent. This phenomenon is observed with 5-gallon field test measures as well. The acceptance tolerance for a 5-gallon test is 3 in^3. Data from laboratory calibrations, the measurement control systems, interlaboratory comparisons show an overall uncertainty of 1 in^3. When the standard is then used in the field by a service agent or weights and measures official, the uncertainty is at least doubled due to field conditions, conditions inside the prover, reading the meniscus, and drain times. The combined uncertainties therefore take approximately two-thirds of the Handbook 44 tolerance (or 0.17%).

Table 2. Summary of Field Test Comparison Data

Test	Meter	Product	No. Runs	Flow Rate (ave gpm)	SVP* % Repeatability	TM** % Repeatability	Bias %	
Test	TM	Unl Reg	12	400	0.0608	0.0467	0.0175	
A2	TM	Unl Sup	2	600	0.0015	0.0129	-0.0058	
A3	TM	#2 FO	6	450	0.0713	0.2027	-0.3385	not included in averages
A3	TM	#2 FO	3	460	0.2169	0.0281	0.4936	not included in averages
A3	TM	#2 FO	3	460	0.0162	0.0281	0.0363	weighted for meter linearity, not included
S1	PD	Unl Reg	3	545	0.0173	0.0287	-0.0297	
S2	PD	Unl Reg	6	595	0.0301	0.0192	-0.0266	
J1	TM	Unl Reg	5	500	0.0635	0.0853	0.0265	
D1	TM	#2 FO	6	400	0.0159	0.01	0.0217	
D2	TM	#2 FO	6	175	0.183	0.12	0.1153	slow flow test leakage noted
				Average:	0.0532	0.0461	0.0169	not including A3 points (7 data points)
SB1	TM	Water	3	400	0.0255	0.0152	0.0322	SVP evaluation
SB1A	TM	Water	14	200	1.2719	1.3445	-0.0342	SVP evaluation
SB2	TM	Water	6	165	0.0122	0.0235	0.0505	rebuilt
SB2A	TM	Water	5	400	0.0815	0.121	0.0835	rebuilt
SB3	TM	Water	6	150	0.1195	0.0165	0.0091	rebuilt
SB3A	TM	Water	3	500	0.0084	0.0093	0.0468	rebuilt
SB3B	TM	Water	5	500	0.0462	0.018	0.041	rebuilt
SB4	TM	Water	5	550	0.3934	0.3938	0.174	normal drain
SB4A	TM	Water	4	550	0.3934	0.3934	0.026	6 min drain
				Average:	0.135	0.1239	0.0477	not including SB1A

*SVP = Small Volume Prover

**TM = Graduated Neck-Type Prover (Test Measure)

Description of Tests

STAR Enterprise, Apex, NC **March 1994**

A1: Fast flow tests were conducted on unleaded regular gasoline with turbine meters; nothing unusual is noted. Results were good and data is included in the analysis.

A2: Fast flow tests were conducted on unleaded super gasoline with turbine meters; nothing unusual is noted. Results were good and data is included in the analysis.

A3: Fast flow tests were conducted on #2 fuel oil with turbine meters. Results from the first two runs were analyzed and it was noticed that the meter linearity was a problem. These two points are shown in Figure 1 as the points outside the acceptance tolerances. The third A3 point shows a randomized analysis of the second set of small volume prover data and is weighted for meter linearity from the start-up, shut-down, and fast flow passes of the small volume prover. It is not possible to conduct this type of analysis with the graduated neck-type prover. Agreement between the two provers is shown in the third set.

Southern Facilities, Selma, NC **September 1994**

S1: Fast flow tests were conducted on unleaded regular gasoline with positive displacement meters; nothing unusual is noted. Results were good and data is included in the analysis.

S2: Fast flow tests were conducted on unleaded regular gasoline with positive displacement meters; nothing unusual is noted. Results were good and data is included in the analysis.

Chevron, Jacksonville, FL **October 1995**

J1: Normal tests were conducted on unleaded regular gasoline with turbine meters; nothing unusual is noted. Results were good and data is included in the analysis.

Amoco, Doraville, GA **May 1996**

D1: Fast flow tests were conducted on #2 fuel oil with turbine meters. Results were good and data is included in the analysis.

D2: Slow flow tests were conducted on #2 fuel oil with turbine meters. Results showed poor repeatability and poor agreement between the small volume prover and the graduated neck-type prover. Leakage in the small volume prover was suspected. Data is included in the analysis and additional testing was conducted at the Brooks' Statesboro, GA, facility to follow up.

Brooks, Statesboro, GA **June/July 1996 (not witnessed)**

SB: A number of tests and analyses were conducted on water with turbine meters as a follow-up to the Doraville, GA, tests. This data is considered "experimental" in comparing results between the small volume prover and the graduated neck-type provers. Agreement between the provers is within one third of the tolerance.

SB1: Comparison between the fast flow and slow flow tests again showed a discrepancy resulting in a replacement of the small volume prover seals.

SB: Subsequent tests were an investigation of proper drain times and evaluation of retention characteristics in the graduated neck-type prover. The prover was calibrated by the Fuel Division of the State of Georgia prior to these tests, but was washed during these comparisons.

SB4: Comparison of drain times shows the bias resulting from the normal use of the graduated neck-type prover and a 6-minute pump off with a 6 minute drain. The 12 minutes approximates the calibration time from a gravity delivery according to the SOP followed by a 30-second drain.

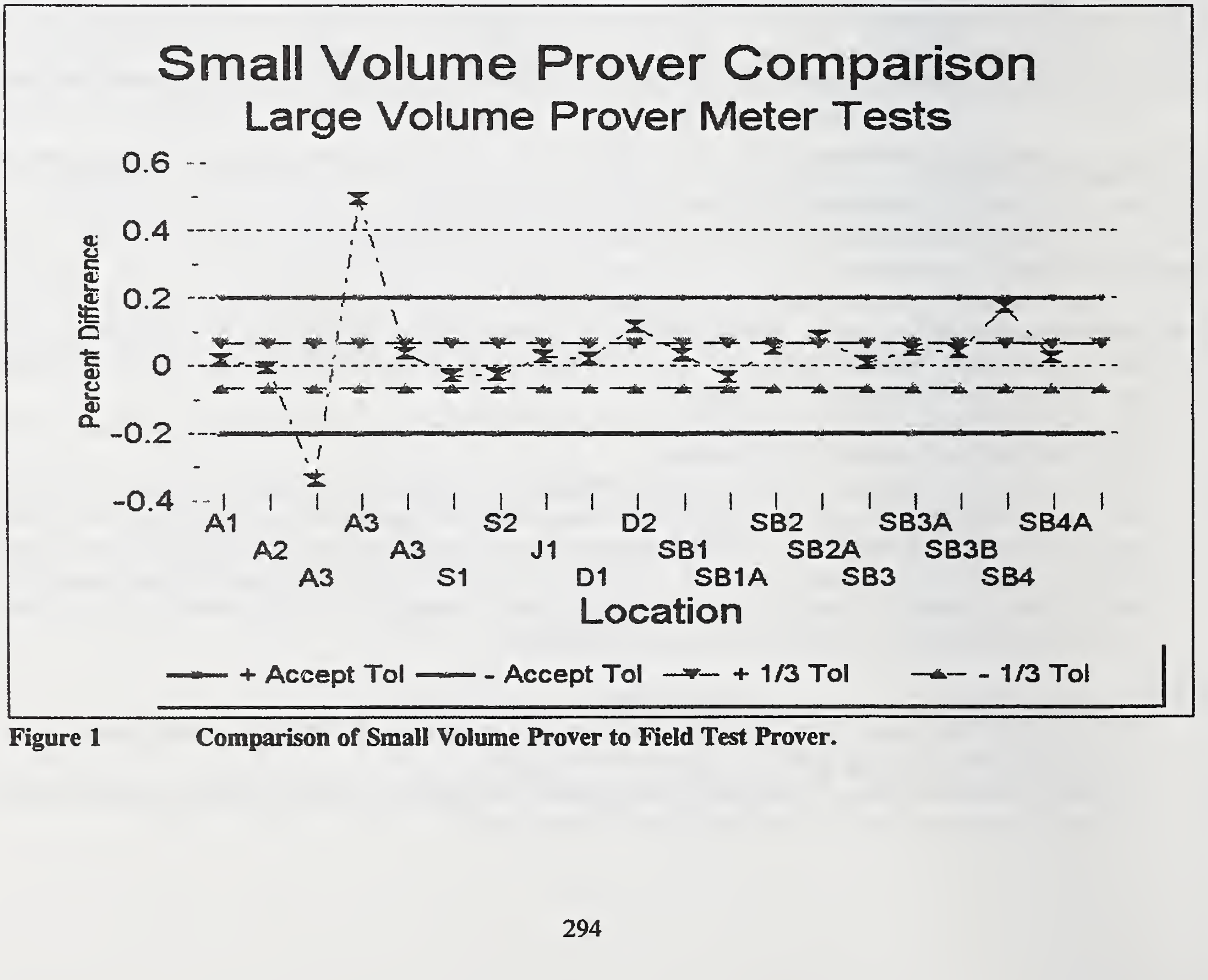


Figure 1 **Comparison of Small Volume Prover to Field Test Prover.**

Report of the Resolutions Committee

Archie Lambert, Chairman
Program Manager Weights and Measures Division
Louisiana Department of Agriculture and Forestry

Reference
Key No.

700

GENERAL

The Resolutions Committee wishes to express the appreciation of the members of the National Conference on Weights and Measures to those persons who contributed their time and talents toward the arrangements for the conduct and success of this 81st Annual Meeting. Special votes of thanks are extended:

(1) to Bob Odom, Commissioner of Agriculture and Forestry, State of Louisiana, for his welcoming remarks during which he indicated his support of the work of the Conference, and all of weights and measures;

(2) to the Louisiana Department of Agriculture and Forestry, particularly Director of Weights and Measures Ronald Harrell, Assistant Director of Weights and Measures Melvin Lyons, and all of the Louisiana Weights and Measures staff for the hospitality extended to the Conference and their assistance in the preparation for and conduct of the 81st Annual Meeting;

(3) to Sergeants at Arms, Ike Lawson and Cecil Shivor, Louisiana Department of Agriculture and Forestry Weights and Measures;

(4) to Captain Tom Marhevko, United States Coast Guard, the U.S. Coast Guard, New Orleans, Regional Color Guard, and Mona Bond, Associate Professor of Voice, Loyola of New Orleans University, for their professional and enjoyable contributions to the Opening Session of the 81st Annual Meeting;

(4) to Dr. Peter L. M. Heydemann, Director of Technology Services of the National Institute of Standards Technology (NIST), for his remarks to the membership concerning the importance of uniformity in national and international weights and measures standards and practices;

(5) to Charles A. Gardner, Chairman, and the officers and appointed officials of the National Conference on Weights and Measures for their assistance and service toward progress on national issues;

(6) to committee members for their efforts throughout the past year preparing and presenting their reports; to the subcommittees and work groups for their discerning and appropriate recommendations;

(7) to regulatory officials of State and local jurisdictions for the advice, interest, and support of weights and measures administration in the United States;

(8) to representatives of business and industry for their cooperation and assistance in committee and Conference work, most especially the continuing support as demonstrated by the granting of scholarships for training; to the Associate Membership organization for the hospitality exhibited in sponsored social functions and in particular to Richard L. Davis, Manager of Product Safety and Industry Standards, James River Corporation, for arranging the excursion to Mardi Gras World for the enjoyment of Conference members and their guests;

(9) to the staff of the Westin Canal Place Hotel for their assistance and courtesies, all of which contributed to the enjoyment and comfort of the delegates within their outstanding facilities; and

(10) to the National Institute of Standards and Technology and its Office of Weights and Measures for their dedicated assistance in planning and conducting the work and program of the National Conference on Weights and Measures, especially to Ann Turner, Phillip Bryson, and Michele Krebs, for their professional and hospitable conduct of the administrative operations of the meeting; to Dr. Gil Ugiansky for his participation and for his continued support.

On this occasion of the 81st Annual Meeting of the National Conference on Weights and Measures, the Committee wishes to recognize and express its appreciation to the following individuals:

(1) to Otto K. Warnlof, now retired, former Technical Advisor to the NCWM Specifications and Tolerances Committee and a public sector member of the National Type Evaluation Technical Committee, for his contributions to these technical programs, and especially for serving as the NCWM liaison with relevant technical activities of the International Organization of Legal Metrology in his former position as Senior Standards Specialist, Standards Management Program, NIST Office of Standards Services.

(2) to Ann H. Turner, Weights and Measures Coordinator, NIST Office of Weights and Measures, upon her impending retirement, in grateful appreciation for her 19 years of dedicated service to the National Conference on Weights and Measures and her tireless efforts as Conference Coordinator in the planning, coordination, and conduct of meetings of the Conference and its committees that have been consistently enjoyable and always of the highest quality.

A. Lambert, Chairman
J. Bane, Iowa
J. Hile, AR
V. Massey, Shelby Co., TN
C. Pittman, TN
J. Silvestro, Gloucester County, NJ
D. Wallace, CO

J. Mindte, NIST, Coordinator

Resolutions Committee

Report of the Nominating Committee

James C. Truex, Chairman
Inspections Manager Weights and Measures
Department of Agriculture
Ohio

Reference
Key No.

800

The Nominating Committee met during the Interim Meeting at the Radisson Bahia Mar Hotel, Fort Lauderdale, Florida, and nominated the persons listed below to be officers of the 82nd National Conference on Weights and measures. In the selection of nominees from active membership, consideration was given to professional experience, qualifications of individuals, Conference attendance and participation, and other factors considered to be important.

Two members of the committee were unable to be present during the meeting; members Ken Simila and N. David Smith were consulted by way of telephone in reaching consensus. The following slate of officers was selected by unanimous vote of the Nominating Committee:

CHAIRMAN-ELECT:	Steve Malone, Nebraska
VICE-CHAIRMEN:	Mike Pinagel, Michigan Lou Straub, Maryland Aves Thompson, Alaska A. Courtney Yelle, Bucks County, Pennsylvania
EXECUTIVE COMMITTEE:	Sharon Rhoades, Arizona Gary West, New Mexico
TREASURER:	J. Alan Rogers, Virginia

J. Truex, Ohio, Chairman

S. Colbrook, Illinois
T. Geiler, Barnstable, Massachusetts
A. Nelson, Connecticut
S. Rhoades, Arizona
K. Simila, Oregon
N. David Smith, North Carolina

Nominating Committee

Report of the Auditing Committee

Monty Hopper, Acting Chairman
Director of Weights and Measures
Kern County, California

Reference
Key No.

900

The Auditing Committee met on Sunday, January 21, 1996, during the NCWM Interim Meeting in Fort Lauderdale, Florida. The purpose of the meeting was to review the financial reports of the Conference Treasurer.

Committee member Richard Philmon, Illinois, was unable to attend the meeting. The following persons were also in attendance:

- Fred Clem, Assistant Treasurer
- J. Alan Rogers, Treasurer
- Ann H. Turner, Weights and Measures Coordinator

The Auditing Committee finds the financial reports of the Conference Treasurer to be in order and correct, according to Conference procedure.

M. Hopper, Kern County, California, Acting Chairman

R. Kalentkowski, Chairman, Connecticut

R. Philmon, Illinois
R. Williams, Tennessee

Ann H. Turner, NIST, Technical Coordinator

Auditing Committee

NCWM GENERAL ACCOUNT
FISCAL YEAR REPORT
1/1/95 - 12/31/95

Category Description			
INCOME/EXPENSE			
INCOME			
Income Accounts:			
Associate Membership Tran	-15.00		
Account Origination Fee	1.00		
Earned Interest	2,763.95		
[1]Grain Equip. Cooperative Agreement	9,328.27		
		12,078.22	
Membership Fees:			
Associate Membership Fees	70,605.00		
Government Membership Fees	51,135.00		
Total Membership Fees		121,740.00	
NTEP Seminars:			
Metrology Seminars	25,260.00		
Total NTEP Seminars:		25,260.00	
Other Income:			
Industry Non-Member CEU	31.50		
[2]Miscellaneous	1,647.05		
Other Income - Other	31.50		
Total Other Income		1,710.05	
Promotions		497.70	
Publications:			
HB-133 Third Edition Sales	1,749.25		
NCWM Publications Sales	502.00		
NTEP Training Module Sales	395.00		
Videos Sales	142.50		
Total Publications		2,788.75	
Registration Fees:			
Annual Meeting	45,525.00		
Interim Meeting	25,375.00		
Total Registration Fees		70,900.00	
Services Revenues:			
Annual Mtg. Opt. Evening	20.00		
Total Services Revenues		20.00	
Total Income Accounts			234,994.72
TOTAL INCOME			234,944.72

EXPENSES		
Expense Accounts:		
Administration:		
Bank Charges	86.51	
Contracts/Personnel	19,292.92	
Equipment/Supplies/Stationary	1,174.40	
Mailing/PO Box	172.00	
Miscellaneous	160.00	
NTP/CEU/Copyright/Equipment	1,921.00	
Treasurer Bond	698.00	
Total Administration		23,504.93
[3]Chairman/Chairman Elect	16,696.50	
[1]Grain Moisture Task Force	5,441.12	
		22,137.62
NCWM Annual Meeting Expenses.:		
AV Equipment & Supplies	373.86	
[4]Awards	2,758.66	
Hotel/Food Service	18,668.73	
Print Announcement	13,325.00	
Photographer	620.25	
Printing/Copying	1,918.35	
Miscellaneous	797.27	
Total NCWM Annual Meeting		38,462.12
NCWM Interim Meeting Expenses:		
Hotel/Food Service	18,607.04	
Print Agenda	6,638.00	
S & T Committee	2,226.35	
L & R Committee	1,681.50	
A & P Committee	2,308.95	
Other Committees/TF's	1,322.51	
	1,540.21	
Printing/Personnel/Equipment/Misc.	6,214.15	
Executive Committee		40,538.71
Total NCWM Interim Meeting		
NTP Seminars:	9,686.92	
Metrology Seminars		9,686.92
Total NTP Seminars		
Other Meetings-Committees	6,933.17	
Exec. Com. Strategic Planning	1,162.31	
L&R/H133 Work Group	4,312.31	
Education	1,652.45	
Annual Committees	3,915.13	
[5]Other		17,975.37
Total Other Meetings-Committees		
Other Meetings/Task Force	1,495.90	
Petroleum Subcommittee		1,495.90
Total Other Meetings/Task Force		
Printing	10,618.14	
Membership	12,817.00	
NCWM Pubs for Members	1,362.00	
Miscellaneous		24,797.14
Total Printing		

Promotional	9,786.35		
Special Events	-1,847.99		
Task Force & Special Meetings	4,992.00		
		12,930.36	
Total Expense Accounts		191,529.07	
TOTAL EXPENSES			191,529.07
TOTAL INCOME/EXPENSES			43,465.65
Carryover 12/31/94			105,078.54
Year Ending Balance 12/31/95			148,544.19
Account Balance 12/31/95			148,544.19
Difference			-0-
Year End Adjusted Balance			148,544.19

1. Grain Equipment Cooperative Agreement moved to NTEP mid-year.
2. Other Income - Miscellaneous includes: $733.30 return of travel advance
   $733.50 return of deposit for multi-dimensional meeting
3. Chairman/Chairman Elect - Includes annual cost and advances for FY 1996.
4. Awards - Includes costs for current year and FY 1994.
5. Other meetings includes costs for HB 133 training and Budget Review Committee & Strategic Planning.

NCWM NTEP ACCOUNT
FISCAL YEAR REPORT
1/1/95 - 12/31/95

Category Description			
INCOME/EXPENSE			
INCOME			
Income Accounts:			
Account Origination Deposit		1.00	
Earned Interest		739.59	
NTEP Operations			
CoC Maintenance Fees	118,795.00		
Publications 5 & 14 Sales	7,136.25		
Sales of NTEP Sales	3,475.00		
Total NTEP Operations		129,406.25	
Total Income Accounts			130,146.84
TOTAL INCOME			130,146.84
EXPENSES			
Expense Accounts:			
Administration:			
Bank Charges	43.51		
Total Administration		43.51	
Grain Moisture Task Force		5,700.61	
NTEP Operations:			
Board of Governors	895.31		
NTEP Publication 5 and 14	10,019.87		
NTETC Belt Conveyor Scale	689.69		
NTETC Measuring Sector	6,967.76		
NTETC Weighing Sector	10,327.25		
Participating Lab Training	260.20		
Automatic Weighing System	2,682.50		
US/Canada Work Group	6,403.21		
Personnel	506.10		
Total NTEP Operations		38,751.89	
Software Work Group Meeting		1,098.20	
Total Expense Accounts			45,549.21
TOTAL EXPENSES			45,594.21
TOTAL INCOME/EXPENSE			84,552.63
Carryover 12/31/94			185,754.13
Year Ending Balance 12/31/95			270,306.76
Account Balance 12/31/95			270,307.16
Difference			.40
Year Ending Adjusted Balance			270,307.16

NCWM ASSOCIATE ACCOUNT
FISCAL YEAR REPORT
1/1/95 - 12/31/95

Category Description			
INCOME/EXPENSE			
INCOME			
Income Accounts			
Account Origination Fee		1.00	
Earned Interest		265.17	
Membership Dues	30,000.00		
Deposits Returned	2,544.00		
Total Income Accounts			32,810.17
TOTAL INCOME			32,810.17
EXPENSES			
Expense Accounts:			
Service Charges	12.49		
Training Grants	7,303.00		
Conference Outing	15,154.66		
Total Expense Accounts			22,470.15
TOTAL EXPENSES			22,470.15
TOTAL INCOME/EXPENSE			10,340.02
Carryover 12/31/94			21,118.38
Year Ending Balance 12/31/95			31,458.40
Account Balance 12/31/95			31,458.40
Difference			-0-
Year Ending Adjusted Balance			31,458.40

NCWM GRANT ACCOUNT
FISCAL YEAR REPORT
1/1/95 - 12/31/95

Category Description				
INCOME/EXPENSE				
INCOME				
Income Accounts:				
Earned Interest		30.01		
Total Income Accounts				30.01
TOTAL INCOME				30.01
EXPENSES				
Expense Accounts:				
Purchase of Slides	257.50			
Total Expense Accounts				257.50
TOTAL EXPENSES				257.50
TOTAL INCOME/EXPENSE				227.49
Carryover 12/31/94			3,338.79	
Year Ending Balance 12/31/95			3,111.30	
Account Balance 12/31/95			3,111.30	
Difference			-0-	
Year Ending Adjusted Balance			3,111.30	

New Chairman's Address

Barbara J. Bloch, Assistant Director
California Division of Measurement Standards

Good morning, everyone. Charlie, would you please remain at the podium, and I would ask Steve Malone, our Chairman Elect, and Paul Zalon, our new Chairman of the Associate Membership Committee to join us up here for the remainder of the session.

It is truly an honor and a privilege to be here today assuming the role of Chairman. In 1983, when I attended my first National Conference, it never seemed possible to me that day that I would be standing here as Chairman. It is a very sobering thought, following in the footsteps of the many fine former Chairmen, and living up to the standards they have set. However, I will do my level best to serve you and the Conference.

This past year has been one of the most challenging and enjoyable of my entire career. I've crisscrossed the country several times attending various meetings, having the "easy" job of Chairman in training, watching and admiring the professionalism and expertise of Charlie Gardner. He has been an outstanding role model and mentor. Thank you, Charlie, it has been a real pleasure to work with you.

Also, this was certainly not an easy year to serve as Chairman, with the Federal budget problems, the furloughs, and the weather problems, but Charlie was pretty unflappable. I've already been offered my first challenge, with Ann Turner's retirement announcement. Since I can't imagine a Conference without Ann, it was great news to hear that she may continue to work part time, handling meeting planning, the newsletter, and other projects.

I am a strong supporter of the team approach in getting things done, and it is my plan to work closely with Charlie, Steve, Paul and the Associate Membership Committee, and Gil Ugiansky and his fine staff, to guide the Conference through this next year. I would like to call on all the Conference membership to actively participate in our future. Over this past year, I've had many offers of assistance, and in making the appointments to the various Committees, everyone has enthusiastically accepted. This is a fine organization, and working together, there is no limit to what we can accomplish.

Over the past year and a half, the Executive Committee and the Strategic Planning Subcommittee have worked to look to our future, and while we're not as far ahead as we hoped we would be at this time, we have published vision, values, mission, and goals statements, which sets the tone for the future.

As is traditional with all new Chairmen, I've selected a theme for this coming year. I hope it adequately demonstrates my interest and strong support for the global marketplace in which we play such a major role, and for our ability to influence emerging economies with U. S. standards. This year's theme is:

"Fostering International Harmony in Legal Metrology."

Because of the work in progress before us, my goals for the coming year are to focus on areas identified in our long range planning efforts. *These include:*

- Continuing to develop and refine the Conference long range plan, with a next step of working to identify our objectives. Your input is critical to this project. Visions, values, goals, and objectives are only words without commitment and action.

- Expanding the training efforts-this year NIST has played a major role in providing "train the trainer" classes, which have been outstanding. I would like to add my thanks to Peter Heydemann for demonstrating his support to this effort by providing the necessary funds. There are several classes still planned, and the Conference has additional grant funds which are also planned for training.

- Continuing the work of the Program Evaluation Work Group, which is currently piloting a data management project for package inspection and retail motor fuel dispensers. Their next meeting is in August, when they will be reviewing their progress.

- Continuing our mutual recognition projects with Canada and expanding into reciprocal agreements with OIML. The "one stop shopping" approach has many benefits for all of us. I would like to applaud the efforts to date, as we have seen that it can work.

- And finally, continuing to encourage and support the work of the Committees, Subcommittees, working groups, and task forces of the Conference. You do a yeoman's job, and through your efforts the Conference moves in a positive direction.

At this time, it is my pleasure to make the following appointments:

Specifications & Tolerances Committee: George Shefcheck, State of Oregon, a 5-year term;

Laws & Regulations Committee: Robert Williams, State of Tennessee, a 5-year term;

As **Associate Member Representative to the Laws & Regulations Committee**, Claire Regan of the Grocery Manufacturers of America;

Administration & Public Affairs Committee: Richard Philmon, State of Illinois, a 5-year term;

Budget Review Committee: William Corey, American Frozen Foods, a 4-year term;

Assistant Treasurer, Fred Clem, Columbus, Ohio a 1-year term;

Chaplain, Mike Hile, State of Arkansas, a 1-year term;

Nominating Committee: a 1-year appointment -

N. David Smith, North Carolina
Tom Geiler, Massachusetts
Allan Nelson, Connecticut
Darrell Guensler, California
Sid Colbrook, Illinois
Jim Truex, Ohio.

I would also like to announce the new officers in the **Associate Membership Committee**; in addition to Paul Zalon, as Chairman, Bob Fuehne is Vice-Chairman, and Frances Holland is Secretary-Treasurer. As always, your support is very much appreciated.

To all of the new appointees, thank you for your continued commitment to the Conference.

I would also like to acknowledge the importance of the retirees and guests and the contribution they make to a meeting environment that is so productive.

In closing, I owe many thank you's for all the support and encouragement I've received over the years. I sincerely appreciate your faith in me, and pledge to serve to the best of my ability.

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