

NIST SPECIAL PUBLICATION 816

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# Report of the 76th National Conference on Weights and Measures

## 1991





Report of the  
**76th National Conference on  
Weights and Measures 1991**

*Sponsored by the National Institute  
of Standards and Technology,  
Attended by Officials from the  
Various States, Counties, and Cities, and  
Representatives from U.S. Government,  
Industry, and Consumer Organizations  
Philadelphia, PA July 14–19, 1991*

Report Editors:

Carroll S. Brickenkamp  
Ann H. Turner



*U.S. Department of Commerce*  
**Robert A. Mosbacher, Secretary**

*National Institute of Standards and Technology*  
**John W. Lyons, Director**

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## Abstract

The 76th Annual Meeting of the National Conference on Weights and Measures (NCWM) was held at the Four Seasons Hotel in Philadelphia, PA during the week of July 14 through 19, 1991. The theme of the meeting was "Weights and Measures for the Twenty-first Century".

In his address to the delegates, Chairman David Smith of North Carolina mentioned the progress made in fuel quality inspection programs; the new joint Federal Grain Inspection Service and NCWM joint program; the National Type Evaluation Program; and the needs for State metrology.

Special meetings included those of the Metrologists, the Associate Membership Committee, the Retired Officials Committee, the Scale Manufacturers' Association, the American Petroleum Institute, the Industry Committee on Packaging and Labeling, the State regional weights and measures associations, and the National Association of State Departments of Agriculture Weights and Measures Division, and the National Council on State Metrication.

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.

Key words: motor fuel dispensers; legal metrology; railroad track scales; safety; specifications and tolerances; training; type evaluation; uniform laws and regulation; weights and measures.

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Note: 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 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 Nagele, MI
73rd	1988	Darrell A. Guensler, CA
74th	1989	John J. Bartfai, NY
75th	1990	Fred A. Gerk
76th	1991	N. David Smith

## State Representatives

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

STATE	REPRESENTATIVE	ALTERNATE
Alabama	Don E. Stagg	Charles A. Burns, Jr.
Alaska	Aves D. Thompson	None
American Samoa	None	None
Arizona	Raymond Helmick	None
Arkansas	Sam F. Hindsman	Mike Hile
California	Darrell A. Guensler	Barbara Bloch
Colorado	None	None
Connecticut	Allan M. Nelson	Raymond Kalentkowski
Delaware	William Lagamann	None
District of Columbia	None	None
Florida	Maxwell H. Gray	Jack Jeffries
Georgia	None	None
Guam	None	None
Hawaii	James E. Maka	None
Idaho	Glen Jex	None
Illinois	Sid Colbrook	None
Indiana	Sharon S. Rhoades	None
Iowa	Jerry L. Bane	None
Kansas	DeVern H. Phillips	None
Kentucky	Victor Page	None
Louisiana	Melvin L. Lyons, Jr.	None
Maine	None	None
Maryland	Louis Straub	None
Massachusetts	Charles H. Carroll	None
Michigan	Harold Zorlen	Edward C. Heffron
Minnesota	Michael F. Blacik	Mark V. Buccelli
Mississippi	None	None
Missouri	Lester H. Barrows	Robert D. Wittenberger
Montana	None	None
Nebraska	Steven A. Malone	Michael Diesley
Nevada	None	None
New Hampshire	Michael F. Grenier	None
New Jersey	Carl P. Conrad, Jr.	None
New Mexico	Fred A. Gerk	Gary D. West
New York	None	None

STATE	REPRESENTATIVE	ALTERNATE
North Carolina	N. David Smith	Ronald Murdock
North Dakota	Curtis Roberts	None
Ohio	James C. Truex	None
Oklahoma	Charles D. Carter	None
Oregon	Kendrick J. Simila	George Shefcheck
Pennsylvania	Ronald R. Roof	Dean F. Ely
Puerto Rico	Jose A. Torres-Ferrer	None
Rhode Island	Lynda L. Maurer	None
South Carolina	Carol P. Fulmer	John V. Pugh
South Dakota	James A. Melgaard	Jim Peskey
Tennessee	Cathryn Pittman	None
Texas	Edwin J. Price	James H. Eskew
Utah	Robert A. Smoot	None
Vermont	Bruce A. Martell	None
Virginia	Wes Diggs	None
Virgin Islands	Joycelyn Encarnacion	Archie Corbitt
Washington	James Cammel	None
West Virginia	Stephen L. Casto	None
Wisconsin	Alan J. Porter	James H. Akey
Wyoming	Victor Gerber	None

# **Organization Chart of the 76th National Conference on Weights and Measures**

## **Operating Committees**

## **Executive Committee and NTEP Board of Governors**

**Chairman:**<sup>e</sup> N. David Smith, NC  
**Chairman-Elect:**<sup>e</sup> S. Colbrook, IL  
**Past-Chairman:**<sup>e</sup> F. Gerk, NM  
**Treasurer:**<sup>e</sup> C. Gardner, Jr., NY  
**One Year:** T. Geiler, MA  
 E. Heffron, MI  
**Two Year:** K. Butcher, MD  
 K. Simila, OR  
**Three Year:** R. Andersen, NY  
 P. Nichols, CA  
**President:**<sup>n,e</sup> J. Lyons, NIST  
**Executive Secretary:**<sup>n,e</sup> A. Tholen, NIST

## **Conference Coordinator**

A. Turner, NIST

## **Other Elected Officers**

**Vice-Chairmen:**  
 K. Butcher, MD  
 M. Deisley, NE  
 G. Jex, ID  
 L. Maurer, RI

## **Appointed Officials**

**Chaplain:** D. Ely, PA  
**Parliamentarian:** K. Simila, OR  
**Assistant Treasurer:** G. Hanson, CA  
**OIML Representatives:**  
 PS 7/RS 5: R. Helmick, AZ  
 PS 5D/RS 10: K. Butcher, MD  
 PS 7/RS 4: J. Truex, OH

## **Subcommittee on Member Expenses**

**Chairman:** K. Simila, OR  
**Members:** T. Geiler, MA  
 E. Heffron, MI

## **Standing Committees**

### **Auditing Committee**

**Chairman:** E. Murphy, PA (1)  
**Members:** S. Casto, WV (2)  
 E. Hanish, IN (3)

### **Credentials Committee**

**Chairman:** D. Wallace, CO (1)  
**Members:** J. Silvestro, NJ (2)  
 G. Tommasi, CT (3)

### **Resolutions Committee**

**Chairman:** D. Ely, PA (1)  
**Members:** M. Grenier, NH (3)  
 G. Jex, ID (3)  
 M. Phillips, IN (3)  
 C. Pittman, TN (2)  
 E. Price, TX (3)  
 A. Thompson, AK (2)

### **Nominating Committee**

**Chairman:** F. Gerk, NM<sup>e</sup>  
**Members:** C. Conrad, NJ  
 L. F. Eason, NC  
 C. Gardner, NY  
 S. Malone, NE  
 A. Rogers, VA  
 D. Soberg, WI

### **Budget Review Committee**

**Chairman:** N. David Smith, NC  
**Members:** F. Gerk, NM (2)  
 D. Guensler, CA (1)  
 R. Wells, Sensitive Meas. (1)<sup>n</sup>  
 C. Gardner, NY<sup>e</sup>  
 A. Tholen, NIST<sup>e</sup>

### **Sergeants-At-Arms**

J. Noone, PA  
 R. Roof, PA

### **Specifications & Tolerances Committee**

**Chairman:** J. Truex, OH (1)  
**Members:** C. Carroll, MA (3)  
 R. Helmick, AZ (2)  
 J. Jeffries, FL (4)  
 R. Suiter, NE (5)  
**Tech Advisor:** H. Oppermann, NIST

### **Laws and Regulations Committee**

**Chairman:** A. Nelson, CT (2)  
**Members:** B. Bloch, CA (4)  
 F. Clem, OH (3)  
 S. Rhoades, IN (5)  
 L. Straub, MD (1)  
**Tech Advisor:** C. Brickenkamp, NIST

### **Education, Administration, & Consumer Affairs Committee**

**Chairman:** S. Malone, NE (1)  
**Members:** M. Coile, GA (5)  
 M. Gray, FL (2)  
 J. Harnett, CA (4)  
 R. Kalentkowsky, CT (3)  
**Tech Advisor:** J. Koenig, NIST

### **Liaison Committee**

**Chairman:** K. Thuner, CA (1)  
**Members:** C. Davis, ME (5)  
 R. Davis, James River Corp. (2)  
 J. Lacy, P&S, USDA (4)  
 A. Thompson, AK (3)  
**Tech Advisor:** K. Newell, NIST



### Associate Membership Committee

**Chairman:** D. Brydon, Int. Dairy Foods Assn.

**Vice**

**Chairman:** C. Kloos, Beatrice/Hunt Wesson

**Secretary/**

**Treasurer:** T. Stabler, Toledo Scale Corp.

**Members:** W. Braun, Procter & Gamble  
D. Quinn, Fairbanks Scales  
H. Lodge, Dunbar Manuf.  
J. Schnitzler, Accurate Metering  
E. A. Thompson, Am. Petr. Inst.  
J. Ed. Thompson, Kraft, Inc.  
R. Wells, Sensitive Meas.  
R. Whipple, Gilbarco, Inc.

### Technical Committee on National Type Evaluation

**J. Elengo, Jr., Chairman**  
Revere Transducers, Inc.

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**Chairman:** J. Elengo, Jr., Revere Transducers, Inc.

##### Public Members

R. Andersen, NY  
T. Butcher, NIST  
C. Conrad, Jr., NJ  
C. Cotsoradis, MD  
D. Guensler, CA  
J. Lacy, USDA-P&S  
D. Mahoney, USDA-FGIS  
H. Oppermann, NIST  
J. Truex, OH  
O. Warnlof, NIST  
K. Yee, NIST

##### Private Sector

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J. Anikowiak, Hottinger Baldwin Msmts.  
J. Giannina, Port of Corpus Christi  
W. Goodpaster, Cardinal Scale Co.  
K. Haker, BLH Electronics  
T. Johnson, Sensortronics  
H. Lockery, Lockery Assoc.  
J. MacDonald, Howe Richardson  
R. McCarty, NCR Corp.  
G. Lameris, PMI Food Equipment  
J. Robinson, Assoc. of Am. Railroads  
T. Stabler, Toledo Scale Corp.  
D. Tonini, Scale Manufacturers Assoc.

### Task Force on Safety

**Chairman:** C. Gardner, Jr., NY

**Members:** L.F. Eason, NC  
J. Harnett, CA  
E. A. Thompson, American Petr. Inst.  
D. Soberg, WI

### Task Force on Planning for the 21st Century

**Chairman:** D. Guensler, CA

**Members:** T. Geiler, MA  
M. Heslin, CT  
C. Kloos, Beatrice/Hunt-Wesson  
B. Martell, VT

### Belt Conveyor Scales Sector

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Revere Transducers, Inc.

##### Public Members

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R. Helmick, AZ  
H. Oppermann, NIST  
J. Rabb, AL  
R. Miller, CO  
O. Warnlof, NIST

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G. Burger, Consultant  
M. Casanova, Ramsey Tech., Inc.  
D. Cockrell, Weighing & Control Sys., Inc.  
R. Desollar, Central Ill. Public Ser.  
S. Gibson, ABC Scale  
J. Giannina, Port of Corpus Christi  
T. Healy, Thayer Scale Division  
N. Johnson, Merrick Corp.  
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G. Kachel, Riede Systems, Inc.  
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F. Joe Loyd, CSX Transportation  
J. MacFarlane, Auto Weight Co.  
N. Ortyl, Ill, Dresser Industries  
J. Robinson, Assoc. of American Railroads  
J. Oliver, Virginia Power  
W. Thurman, Southern Co. Services, Inc.  
D. Tonini, Scale Manufacturers Assoc.

### Measuring Sector

**Chairman:** N. Alston, Daniel Flow Products, Inc.

##### Public Members

R. Andersen, NY  
T. Butcher, NIST  
D. Guensler, CA  
J. Jeffries, FL  
S. Malone, NE  
D. Morgan, Canada  
R. Murdock, NC  
H. Oppermann, NIST  
J. Truex, OH  
O. Warnlof, NIST

##### Private Sector

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F. M. Belue, Belue Assoc.  
R. Fonger, Bennett Pump  
M. Hankel, Liquid Controls  
F. Holland, Schlumberger Technologies  
G. Johnson, Gilbarco, Inc.  
C. Kunkel, EMARK Corp.  
G. Marshall, Shell Oil Co.  
R. McCarty, NCR, Corp.  
T. McDonald, Mobil Oil Corp.  
L. Murray, Dresser Ind., Inc.  
R. Shields, Southwest Pump  
J. Skuce, Smith Meter, Inc.  
D. Smith, William M. Wilson's Sons  
R. Tucker, Tokheim Corp.

### Legend

n - Non-Voting Members

e - Ex-Officio Members

Numbers in parentheses refer to years remaining to serve on committees.

State and Local Government officials are identified by their state abbreviations.

USDA - U.S. Department of Agriculture  
P&S - Packers & Stockyard Administration  
FGIS - Federal Grain Inspection Service  
OIML - International Organization of Legal Metrology  
NIST - National Institute of Standards and Technology

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## Welcoming Address

Leon G. Wigrizer, Commissioner  
Department of Licenses & Inspections  
Philadelphia, PA

Good Afternoon. I want to thank you for inviting me to be here today at our opening meeting. On behalf of the citizens of our city I want to welcome all of you to Philadelphia. I hope you have a wonderful time while you are here. This is a grand place to be - and we have many historical and cultural places that you can enjoy. As I'm sure you know, you are staying in one of the cultural centers of the country with the world famous Philadelphia Art Museum, the Rodin Museum, Franklin Institute and more places of interest within easy walking distance. We hope you take time to visit all around this city and enjoy Independence Historical Park and the Liberty Bell.

As Commissioner of Licenses and Inspections, my responsibilities are varied. The department oversees the inspection of all commercial and residential structures within the city. We license all business activity within the city from bingo games to the largest manufacturing and service operations. The department is responsible for removing hazardous material and asbestos as well as demolishing dangerous buildings. We also clean and seal 2500 buildings and vacant lots each year to protect our residents.

The Bureau of Weights and Measures is one of the units in the Department of Licenses and Inspections. The importance of its activities are weighed (pun intended) by the many benefits it provides to our consumers and citizens.

In Philadelphia, as in your own communities, every consumer benefits daily from the various activities of the bureau.

The motorist gets a fairer deal at the gas pump; the grocery shopper benefits from supermarket scale and packaged goods inspections; and homeowners and tenants save on fuel bills.

As Commissioner of Licenses and Inspections, (the Mayor appointed me less than two months ago) I am probably one of the newest, if not the newest weights and measures official in this room. Each day I learn more about the many life-safety and protective activities of our inspectors. And, each day, I am truly impressed with their dedication and their expertise. No unit in our department can be more proud of its accomplishments and the benefits to our community than the Bureau of Weights and Measures. Weights and measures inspections are a vital part of our national responsibility to provide the best products and services to all of our citizens. Congratulations to all of you on a job well done.

Now, I would like to introduce your keynote speaker.

Mayor W. Wilson Goode has been in office for almost eight years. Before that he was the managing director of this city for four years. Prior to that time he spend many years as a community activist working for the good of Philadelphians. Mayor Goode has worked hard all his career to make Philadelphia a world class city for all of its citizens. Among this many accomplishments - and there are many including the wonderful skyscrapers you see around you and the wonderful Vine Street Expressway that you may have used to get here - is his personal dedication to redirect the city government to the highest possible level of integrity. Mayor Goode established the first Office of Inspector General and issued a directive of integrity standards for city employees that can be a model for other cities. His personal efforts to aid our city and its honest hard working employees will not be forgotten. It is an honor to present the Honorable W. Wilson Goode, Mayor of this historic city.

(There will be no report of the Mayor's talk. He spoke from notes that are no longer available and were extemporaneous.)

## President's Address

### Sharpening Our Focus for the Future

Ray Kammer

Deputy Director, National Institute of Standards and Technology

John Lyons sincerely regrets not being able to address you today. He is meeting with Congressman Neal Smith, (D, IA), Chairman of the House Appropriations Committee. However, I am very pleased to be here today, my second opportunity to participate in your Annual Meeting.

Last year, Dr. Lyons reviewed the parallel histories of the National Institute of Standards and Technology (NIST) and the National Conference on Weights and Measures (NCWM). His theme was that both organizations were important to the progress of our nation 85 years ago, and that they are important to our national economic success in the future.

As John Lyons mentioned last year, Congress gave NIST a major new role to play, based on its world-class science and effective technology transfer mechanisms, to assist U.S. industry to compete in the global marketplace. The broad assignments to NIST result from our successes in the past in:

- building on our technical strengths;
- cooperating effectively with both the public and private sectors;
- identifying and focussing on emerging technologies; and
- emphasizing industrial processing, concurrent engineering, and ever-improving quality.

The Office of Weights and Measures (OWM) has, as an important office within NIST, built its reputation by emphasizing these same objectives in the commercial marketplace in close coordination with the National Conference on Weights and Measures. Again, the results have been successful based on:

- building on the technical strengths of NIST as well as the Conference membership;
- cooperating effectively with Federal and State weights and measures regulators, the device manufacturing and servicing, and the commodity, packaging and consumer retail industries;
- changing NIST Handbook 44 to recognize new technologies and new applications to existing technologies; and
- considering manufacturing and service sector process quality with post - National Type Evaluation Program regulation of the production quality of devices, and quality of weights and measures enforcement and citizen service programs.

I believe that the weights and measures community, like NIST, has been successful in meeting the challenges in the recent past, and that both organizations are positioned to deal extremely effectively with the future. We at NIST, including the OWM, have been working to sharpen our focus for the future. This Conference, through its Task Force on Planning for the 21st Century is sharpening its focus on the future. I encourage you to carry these efforts forward.

As you in the Conference progress with your planning and program development, I hope you will pay special attention to a few issues important to NIST and the Nation. These issues directly relate to our futures together and impact our ability as a nation to remain competitive and progressive.

These issues are:

- the use of Metric (SI) System;
- enhancement of international trade; and
- application of Total Quality Management.

## Use of the Metric System

The metric system (synonymous for most of us with the International System of Units or "SI") is the authorized system of measurement in the United States. This has been true since the adoption by the Congress of the Act of July 28, 1866 - "An act to authorize the use of the Metric System of Weights and Measures". Use of the metric system in the world has grown steadily. Today, it is the preferred system in most countries. Use in the United States has lagged. As you know, the United States Congress adopted new legislation to encourage the Nation to increase its use of the metric system. In the late 1970s, the Congress passed the Metric Conversion Act. This Act established the Metric Board and a Metric Information Office in the Department of Commerce. This Conference was a very strong proponent of the legislation and supported the Metric Board, even having a member of the Conference as a member of the Board. More recently, Congress passed the "Omnibus Trade and Competitiveness Act of 1988" (the Act that changed our name from National Bureau of Standards to NIST); this Act contains very specific language that Federal government procurement be in metric units by 1992. At the conclusion of the NCWM Annual Meeting, there will be a meeting of the National Council on State Metrication. I encourage that group to address the issue of State government adding to the drive towards metric conversion by joining with the Federal government to purchase in metric.

All agencies of the Federal government are required to complete plans for meeting the requirements of the new legislation. The plans made by NIST include the use of metric (SI) units in all of our publications. Since the NIST publishes your handbooks, this new Federal policy directly affects the work of this Conference and its constituency. NIST has established a very specific policy in this regard, and will work with the Office of Weights and Measures in their and your efforts to conform with this metric policy. We have already approved one of your publications, NCWM Publication 5, "NTEP Index of Device Evaluations," for printing under the new policy, and have requested that advance copies of future proposed publications be submitted for review. I know that your Standing Committees have work plans for the following year that include addressing all the issues of how to meet the NIST publication policy in the light of the consensus standards process that you operate. I assure you that we understand some of the problems and limitations that face you in conforming to this policy, since there are whole categories of weights and measures commercial devices that have no metric counterparts.

## Enhancement of International Trade

Moving to the second policy issue, Enhancement of International Trade, I call your attention to very important political and economic changes underway in Europe. Often referred to simply as "EC-92" activities, the nations in the European Community are in the midst of a process started in 1985 intended to harmonize and facilitate the flow of goods, money, and people to create the world's largest unified market. This 1992 plan -- named after the scheduled target year for its completion -- covers a multitude of regulatory activities to remove existing physical, technical and fiscal trade barriers among the 12 EC nations to improve European competitiveness in the global marketplace. A central concern to the United States has been standards, testing, and certification issues and how they will affect market access for U.S. producers.

The intent is to create a single European market of 325 million people with a harmonized set of business and technical rules. Attaining this goal requires a major standards development program and a single, harmonized conformity-assessment procedure to replace multiple national requirements for product certification. These issues have been, and continue to be, a top priority of the U.S. Department of Commerce. This June, Secretary of Commerce Mosbacher and his EC Commission counterpart, Vice President Bangemann, discussed standardization and conformity-assessment policy in the United States and Europe. It was their third meeting in the past two years. They agreed that international standardization and openness of conformity assessment were indispensable means of eliminating or avoiding the creation of technical barriers to trade.

In this regard, one of the major voluntary European regional standards bodies, CEN - the European Committee for Standardization - has recently announced that it will give preference to the International Organization of Legal Metrology (OIML) standards in such areas as legal metrology, environmental measurements, and medical



devices, among others. This is in accord with the EC's stated policy of adopting international standards as European standards where such international standards are available. It is very important that we at NIST, and you in the Conference, follow developments in the EC, especially with respect to their actions regarding adoption of OIML recommendations.

The commitment of the Conference to consider international standards to enhance international trade is evident from the changes made in its Handbooks and in its operation. The Scales Code in NIST Handbook 44, "Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices," was extensively revised in 1986. These revisions were based on the OIML International Recommendations 3 and 28. This change had a major impact on the United States because it often required scale and load cell manufacturers to change the design of their products to comply with the new requirements. It required a great commitment from weights and measures officials because they had to change their philosophical approach to many devices and train their staff and field units to understand the content and application of the new code.

I know that the Conference reliance on OIML recommendations to develop U.S. requirements is increasing. When the U.S. and Canada, and I'll talk more about this later, met to develop the Mass Flow Meters Code, the OIML draft recommendation was the fundamental document used to develop the code. The OIML International Recommendation for belt-conveyor scales was referenced continually in the development of the type evaluation criteria and procedures for the United States. Conversely, the U.S. delegation has achieved some of its greatest success just recently when OIML accepted many significant revisions to Recommendations 60 and 76 as proposed by the U.S. delegation. Fortunately, OIML International Recommendation 87 "Net Content in Packages" was patterned after the existing requirements in NIST Handbook 130, "Uniform Laws and Regulations," and the United States has proven to be the leader in this area of legal metrology. We plan to continue to lead in this regard. Now that the U.S. Department of Agriculture has adopted NIST Handbook 133, "Checking the Net Contents of Packaged Goods," we expect to provide a united front (Federal and State regulators and the packaging industry) in future international negotiations.

On another front, current activities related to the North American Free Trade Agreement (NAFTA) could have significant impact on the work of the Conference. On February 5, 1991, the Presidents of the United States and Mexico and the Prime Minister of Canada announced their intentions to begin negotiations on a North American Free Trade Agreement. Successful negotiation of such an agreement will create the world's largest free trade area, larger than the EC, comprising over 360 million consumers and producers with a combined annual output of \$6 trillion.

Trilateral trade and investment negotiations started this summer, with the goal of reaching a free trade agreement in the next year or two. The current goal is that NAFTA will be submitted to each country's legislature for approval before June 1993, so that NAFTA can go into effect soon thereafter.

One of NAFTA's key negotiating elements will be the development of trilateral trade rules for standards-related activities conducted by government agencies and private sector bodies. One of the models which the negotiators will draw upon is the existing bilateral agreement between the United States and Canada - the U.S.-Canada Free Trade Agreement (CFTA) which we entered into in 1989.

Under this agreement with Canada, and through the efforts of the private sector, significant progress has already been achieved in harmonizing standards. For example, 12 Canadian and U.S. standards have been combined to form one single binational heating and air conditioning standard. The big winners are manufacturers, who now can produce to a single standard; and consumers, who will have wider product selection at lower cost.

I know that the Conference has undertaken a major project to pursue the harmonization of weights and measures requirements with Canada to facilitate trade among our countries. Representatives from the Canadian Legal Metrology Branch (LMB) are collaborators on the NCWM Laws and Regulations Committee and the Specifications and Tolerances Committee. The LMB is also represented on the three Sectors of the NCWM

Technical Committee on National Type Evaluation. Their contributions have led to the development and resolution of issues much more quickly and with higher quality than could have been achieved by relying only on the resources within the United States. Examples of progress are the development of the audit trail concept for Handbook 44, the type evaluation of weighing and measuring systems incorporating computers, development of the Mass Flow Meters Code, and the type evaluation of belt-conveyor scales to name a few. The partnership with Canada has been one of the most rapidly rewarding efforts the Conference has undertaken.

The OIML has a major initiative to promote the acceptance of an OIML mark on devices evaluated to OIML criteria and the OIML certification of type evaluation laboratories in different countries. This initiative is under study by the NCWM Executive Committee. Serious consideration of the OIML plan is needed to identify whether or not the Conference should endorse the plan and initiate changes to align itself more closely with the OIML proposal.

### **Application of Total Quality Management**

NIST has the responsibility for managing the Malcolm Baldrige National Quality Award. The award was established by the Congress in 1987 to promote quality awareness, to recognize quality achievements of U.S. companies, and to publicize successful quality strategies. The interest in the award by the private sector has been unexpectedly high. More recently, interest has developed concerning the applicability of the principles and criteria underlying the Baldrige Award to non-profit and public sector organizations. This possibility is of interest to the NCWM Task Force on the 21st Century. The members of the Task Force met with the director of Quality Programs at NIST, in January. I understand that the Task Force is planning to explore the applicability of quality management to State weights and measures programs and to the operation of the National Conference on Weights and Measures. Additionally, OWM is into the early stages of its participation in a NIST-wide planning exercise that includes incorporation of quality management features into its program.

With the possible involvement of the State programs, the Conference, and OWM, Tina Butcher of OWM has been assigned to the NIST Office of Quality Programs to learn the details of the award procedures including the application of its criteria. We expect that Tina will be able to guide OWM and the Conference in applying the principles she is now learning to your programs. The proper use of the Baldrige Award principles should be valuable in improving the quality of weights and measures programs, both those of the public and private sectors. I am sure that this effort will reinforce the work of your Task Force on the 21st Century and your standing committees in the years ahead.

We are also confident that efforts in this area will be applicable to your state programs. The potential for upgrading of service operations is significant. We urge you to participate in this effort with your Executive Committee and Task Force. We also encourage device and component manufacturers to apply these concepts to your organizations; you see, the reputation of United States manufacturing quality rests in your hands. The Conference stands ready to assist you.

### **Planning for the Future**

When we talk about planning for the future, we are, in fact, planning to deal with change. I thought I would get the Conference off to a good start in this regard by announcing changes in the Office of Weights and Measures.

Al Tholen, your current Executive Secretary, has accepted the position as Acting Chief of the National Voluntary Laboratory Accreditation Program, another office under Dr. Stanley Warshaw, Director of the Office of Standards Services. We owe a great deal to the leadership of Al Tholen. It has been during Al's guidance that the Conference is now a membership organization, that there is now a National Type Evaluation Program, and a National Training Program. Today the Conference is more than an annual meeting; it has year-round operations and year-round standards development. Congratulations, Al, and thank you from all of us.

Dr. Carroll Brickenkamp has been named Acting Chief of the Office of Weights and Measures (OWM) to replace Al. As President of the National Conference, Dr. Lyons will appoint her to replace Al as Executive

Secretary. I know that you share our pride in Carroll's competence and in her long-standing commitment to quality public service and to weights and measures. It has been through her leadership and teamwork that the U.S. Department of Agriculture has adopted NIST Handbooks 133 and 44. Congratulations, Carroll.

We also want to announce the arrival of Dick Whipple to the Office of Weights and Measures as a new Weights and Measures Coordinator. His activities will span both device technology and National Training Program assignments. Formerly with Gilbarco and before that, Fairbanks, Dick brings a unique package of skills and experience to the OWM that will serve the Conference well. He's here at the Annual Meeting in his new capacity.

On July 29, another new Weights and Measures Coordinator will be joining NIST - Ken Butcher, presently Chief of Maryland Weights and Measures. He will be working in the NIST Standards Management Program in the arena of the International Organization for Legal Metrology and also assisting the Office of Weights and Measures in the device, commodity, and training area. Because of the closeness of his entry date and because of Al Tholen's immediate departure after the Annual Meeting, Ken also joins us at this Annual Meeting not representing Maryland, but in his new capacity, so that when he formally joins the office, he can "hit the ground running."

In summary, I commend this Conference for the progress it has made, and its commitment to sharpen its focus on the future. I encourage you to continue to build on:

- your technical strengths;
- your unique ability to manage the cooperation of public and private sectors;
- your attention to emerging marketplace technologies; and
- your increasing focus on the marketplace processes

As you develop your plans, be sure to give attention to:

- the use of metric (SI) units;
- the impact of your program on enhancing trade; and
- applying quality management principles in your programs

## **THE FUTURE IS IN OUR HANDS**

## Chairman's Address

N. David Smith  
Director, Standards Division  
Raleigh, North Carolina

For two years it has been my pleasure to represent the National Conference. During this time, I have shared the podium with many distinguished people and this meeting is no exception. Mayor Goode, Mr. Wigrizer, and Mr. Ray Kammer are three men who can surely help my image. For taking the time to be with us today, I have a special, Southern treat for each of you gentlemen. As many of you know, I have taken great delight in spreading the joys of eating grits. With the able assistance of my son, Eric, I want to present you with a gift of this treat. The correct Southern spelling of this word is "griyuts". Eating grits can make you famous. You will recall that a Yankee by the name of Ulysses S. Grant once went South on some business, liked grits, and he later became President.

Mayor Goode and Mr. Wigrizer I want you to know that you have an excellent weights and measures staff. This staff is headed by a dedicated individual, Mr. Emmett Murphy. Emmett has been of great assistance to us as we planned this meeting. Thank you for allowing him to depart from his many responsibilities to give us a helping hand.

When you elected me chairman last year, I was given much advice. One comment seemed to come up more often than others. People told me to follow Fred Gerk's example. I must admit that such advice is sound, for Fred is an honest person. How can you question Fred's honesty, when he lists, for income tax purposes, half of his State salary as unearned income? Fred also feels that the IRS should reward his honesty by taking him off their mailing list.

At this time, the chairman usually reports on what happened during his term. Not wanting to break with tradition, I quickly did a little research. Here are a few of the happenings during my term as chairman of the National Conference.

- Margaret Thatcher resigned as prime minister of Great Britain.
- The United States became involved in a shooting war in the Middle East.
- Magic Johnson discovered that Michael Jordan does, in fact, eat Wheaties.
- Al Tholen had a heart attack.
- Al Tholen quit his job at the Office of Weights and Measures.

All is not lost, since you have the benefit of great conference leaders who preceded me. These people have pointed the conference in the right direction and we have many reasons to be proud.

Sometimes we tend to forget what we have accomplished, and get impatient for new developments. Let's review our major accomplishments during the past four or five years.

- I recall many discussions during the development of Handbook 133, in which many people questioned the wisdom of promoting a net contents standard that no one seemed to endorse. Eventually, the Conference adopted Handbook 133 and began to sell it to other agencies. I am not sure that we appreciate the significance of Handbook 133 being adopted by USDA and endorsed by FDA and FTC. Handbook 133, a document we developed and continue to work on, is now the premier net contents



standard in the United States. This is a major accomplishment for the National Conference.

- When I first became involved in weights and measures, only a handful of States had fuel testing programs. Through the foresight of Sam Hindsman, the conference began to examine fuel quality inspection programs and how they might fit within the National Conference. Just in the past couple of years, New Mexico, Tennessee, Illinois, New York and Michigan have committed resources to improve the quality of fuels sold in their State. Other States, Connecticut, Kentucky, and West Virginia, have either just passed authorizing legislation or appear on the verge of doing so. Virtually every one of the fuel quality programs has been placed in weights and measures programs. This is another major accomplishment for the National Conference.
- For years we have been complaining about the lack of standardization in grain moisture measurement. The ball is now in our court. The Conference Executive Committee and the Federal Grain Inspection Service have recently agreed to a joint program, which will eventually place the testing of moisture meters under the National Type Evaluation Program (NTEP). Further, we have agreed to venture into unfamiliar waters and include Near Infrared spectroscopy (NIR) devices in the program. This new responsibility exposes the National Conference to a new segment of trade and is a major expansion of NTEP. This is another feather in our cap.
- Lastly, and I apologize for using an overused term, I want to discuss the "mother" of National Conference accomplishments. Something significant happened in this country that not many people are aware of and as a result of this happening, even international trade has been affected. This program was started without the usual Congressional hearings. There were no bruising budget battles. No high paid lobbyists came calling, wanting to twist arms at every corner. Quietly, weights and measures officials and industry representatives have put in place this country's only weights and measures device approval program. Of course, I am referring to the National Type Evaluation Program. How important is NTEP? Consider that some South American companies routinely specify NTEP acceptance in their bid specifications. Consider that NTEP has become the de-facto law of the land in this country. Consider that NTEP acceptance opens doors, as companies move to take advantage of trade opportunities in Eastern Europe and the Far East. NTEP, in my opinion, is our crowning accomplishment.

While we have accomplished much, I don't want anyone to suggest that we should sit back and take it easy. There is much that remains to be done even while our resources are being strained to the limit. Probably every weights and measures official in this room has been broadsided by the budget process this year. In spite of economists saying that the recession is over, I remain fearful for weights and measures programs. During the year, I have been asked on numerous occasions to write to agency administrators and legislative leaders about the importance of weights and measures and the possible consequences of severe program cutback, consolidation, or elimination. I have had limited success, for it is very difficult to compete with infant mortality, education, environment, and health. Yet, we must keep trying. In 1983, an outmanned N.C. State University basketball team won the NCAA championship. Throughout their march to the title, they faced seemingly impossible odds. The coach, Jim Valvano, when asked what his game strategy was, replied "survive and advance to the next game". We must survive and advance to the next budget year. If you are having budget problems, I urge to contact the Conference Chairman and the Office of Weights and Measures for assistance. Perhaps a well placed letter to the appropriate person is what is needed for your program to survive.

Speaking of budget sacrifices, I want to thank those of you who are attending this meeting at your own expense. Your dedication is duly observed and appreciated.

Mr. Kammer, there are a few items I want to bring to your attention. Since I have only three days remaining as chairman, I figure there is not enough time for you to order that I be replaced. Al Tholen has gone on to another job so he can't be held responsible and Carroll Brickenkamp has not been in her new job long enough



for me to have discussed this issue with her. So, you will have to hear me out.

In 1965, Public Law 89-164 authorized the expenditure of 1.8 million dollars to equip the State Metrology Laboratory Program. That investment can be used today to meet the challenges of the Omnibus Trade and Competitiveness Act. The State laboratories are already in place providing technology transfer to a very broad industrial base. The North Carolina laboratory alone performs tests for over 450 North Carolina companies. The challenge is to improve the services provided by the State laboratories to meet the expanding level of industrial needs.

The equipment and standards issued in 1965 have aged and are no longer state of the art. Round robin measurements between laboratories have documented that many of the mass and volume standards have changed significantly. New assistance from NIST is needed if the State metrology laboratories are to remain a viable link in our national measurement system and if we are to meet the challenges of the future.

First, there needs to be an increased NIST emphasis on providing better basic mass and volume measurement services. Since the State laboratories are part of the NIST national measurement system, we feel that the laboratories should be given a price break on recalibration of standards. Turnaround times at NIST should be reduced from the current time of up to three months. NIST needs to purchase new equipment to reduce measurement uncertainties for mass calibrations above the one kilogram level so that the States are not limited by initial excessive uncertainties. Volume uncertainties also need to be examined very closely and reduced.

Second, the NIST Mass Measurement Assurance Program, the Mass MAP, needs to be expanded to include the State laboratories that have the measurement need and the required capabilities. This program will allow these laboratories to provide mass calibration using the same methodology as NIST. Inclusion of the State laboratories in the Mass MAP will ultimately relieve some of the NIST mass workload as State laboratories are brought on line.

I urge you to look into these issues. Since you probably need additional detail, I will provide that to you in a letter. Thank you for patiently listening to my plea for assistance.

If you were in attendance at the conclusion of last year's annual meeting, you will recall that I introduced my son, Eric, and used him as a prop to talk about the future of weights and measures. Eric is back and we are one year closer to the 21st century. Our Task Force on the 21st Century, otherwise known as the Blue Sky Task Force, has covered considerable ground in examining the future of weights and measures. No doubt, when the task force completes its work there will be many who will question the recommendations. I asked the task force to give us a plan for the future. It is important for us to have a sense of direction or we may fall victim to Yogi Berra's observation, "If you don't know where you are going, you could wind up someplace else". We need only examine what is already known to us to realize that the future can't be business as usual.

- With landfills rapidly filling up and the siting process to locate new ones becoming nearly impossible, many people are saying that packaging must change to eliminate as much packaging material as possible and to promote recycling. Such measures are bound to change how we view the traditional package and perhaps what we have always considered to be appropriate packaging materials and methods.
- During the Northeastern Weights and Measures Conference in May, a packaging equipment representative stated that his company could guarantee no underfills and severely limit overfills. Suppose such equipment becomes commonplace. This should cause a major change in how we check packages for net contents compliance. Perhaps our emphasis should shift to the process and away from the end result.
- With shrinking weights and measures budgets, can we continue to insist on annual device inspection even though some types of devices have a very low rejection rate? What would be the rejection rate

if these devices were inspected on a longer interval? If we don't examine our device inspection criteria and make the necessary adjustments, I am convinced that our budget review people will seize this issue as a justification to weaken weights and measures enforcement.

- More and more jurisdictions are funding weights and measures programs through alternative means (we call this "creative financing"). Why can't we, the administrators of weights and measures programs, have some say in this? After all, who knows more about weights and measures programs than we do? Maybe it is time for us to seize the moment and put forth our recommendations on funding.
- The entire world seems to be caught up in the drive to improve quality. Private enterprise shouldn't have a lock on the quality issue. Even though we are a governmental unit, we are expected to deliver a product. We are judged on how well we make that delivery. Can we apply established quality principles to weights and measures and to our programs? I think it can and should be done. With the Malcolm Baldrige National Quality Award program being managed by NIST, we have access to people who can steer us in the right direction.
- All of us know how rapidly technology and markets change. Before the ink is dry on an NTEP Certificate of Conformance, someone has developed a superior product. Companies are forever giving us different ways and means of buying things. Kentucky Fried Chicken now has mobile restaurants. (I call them mobile finger lickers.) Supermarkets are experimenting with self-checkout. Households are being charged for the amount of garbage they produce. We must stay at least even with the changes. We need to think like Wayne Gretsky, possibly the greatest hockey player of all time. Mr. Gretsky said, "I skate to where the puck is going to be, not where it has been".
- Even our crowning accomplishment, NTEP, needs attention. In my opinion, NTEP is at a crossroads. We must either cap the program at its current level or provide the means for its continued growth. Such a dynamic program cannot continue its rate of growth with volunteers and part-time workers. As we say back home, it's time to fish or cut bait.

I, for one, look forward to the discussions once the task force finishes its work. Don't expect a sudden change in how we do business, but do expect to discuss and debate what weights and measures should be as we approach the 21st century. Winston Churchill is quoted as saying, "There is nothing wrong in change if it is in the right direction. To improve is to change, so to be perfect is to have changed often". On the other hand, Woodrow Wilson said, "If you want to make enemies, try to change something". Eric, you have much to look forward to and fortunately, under Sid and then Allan, the National Conference is in good hands.

Many of you think that the grits stories are just about over. Well, don't act too hastily. Grits are a product of corn and please remember that Sid Colbrook is from Illinois, the second leading corn producing State.

Thank you for putting up with this country boy.

## **National Type Approval and NCWM/SMA Program for Adoption of Uniform Regulation for National Type Evaluation**

**Daryl Tonini  
Scale Manufacturers Association**

[This presentation was given during the S&T hearings on Monday, July 15, 1991 at the 76th NCWM]

The National Type Evaluation Program (NTEP) was created in collaboration between the National Conference on Weights and Measures and the National Bureau of Standards in the early 1980's. The program was set up as a "voluntary" program to give jurisdictions having equipment "type approval" laws or regulations a means whereby new equipment could be evaluated for conformance with NIST Handbook 44.

Such evaluations, in earlier periods, were often conducted on a jurisdiction by jurisdiction basis. However, with the advent of the electronics era along with influence factor based tolerance requirements (Handbook 44 T.N.8, Influence Factors), such evaluations became much more involved and expensive if conducted on an individual jurisdiction basis.

The National Type Evaluation Program (NTEP), based on series of specially equipped labs and trained personnel, was conceived to give a consistent, one-stop evaluation that was cost-effective for all parties concerned.

### **How the NTEP system works**

To request an NTEP evaluation, a manufacturer submits a request for a new (often a prototype, or pre-production) device to the Office of Weights and Measures (NIST-OWM). OWM "logs" the request into the system and assigns it to one of the approved laboratories - California, Ohio, New York, North Carolina, Federal Grain Inspection Service (FGIS), or NIST Office of Weights and Measures, in the case of load cells, to the NIST Force Group.

Using standardized check lists, the device is evaluated and a report forwarded to NIST-OWM. Based on the report, OWM will make the determination to issue a Certificate of Conformance (CC) or to advise the manufacturer that the device does not conform to Handbook 44.

Based on the CC, the manufacturer then places the device into production and it then finds its way into the marketplace. An initial verification test is performed by the jurisdiction. As part of this test, an NTEP jurisdiction determines whether the device has a CC and, if it does, whether the device conforms to the certificate. The device is then evaluated for field performance, such as tolerances, user requirements, etc., and may be approved for use.

It should be noted, that the type evaluation process does not preempt the jurisdiction's approval prerogatives; it assists and supports the process, but does not replace any legal or regulatory requirements regarding actual approval of a device. The Uniform Regulation for National Type Evaluation (URNTE) provides the jurisdiction the authority to require that devices have a CC.

With regard to the joint program we are reporting on today, interest in adoption of NTEP has quite a long history. When the program was first established, Dr. Ambler, the Director of the National Bureau of Standards (NBS), challenged the NCWM and weights and measures jurisdictions to adopt NTEP concurrent with his commitment to see that the program would enjoy the benefit of the technical facilities and expertise at NBS (now NIST).

As a result, OWM provided the NCWM Executive Committee periodic reports on the adoption of NTEP. Following the report at the 75th NCWM, the SMA undertook a study to determine what the Association could do to assist the Conference in encouraging universal adoption of the URNTE.

It should be noted here that, although URNTE adoption by weights and measures jurisdictions was voluntary, for manufacturers, it was, in effect, a mandatory program.

Based on interviews and contacts with weights and measures officials it was determined that an industry initiative would be well received and could be productive in providing resources to jurisdictions desiring to adopt the URNTE.

A program was approved and funded by the SMA Board of Directors in November 1990. It was presented to the NCWM leadership and to OWM in December 1990.

It was agreed to proceed and the joint program was initiated before year end. The program was presented to the NCWM Executive Committee in January 1991 and has been proceeding actively since that time.

The objectives of the joint effort are to:

- encourage state jurisdictions to adopt the URNTE and to implement NTEP administratively; and

- train and inform the weights and measures community, i.e., officials, manufacturers, dealers and service personnel, regarding NTEP technical requirements.

In addition, the SMA and the NCWM/OWM have offered their expertise and a technical resource to the jurisdictions by assisting as advocates at legislative or regulatory hearings to adopt the URNTE.

Although nearly all jurisdictions will accept a Certificate of Conformance, acceptance of the CC falls short of requiring a CC for all new equipment coming into service. Therefore, the emphasis of the joint program is on adoption of the URNTE and not a policy of mere acceptance of CCs.

At this time we are pleased to report the status of various aspects of the joint program.

In the ongoing direct contact phase, we are continuing to work with non-URNTE jurisdictions to assist them when a decision is made to proceed with the adoption process.

As of this meeting, we have made panel presentations at the Central and Northeast Weights and Measures Annual Meetings and are on the program for the Western and Southern Association meetings this fall. The panel will include a weights and measures official, a user, and a manufacturer. Thus, a broad view of NTEP is presented.

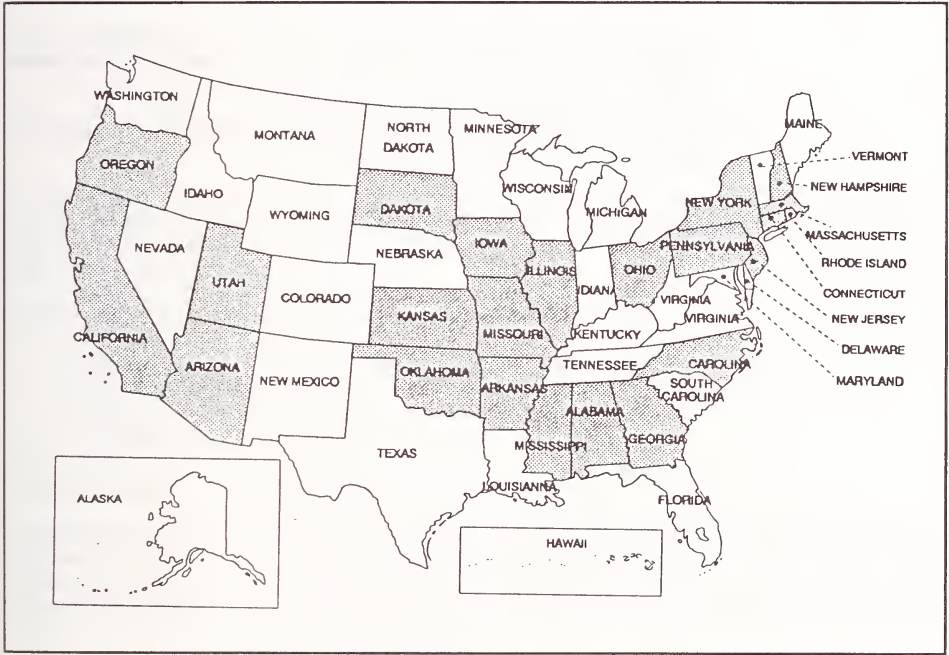
The panel has also appeared at the National Industrial Scale Association meeting this spring and at the International Society for Weighing and Measurement meeting in San Antonio in June.

One of the identified needs of the NTEP program is better understanding and training of all parties involved in the process. The Institute for Weighing and Measurement (IWM) has been active in delivering training on



the subject. Tom Stabler reports that the IWM program has reached in excess of 2,000 participants thus far in the effort. The members of SMA have made a commitment to include an NTEP information block in their technical training programs.

State jurisdictions who have adopted some form of the URNTE are as shown in the figure below. Jurisdictions who are classified as URNTE are shaded. Oregon adopted in the fall of 1990 and Nebraska is scheduled to adopt in 1991. In addition, we have been informed at this meeting that New Mexico is taking steps to adopt and Michigan has received approval to proceed with implementation. Maryland is in the process of becoming an authorized laboratory and, presumably, a URNTE jurisdiction.



All parties in the weights and measures process have their own perspective regarding adoption of NTEP/URNTE.

For the weights and measures official, the process frees up resources (people and laboratory facilities) to address other priority needs in the jurisdiction. It also appears to provide greater uniformity and better quality of equipment presented for approval. It also removes concerns over maintaining specialized staff and expensive laboratory equipment to insure state by state determination of T.N.8 conformance. On the other side of the equation, adoption and implementation represent a significant investment in administering and managing a CC system.

For users involved with more than one jurisdiction, the CC process provides a uniform passport between jurisdictions. Equipment bought and placed in service in one jurisdiction with a CC is acceptable in another

NTEP jurisdiction provided local inspection requirement are satisfied. In addition, the CC can be viewed as a type of "Good Housekeeping Seal of Approval" for certified weighing operations.

For manufacturers, the CC system provides a means to insure that commercial equipment that is sold in a specific jurisdiction meets a common technical standard.

Goals of the program for 1991-1992 are as follows:

1. Continue contacts with non-URNTE jurisdictions, seeking specific commitments and providing regulatory/legislative hearing testimony as invited.
2. Provide an administrative network of support to new URNTE jurisdictions. A good base of administrative procedure information has been accumulated and is available to assist new URNTE jurisdictions with implementation of NTEP.
3. Continue the IWM and industry programs to train more of those actively involved in weights and measures equipment applications.

## National Council on State Metrication Meeting

The National Council on State Metrication held a meeting on Friday, July 19. Because of the juxtaposition of this meeting with the Annual Meeting of the National Conference on Weights and Measures, 35 States, U.S. Territories, and the District of Columbia were represented, more than double the number ever attending any other National Council meeting.

Reports on the status of certain Federal agencies' efforts to convert to metric were given:

Paul Lynch, Office of Acquisition Policy, Government Services Administration  
Byron Nupp, Policy and Economics Division, U.S. Department of Transportation  
Andrew Certo, Standardization Program Division, Department of Defense  
Loren Casement, U.S. Department of Commerce

The keynote speaker was Allison Kaufman from the U.S. Department of Commerce.

The Omnibus Trade and Competitiveness Act of 1988 mandates that the Federal government use (to the extent economically feasible) the metric system of measurement in procurement, grants, and other business-related activities. Other business-related activities include all use of measurement units in agency programs and functions related to trade, industry, and commerce. [Editor's Note: President Bush issued Executive order 12770 on July 25, 1991 implementing this portion of the Act.]

A draft charter of the National Council on State Metrication was discussed. A resolution to encourage States to require metric in their business was also discussed.

## Honor Awards Presentations

Raymond Kammer, Deputy Director of the National Institute of Standards and Technology, presented Honor Awards to members of the Conference who, by attending the 76th Annual Meeting this year, reached one of the attendance categories for which recognition is given - attendance for 10, 15, 20, 25, 30, or 35 years.

### 10 YEARS

Robert Land, City of Anderson, Indiana  
Stanley Warshaw, National Institute of Standards and Technology  
Charles Carroll, State of Massachusetts  
Robert Wittenberger, State of Missouri  
Richard Whipple, National Institute of Standards and Technology  
James Truex, State of Ohio  
Daryl Tonini, Scale Manufacturers Association

### 15 YEARS

Chip Kloos, Beatrice/Hunt Wesson Foods  
John Elengo, Jr., Revere Transducers, Inc.  
Fred Gerck, State of New Mexico  
Henry Oppermann, National Institute of Standards and Technology  
Albert Tholen, National Institute of Standards and Technology  
Raymond Lloyd, Scale Manufacturers Association  
Edward Heffron, State of Michigan  
W. Terry James, Cardinal/Detecto Scale Manufacturing Co.  
Carl Conrad, State of New Jersey  
William Braun, Consultant

### 20 YEARS

Patrick Nichols, Alameda County, CA  
David Edgerly, National Institute of Standards and Technology  
James Akey, State of Wisconsin



## Certificates of Appreciation

N. David Smith, Conference Chairman, presented Certificates of Appreciation to members of standing committees and annual committees who had completed their tenure on the following committees:

Specifications and Tolerances Committee	James Truex, State of Ohio
Laws and Regulations Committee	Louis Straub, State of Maryland
Liaison Committee	Kathleen Thuner, San Diego County, CA
Education Committee	Steve Malone, State of Nebraska
Executive Committee	Thomas Geiler, Town of Barnstable, MA Edward Heffron, State of Michigan
Budget Review Committee	Raymond Well, Sensitive Measurement Darrell Guensler, State of California
Associate Membership Committee	Dawn Brydon, International Dairy Foods Association
Auditing Committee	Emmett Murphy, City of Philadelphia, PA
Resolutions Committee	Dean Ely, State of Pennsylvania
Credentials Committee	David Wallace, State of Colorado
Task Force on Safety	Charles Gardner, Chairman, Suffolk County, NY L. F. Eason, State of North Carolina James Harnett, Orange County, CA E.A. Hap Thompson, American Petroleum Institute Donald Soberg, State of Wisconsin Tina Butcher, National Institute of Standards and Technology

## **President's Award**

This special award is a banner or streamer presented to the State Director of each State having 100% of all weights and measures officials in the State as members of the National Conference on Weights and Measures for the membership year July 1, 1990 - June 30, 1991.

### **First Year Award Banners**

State of Colorado  
State of Indiana  
State of Nevada  
State of Oklahoma

### **Streamers for Second Year 100% Membership**

State of Montana  
State of Oregon  
State of Utah  
State of Washington  
State of Wyoming

### **Streamers for Third Year 100% Membership**

State of Arizona  
State of Hawaii  
State of Michigan  
State of New Hampshire

### **Streamers for Fourth Year 100% Membership**

State of New Mexico  
State of Vermont

### **Streamers for Fifth Year 100% Membership**

State of Alaska  
State of Delaware  
State of Idaho  
State of Kansas  
State of South Dakota

### **Streamers for Sixth Year 100% Membership**

State of Arkansas  
State of Nebraska

## **President's Certificate Award**

This award is given to States with 100% of their State office staff as members for the 1990-91 year:

### **First Year Awards**

State of Missouri  
State of Rhode Island

### **Second Year Awards**

State of Maine  
State of New York  
State of Virginia  
State of Wisconsin



## Final Report of the Executive Committee

N. David Smith, Chairman  
Director, Standards Division  
North Carolina

Reference  
Key Number

### 100 Introduction

This is the Final Report of the Executive Committee for the 76th 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.

Items are grouped into two parts: Part I - Executive Committee business; and Part II - National Type Evaluation Program, Board of Governors' business. Table A identifies all of the items contained in the Report by the Reference Key Number, Item Title, and page number. Table B lists the Appendices to the Report. Table C reports the voting results.

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## Order of Presentation

The Report was presented to the membership for voting as follows:

1. A separate vote was taken on the following items:

- 101-4 V Organization, Chairman of the Board of Governors
- 101-6B V Adoption of NIST Handbook 105-1, 1990 Edition
- 101-8 V Finances, Expenses of Committee Members
- 101-11 V Finances, Budget Review; New Chart of Accounts
- 101-12 V Meetings, Annual & Interim, Work Schedule

2. A vote was taken on the entire Report with editorial privileges accorded to the Executive Secretary.

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**Table C**

### Voting Results

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Reference Key No.	House of State Representatives		House of Delegates		Results
	Yes	No	Yes	No	
101-4	41	0	44	0	Passed
101-6B	41	0	43	0	Passed
101-8	40	0	46	0	Passed
101-11	39	0	46	0	Passed
101-12	39	0	47	0	Passed
100 (Report in its entirety)	41	0	47	0	Passed

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## Details of All Items

### Part I - Executive Committee

#### 101-1 I Publications, Update

Distribution of Publications. Following the 75th Annual Meeting, the NCWM initiated a new policy for the sale and distribution of weights and measures documents (reference NCWM Publication #3, Policy 1.4.9. Publications, Weights and Measures, Distribution Policy). The policy was aimed at: (1) generating income through the sale of documents to non-members (rather than providing documents at no cost upon request), and (2) reducing the total number of copies printed for members by asking them to select only those documents that they actually use.

Although sales to non-members have, in fact, been insignificant, about 100-150 new members have joined and received NCWM documents at reduced or no cost. However, members should be reminded to select publications when they renew their memberships this year. (1) NCWM membership services personnel noticed that a very high percentage of members failed to indicate any specific publications that they wished to receive. The services personnel then entered all publications into the computer; this will not be continued. (2) Many members who are known to attend the Interim and Annual Meetings did not select either the NCWM Interim Agenda or the Announcement Book, publications vital for ongoing participation in the process of standards development. Again, services personnel entered computer data to send Interim Agenda (NCWM Publication 15) and Announcement Books (NCWM Publication 16). This coming membership year (July 1, 1991 to June 30, 1992), members will automatically receive NCWM Publication 15, the Interim Meeting Agenda, and Publication 16, the Announcement Book and Committee Reports for the 77th Annual Meeting. They will not automatically receive NIST Handbooks 44, 130, and 133, NCWM Publication 2, the Weights and Measures Directory, nor the Report of the 76th Annual Meeting unless specifically requested by marking the appropriate boxes on the back of their membership renewal forms. These forms were mailed to 1990-91 members in May. There is no extra charge for these publications, which all members may receive. Any member concerned that he/she may not have marked the back of the form may check off publication selections and return the back sheet of the W&M Today Newsletter sent out immediately after the Annual Meeting.

Members' selection of publications has resulted in a slight reduction in the number of copies printed. With the planned modifications in membership services data input described above, the total is expected to drop significantly in the coming year. The membership applications and renewals sent in May highlighted the changes in policy and membership services.

Training Modules. The development of the National Training Program (NTP) was expected to generate income to the NCWM through the sale of copies of the training modules. Based on the success of other organizations, such as the Instrument Society of America (ISA), that have developed large sales of their training materials, income from sales was expected to help fund the updating or development of additional modules.

Sales of NCWM training modules have not been large. When a new module is published, each State is given one free copy. Rather than buy "sets" of Inspector Manuals for use in training sessions (as is done by ISA), States request and receive waivers on the copyright, then reproduce the copies needed. Other revenue means must therefore, be generated to support the NTP.

NIST training administrator Joan Mindte sent a flyer to the entire 15,000-name NCWM mailing list announcing the availability of two new modules, 19 (Loading Rack) and 24 (Commodity Inspection); the republication and updating of two existing modules, 8 (Retail Motor Fuel) and 10 (Package Inspection); and the availability of all the modules. This generated nearly \$5,000 income from the sale of modules. With additional updating and module generation in the coming year, it is anticipated that a small amount of income will be generated, but enough to support module development (nearly \$40,000 in 1990 dollars) is not expected.



Use of Metric (SI) Units in Publications. Metric (SI) units are used in all weights and measures publications, and the Conference is on record as a proponent of the use of the metric system. Nonetheless, Congressman Tim Valentine (D, NC) wrote to Dr. Lyons, Director of NIST and NCWM President, suggesting that the use of metric units in NIST Handbook 44 is inadequate. A special session was arranged at the Interim Meeting to exchange information with Ms. Cristine Wegman of Congressman Valentine's (NC) office.

NCWM's longstanding support for the metric system was pointed out at this meeting. It was the opinion of many that Handbook 44 and (indirectly) NIST and the NCWM were being unfairly criticized. NCWM's support for the U.S. Metric Board was recounted. The issue was raised that the Fair Packaging and Labeling Act (FPLA) requires quantity declarations in inch-pound units, and that Congressional action is required to permit labeling in metric only. Several speakers from the private sector reported on company problems with attempts to label their products in metric. For example, Shell Oil Company related its efforts to convert to gasoline sales by the liter; they had to convert back to sales by the gallon due to loss of sales.

The weights and measures representatives at this meeting conveyed agreement with the commitment of Congressmen Brown (CA) and Valentine on this issue, they felt that a commitment by a majority of the Congress would be necessary before significant progress could be made. (Congressman Brown has been a longstanding proponent of metric conversion and has submitted legislation to make the FPLA require metric labeling.)

In letters responding to Congressman Valentine, NCWM's commitment to metric usage was reconfirmed. In line with this reconfirmation, the Executive Committee has requested that the members of the NCWM Committees be especially aware of the need to use the SI system to the fullest degree possible as they recommend changes to the NIST and NCWM publications.

Recent actions taken by Congress and NIST directly affect the NIST publications used by the weights and measures community. Of special importance is the NIST policy requiring the use of SI units (with the corresponding values in non-SI units optionally following in parentheses) in all NIST publications. If this policy is considered inappropriate for use of the publications in State regulation and/or by manufacturers, sellers, and users of devices, provision is made for exceptions requiring the approval of the NIST Director. The policy statement is as follows:

"In accordance with the Metric Conversion Act of 1975 as amended by Section 5164 of the Omnibus Trade and Competitiveness Act of 1988 and as required by related provisions of the Code of Federal Regulations, the National Institute of Standards and Technology (NIST) will use the modern metric system of measurement units (International System of Units; abbreviation: SI) in all publications. When the field of application or the special needs of users of NIST Publications require the use of non-SI units, the values of quantities will be first stated in SI units and the corresponding values expressed in non-SI units will follow in parentheses. Exceptions to this policy require the approval of the Director."

Two actions have been taken regarding the use of metric units in NCWM documents published by NIST: (1) the OWM staff developed tables outlining proposed changes to Handbooks 44, 130, and 133 for consideration by the responsible NCWM standing committees; and (2) Mr. Albert Tholen (Chief, OWM) briefed Dr. John Lyons (Director, NIST) on the current status of the publications and the proposed changes.

Dr. Lyons has approved the printing of NCWM Publication #5, "Index of Device Evaluations, Third Edition". He requested that OWM provide him with advance copies of documents to be published so that he can have the opportunity to judge the progress being made towards fully meeting NIST metric policy in publications.

## 101-2                      W                      Publications, Two-year Printing Cycle

This item was withdrawn due to the lack of support by the Regional Associations, the Scale Manufacturers Association, and the Gas Pump Manufacturers Association. The Western Weights and Measures Association is on record opposing a two-year printing cycle; the Central Weights and Measures Association is on record supporting it provided that (1) voting on a committee's recommendations also occurs on an every-other-year basis and (2) a mechanism is established for handling emergency issues. The Central's reasoning for part (1) is that, if voting on

items were conducted every year, voters would need two documents in the "off" year - the handbook and the prior year's proceedings - in order to know what had already been approved, but not yet added to the published handbook.

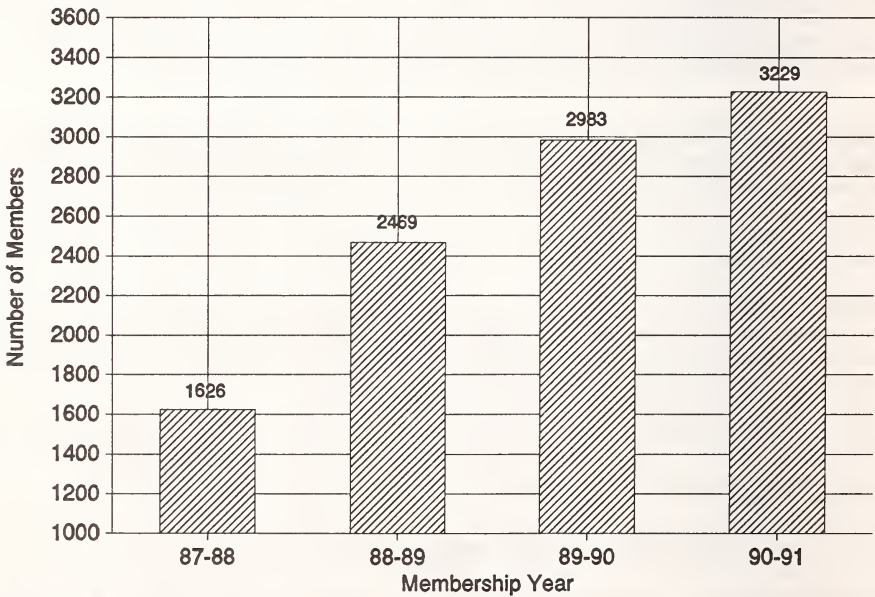
See NIST Special Publication 793 "Report of the 75th National Conference on Weights and Measures", Items 101-2, 101-2A, and 101-2B for the background on this issue.

**101-3                    I                    Membership, Status Report**

A review of the membership program included: (1) the current membership, (2) its composition, and (3) plans for future recruitment. As can be seen in the figure below, membership has been rising. See Appendix A for the composition of membership and the NCWM mailing list.

Membership grew from 1988 to 1989 by 52%, from 1989 to 1990 by 21%; in spite of a poor national economy, the membership grew from 1990 to 1991 by 8%. The growth in membership is attributed to: (1) an intensive mailing campaign targeting local businesses (identified by the States), and (2) renewed efforts by the States to enroll their staffs. Despite this increase, less than half of the weights and measures officials in the country are NCWM members; a much smaller percentage of the potential private sector mailing list are members. However, the NCWM membership continues to be split almost 50% each, public and private sectors. Increases are expected in the future as a result of incorporating State lists of registered repair firms into the NCWM mailing list, continuing promotional efforts, and broadening of the NCWM program (NTEP expansion to include grain measuring devices, wider acceptance of NTEP generally, and increasing international activities (Canada, Mexico, EC92)).

**NCWM Membership Growth**



The following recommendations were made to encourage membership growth:

1. The Executive Secretary should continue to contact States and local jurisdictions to obtain mailing lists. (As of January 30, all States had been contacted.)
2. The NCWM should experiment with mailings originated by the State offices in lieu of mailings from OWM to determine if this approach is more effective.
3. Request the Gasoline Pump Manufacturers Association (GPMA) and the Scale Manufacturers Association (SMA) to ask their members to compile mailing lists of potential NCWM members.
4. Arrange for NCWM institutional articles and advertisements in publications (e.g., Petroleum Marketeer, Weighing and Measurement).

## 101-4 V Organization, Chairman of the Board of Governors

(This item was adopted.)

**Background:** Due to the complexity of some of the issues that need to be resolved by the NTEP Board of Governors, the current policy of assigning the NCWM Chairman-Elect to sit as Chairman of the Board of Governors was questioned. The Chairman-Elect may have had no previous experience in any aspect of the NTEP, such as service on the Board of Governors, the NTEP Technical Committee, or the Committee on Specifications and Tolerances. Chairing the Board could therefore impose a heavy obligation on the Chairman-Elect to study past actions and develop an expertise on the workings of the NTEP.

The Executive Committee discussed and unanimously passed a proposal to change the Bylaws of the NCWM so that the Past Chairman of the Conference serves as the Chairman of the Board of Governors. The recommendation was broadened to include the duty already assigned to the Past Chairman as Chairman of the Nominating Committee. (See Constitution, Section 2.B.1.a.) The Executive Committee agreed that this change should become effective immediately upon the close of the 1991 annual meeting of the NCWM.

**Committee Recommendation:** Delete Bylaws Article IV, Section 2D which states that the Chairman-Elect will "serve as Chairman of the Executive Committee when it sits as the Board of Governors for the National Type Evaluation Program".

Add a new Section to Article IV of the Bylaws as follows:

### SECTION 9 - PAST CHAIRMAN

The most recent still-active Past Chairman will serve as: (1) Chairman of the Executive Committee when it sits as the Board of Governors for the National Type Evaluation Program and also as (2) Chairman of the Nominating Committee.

## 101-5 I Organization, Appointments and Assignments

At the Interim Meeting, NCWM Chairman Smith reported on his appointments and on the status of the NCWM organization. (See the Proceedings of the 75th Annual Meeting for the appointments made by Chairman Smith at the time of his taking office.)

### Executive Committee

Mr. Ken Butcher, MD to complete the two years remaining on the term of Mr. Lacy DeGrange who retired.

### National Type Evaluation Technical Committee - Weighing Sector - Private Subsector

Mr. Gary Lameris, PMI Food Equipment Co. replacing William Paull.

Executive Committee

National Type Evaluation Technical Committee -  
Weighing Sector - Public Subsector

Mr. Constantine Cotsoradis, MD

National Type Evaluation Technical Committee -  
Measuring Sector - Public Subsector

Mr. Jack Jeffries, FL  
Mr. Steve Malone, NE  
Mr. Ron Murdock, NC

OIML Pilot Secretariat 7

Mr. Jim Truex, OH

Task Force on Planning for the 21st Century

Mr. Darrell Guensler, CA, Chairman  
Mr. Thomas Geiler, MA  
Ms. Mary Heslin, CT  
Mr. Chip Kloos, Beatrice/Hunt-Wesson  
Mr. Bruce Martell, VT

Task Force on Safety

Reappointed Mr. Charles Gardner, NY, Chairman  
" Mr. L.F. Eason, NC  
" Mr. Jim Harnett, CA  
" Mr. Don Soberg, WI  
" Mr. Hap Thompson, American Petroleum Institute

Associate Membership Committee

Ms. Dawn Brydon, International Dairy Foods Association, Chairman  
Mr. Chip Kloos, Beatrice/Hunt-Wesson, Vice Chairman  
Mr. Tom Stabler, Toledo Scale Corp. Secretary/Treasurer  
Mr. Harvey Lodge, Dunbar Man. Co.  
Mr. Bill Braun, Procter and Gamble  
Mr. David Quinn, Fairbanks Scales  
Mr. Jim Schnitzler, Accurate Metering Systems  
Mr. Ed Thompson, Kraft Inc.  
Mr. Ray Wells, Sensitive Measurements Inc.  
Mr. Dick Whipple, Gilbarco  
Mr. Hap Thompson, American Petroleum Institute

Chairman Smith made the following appointments since the Interim Meeting:

Mr. James Harnett, CA, was appointed to serve on the Committee on Education, Administration, and Consumer Affairs (the Education Committee) for Charles Greene, NM, who has retired.

Mr. Dean F. Ely, PA, was appointed to serve as Chaplain for the 76th Annual Meeting.

Mr. Norman A. Alston, Daniel Flow Products, Inc., was appointed Chairman of the Measuring Sector of the Technical Committee on National Type Evaluation.



Mr. Curtiss R. Kunkel, EMARK Corporation, Mr. Glen R. Marshall, Shell Oil Company, and Mr. Gordon W. Johnson, Gilbarco Inc., were appointed to the Measuring Sector of the Technical Committee on National Type Evaluation.

Mr. Thomas J. Healy, Thayer Scale Division, was appointed to the Belt-Conveyor Scales Sector of the Technical Committee on National Type Evaluation.

Appointments made at the 76th Annual Meeting by 1991-1992 NCWM Chairman Sid Colbrook are listed in Chairman Colbrook's address (New Chairman's Message) following the committee reports in this publication.

## 101-6A I Organization, Role of Metrologists

At the Interim Meeting, Mr. Ross Andersen reported on the activities of the Metrologists' Group, referencing a report prepared by L.F. Eason, Chairman of the Group. The Group accomplished much that it had planned to do in July, 1990. It explored several alternatives for improving its effectiveness in the NCWM, as well as completing work in the technical area related to mass and volume measurement.

Organization. The metrologists originally proposed a formal organizational structure that would, in their opinion, allow them to provide the best support for the Conference. They recommended the recognition of a NCWM Technical Committee on Metrology composed of a representative from each Regional Measurement Assurance Program (RMAP) region, an industry representative, and the NIST technical advisor. Chairmanship of this Technical Committee would rotate among regions. The Metrologists' Group has been informally organized this way since 1988.

Meeting Format. In the opinion of the Metrologists' Group, the NCWM Metrologist Workshop format at the annual meeting does not allow enough time to accomplish their goals. Alternatives to the present format include holding a separate annual national metrology conference sponsored by NCWM or extending the metrology meeting schedule to the two days before or after the NCWM Annual Meeting. A national conference would provide many advantages, including adequate time for a comprehensive agenda featuring speakers and tutorials. The original proposal included several questions for the Executive Committee to answer:

1. Can the Executive Committee and the NCWM support the proposed metrologist organization? Can it support a separate or extended meeting?
2. How and to what extent can the NCWM "sponsor" and include such an organization of metrologists within the current NCWM structure?
3. Can a way be found under this proposal to assure the continued, direct participation of the metrologists (appointment to committees and task forces, election to office, etc.) within NCWM?
4. What type of liaison will be possible and how can a meaningful, active link between the NCWM and the metrologists be maintained?
5. Can a separate metrology conference be attached to the Annual Meeting of the NCWM?

Tasks Accomplished. The Executive Committee appreciates the work accomplished by the Metrologists' Group in the past year. These tasks (see the July 1991 Metrology Report in this publication for details) have contributed to the progress of the NCWM and the OWM.

The Executive Committee discussed several alternatives to the annual workshops including: (1) strengthening the five RMAP's by funneling the results of those meetings through a metrologists' standing committee reporting to the Executive Committee at the Interim and Annual Meetings of the NCWM; (2) enforcing requirements for States to send metrologists to the RMAPs; (3) extending the work week of the metrologists at the Annual Meeting to include Thursday afternoon and Friday in order to provide the time needed for their program since some members of the Executive Committee felt that jurisdictions would have difficulty supporting another annual meeting (in addition to the NCWM Annual Meeting, the Intermediate Seminars, and the RMAPs) if held separately.

Recommendation of the Executive Committee: Based on comments from the Metrologists' Group and a review of their activities, the Executive Committee recommends that the Metrologists' Group continue to: (1) operate under its new structure; (2) meet during the week of the Annual Meeting of the National Conference on Weights and



## Executive Committee

Measures; and (3) continue its program as outlined in the report to the Executive Committee. The Executive Committee will continue to support the Metrologists' Group in these activities.

These recommendations essentially delay any additional steps that would: (1) formally integrate the Metrologists' Group as a separate committee into the structure of the National Conference; or (2) reestablish the work of the Metrologists' Group outside the umbrella of the Annual Meeting. Current funding of state programs plus the limitation on the resources of the Conference make it difficult to recommend actions that require additional funds.

## 101-6B V Adoption of NIST Handbook 105-1, 1990 Edition

(This item was adopted.)

**Committee Recommendation:** Adopt NIST Handbook 105-1, "Specifications and Tolerances for Reference Standards and Field Standard Weights and Measures, 1. Specifications and Tolerances for Field Standard Weights (NIST Class F)" revised 1990, based on the recommendation of the Metrologists' Group.

## 101-7 I Finances, Treasurer's Report

The Committee reviewed the financial status of the NCWM, including:

1. the status of the current operating budget;
2. changing the fiscal year;
3. charging a registration fee for the Interim Meetings; and
4. means to improve the budget auditing procedures.

**Status of the Current Operating Budget.** The Treasurer provided an updated report of the current operating budget to the Executive Committee at the Annual Meeting. See the Treasurer's Report in this publication for details.

**Changing the Fiscal Year.** The fiscal year begins July 1 and extends through June 30. Most of the revenues of the NCWM are received in the spring of each year (membership renewal). The period of large receipts continues into the next fiscal year. Because of the variability in the income stream from one year to the next, the operating budget status is often distorted and makes comparison with past years difficult. Consequently, the Treasurer made a motion to change the fiscal year to coincide with the calendar year, namely January 1 through December 31. The motion passed unanimously. (NOTE: Change in the fiscal year does not require changing the membership year, which will remain July 1 through June 30; the new fiscal year is for bookkeeping and management purposes only.) The Executive Secretary was requested to institute the new fiscal year as of January 1, 1992. There will be a July 1, 1991 to December 31, 1991 reporting period to permit the change in fiscal year reporting.

**Charging a Registration Fee for the Interim Meeting.** In the interests of more closely associating income and costs in the budget, consideration was given to establishing a registration fee for attendance at the Interim Meeting. Although costs associated with the Interim Meeting are large, the Interim Meeting now generates no income. After discussion, it was decided not to establish a fee. The Committee concluded that: (1) the income to the NCWM is adequate for its current program, including the Interim Meeting, and (2) the costs associated with the Interim Meeting can be easily identified.

**Changing the Auditing Procedures.** The books of the NCWM are audited by the Auditing Committee at the Annual Meeting each year. Prior to the Annual Meeting, the Treasurer provides the members of the Auditing Committee with the NCWM financial policy, information describing the accounts in the budget, and procedures for auditing. The Executive Committee concluded that the current procedure is adequate but that the Executive Secretary should explore alternatives available to the NCWM. The operating budget of the NCWM continues to grow and is approaching \$200,000 per year.

Additionally, the Treasurer and the Executive Secretary are following a plan to automate the bookkeeping and reporting functions of the NCWM in order to provide more detail to the Executive Committee to manage the NCWM business.

Encumbering Monies for Training Program. The current year's budget contains \$10,000 "earmarked" for use by the regional associations in obtaining instruction in training delivery, and \$10,000 for use in enhancing the capability of the National Training Program to update the modules.

Instructional Training. The Northeastern Weights and Measures Association and the Western Weights and Measures Association have contracted for and received training seminars from the Institute of Weights and Measures. The other regional associations have not contracted for training trainers yet. The Executive Committee voted to encumber the balance remaining of the \$10,000 at the end of the current fiscal year (currently \$5,698.64) for one additional year, to be used for the originally intended purpose.

Module Updating. As of the time of the Interim Meeting, \$5,494.86 of the budgeted \$10,000 had been spent (\$3,540 for purchase of a laserjet printer and \$1,954.86 to a contractor for reformatting Module 6). The Executive Committee voted to encumber the balance remaining of the \$10,000 at the end of the fiscal year (currently \$4505.14) for one additional year to be used for the originally intended purpose.

## 101-8                    V                    Finances, Expenses of Committee Members

(This item was adopted.)

**Background:** As an informal policy, members have been reimbursed for expenses incurred when on travel for the conduct of NCWM business. This expense has been rising as the activities of the NCWM have increased and now accounts for a large portion of the operating budget.

A subcommittee was established by the then Chairman, Fred Gerk, to draft a policy for reimbursing members' expenses when on Conference business. The following members were appointed to the subcommittee: Ken Simila, OR, Chairman; Ed Heffron, MI; Tom Geiler, MA.

The Subcommittee developed a draft policy which was put to a ballot of the Executive Committee. Following refinement, the draft policy (see Appendix B) was accepted by the Executive Committee, which then requested the Executive Secretary to put it into operation.

**Committee Recommendation:** Appendix B is recommended for adoption as policy of the Conference.

## 101-9                    I                    Finances, Associate Membership Fees

In a Memorandum to the Executive Committee dated July 11, 1990, the Associate Membership forwarded a motion unanimously supported by its members to:

- support the National Conference on Weights and Measures more effectively; and
- provide a more equitable distribution of sources of funding by the Associate Members for Conference-related programs (e.g., the traditional Conference reception, as well as educational programs, training and publications).

The memorandum also stated that:

The Associate Membership Committee proposes that associate membership dues be initiated, effective Conference Year 1990-91, at a level of \$15. This incremental differential could be added to Conference dues (currently \$35) for a total of \$50, and would be applied to carry out the type of programs outlined above."

This issue was discussed at the Interim Meeting with representatives of the Associate Membership. The following conclusions were reached:

1. The Executive Committee generally opposes a two-tier dues structure (\$35 for active and \$50 for associate members).
2. If dues were to be raised, they should be raised for all members based on the need of the NCWM. (It was noted that the membership fees have not been raised since the initiation of the membership program in 1980.)

## Executive Committee

3. The cost of the special activities at the Annual Meeting has been escalating for the Associate Membership Reception and for the functions sponsored by the NCWM and NIST.
4. It was agreed that all special functions need to be scaled back. It was proposed and agreed by all present that the Executive Secretary and the Associate Membership should work to arrange a "joint" activity at the 76th Annual Meeting in Philadelphia, PA in July 1991. A general plan was discussed that would move the NCWM "outing" from Thursday to Wednesday, preceded by a reception sponsored by the Associate Membership. This plan would significantly reduce the costs for everyone involved. Moving the "outing" to Wednesday would also make it possible for more Associate Members to attend.

Because of prior scheduling and contractual agreements, this year's outing was scheduled on Thursday rather than moved to Wednesday. This year's outing is considerably less expensive than prior years, and the Associate Membership Reception scheduled on Wednesday evening is, in fact, a shared activity (although the bulk of the reception is the gift of the Associate Membership). The Executive Committee will continue to review the issue of outings and receptions so that they do not financially burden either the individual meeting attendees or the Associate Membership Committee. One possibility is to incorporate the costs of a reception or outing into the registration fee.

### 101-10 I Finances, NTEP Operation and Funding

The NTEP has neither policy nor budget for meeting unusual expenses incurred in the resolution of appeals, especially those incurring high costs, such as testing load cells. The Executive Secretary drafted and proposed a policy to the Board of Governors in May 1989. (See the Report of the 75th NCWM 1990, pages 52-54.) Although the proposal was adopted by the Board by letter ballot, it was not implemented because neither the Scale Manufacturers Association nor the Gas Pump Manufacturers Association agreed with the proposal. The Board had requested the two associations to provide their recommendations for resolving this problem. No clear alternatives were forthcoming.

The Executive Committee is now considering an NTEP "maintenance fee" to be assessed annually for every valid certificate of conformance. Failure to pay the fee would result in automatic "expiration" of the certificate; this approach is common to programs similar to the NTEP.

The Executive Committee agreed to: (1) develop a plan encompassing the concept of a "maintenance fee" including the basis for assessing and the amount of the fee(s); (2) put the subject on the agendas of both NTEP Technical Committees; (3) request information from other organizations (e.g., Factory Mutual, Underwriters Laboratories, National Sanitation Foundation) concerning their funding mechanisms; and (4) tie this item into the discussions of the Committee on Specifications and Tolerances related to marking of devices and the use of the NTEP logo.

The Committee plans to continue development of plans for the future administration of the NTEP program. In its review of the issue, the Committee recognized that this issue must be broadened to include plans for funding other maintenance functions of NTEP. Consequently, the current title is deleted and changed to: Finances, NTEP Operation and Funding.

### 101-11 V Finances, Budget Review; New Chart of Accounts

(This item was adopted.)

Budget Growth. The growing resources of the NCWM result from increased membership. The Executive Committee and the Budget Review Committee are becoming more intimately involved in budget development and management. The budget for FY 90-91 was \$158,000, a significant increase over the \$113,000 for FY 89-90. The draft budget for FY 91-92 is \$191,000. The income from membership fees is projected to rise from \$67,550 (FY 89-90) to \$110,950 (FY 90-91).

The National Conference on Weights and Measures is a growing organization. As the membership increases, programs are expanding. The NCWM is now both a standards developing body AND an operating organization, operating both the National Type Evaluation Program and the National Training Program. Both of these programs have great potential to serve the membership and weights and measures in general. The budget for FY 91-92 was developed with this trend in mind (i.e., funding of NTEP appeals processes, auditing device production processes, delivery of formal prescheduled training seminars for 14 to 20 modules, etc).



In order to fund this expansion in mission, new mechanisms must be developed along with new funding sources, such as training tuition and registration fees directly related to the particular meeting. An example of identifying expenditures with major activities is the budgeting for the Annual Meeting. Previous budgets reported expenses of the Annual Meeting as those associated only with the hotel; they did not include such other incurred expenses as committee operations and travel/per diem expenses. The 1991-1992 Proposed Chart of Accounts (Appendix C) portrays ALL costs associated with conducting the Annual Meeting as "Annual Meeting" expenses. The Proposed Chart of Accounts reflects that the cost of printing NCWM Publication 15, the Interim Meeting Agenda, is part of the cost of conducting the Interim Meeting, and that the cost of printing NCWM Publication 16, the Annual Meeting Program and Committee Reports, is part of the cost of conducting the Annual Meeting.

**New Format.** Section IV Accounting of NCWM Policy 1.3.1. Procedures for Establishing the Budget and Administering Funds of the National Conference on Weights and Measures contains a list of accounts for NCWM operations. A new accounting format is proposed for three reasons: (1) to provide more detail of both income and expenses; (2) to regroup income and costs to better reflect the application of these items; and (3) to establish the basis for computerizing the accounting of the NCWM.

By automating the financial management of the Conference, the Treasurer and the Executive Secretary will be able to provide the Chairman and the Executive Committee with monthly statements and reports of expenditures. This will provide the ability to compare operations with the budget and make budgetary decisions rapidly and confidently.

See Appendix C for a description of the proposed Chart of Accounts. The Operating Budget for Fiscal Year 1991-1992 was adopted by the Executive Committee (Appendix D).

**Committee Recommendation:** Replace Section IV Accounting in NCWM Policy 1.3.1. with the Chart of Accounts in Appendix C.

## 101-12 V Meetings, Annual & Interim, Work Schedule

(This item was adopted.)

Discussions continued about the format of the Interim and the Annual Meetings. The Committee decided against major changes in the current format. Three issues were discussed: (1) additional technical sessions on major issues; (2) shortened work week; and (3) executive (closed) sessions.

**Technical Sessions.** The proposal to add technical sessions was based on two observations: (1) the membership needs a fuller understanding of some issues before the Conference so that final decisions are better understood and applied at the State and local level; and (2) many non-committee members in attendance have free time to spend in technical sessions. Tutorials or other informational sessions would clarify some of the more complex issues under consideration. They could be held concurrent with committee sessions without delaying the business of the Conference. One obstacle to planning and conducting these additional sessions is the limited availability of OWM staff, who are already fully committed at both the Interim and Annual meetings. No specific conclusions were reached on this subject.

**Shortening the Work Week.** Two reasons for a shorter work week were discussed: (1) to reduce total per diem costs to the NCWM or to the members' jurisdictions or companies for attending the meeting; and (2) to reduce the total time the individual is away from the office. During the past few years, the Interim Meeting has required five working days to complete the work of the Standing Committees. In fact, the actual work week has been getting longer, with members flying on Saturdays to get better air fares. Sunday is a work day at both the Interim and Annual Meetings. At some Interim Meetings, reducing the time available to the committees was a hardship. At the Interim Meeting in Scottsdale, the working days were curtailed in order to work in field trips; in Bethesda, the workday on Wednesday was shortened in order to take a field trip to the new weights and measures facility in Annapolis. In both cases, committee members reported difficulties in getting all their work done. It was decided not to change the current weekly format of the Interim Meeting. The 76th Annual Meeting was concluded at 3 p.m. on Thursday rather than Friday morning.

**Executive Sessions.** An associate member registered a complaint with the Executive Secretary that one of the standing committees closed its meeting on a Sunday afternoon during the agenda review session. The committee members

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had felt the pressure of dealing with a large agenda in a relatively short time and concluded that a closed session would likely result in a faster pace than an open session. Several sensitive issues on the agenda had led industry representatives at earlier Interim and Annual Meetings to attend the Sunday meeting to introduce information. The Committee felt that the Sunday session should be a work session, and that industry input should be held until the open forums on Monday. Since they had had difficulty in controlling interruptions in the past, they decided that the fairest approach would be to make the Sunday session an executive (closed) session. The Committee obtained prior approval of the Executive Secretary and posted the notice at the registration desk. Unfortunately, since the meetings began on Sunday, there was no advance warning for out-of-town participants planning to attend the Sunday session.

The Conference has followed a general policy to keep all meetings open. The Announcement Books read: "Unless otherwise posted, all meetings are informal and open to all registered delegates." As a result of much soul-searching at the Annual Meeting in July 1990, the following was added to the Sunday session descriptions for each committee in the Interim Agenda this year: "This is a working session for the Committee. Although the session is open, no input will be taken from other than members of the \_\_\_\_ Committee." However, the Executive Committee believes it is necessary to formalize its open meeting policy.

The Committee acknowledges the need to emphasize the purpose of the Sunday committee meetings. The Committee instructs the Executive Secretary to include appropriate text in NCWM Publication 16, Program and Committee Reports for the NCWM, to clarify the purpose of these meetings for members who plan to attend the annual meeting.

**Committee Recommendation:** Adopt the following policy:

All sessions of conference meetings are normally open to all members of the Conference. If the Chairman of a Committee recognizes an abnormal situation involving a proprietary issue (e.g., NTEP appeals) or sensitive issue or other substantive need, that portion of the session dealing with the abnormal issue may be closed provided that: (1) the Conference Chairman (or in his absence the Chairman-Elect) approves, and (2) announcement the closed meeting is posted on or near the door to the meeting session and on the announcement board at the registration desk. If at all possible, the posting should be done at least a day prior to the planned closed session.

## 101-13 I Meeting, Annual, 76th

The 76th Annual Meeting was held at the Four Seasons Hotel in Philadelphia, PA during the week of July 13, 1991.

A total of 275 delegates were in attendance along with 60 guests. There were 43 States represented, plus Puerto Rico and the U.S. Virgin Islands. American Samoa, Colorado, the District of Columbia, Georgia, Guam, Maine, Mississippi, Montana, Nevada, and New York were not represented this year. Delegates from Canada also attended.

This year four states received first year banners for 100% membership of their State and local weights and measures officials in the NCWM. This brings the total to 22 States that have 100% membership in the NCWM.

The "President's Certificate Award" was presented this year for the second time. Six States received this award with 100% of their State office staff as members for the 1990-1991 conference year.

### Weights and Measures for the 21st Century

In his address to the Conference, Chairman Smith reflected on the major accomplishments of the NCWM over the past five years. He emphasized the need for NCWM members to continue efforts to promote the importance of weights and measures programs in spite of the severe program cutbacks experienced by many jurisdictions. Chairman Smith recalled the theme of the 1990-1991 NCWM year, "Weights and Measures for the 21st Century." He cited a number of current changes that have occurred in technology and markets which affect the weights and measure community, and he stressed the need for the weights and measures community to continue to look ahead. Chairman Smith ended his address by recognizing the importance of the work of the Task Force on Planning for the 21st



Century; he commended the Task Force for the work which has already been accomplished by its members. It is hoped that the Task Force will present recommendations to the NCWM for developing strategies that will enable the weights and measures community to improve the quality of its services and products as it responds to the rapidly changing environment of the future.

#### 77th Theme: Partnerships for Progress

Chairman Colbrook has chosen "Partnerships for Progress" as the 1991-1992 theme. In his address to the NCWM, Chairman Colbrook cited some of the many examples of partnership which exist among members of the NCWM and other organizations and agencies, both nationally and internationally. He also announced his appointments for the 1991-1992 year. (See the New Chairman's Message for details.)

Chairman Colbrook reviewed some of the exciting new endeavors of the NCWM, such as the expansion of the National Type Evaluation Program to include performance criteria for grain moisture measuring devices and protein analyzers. He also noted that he has asked the members of the Task Force on the 21st Century to continue their work on looking to the future for the weights and measures community.

#### **101-14            I            Meeting, Annual, 77th**

The 77th Annual Meeting will be held during the week of July 19-24, 1992 at the Stouffer Nashville Hotel in downtown Nashville, TN. Planned activities include attendance at the Grand Ole Opry and the dinner theater on the General Jackson (a river paddle boat). The rates are \$99 for a single or double room. The Stouffer is a 31-story hotel in the heart of Nashville. It is connected to the new Convention Center and the new Church Street Shopping Mall (over 65 retail stores and dining). The hotel has a health center containing a fitness room, indoor swimming pool, whirlpool, sauna, and outdoor sun deck. Nashville has many attractions, including the Grand Ole Opry, Music Row, Riverboats, a theme park, and Printer's Alley (for night-time dinner and entertainment). The hotel is within a half hour of the airport.

#### **101-15A            I            Meetings, Annual 78th**

The Executive Secretary reported on general plans regarding the location of future meetings. The 78th Annual Meeting is being planned for the Central Weights and Measures region. The Central Weights and Measures Association has recommended that the NCWM consider either Cincinnati, OH or Kansas City, MO as appropriate locations for the 78th Annual Meeting.

#### **101-15B            I            Meetings, Interim 1992**

The Interim Meeting will be held at the Hyatt Regency Bethesda, Bethesda, Maryland during the week of January 12-16, 1992. The room rate will be \$69 for a single or double room.

#### **101-16            I            National Training Program (NTP)**

The Executive Committee and the Committee on Education, Administration, and Consumer Affairs met in a joint session at the Interim Meeting. At that session, Education Committee Chairman Steve Malone reported on the progress and the status of the National Training Program. His report was essentially a summary of the Education Committee's Interim Report published in NCWM Publication 16, 76th Annual Meeting Program and Committee Reports 1991. (See the final Education Committee Report.)

The Education Committee is concerned that the existing modules will not be updated routinely and will become obsolete, thus wasting much of the effort and resources invested in their development. The OWM staff does not have the resources to keep all modules current. At each Annual Meeting large numbers of changes to Handbooks 44, 130, 133, and other publications are adopted. This, in turn, establishes the need to make large numbers of changes in the training modules, not only to the excerpts from the Handbooks, but also text to explain the changes. In response to selected cases of the need for massive changes in a Module (e.g., Module 5), the Education Committee is contracting to get the work done. However, the long term need for annual updating still needs to be resolved.

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The Executive Committee took action to encumber previously allocated funds into the next fiscal year (see Item 101-7).

### 101-17 I Program, Coordination With Canada

Coordination between the U.S. and Canadian weights and measures programs is continuing with the objectives to: (1) reduce differences in the legal requirements of the two countries; and (2) share the workload for studying and analyzing issues affecting both programs.

Reduction of Differences. The two countries continue to send representatives to each other's meetings. The Canadian Legal Metrology Branch sends representatives to the meetings of the Committee on Specifications and Tolerances, the Committee on Laws and Regulations, and the NTEP technical committees. Henry Oppermann and others from the OWM staff attend technical meetings in Canada.

The Canadian Legal Metrology Branch and the NIST Office of Weights and Measures solicited comments from the private sector to identify differences between the legal requirements of the two countries that cause problems or confusion for device manufacturers. Both the Canadians and the U.S. wrote to the industries on their mailing lists. To date, the OWM has received over 20 written responses and a similar number of telephone responses to its letter. The Canadians report a smaller response to their letter. The two countries are exchanging copies of the letters and comments received.

Sharing Study of Issues. The two countries have divided primary responsibilities to study selected technical issues and will share results. This will reduce expenditures in time and workload and should enable combined studies of more issues. Issues now under study include computers, audit trails, mass flow meters, and the method of sale for baler twine.

### 101-18 I Program, Task Force on Safety

At the Interim Meeting, Mr. Charles Gardner, NY, Chairman of the Task Force reported on the work accomplished by the Task Force and its future plans. This report was included as an appendix in the Announcement Book (NCWM Publication 16).

Mr. Gardner provided the Executive Committee with an update of the work of the Task Force since the Interim Meeting. The Task Force completed its work at its final meeting in April 1991. The Task Force has submitted a complete final report to the Executive Committee along with its final recommendations to the NCWM for addressing the issue of safety in the weights and measures workplace. This complete report of the Task Force is divided into the following sections:

- I) Summary
- II) Recommendations to the NCWM
- III) Background -- The Establishment of the NCWM Task Force on Safety
- IV) The NCWM Task Force on Safety
- V) Who Needs a Safety Program? -- Making a Commitment
- VI) Establishing a Safety Program in the Weights and Measures Workplace -- Where to Start
- VII) Evaluating the Effectiveness of a Program and Making Modifications
- VIII) Resources for Maintaining an Effective Safety Program

The complete report of the Task Force was made available to attendees of the Annual Meeting as an addendum to the Interim Report of the Executive Committee. A brief summary of the Task Force's work is included in Appendix E to this report. Also included in Appendix E are sections (II), (V), (VI), (VII), and (VIII) of the final report. The latter four sections contain major points to be addressed when establishing a safety program. They are considered to be the most significant portion of the Task Force's report.

The final report of the Task Force is available in its entirety as a separate NCWM Publication, Number 19. Copies of NCWM Publication 19 will be distributed to all State weights and measures directors. A limited number of copies

of Publication 19 are still available at no cost to NCWM members. When this supply is exhausted, a second printing will be made and copies made available (at reduced cost to members).

Revisions to include safety considerations will be included in the 1992 publication of NCWM Publication 12, Examination Procedure Outlines for Weighing and Measuring Equipment. Similar revisions are expected to be made to future editions of NIST Handbooks 143, State Weights and Measures Laboratories Program Handbook, and 145, Handbook for the Quality Assurance of Metrological Measurements, or issued as addenda to the Handbooks. A glossary of the key safety phrases which will be used in Publication 12 and/or in Handbooks 143 and 145 is included as an attachment to Appendix E.

## 101-19 I Program, International Organization of Legal Metrology (OIML)

At the Interim Meeting, Dr. Sam Chappell, Chief of the Standards Management Program, NIST, updated a joint session of the Committee on Liaison and the Executive Committee on the activities of OIML. With the development of the OIML "pattern approval" plan and the evolution of the EC, the NCWM needs to consider these rapidly moving activities to determine the impacts on the NCWM and the U.S. commercial system.

An update to Dr. Chappell's report is included in Appendix F to this report.

## 101-20 I Program, Office of Weights and Measures (OWM)

OWM Status. At the Interim Meeting, Mr. Albert Tholen, Chief of the OWM, briefed a joint session of the Committee on Liaison and the Executive Committee on the program of the OWM. Each member of the Executive Committee was provided with a copy of the OWM's Long Range Plan. Copies were later provided to members of the Committee on Liaison and the Task Force on the 21st Century. Mr. Tholen encouraged review of the Long Range Plan, especially from the point of view of addressing the needs of the weights and measures community. He also suggested that it be reviewed (especially the Section on "Program Trends and Needs") in the context of the work of the Task Force on the 21st Century so that the plans of the NCWM and the OWM are compatible.

As reported by Mr. Tholen, the work of the OWM is conducted in seven task areas:

1. Provide the Secretariat and technical advisors for the operation of the National Conference on Weights and Measures to: (a) maintain and improve the Conference organization and operations for the solution of weights and measures problems; and (b) develop and adopt national consensus standards for uniformity in the regulation of commerce.
2. Provide the basis for equity in trade through the development of uniform laws and regulations and methods of test that serve as standards for the State regulation and administration of commercial commodity exchange.
3. Promote uniformity of weights and measures administration, inspection, and enforcement in State, county, and local jurisdictions, through training and the design and development of training materials.
4. Provide technical support for the traceability of State weights and measures laboratories to the national standards through development and use of standard procedures, protocols, measurement assurance programs, and audit the use and care of the physical standards of mass, length, and volume.
5. Provide the technical measurement bases for development of uniform performance specifications, tolerances, and test methodology for commercial weighing and measuring devices and systems, and field standards and equipment.
6. Evaluate new measurement instruments, systems, and field standards to determine their conformance with required standards of design and performance. Provide training of State officials for NTEP evaluation and laboratory authorization.
7. Provide leadership and coordination among State and local weights and measures officials, and between them and Federal agencies, private sector organizations, and the International Organization of Legal Metrology.



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Mr. Richard Whipple, formerly from Gilbarco, Inc., was hired by OWM July 1, 1991. Mr. Kenneth Butcher, chief of Maryland Weights and Measures, was hired July 29, 1991 to replace Mr. Eric Vadelund in the Office of Standards Management (OIML) and to provide assistance in OWM.

NIST Visiting Committee. Dr. Ed Heffron, MI, is a member of the National Institute of Standards and Technology's Visiting Committee. He reported on the role and activities of the NIST Visiting Committee and his participation. Dr. Heffron said that he is quite impressed with the members of the Visiting Committee and believes that he has an important role to play in its deliberations.

At the Annual Meeting, Dr. Heffron reported further on the role of the nine member committee as authorized by the 1988 Omnibus Trade and Competitiveness Act in reviewing and making recommendations on budgets, programs, and policies of NIST. His report acknowledged justification of a NCWM member being appointed to the Visiting Committee to utilize the experience and expertise of NCWM as a broad measurement science organization, in particular, its liaison work with State and local government and industry.

The report outlined the Visiting Committee's independence in analyzing and making ongoing recommendations to the administration of NIST and to appropriate congressional committees in an annual report to the Secretary of Commerce. Examples were outlined of the determination of the Visiting Committee to implement major updating of the NIST facilities at Gaithersburg, MD and at Boulder, CO. Dr. Heffron indicated that the Visiting Committee has a major ongoing charge to emphasize the transfer of advanced technology. One of the success stories of NIST has been its scientific discoveries that have been or are amenable to transfer into useful commercial products. One of the means undertaken by NIST for enhancing the transfer of advanced technology is the establishment of regional manufacturing technology centers, now numbering five. These centers are exhibiting early signs of significant results.

The extension of technology by NIST is, in many aspects, similar to the productive relationship between the NCWM and the OWM. The Visiting Committee is increasingly aware of the need for NIST to continue to expand its measurement science base for commerce and industry (similar to the extension as conducted by the OWM and the NCWM). These Visiting Committee views coincide with and reinforce the planning of NIST. Dr. Heffron summarized the vital role that the NCWM can play, not only as a functioning model, but also as a measurement science conduit to industry.

## 101-21 I Program, National Uniformity

Status of Uniformity. The Office of Weights and Measures has as a major goal in the legislation that established the National Bureau of Standards in 1901 "cooperation with the States in securing uniformity in weights and measures laws and methods of inspection". After 90 years, attainment of uniformity is still a goal; this conclusion is based on the following evidence:

1. NIST Handbook 130 reports on the status of adoption of the uniform laws and regulations and NIST Handbook 44. The format of reporting the status of adoption has been changed. Handbook 130 now keeps track of whether a State automatically updates its rules when new editions of Handbook 44 and the regulations in Handbook 130 are printed. In many cases, fewer States have adopted uniform regulations than the number that have not adopted them.
2. Although 36 States automatically adopt the most recent edition of Handbook 44, 17 States must go through additional rule-making administrative procedures or through their legislatures to adopt changes. Some States consequently reference handbooks five or more years out of date.

If the goal is uniformity, can the Conference and NIST be satisfied with anything less than complete adoption of Handbook 44 and the uniform laws and regulations in Handbook 130? The reason for including the new Sections 5 through 10 in the Uniform Law (1983) was to provide a mechanism for the States to keep up to date with the actions of the Conference. For example:

## "Section 5. Requirements for Packaging and Labeling

The Uniform Packaging and Labeling Regulation as adopted by the National Conference on Weights and Measures and published in the National Institute of Standards and Technology Handbook 130 "Uniform Laws and Regulations" and supplements thereto or revisions thereof, shall apply to packaging and labeling in the State, except insofar as modified or rejected by regulation."

Knowing that essentially every State Director attends the Annual Meeting and votes on every issue before the Conference, one could conclude that the efforts working toward uniformity are understood. Why, then, is the progress toward to uniformity so slow?

Answers include claims that: (1) State regulations are similar to the models; (2) an individual State does not "need" certain regulations; (3) it is very difficult to get changes through the legislature; or (4) budgets are being cut and Directors want to "keep a low profile."

The Executive Committee restated its desire to continue the ongoing efforts for uniformity, including the following:

1. Reconfirm the information in Handbook 130. If States know of inaccuracies in Appendix G (reprint of pages 4-6 in Handbook 130), please contact Carroll Brickenkamp, OWM, 301-975-4005 with corrections and updates.
2. Offer assistance of OWM and the NCWM to the States in their efforts to update statutes.
3. Determine if the NCWM should establish an official program for promulgation of uniform laws, regulations, and standards to achieve uniformity among all jurisdictions.

In this period of growing complexity in and internationalization of commerce, the status quo with many State "variations" adds costs to our business system. Can all the States achieve the goal of adopting the uniform laws and regulations as written? Until or unless this is accomplished, will we have the free, open, uniform marketplace envisioned 90 years ago?

State Program Funding. Considerable concern was expressed that being aggressive about changing legislation at the State level is not high on the agenda because of belt tightening due to widespread budget shortfalls. The discussion turned to addressing the growing pressures to reduce budgets, including legislating fees and/or licenses as sources of income to reduce strain on general funds.

The official position of the NCWM is:

1. Weights and Measures is a regulatory function, not a "service" for fee function.
2. The preferred source of funding weights and measures programs is from general funds.
3. Funding through fee systems is inequitable and conflicts with effective regulation.

The Executive Committee suggested that States faced with major changes in funding and funding sources solicit the assistance of neighboring jurisdictions, the NCWM, and the OWM to assist in providing arguments for maintaining general funding. Position papers on program funding are available from OWM upon request.

## 101-22 I Program, Task Force on Planning for the 21st Century

This Task Force was established by Chairman Smith. At the Interim Meeting, the Task Force Chairman, Mr. Darrell Guensler, reported on the work plan of the Task Force. The responsibilities of the Task Force are to:

1. make predictions on the future of weights and measures and recommendations for meeting the challenges;
2. make recommendations for new areas to come under the weights and measures umbrella;
3. investigate avenues that will put the value of weights and measures and the Conference before the political and civic "movers and shakers" in our States and at the National level;



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4. suggest how to take the Conference to the membership, rather than only bringing the members to the Conference;
5. determine the need to include a session on motor fuel quality at the Annual Meeting;
6. consider the impact of biodegradable, recyclable, and safety packaging on existing requirements; and
7. generally "rock the boat" and get us "sailing in the right direction" now and into the future.

The Task Force held its first meeting on December 13 and 14, 1990 in Raleigh, NC. In addition to the members of the Task Force, Chairman Smith and Carroll Brickenkamp participated in the meeting.

After much discussion and agreement on what the Task Force should do, the group identified approximately 25 issues and goals to study. These items include "new ways of financing weights and measures programs," "networking," "future of device inspection," and "identifying with the quality movement."

Each member of the group was assigned the task of identifying five top priority subjects that will allow the group to concentrate at the next meeting on the most important ideas.

The Task Force met March 21-22, 1991 in Burlington, VT. The report of this meeting is included as Appendix H to this report.

## Part II - Board of Governors

### 102-1 I Publications, Status Report

The Executive Secretary reported on the status of NTEP Publications 5 and 14.

Publication #5. Publication 5 was originally offered in three formats: (1) Publication 5 - complete document including listings of Certificates of Conformance issued by company, device type, and certificate number; (2) Publication 5A containing listing by company only; and (3) an electronic version on floppy disk (provided by requester).

As of the Interim Meeting, the following orders were filled:

	Pub. #5	Pub. #5A
At no charge to members	338	251
To non-members	46 (\$15 each)	34 (\$5 each)
Electronic (no cost)	<u>60</u>	<u>14</u>
Total	384	285
Cost of printing	\$5,320	\$ 649
Income	<u>710</u>	<u>170</u>
Net loss	(\$4,610)	(\$479)

The number of requests is encouraging, but we think that inspectors need more. The large expenditure in printing resulted from a lack of deadline for requests; reprinting to meet the demand of members was expensive.

The latest edition of NCWM Publication 5, "National Type Evaluation Program Index of Device Evaluations", has been updated and was published in May 1991; it lists all NTEP Certificates of Conformance issued from January 1986 through May 8, 1991. The publication is available in two versions. The first version, NCWM Publication 5, is a complete listing of certificates sorted three ways, by company, by device type, and by certificate number. The cost of this publication is \$20 per copy for NCWM members (\$35 for nonmembers). The second version, Publication 5A, is a 5-1/2 by 8-1/4-inch version of Publication 5. This smaller version was published for convenience in field inspections. This publication is available at \$15 per copy for NCWM members (\$30 for nonmembers).

A flyer detailing purchasing information for Publications 5 and 5A was mailed to all NCWM members in late July 1991. For further information on how to order a copy of these publications, please call (301) 975-4003.

Publication 14. This publication is in the process of a major revision with publication targeted for the fall of 1991. The new edition will include a checklist and test procedures for automatic bulk-weighing systems, and belt-conveyor scales; the checklists for scales, load cells, and liquid-measuring devices will be updated.

National Type Evaluation Program Weighing Sector Technical Committee Reports. Summaries of all Weighing Sector Technical Committee Meetings held from November 2, 1988 through June 26-27, 1990 have been combined into a separate report and is Appendix I to the Executive Committee Report.

## 102-2 I Program, Acceptance of the NTEP Regulation by the States

The adoption of the Uniform Regulation on National Type Evaluation (URNTE) has been a subject of interest and discussion by the Executive Committee for the past two years. The Board of Governors strongly urged that: (1) all States adopt the regulation; (2) all field inspectors be trained to enforce the codes in the latest edition of Handbook 44; and (3) field inspectors routinely verify that all inspected devices have been issued a Certificate of Conformance. Although the NTEP program has attained many of its objectives, it will not fulfill its potential until it is used throughout all of the States. Nonuniform or lack of application of NTEP requirements unfairly penalizes those manufacturers who fully subscribe to NTEP as the process to assure conformance with the requirements of Handbook 44 since those who do not participate still have access for their products (which may not meet requirements) to the same markets. The problem is compounded by variability in inspection protocols among inspectors due to incorrect or incomplete training. Additional problems are introduced into the system by lack of knowledge and understanding on the part of private sector design, manufacturing, and service personnel.

Shortly before the 75th NCWM, the SMA established an Ad Hoc Task Force to study the status of adoption of the URNTE and to make recommendations for the SMA's consideration regarding an industry program to support NTEP.

The Task Group, chaired by SMA Technical Director Daryl Tonini and including Terry James (Cardinal Scale), David Quinn (Fairbanks Scales), and Tom Stabler (Toledo Scale) as members, interviewed 10 weights and measures officials regarding their views on NTEP and the URNTE.

These interviews, conducted at the 75th NCWM and the 1990 meetings of the Western and Southern Weights and Measures Associations, led to consensus that:

- a. an industry role in encouraging state adoption of the URNTE would be welcome;
- b. such an effort should include concurrent support for adoption of the Voluntary Registration of Servicemen Model Regulation;
- c. weights and measures officials view NTEP training for their staffs to be their responsibility. However, an industry role and involvement would be in order for training of service and dealer personnel; and
- d. there is a need for improvement of industry, service, and dealer understanding of NTEP.

Following the report of the Task Group in November, 1990, the SMA Board of Directors approved a program for a joint NTEP effort with the NCWM. The objective of the program is to encourage and assist state adoption of the URNTE.

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In addition to the members of SMA taking a more active role in NTEP training of their service and sales personnel, the SMA Task Group was assigned to develop a program to present the NTEP/URNTE message at regional W&M and industry association meetings (such as NISA and ISWM).

The program was presented to NCWM/OWM in December, 1990. NCWM and SMA then announced the program in letters to State Weights and Measures Directors in jurisdictions without type approval or URNTE. Modest but important responses were received from about 10 jurisdictions.

At the 1991 Interim Meeting, Mr. Dave Quinn, Fairbanks Scales, gave a presentation on the "Scale Manufacturers Association/ National Conference Program for adoption of the URNTE." As explained by Mr. Quinn, there are two objectives of the program: (1) to achieve national adoption of the URNTE; and (2) to advocate aggressive enforcement of the URNTE. The SMA goals are to attain high nationwide product quality so that all devices meet the requirements of Handbook 44. This will require that the NTEP no longer be "voluntary".

The SMA encourages adoption of the URNTE as an efficient and effective system of type approval requiring only one approval (rather than 12 or more as before NTEP) for any type device. A Certificate of Conformance is evidence that the device meets the code requirements of Handbook 44, paragraph T.N.8., and is of commercial quality and product conformance.

The Task Group has been told that the industry participants need additional training in the knowledge of and application of NTEP, and that increased communications are needed between the industry and the weights and measures jurisdictions.

The program of the SMA/NCWM initiative includes the following steps:

1. identify jurisdictions that have not adopted the URNTE, but are interested in adopting it;
2. offer the assistance of the SMA Task Group or individual SMA members, and of the NCWM or OWM, in planning for adoption, including scheduling and holding of hearings and deliberations necessary in a given jurisdiction;
3. monitor the adoption process in specific jurisdictions and nationally; and
4. train industry personnel to aid the implementation of NTEP and develop support of NTEP among the industry.

Panels were organized to present the case for URNTE adoption at the 1991 regional weights and measures conferences, the National Industrial Scale Association spring meeting, and the International Society of Weighing and Measurement annual meeting.

As of the 76th NCWM, panels have made presentations at meetings of the Central and Northeastern Weights and Measures Associations, NISA, and ISWM. Weights and measures panel members have included Sid Colbrook of Illinois, Allan Nelson of Connecticut, Jim Truex of Ohio, and Henry Oppermann of OWM.

The Institute for Weights and Measures (IWM) is independently pursuing a very active NTEP training program for W&M officials, dealers, and servicemen.

In addition to Nebraska, which will adopt URNTE in 1991, Florida, Indiana, Maryland, and Michigan are considering strategy for URNTE adoption. Other jurisdictions also have the program under active consideration.

In general, other non-URNTE jurisdictions have responded positively to the SMA/NCWM initiative. However, other factors and priorities often have to be considered before the adoption process can proceed.

In view of the number of non-URNTE jurisdictions, a program goal is to see URNTE adoption proceed at the rate of 3-5 jurisdictions a year.

At the Annual Meeting, Daryl Tonini provided an update on the work of the SMA Task Group to the NCWM. (See Mr. Tonini's presentation at the front of this publication for details.)



### 102-3 I Program, OIML Certification Plan

At the Interim Meeting, Dr. Sam Chappell of NIST briefed the Board on the "OIML Certificate System for Measuring Instruments" adopted by the Organization of International Legal Metrology (OIML). See Appendix J for Dr. Chappell's report.

The Board of Governors and the Committee on Specifications and Tolerances are studying the OIML system to develop a position for the NCWM regarding U.S. use of the OIML system. Some basic questions need to be answered, including: (1) To what extent are NTEP and the OIML Program compatible? (2) What is the value of the OIML Program to U.S. manufacturers? (3) Does the NTEP have the capability to test devices for conformance to the OIML recommendations? Some observations were:

1. The range of instruments included in the OIML program under "legal metrology" is broader than the U.S. system (Handbook 44 and NTEP); for example, OIML includes medical and environmental instruments. The U.S. (perhaps the NCWM) will have to review the possible need for coverage of instruments not now addressed under NTEP in order to serve U.S. manufacturers.
2. The U.S. may have problems ensuring that our issuing authorities and testing laboratories meet the criteria of the OIML system, including acceptance of our system in the international exchange of Certificates.
3. We may have to strengthen our appeals mechanisms and funding in order to "go international." At this time, the U.S. industry position on funding appeals could severely restrict our operations.
4. No conclusion has been reached regarding the impact of the OIML system on the workload and interests of the NTEP Participating Laboratories.
5. Regarding paragraph 3.3.1. (See Appendix J) OIML will look at the ISO/IEC Guides 25 (General Requirements for the Competence of Calibration and Testing Laboratories) and 38 (General Requirements for the Acceptance of Testing Laboratories) to determine the effect on the NTEP Participating Laboratories.
6. Finally, if we embrace the OIML system, we will need to revisit NCWM Publication 14, NTEP Administrative Procedures, Technical Policy, Checklists, and Test Procedures to bring our two systems into "harmonization," including consideration of requirements contained in OIML D19 (Pattern Evaluation and Pattern Approval).

Mail Ballot 76-6 was sent to the Board of Governors in the Fall of 1990 for their comments on the OIML Certificate system. Comments received indicated that the Board members had concern about the compatibility of that system with the NTEP, as well as questions regarding the value of the system to the U.S. The Board requested that the Executive Secretary re-ballot the Board now that the members have been briefed in detail about the OIML Certificate system to determine whether or not the members' original votes would change based on the information provided.

### 102-4 I Program, USDA Certification Plan

At the Interim Meeting, Mr. Richard Pierce, USDA, briefed the Executive Committee on the "Grain Quality Incentives Act of 1990" (the 1990 U.S. Farm Bill) which contains provisions that could result in the expansion of the National Type Evaluation Program to include commercial devices used in commercial grain inspection. See Appendix K for the report.

In summary, the United States Grain Standards Act (7 U.S.C. 71) is amended by adding at the end the following new section:

"Sec. 22. Standardizing Commercial Inspections.

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- (a) **Testing Equipment.** -- To promote greater uniformity in commercial grain inspection results, the Administrator may work in conjunction with the National Institute of Standards and Technology and the National Conference on Weights and Measures to --
  - (1) identify inspection instruments requiring standardization under subsection (b);
  - (2) establish performance criteria for commercial grain inspection instruments;
  - (3) develop a national program to approve grain inspection instruments for commercial inspection; and
  - (4) develop standard reference materials or other means necessary for calibration or testing of approved instruments.
- (b) **General Inspection Procedures.** -- To ensure that producers are treated uniformly in delivering grain, the Administrator shall develop practical and cost-effective procedures for conducting commercial inspections of grain with respect to the application of quality factors, that result in premiums and discounts. The procedures shall be made available to country elevators and others making first-point-of-delivery inspections.
- (c) **Inspection Services and Information.** -- To encourage the use of equipment and procedures developed in accordance with subsection (a) and (b), the Administrator shall provide for official inspection services by the Service, States, and official inspection agencies and provide information on the proper use of sampling and inspection equipment, application of the grain standards, and availability of official inspection services, including appeals under this Act."

The NCWM and the USDA are working together studying this proposal to determine its impact on both organizations. The NCWM needs to determine the feasibility for NTEP to expand into this area of inspection, including the related work load on the Conference Committees, the Office of Weights and Measures, and the NTEP evaluation capabilities.

The Chairman, the Chairman-Elect, Carroll Brickenkamp (NIST), and Henry Oppermann (NIST) met in April with FGIS to establish priorities within the resources available and the roles each organization should play. The Executive Committee believes that the Conference is being invited to lead a very important standardization effort - one that many State weights and measures and grain moisture program directors have long sought - the partnership of FGIS with the NCWM in the whole area of commercial grain measurement equipment beyond just scales and weighing. In answer to the question of whether or not the Conference should get involved to this depth with commercial grain measurement equipment, we need to be reminded that there are 37 State weights and measures agencies that report to State Departments of Agriculture. The prices set for grain trades are directly related to the measurements of moisture, protein, dockage, and test weight on the grain; this makes these measurements definitely in the scope of weights and measures concerns.

FGIS is committing 1/4 staff year to serve as technical advisor to two National Type Evaluation Technical Committees (NTETC's) (moisture meters and near infrared devices). It also plans to provide funds to the NCWM to support two meetings per year for each of two NTETC's for at least two years. The NCWM will provide the forum for public consensus building, volunteers from the State regulatory agencies and regulated businesses, and the administration of the task with the Executive Committee acting as the Board of Governors, the S&T Committee to address the codes, and the two NTETC's.

As with measurement of octane and other quality factors in motor fuel, the Committee believes that involvement of weights and measures in this arena is an opportunity for public service, "good press," and program growth.

The Conference will announce the formation of the new sectors and request in the grain trade press and elsewhere that organizations express their interest in participating in the meetings. An organizational meeting is planned in December 1991 that will include a discussion of the key issues. Because of the overlap in interest in both sectors, the two sector meetings will be scheduled sequentially, probably for two days each.



## 102-5 I Program, Participating Laboratories/Evaluation Report

The Executive Secretary reported on: (1) certificates of conformance issued by type and by laboratory; and (2) the capabilities to conduct evaluations now and in the future.

Certificates Issued. In 1990, 231 Certificates of Conformance (CCs) were issued or updated. Of this total, 26 Provisional, 23 Pre-NTEP, and 182 Full certificates were issued.

Of the 231 certificates issued, many were updates (addenda and amended) of certificates issued in previous years. Updated certificates often retain the Certificate of Conformance number prefix of the year the certificate was originally issued; the 47 certificates modified from previous years were: 26 1989 CCs, 10 1988 CCs, 7 1987 CCs, and 4 1986 CCs.

The 231 evaluations were conducted by the following participating NTEP laboratories: California, 64; Ohio, 52; New York, 10; North Carolina, 6; Federal Grain Inspection Service, 2; Kansas, 1; and the National Institute of Standards and Technology, 96 [39 for load cells; 23 Pre-NTEP; and 17 addenda (paper reviews)].

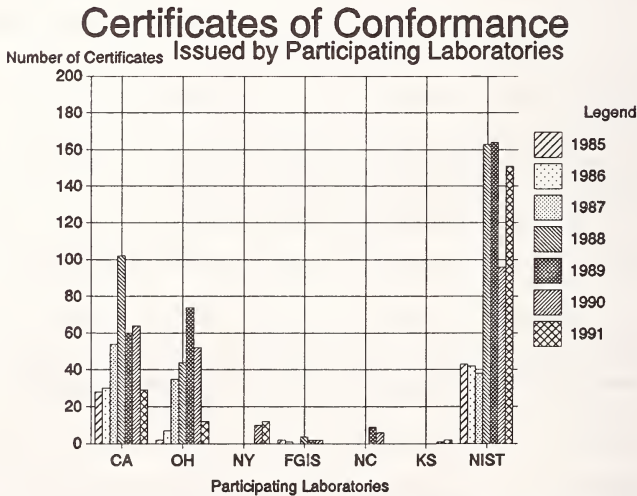
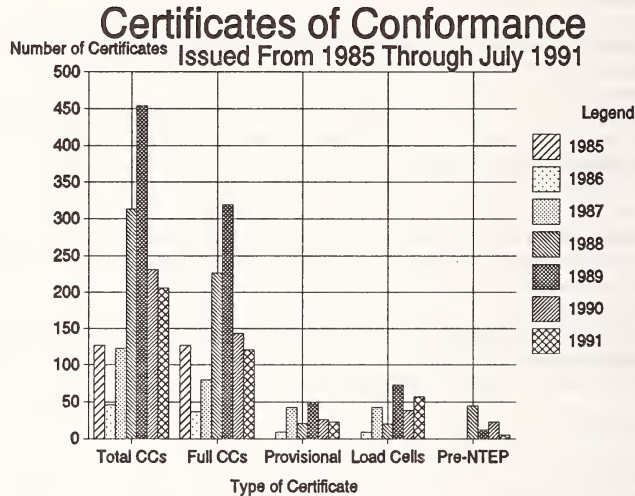
Evaluation Capability. The term "participating laboratories" refers to jurisdictions or agencies that are authorized to perform specific types of evaluations for the NTEP in areas for which they have the capabilities. The Participating Laboratories are authorized to conduct evaluations in the following areas:

Laboratory	Areas of Authorization
California	Design and performance evaluation of scales, cash registers, metering devices, service station consoles, and taximeters.
Kansas	Performance evaluation of large-capacity scales.
New York	Design and performance evaluation of scales and cash registers. Expansion into liquid measuring devices is under discussion.
North Carolina	Performance testing of liquid-measuring devices.
NIST	All NTEP evaluations, including load cells (NIST Force Group).
Ohio	Design and performance evaluation of scales and cash registers.
USDA/Federal Grain Inspection Service (FGIS)	Design and performance evaluation of automatic bulk-weighing systems, grain test scales, and performance testing of railway track scales.

The total workload of the Participating Laboratories has not changed much; the major change in the evaluation process has been associated with evaluation of load cells by the NIST Force Group. A major problem faced by the laboratories is the large proportion of devices submitted for evaluation that fail initial inspection or testing. In some cases, the submitting organization does not have the capability to test to NTEP criteria and, therefore, the NTEP laboratory is a first evaluator of a new design. In some ways, this involves NTEP in the R&D process, which is not its intended purpose. When devices need to be returned, a considerable amount of effort is expended in administrative work. Even though the manufacturer is billed for this work, the time and effort expended could be better utilized by the Participating Laboratory staff.

The Board expects the annual requests for evaluations to continue in 1991 at about the same rate as 1990. Offsetting any expected increases in requests as a result of more States adopting the Uniform Regulation will be a decrease as a result of the recession. The Board plans to add one Participating Laboratory within the next 12 months.

The following graphs are summaries of NTEP Certificates of Conformance and evaluations performed between the time period of 1985 and July 1991. The first graph is a summary of the number of Certificates of Conformance issued by type of certificate, and the second graph is the number of certificates issued by the participating laboratories.



## 102-6 I Policy, Type Evaluation Criteria for Computers

Computers are being used more frequently as integral elements in weighing and measuring systems. Agreement is needed on the procedures and criteria for the NTEP to follow when evaluating computers and the effects on the performance of systems being evaluated. The item was referred to the OWM for further development. OWM is working with Canada on this issue.

Discussions with Canada, and subsequently with the Weighing Sector of the Technical Committee on National Type Evaluation, have evolved to the position where computers incorporated into weighing and measuring systems do not need separate type evaluation criteria. The Weighing Sector has reviewed and modified type evaluation criteria

that most criteria will apply to the typical scales or computers incorporated into weighing systems without any special distinction being made. Additionally, the scope of type evaluations for systems that may incorporate computers has been defined (see Item 310-1 in the Report of the Specifications and Tolerances Committee). The type evaluation criteria for computers as part of weighing systems will be included in the next update on NCWM Publication 14.

## **102-7 I Policy, Load Cell Testing**

The load cell test procedures contained in NCWM Publication 14, Part II, Section 2, have been updated to incorporate the changes that have been made since January of 1989 by the Weighing Sector of the Technical Committee on National Type Evaluation. The changes are not extensive; however, they include clarification of certain aspects of the test procedures, changes to the tolerances reflecting the change to the class III L tolerance for temperature effect on zero, and numerous editorial changes. The basic nature of the test procedures has not changed.

## **102-8 I Policy, Belt-Conveyor Scales, Test Procedures**

At the Interim Meeting, Mr. Pete Perino, Chairman of the Belt-Conveyor Scales Sector, reported that work has been completed in the development of test criteria and procedures for use in evaluation of belt-conveyor scales. The Executive Committee voted to conduct a test using these criteria and procedures prior to the 76th Annual Meeting.

The Belt-Conveyor Scales Sector met in June 1991 to discuss issues that arose as companies prepared to submit scales for the laboratory tests. Agreement in concept was reached on the most complex issues; the details of the revised laboratory test procedures are being developed. It is expected that the first laboratory tests will be started in late summer or early fall. The field permanence test, which is a 6-month test, has been initiated on two scale models.

N. David Smith, North Carolina, Chairman  
S. Colbrook, Illinois, Chairman-Elect  
F. Gerk, New Mexico, Past Chairman

R. Andersen, New York  
K. Butcher, Maryland  
T. Geiler, Barnstable, MA  
E. Heffron, Michigan  
P. Nichols, Alameda County, CA  
K. Simila, Oregon

C. Gardner, Suffolk County, NY, Treasurer  
A. Tholen, NIST, Executive Secretary  
T. Butcher, NIST, Technical Assistant

## **Executive Committee**

Appendix A - Composition of NCWM Mailing List (as of 1/8/91)												
Category	NCWM Members					Non-members			Total		% of total who are members	
	89	90 (end of year)	90 (as of Jan 90)	91 (as of Jan 91)	% increase	89	90	91	89	90	89	90
State	537	759	698	741		860	744	792	1397	1503	38.4	46.4
County	275	335	322	338		615	614	607	890	943	30.9	33.9
City	213	231	206	222		453	370	363	666	601	32.0	34.3
Subtotal	1025	1325	1226	1301	6.1	1929	1728	1762	2953	3053		
Industry (U.S.)	924	1249	1139	1279		1812	3695	5966	2736	4944	33.8	23.0
Industry (frgn)	15	28	19	27		50	60	150	65	88	23.1	21.6
Subtotal	939	1277	1158	1306	12.8	1862	3755	6116	2801	5032		
US govt	44	45	38	46		135	149	161	179	194	24.6	19.6
Foreign govt	18	23	23	23		65	81	86	83	104	21.7	22.1
Retirees	31	351	29	324		46	.. <sup>2</sup>	.. <sup>2</sup>	78	324		100. <sup>2</sup>
Subtotal	93	419	390	393	0.8	200	230	247	340	627		
Guests						112	181	233	112	181		
Grand Total	2057	3021 <sup>3</sup>	2774 <sup>3</sup>	3000	8.1		5894	8358	6206	8893	33.1	31.8

<sup>1</sup> In March of 1990, 300 retirees were made members of the NCWM. Retirees do not pay for membership, receive all newsletters and flyers, but do not receive the handbooks. The mailing list included retirees, but they were not listed as members. Since membership did not cover all retirees were made members.

<sup>2</sup> All retirees on the mailing list are members.

<sup>3</sup> Membership increase between January and June was approximately 200.

<sup>4</sup> The large increase in the mailing list is due to the fact that we are keying in repair firms kept by States; this will continue, only 18 State lists have been entered.

<sup>5</sup> The actual number of members and measures officials who are members have been increasing in proportion to the total number of officials.



## Appendix B - Policy, Members' Expenses

### Section 1 - Introduction

- 1.1 **Background** - As a legal metrology standards-developing organization, the NCWM provides essential support to the various State and local weights and measures jurisdictions, developing its products largely through the attendance and participation of its active members, advisory members and associate members, at a wide range of meetings, conferences, and related forums.
- 1.2 **Purpose** - It is the purpose of this policy to establish a fair and equitable procedure for the reimbursement of travel expenses for Conference members when on authorized Conference business. Any traveler on official business is expected to exercise the same care in incurring expenses that a prudent person would exercise if traveling on personal business and expending personal funds. Excess costs, circuitous routes, delays or luxury accommodations and services unnecessary or unjustified in the performance of official business are not acceptable under this policy.
- It is the intent of this policy to make the NCWM the "reimbursing of last resort." NCWM reimbursement is to be requested only after it has been determined the traveler's organization can not reimburse the traveler fully or partially.
- 1.3 **Persons Covered** - This policy applies only to NCWM Active Members, Associate Members, and Advisory Members, and not to non-members, invited observers, Federal agency personnel, or Conference guests including speakers.
- 1.4 **Annual Meeting** - Attendance at the NCWM's Annual Conference is not a Conference reimbursable expense.

### Section 2 - Definitions

- 2.1 **Traveler** - means any person authorized to be reimbursed.
- 2.2 **Official Station** - means the site (providing the lesser cost to the Conference)
- 1) at which a traveler is normally assigned by his/her employer, or
  - 2) which is officially recognized as the domicile of the traveler.
- 2.3 **Per Diem** - means subsistence (meals and/or lodging) reimbursement for a 24-hour period beginning with the traveler's time of departure.
- 2.4 **Transportation Expenses** - means:
- a) commercial carrier fares;
  - b) taxi, bus, van, airport limousine or necessary rental car charges;
  - c) private car mileage allowance;
  - d) parking, garage and toll charges;
  - e) other charges essential to the traveler while en route; and
  - f) taxes for any of the above.

### Section 3 - Levels of Reimbursement

- 3.1 **Full Reimbursement** - Reimbursement is available for any authorized travel when the traveler's parent organization can not provide funding.
- 3.2 **Partial Reimbursement** - Partial reimbursement is available when the traveler's parent organization partially funds the travel expenses.

## Section 4 - Reimbursement Rates

### 4.1 Per Diem Expenses

- 4.1.1 Meals - Except as stated in section 4.1.3, the NCWM's meal per diem shall be that rate authorized by NIST for its employees' meals. For a portion of a day, dinner shall constitute 50% and breakfast and lunch 25% each. Actual meal expenses (documented by receipts) may be authorized when necessary by the NCWM Executive Secretary and NCWM Chairman.
- 4.1.2 Lodging Expense - except as provided in section 4.1.3., expenses shall be reimbursed at no more than the minimum rate at the meeting site hotel except when otherwise authorized in writing.
- 4.1.3 Lodging and Meals at an Interim Meeting -
- a) When an authorized traveler shares a room, the NCWM will reimburse the traveler the cost of the room plus up to 100% of the traveler's meal per diem allowance.
  - b) When an authorized traveler occupies a single room, the NCWM will reimburse the traveler the cost of the room at the minimum single room rate plus up to 60% of the traveler's meal per diem allowance.

### 4.2 Transportation Expenses

- 4.2.1 Airline travel shall be reimbursed at the most economical coach class (including economy or excursion or Saturday fare) rate practical. Travelers shall utilize advance purchase discounts.
- 4.2.2 Rental cars when authorized shall be reimbursed at the subcompact or compact rate.
- 4.2.3 Private car mileage reimbursement shall be the current NIST reimbursement rate, but not to exceed the round trip airfare, as provided in section 4.2.1, from the traveler's official station.
- 4.2.4 Taxis, limos, shuttles and other ground transportation shall be reimbursed at the most economical rate.
- 4.2.5 Airport parking shall be reimbursed at the most economical rate (i.e., satellite parking).

## Section 5 - Travel Authorization

- 5.1 Domestic Travel (within USA) - Travel to be reimbursed fully or partially from NCWM sources must be authorized in writing (in advance of the travel commencing) by:
- Executive Secretary and the NCWM Chairman or NCWM Chairman-elect.
- 5.2 International Travel - International traveler must have been selected according to Conference international meeting selection procedures. NCWM will reimburse a traveler to locations outside of the U.S. Such travel shall be undertaken only with advanced written authorization from the NCWM Executive Secretary and with the concurrence of the NCWM Chairman.

## Section 6 - Vouchers

- 6.1 Authorized Forms - Requests for reimbursement of travel expenses shall be made on a NCWM Travel Voucher. NCWM will provide a copy of this form, along with a summary of this policy to each traveler at the time such travel is authorized.

#### Executive Committee

- 6.2 Receipts - Receipts for common carrier, lodging and other expenses as required must accompany submitted travel vouchers.
- 6.3 Certification - NCWM Travel Vouchers shall include the traveler's signature attesting the information is correct and that no other reimbursement has been or will be provided by any other source.

#### Section 7 - Exceptions

- 7.1 Exceptions - The NCWM Chairman may grant exceptions to this policy for good cause on a case by case basis.

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## Appendix C - Proposed Chart of Accounts

Until the preparation of the 1991-1992 Budget, the accounting of Conference monies has been primarily a recording of income and expenditures. The Conference has assets (primarily certificates of deposit), is acquiring other assets (e.g., laser printer, computer), and is likely to acquire more. These need to be accounted for by using accepted cost accounting methods.

The sources of income for the Conference come from (1) general funds (registration fees, membership fees, interest) and (2) charges for services (NTP and NTEP). Similarly, expenditures are a result of (1) general operations of the Conference and (2) delivery of services. The proposed income and expense accounts are set up to represent these breakdowns.

To provide the budgetary detail and organization needed for the management of the Conference's finances, the 1991-1992 Fiscal Year draft budget is organized as follows:

### Balance Sheet Accounts

100 Series Accounts for ASSETS

200 Series Accounts for LIABILITIES

### Income and Expense Accounts

400 Series Accounts for INCOME

500 Series Accounts for EXPENSES

### BALANCE SHEET ACCOUNTS

The proposed balance sheet accounts are shown on the following table.

Balance Sheet Accounts	
Assets	Liabilities
100 Total Assets	200 Total Liabilities
110 Current Assets	
111 Signet Bank	
112 European American Bank	
120 Other Assets	
121 Certificates of Deposits	
125 Equipment	
126 Accumulated Depreciation on Equipment	



**INCOME AND EXPENSE ACCOUNTS**

Income is of two types: (1) that from general revenues (i.e., membership and registration fees) and (2) that from reimbursables (i.e., sale of publications, special events, etc.). Similarly, expenses are those paid from general revenues (i.e., meetings) and those incurred for services provided (i.e., cost of printing publications for sale, underwriting training, etc.).

General Revenues and General Expenses

General Revenue and General Expense accounts are shown on the following table, Income and Expense Accounts. General Revenues are Registration Fees, Membership Fees, and Other Income (interest, etc.). General Expenses are categorized into eight areas:

- (1) Annual Meeting;
- (2) Interim Meeting;
- (3) travel expenses of standing and annual committee members (other than that associated with the Annual and Interim Meetings);
- (4) travel expenses of members of Task Forces and Special Committees;
- (5) expenses of the Chairman and Chairman-Elect;
- (6) administration of the business of the NCWM;
- (7) printing and publication expenses; and
- (8) train-the-trainers.

Reimbursable Accounts.

Reimbursable accounts (income and expense) are categorized into five areas:

- (1) Special Events;
- (2) Publications;
- (3) NTEP Operations;
- (4) National Training Program; and
- (5) Promotions.

**Income and Expense Accounts**

INCOME	EXPENSES
400 Total Income	500 Total Expenses
410 General Revenues	510 General Expenses
411 Registrations Fees	511 Annual Meeting 511.1 Hotel, Food Service 511.2 Equipment, AV, Office 511.3 Personnel 511.4 Printing/Copying 511.5 Committee Expenses 511.6 Printing of Announcement Book

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INCOME	EXPENSES
412 Membership Fees	512 Interim Meeting 512.1 Hotel, Food Service 512.2 Equipment/Personnel/Printing 512.3 Exec Cte 512.4 L&R Cte 512.5 S&T Cte 512.6 Education Cte 512.7 Liaison Cte 512.8 Other Ctes & TF 512.9 Printing of Agenda
415 Other Income	513 Other Meetings - Committees 513.1 Exec Cte/Bd of Gov 513.2 L&R Cte 513.3 S&T Cte 513.4 Education Cte 513.5 Liaison Cte 513.6 NTE Technical Ctes 513.7 Annual Ctes
	514 Other Meetings - Task Forces/Spe Ctes 514.1 21st Century 514.2 Safety 514.3 OIML 514.9 Miscellaneous
	515 Chairman/Chair-Elect 515.1 Chairman 515.2 Chairman-Elect 515.3 Regional Breakfast

INCOME	EXPENSES
	516 Administration 516.1 Equipment, Supplies 516.2 Contracts, Personnel 516.3 Awards 516.4 Stationery, Mailing 516.5 Treasurer's Expenses 516.6 Supplies 517.7 NTP 516.9 Miscellaneous
	517 Printing, Publications 517.1 Membership 517.9 Miscellaneous
	518 Train the Trainers
Reimbursables	
480 Services Revenues	580 Services Expenses
481 Special Events 481.1 Annual Meeting 481.2 Interim Meeting	581 Special Events 581.1 Annual Meeting 581.2 Interim Meeting
482 Publications 482.1 NTP Modules 482.2 NCWM Publications	582 Publications 582.1 Modules 582.2 NCWM Publications
483 NTEP Operations	583 NTEP Operations
484 NTP Seminars	584 NTP Seminars
485 Promotions	585 Promotions

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## Appendix D Proposed Operating Budget for Fiscal Year 1991 - 1992

(July 1, 1991 to June 30, 1992)

The proposed Operating Budget is detailed in the following two tables. For each account, the information provided includes:

- the Account Number and Description;
- the proposed budgeted amount for the Fiscal Year (FY) 1991-1992; and
- the comparable budget amount for the current FY (1990-1991).

Note: The attempt to show the comparable 1990-1991 entries could not be done on a one-to-one basis because of the restructuring of the budget as described in Item 101-11 and in Appendix D.

Each of the two tables is followed with footnotes provided additional insight into the derivation of the budget entries.

### INCOME

#### Income

Account Number	Description	Proposed FY 91-92 Budget	FY 90-91 Budget
400	Total Income	\$191,000.00	\$158,000.00
410	Income, General Funds	\$147,500.00	\$126,500.00
411	Registration Fees	\$30,000	\$30,000
412	Membership Fees	\$110,950	\$92,500
415	Other Income	\$6,550	\$4,000
Expense & Income (Reimbursable)			
480	Income, E&I	\$43,500.00	\$31,500
481	Special Events	\$9,000.00	\$8,000
481.1	Annual Meeting	\$8,000	
481.2	Interim Meeting	\$1,000	
482	Publications	\$11,500.00	\$7,500
482.1	NTP Modules	\$ 5,000	
482.2	NCWM Publications	\$6,500	
483	NTEP Operations	\$15,000	\$15,000
484	NTP Seminars	\$6,000	0
485	Promotional	\$2,000	\$1,000

#### Footnotes to INCOME

411 Based on 300 registrants @ \$100.00 (Registration Fee).

412 Based on 3170 members @ \$35.00 (Membership Fee).

413 Interest on Certificates of Deposit

481 This Account is split into two subaccounts (481.1 and 481.1) to track income associated with each of the meetings. The income and expense accounts (581) are planned to balance. This account represents optional events such as outings, tours, etc.

482 This Account is split into two parts (482.1 and 482.1) to record income derived from the sale of training Modules and NCWM Publications respectively. This account is related to Expenses Accounts 582.1 (the cost of printing modules) and 582.2 (the cost of printing NCWM Pubs).



Executive Committee

482.1 Two new modules and complete revisions of two other modules are estimated to generate sales of approximately \$5,000.

482.2 200 Publication 5 (Complete Index of NTEP Evaluations) @\$15 = \$3000  
200 Pub 5A (Company Index of NTEP Evaluations) @ \$5 = \$1000  
approx. 42 Pub 7 (Weights and Measures Week Guide) @ \$12 = \$500  
200 Pub 12 (Examination Procedure Outlines) @ \$10 = \$2000

- 53 See Expense Account 583 which is based on the Executive Committee budgeting \$15,000 for the purchase of load cells to conduct tests as part of appeals and/or gathering data on performance of production load cells as compared with "hand-picked" load cells. Income under Account 483 will occur only if provisions are made through the development of a new policy. Such a policy could include one related to reimbursement of expenses for conducting tests under appeals and/or increasing standard NTEP fees for the evaluation of all devices. If the latter is adopted, all manufacturers would be paying a "surcharge" to cover costs associated primarily with testing load cells.
- 54 This account is related to Expense Account 584 (the cost of conducting seminars). In 1990, NCWM hosted National Training Program Module 8 in New Hampshire on a cost reimbursable basis. This pilot effort indicates that training can be sponsored by the NCWM recovering all costs. In 1991-92, this approach should generate approximately \$6,000 for 4 seminars @ \$1500 each (travel and per diem of instructor plus incidentals such as module printing, coffee breaks, etc. )
- 55 This account is related to expense account 585. It is income and expense from the sale of ties, tie tacks, and other novelties. Expenses in 585 include give-away items at the Annual Meeting plus stock for two-year's worth of sales. Therefore, 485 takes two years to recover costs incurred in 585. In 1992, the replenishment of stock will be necessary.

Executive Committee

EXPENSES

This proposed budget provides much more detail of expenditures than did previous budgets. This additional detail enables the Budget Review Committee, the Chairman, the Executive Committee, and other interested parties to take part in budget development and financial management. This table provides the Expenses portion of the proposed budget by major account. The following footnotes include another table that provides detail by sub-account. The books will be kept in the detail shown in the table located in "Footnotes to Expenses."

EXPENSES

Number	Account Description	Proposed FY 91-92 Budget	FY 90-91 Budget
<b>General Funds</b>			
500	Total Expenses	\$191,000.00	\$132,000.00
500	Expenses, General Fund	\$147,500.00	\$124,000.00
511	Annual Meeting	46,000	15,000
512	Interim Meeting	46,000	5,000
514	Travel - Committees	22,000	20,000
514	Travel-Task Forces/Spe Ctes	4,000	43,000
515	Chairman/Chair Elect	10,000	12,500
516	Administration	20,500	16,500
517	Printing/Publications	4,000	12,000
<b>Expense &amp; Income (Reimbursable)</b>			
580	Expenses, E&I	\$43,500.00	14,000.00
581	Special Events	\$9,000	\$8,000
582	Publications	\$11,500	\$4,000
583	NTEP, Operations	\$15,000	0
584	NTP, Seminars	\$6,000	0
585	Promotional	\$2,000	\$2,000

Footnotes to EXPENSES

511/512 vs 513/514/515

In the FY 90-91 budget, travel for the committees and task forces during the Annual and Interim Meetings was assigned to the Committee accounts (513/514/515) rather than to the Meetings accounts (511/512).

Account Number	Sub Account	Description	Expense (\$)
511		Annual Meeting	46,000.00
	511.1	Hotel, Food Service	20,000
This subaccount includes the Chairman's reception, Opening Session reception, coffee & rolls at breakfast time, annual committees' breakfast or lunch, etc.			
	511.2	Equipment, AV, Office	4,000
	511.3	Personnel	4,000
This includes Convention Bureau staff at registration and hourly personnel in the staff office.			
	511.4	Printing/Copying	5,000
This includes printing the addendum sheets			
	511.5	Committee Expenses (travel/per diem)	2,000

Account Number	Sub Account	Description	Expense (\$)
	511.6	Printing of Announcement Book	11,000
The estimated cost for printing the Announcement Book is \$11,000. NIST can assume the cost of postage at \$4,000 (4th class).			
NIST assumes all costs for printing and distributing NIST Handbooks 44 (\$15,000), 130 (\$12,500), 133 supplement (\$5,000) 133 (\$15,000), Proceedings (\$12,500) Index to Reports (\$5,000), NCWM Publication 2 (Directory) (\$18,000), Pub 1 (Constitution & Bylaws), Pub 3 (Policy & Guidelines), Pub 9 (Nominating Committee Report), Pub 10 (Conduct of Annual Meeting) and other incidental pubs @ \$5,000			
512		Interim Meeting	36,000.00
	512.1	Hotel, Food Service	4,000
	512.2	Equipment, Personnel, Printing	4,000
	512.3	Exec Cte	4,000
	512.4	L&R Cte	4,000
	512.5	S&T Cte	4,000
	512.6	Education Cte	4,000
	512.7	Liaison Cte	4,000
	512.8	Other Ctes & TF	4,000
Expenditures for committees is the largest single expense in the Interim Meeting.			
	512.9	Printing of Agenda	4,000
The reason for the NCWM assuming the cost of publication is because the turn-around time for publishing the agenda by the Government Printing Office is one month or more; if the NCWM goes to a private printer this turn-around time is reduced to two weeks. NIST will assume the cost of mailing the agenda first class at \$4,000.			
513		Travel - Committees	22,000.00
	513.1	Executive Cte/Bd of Governors	6,000
	513.2	Laws & Regulations Committee	0
	513.3	Specifications & Tolerances Committee	3,000
	513.4	Education Committee	3,000
	513.5	Liaison Committee	0
	513.6	NTE Technical Committee	8,000
	513.7	Annual Committees	2,000
514		Travel - Task Forces, Special Committees	9,000.00
	514.1	TF on 21st Century	3,000
	514.2	TF on Safety	0
	514.3	OIML	3,000
	514.9	Miscellaneous	3,000
515		Chairman/Chairman-Elect	10,000.00
	515.1	Chairman, Travel, per diem	5,000
	515.2	Chairman-Elect, Travel, per diem	4,000
	515.3	Breakfast Meetings at Regionals	1,000

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Account Number	Sub Account	Description	Expense (\$)
516		Administration	20,500.00
	516.1	Equipment	8,000
	516.2	Contracts, Personnel	12,000
	516.4	Awards	2,500
	516.4	Stationery, mailing	1,500
	516.5	Treasurer's Expenses	500
	516.5	Supplies	500
	516.7	National Training Program	1,000
	516.4	Miscellaneous	500
517		Printing and Publications	4,000.00
	517.1	Membership	8,000
This includes the printing of membership invoices and Publication 6, the membership brochure. The costs of mailing first-class are assumed by NIST.			
	517.9	Miscellaneous	1,500
581		Special Events - Reimbursable	9,000.00
	581.1	Annual Meeting	8,000
	581.2	Interim Meeting	8,000
582		Publications - Reimbursable	11,500.00
	582.1	NTP, Modules	5,000
Estimated printing costs for 85 instructor manuals = \$2500; 150 inspector manuals = \$2500			
	582.2	NCWM, Publications (not Agenda or Announcement Book)	6,500
Estimated printing costs of Publication 5 & 5A (NTEP Index of Evaluations) @ 700 copies = \$4000; Publication 12 (EPO's) @ 800 copies = \$2000; Publications 1, 2, 3, 7, 9, 10, 11, 13, 14, 17, 18 assumed by NIST, Pub 7 \$500.			
583		NTEP Operations	15,000
584		NTP Seminars	8,000
In 1990, a pilot effort showed that NCWM could sponsor a training seminar and recover all costs. This is planned to expand to 4 in the 1991-92 year at \$1500 per session.			
585		Promotions	2,000
This includes ties, lapel pins, and other novelties given away at the Annual Meeting; costs for give-aways are recovered by sales of ties and lapel pins over a 2-year period.			



## Appendix E - Excerpts from the Final Report of the NCWM Task Force on Safety

Tina G. Butcher, NIST, Technical Advisor

*This appendix includes a brief summary of the work of the Task Force and the Task Force's recommendations to the NCWM. Also included are four sections excerpted from the Task Force's final report; these sections include the major points to be addressed when establishing a safety program, and they are considered to be the most significant portion of the Task Force's report. The final report of the Task Force is available in its entirety as a separate NCWM publication, Number 19.*

Submitted By:

Task Force Members:

Charles A. Gardner, Suffolk County, NY, - Chairman  
L.F. Eason, North Carolina Department of Agriculture, Standards Division  
James D. Harnett, Orange County California Department of Weights and Measures  
Jean Johnson, American Petroleum Institute  
Donald J. Soberg, Wisconsin Dept of Agriculture  
Earl (Hap) Thompson, American Petroleum Institute

Technical Advisors:

Tina G. Butcher, NIST  
Joan Mindte, NIST

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Mr. Fred A. Gerk, New Mexico Department of Agriculture, Division of Standards;  
Mr. N. David Smith, North Carolina, Department of Agriculture Standards Division;  
Mr. Thomas J. Shepich, Occupational Safety and Health Administration;  
Mr. Alphonse Abadir, Occupational Safety and Health Administration;  
Mr. MacArthur Cheeks, Occupational Safety and Health Administration;  
Mr. Roy Demory, Virginia Weights and Measures;  
Ms. Georgia Harris, NIST;  
The Northeastern Weights and Measures Association;  
The NCWM Committee on Education, Administration, and Consumer Affairs;  
The NCWM Committee on Liaison;  
The Office of Weights and Measures, NIST; and  
The many agencies and individuals in the weights and measures community who contributed information and assistance to the Task Force.

The Task Force extends particular thanks to Joan A. Koenig, NIST, for her dedicated assistance in editing this report.

### 1) Summary

The NCWM Task Force on Safety was established in August 1989 by the NCWM chairman at that time, Fred Gerk. The Task Force was established in response to concerns raised by members of the NCWM about how safety is being addressed in the weights and measures workplace.

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The Task Force held a total of four meetings: January 1990, April 1990, November 1990, and April 1991. The major accomplishments and activities of the Task Force during this time included:

- Developed an addendum to NIST Handbook 143 and to NIST Handbook 145;
- Collected, reviewed, and collated information on safety to create a safety library;
- Developed suggested additions to NCWM Publication 12, including revisions to the EPO's to include safety information, the development of an introductory section on safety, and the development of a glossary of safety key phrases;
- Established a working relationship between the NCWM and OSHA;
- Developed a final report in a format designed to:
  - (1) Provide assistance to the NCWM Committee on Education, Administration, and Consumer Affairs in its development of the NTP Module on Weights and Measures Administration; and
  - (2) Assist weights and measures jurisdictions and other NCWM members in the development of a new safety program or the modification of an existing program.

The Task Force recognized that safety in the weights and measures workplace can be a complex issue due to the variation in designs of weighing and measuring equipment; the many different types of potential hazards to which the weights and measures inspector, metrologist, and serviceperson are exposed; and differing policies and regulations from jurisdiction to jurisdiction. Because of these variations, the Task Force realized that it would be impractical to develop a "model" safety program to be used by the weights and measures community. The recommendation of a model program could even have potentially dangerous consequences; an agency might overlook a safety hazard present in its area that was not specifically addressed in the model program, or the agency might violate a local or departmental safety requirement by following the model program.

In the course of its work, the Task Force found that many NCWM members have long had well-established safety programs while many others have few or no recognized safety policies in place. Consequently, the Task Force's recommendations were designed to be useful to jurisdictions with safety programs at all levels. As a result of its work with OSHA, the Task Force was able to develop suggested guidelines which can be useful to any jurisdiction in establishing or maintaining a safety program.

The final report of the Task Force provides suggestions of guidelines to be considered when developing safety policies and procedures and is presented in a format intended to assist an agency in developing a new safety program or in maintaining a current program. An agency must evaluate the safety hazards which are created by the unique combinations of equipment, procedures, and environmental factors present in its own workplace, and it must develop a safety program which is tailored to meet its individual needs and any applicable local and State safety requirements. *It is absolutely essential that the agency work closely with the local or State Occupational Safety and Health Administration (OSHA) official or departmental safety officer when developing a safety program to insure that all potential safety hazards have been adequately addressed.*

The Task Force emphasizes that even the most well-developed safety program must be continually evaluated and monitored; safety procedures or policies are of little use if they do not adequately address the safety hazards actually present in the workplace or if they are not followed.

The intent of the final report of the NCWM Task Force on Safety is to provide information about the work of the Task Force and to emphasize to agencies in the weights and measures community the importance of establishing and maintaining an effective safety program. All agencies in the weights and measures community are urged to make safety a priority issue. The Task Force encourages members of the weights and measures community to work with their local or State OSHA official to develop and implement a safety program which is tailored to meet the specific needs of their agency and all local and State safety requirements.

## II) Recommendations to the National Conference on Weights and Measures (NCWM)

The NCWM Task Force on Safety presents the following recommendations to the Executive Committee of the NCWM.

- 1) **Establish a Subcommittee of the Committee on Education, Administration, and Consumer Affairs (the Education Committee) to address safety in the weights and measures workplace, thereby reaffirming the commitment of the NCWM to safety in this arena. Such a Subcommittee should include representation of all segments of the NCWM including the Associate Membership, the Metrologist's Group, and the general membership of the NCWM.**

While the Executive Committee will be responsible for determining the specific structure and duties of the Safety Subcommittee, the Task Force has identified several basic areas of responsibility with which the Subcommittee should be charged:

- (a) The primary responsibility of the Subcommittee should be to address any questions pertaining to safety in the weights and measures workplace, including field, laboratory, and office environments;
- (b) Additional responsibilities should include:
  - Expanding upon the approach used in the revisions of the Examination Procedure Outlines and extending the approach to other types of routine weights and measures activities such as package checking;
  - Updating and sharing information pertaining to safety in the weights and measures workplace (format to be used might include a biannual safety newsletter or a regular section in the National Institute of Standards and Technology, Office of Weights and Measures newsletter, Weights and Measures Today);
  - Providing a listing of information available in the safety library established by the Task Force;
  - Providing the NCWM and regional weights and measures associations with a report of any activities or issues pertaining to safety that are identified during the year, including a list of safety training seminars and materials;
  - Assisting the Education Committee as requested in revising the National Training Program (NTP) training modules to include safety information;
  - Assisting the Metrologist's Group as requested in revisions to laboratory documents to include safety information;
  - Identifying sections of NCWM documents that should be revised to include safety information, and taking steps to encourage revision of these documents (this would necessitate regular review of the recommendations of the other standing committees to revise or add to existing NCWM documents -- e.g., other NCWM committees' annual and interim reports); and
  - Maintaining the working relationship between OSHA and the NCWM.

The Task Force also emphasizes that the Subcommittee should not be expected to provide analyses of individual safety programs, and that it should only meet as needed.

- 2) **Request that the Education Committee include the recommended safety revisions to the EPO's, the "Safety Considerations" section, and the "Glossary of Safety Key Phrases" in the next publication of NCWM Publication 12, and encourage NCWM members to follow the revised versions of the EPO's.**
- 3) **Encourage NCWM members to follow the safety recommendations that will be added to or issued as addenda to NIST Handbook 143, State Weights and Measures Laboratories Program Handbook, and to NIST Handbook 145, Handbook for the Quality Assurance of Metrological Measurements.**
- 4) **Encourage the Education Committee to include at least a chapter in each National Training Program (NTP) Training Module to address safety precautions.**

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- 5) **Request that the NCWM Specifications and Tolerances Committee recommend the addition of a section pertaining to safety to the General Code of NIST Handbook 44 (and to any other codes deemed appropriate by the S & T Committee), and request that the various sectors of the Technical Committee on National Type Evaluation revise the checklists of NCWM Publication 14 as appropriate to reflect this change to Handbook 44.**

The Task Force recommends consideration of the following language for inclusion in HB 44 as an additional section and/or incorporation into existing sections of the **General Code**:

### Specifications Section:

#### G-S.X. Safe Design Principles

A device shall be designed, manufactured, constructed, and marked in accordance with applicable Federal, State, or local safety requirements and trade or industry standards of safety.

### Notes Section:

#### G-N.X. Safe Inspection Practices

Inspection and testing shall be conducted:

- (a) Using safe work practices, equipment, and procedures; and
- (b) In conformance with Federal, State, and local safety laws and regulations and with the safety policies in effect at the inspection site.

If a violation of the safety provisions of this code occurs or a hazardous condition occurs in the work environment, inspections and tests shall be suspended and the equipment under test placed in an unapproved status until the violation or hazardous condition has been corrected.

### User Requirements Section:

#### G-UR.X. Safe Installation, Maintenance, and Use Practices

- (a) Devices shall be installed in accordance with Federal, State, and local safety laws and regulations, applicable trade or industry safety standards or recommendations; and all safety warnings or procedures specified by the manufacturer.
- (b) Devices shall be maintained (i.e., marking and warning labels, safety mechanisms, and environment) in accordance with the provisions specified in (a).
- (c) Devices shall be operated or used in conformance with the instructions or markings provided by the manufacturer and used only when all safety appliances are operational.
- 6) **Encourage the regional weights and measures associations to establish regional safety committees and to promote the presentation of safety training seminars at regional weights and measures conferences.**

- 7) **Disband the Task Force as of July 1991.**

### **III) Who Needs a Safety Program? -- Making a Commitment**

Almost every organization can realize benefits from establishing a safety program. The reasons for establishing a safety program are many. Among the most basic reasons for establishing a safety program are reducing workplace injury, disability, and property damage. In addition, many agencies are obligated by legal requirements to establish a safety program. There are also a number of less evident, but just as valuable, benefits which can be derived from



the implementation of an effective safety program. Both employers and employees benefit from a well-established safety program; moreover, both have specific responsibilities in maintaining a safety program that is beneficial and worthwhile. The long term cost savings which are often realized from an effective safety program are significant incentives to implement a safety program. However, it is the human element, the basic responsibility for maintaining a safe work environment for employees, that should remain the prime impetus for an agency to establish a safety program.

### Some Basic Philosophy

When considering the establishment of a safety program, many questions arise. Among the most common questions that are asked by many employers are "Why should I establish a safety program?" and "How will it help the agency?" The reasons for establishing a program are varied, but all have the same end result -- reducing workplace injury, disability, and property damage.

Providing a safe working environment reduces the potential for injury to employees and other persons, medical costs for injuries, lost work time due to injuries, decreased productivity due to injury, and damage to equipment and property. A safe working environment also contributes to the improvement of employee morale; an employer who establishes and conscientiously maintains a safe work environment sends a clear message to employees that their safety and health are important to the agency. A correctly implemented safety program may even increase productivity since better equipment, better working conditions, and improved employee moral can all contribute to increased efficiency.

### Legal Reasons

Many employers may not realize that there are probably legal obligations that require them to establish a safety program. There are currently OSHA rules in effect in many States requiring employers to notify employees of potential safety hazards that may be present in their workplace environment. OSHA standards such as the Hazard Communication Standard (29 CFR 1910.1200) (also known as "The Employee's Right-to-Know") and the Occupational Exposure to Hazardous Chemicals in Laboratories Standard (29 CFR 1910.1450) (which includes requirements for a "Chemical Hygiene Plan") are intended to reduce the possibility of workplace injury by informing employees about potential safety hazards that may exist in the workplace and providing a full disclosure about the nature of products to which they are exposed. The implementation and enforcement of such laws help to educate the employer and the employee about the potential hazards associated with a product or procedure; to decrease the exposure of employees to hazardous products and conditions; and to encourage the use of safe work practices by all employees, thereby decreasing the potential for injuries.

Failure to establish and maintain a safety program or to follow established safety laws and regulations may possibly result in penalties to the employer. In many cases, if an agency does not establish a program, it can and will be forced to establish a program and its budget will be used for that purpose.

### Benefits

Among the most elemental benefits for establishing a safety program are reducing workplace injury, disability, and property damage. In addition to these benefits, there are other less-evident, but just as valuable, benefits to be derived from implementing an effective safety program. The implementation of a safety program often has a monetary benefit to an agency which is measured not only in terms of dollars, but also in terms of employee work time and employee health. Many employers find that the benefits realized from the decreases in costs far outweigh the expenses incurred in the implementation of the safety program.

Following the implementation of an effective safety program, an agency often observes an improvement in employee health, moral, and well-being. Better working conditions, proper safety equipment, and proper training can decrease the amount of work-related illness and injury experienced by the employee. For example, training a scale inspector on the use of proper lifting techniques can decrease the frequency of back injuries due to improper lifting. Similarly, a well-ventilated work area and the use of chemical hoods in the laboratory can help to prevent illness due to inhalation of chemical fumes. When an employee understands that the employer is concerned about maintaining a safe work environment for the health and safety of the employees, an increase in employee morale often results. This

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improvement in morale also contributes to the employee's general feeling of well-being and may generate renewed enthusiasm about the work.

A comparison of costs before and after the implementation of a safety program often reveals beneficial changes. Better working conditions, proper safety equipment, and proper training can impact significantly on the employee's performance and, consequently, can affect the costs observed by the agency. For example:

### Sick Leave, Medical Costs, and Insurance Costs

A decrease is often observed in work-related illness or injury as a result of the byproducts of better working conditions, proper safety equipment, and proper training. This also results in a decrease in the amount of sick-leave paid to employees. Similarly, the employer may see decreased costs in health care for injured employees and decrease in insurance claims for work-related injuries.

An employer may also observe a decrease in health insurance premiums with a well-implemented safety program. An insurance company may look upon a safety program as a preventative measure for decreasing work-related injury and illness.

The improvements made to the work environment with the implementation of a safety program may eliminate other risks such as fire hazards. Training such as defensive driving techniques and improved maintenance on vehicles may decrease the risk of vehicle accidents. The reduction of risks such as these may help to decrease property insurance premiums.

### Property, Equipment, and Production Costs:

As part of implementing a safety program, an agency often purchases new equipment, modifies or repairs existing equipment, and provides employee training to reduce a potential safety hazard. Although some initial costs may be experienced in the purchase or modification of equipment, these costs are usually outweighed by the benefits that can be derived. Suitable, properly operating equipment decreases the amount of employee injuries and absences, improves efficiency and production, and reduces repair costs.

Worn, faulty equipment can contribute to work-related injury and illness. As the frequency of employee absence due to work-related injury or illness increases, production can decrease. The cost of production can rise even higher if it is necessary to require other employees to work overtime to compensate for absent employees. Similarly, worn, faulty equipment may not operate as efficiently as equipment that is in good operating condition; this can also decrease productivity. The frequent repairs required for worn equipment can increase repair costs and decrease productivity due to the amount of time required for equipment repair.

The use of inappropriate equipment for a task can be dangerous, inefficient, and costly. Inappropriate equipment can increase injury to employees and, consequently, increase employee absence and decrease production. Because inappropriate equipment is not as efficient for a task as properly selected equipment, it can also contribute to decreased efficiency and decreased production. If equipment is not being used as intended by the manufacturer, the equipment, damage to equipment can often result; this leads to costly repairs and decreased production while the equipment is being repaired. In some cases, improper use of equipment can damage other pieces of equipment or property.

Safety and procedural training teaches the employee how to operate equipment properly and safely; this decreases the chance for injury and employee absence and also decreases the likelihood of damage to the equipment. In addition, training can enable employees to perform more efficiently and effectively.

Another less evident benefit of establishing a safety program is the discovery of existing, but unobserved safety hazards. When implementing a safety requirement, other safety hazards may be uncovered which would not otherwise be discovered until they resulted in personal injury or damage. For example, part of complying with the requirement to post a placard on a vehicle which transports hazardous materials the vehicle must be inspected. During the vehicle inspection other potential safety problems (e.g., faulty brakes or loose parts) may be discovered; such problems can be corrected before causing injury or damage. Similarly, the job hazard analysis is useful in revealing many of the

potential safety hazards associated with a particular activity and the potential hazards can be minimized before injury or damage occurs.

The following is a summary of the benefits to be derived from establishing a safety program that were discussed in detail above:

- Improved employee health, morale, and well-being;
- Improved employee attitude and enthusiasm;
- Decrease in work-related injury and illness;
- Decrease in the amount of sick-leave paid to employees;
- Decrease in health care costs for injured employees;
- Decrease in insurance claims for work-related injuries;
- Decrease in insurance premiums;
- Decrease in employee absence due to work-related injury or illness;
- Decrease in the costs for damaged equipment or property;
- Increase in production time;
- Increase in efficiency and productivity; and
- Increase in the discovery and resolution of safety hazards before injury or damage occurs.

#### The Responsibilities of the Employer and the Employee

Perhaps the most crucial responsibility shared by the employer and the employee is the commitment which each makes to safety in the workplace. This commitment is essential to reducing workplace injury and property damage and is demonstrated in many ways:

##### The Employer

The demonstration of the employer's commitment goes beyond simply announcing or publishing safety policies; the employer's commitment must be evident in many other facets of the workplace operations. The employer's commitment is demonstrated through the employer's personal concern for the safety of the employees; the emphasis which is placed on adhering to safety regulations and following safe work practices; the response of the employer to correct unsafe work conditions or safety violations as they are discovered; and the fulfillment of the other responsibilities of the employer/employee such as those listed later in this section. One of the most critical demonstrations of the employer's commitment is that of setting a good example for workplace safety and health.

##### The Employee

The demonstration of the employee's commitment to maintaining a safe working environment is just as crucial as that of the employer; workers are just as accountable as their employer for their own safety and health. Safety policies and regulations have little benefit if they are not followed by one of the groups they are designed to protect -- the employees. The employee's commitment is demonstrated by a conscientious adherence to safety policies and regulations; to the development of safe work habits and proper use of equipment; and to the immediate reporting of unsafe working conditions. Employees must understand that their own personal commitment to workplace safety promotes not only their own personal safety but also that of their coworkers; failure to adhere to safety policies and regulations threatens not just their own personal safety but that of those around them.

Among the other responsibilities of employers and employees are the following:

- 1) Mandating and maintaining better working conditions;

The employer must mandate the implementation of safety regulations and policies and must clearly outline the consequences of violating these requirements. The employer must also thoroughly evaluate and, if needed, improve the working conditions of the employee to decrease potential safety hazards. The employees have the responsibility of maintaining a safe work environment by carefully following all safety requirements mandated by the employer and local laws.



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### (2) Providing and properly using resources;

Adequate equipment, training, and access to safety information resources must be provided to the employee to promote a safe working environment. Employees must use all equipment as intended and follow all safety policies to insure that a safe working environment is maintained.

### (3) Encouraging everyone to participate;

Safety programs are most effective when everyone participates, and encouragement to participate in a safety program can be generated from various sources. The employer must look for and use ways to encourage everyone's participation in workplace safety, including all levels of management. Employees can be very influential in persuading coworkers to participate in and follow a safety program. Outside functions such as training seminars and demonstrations can also provide needed encouragement to inspire all levels of employees to participate in the program.

### (4) Maintaining open channels of communication;

An effective safety program can only be sustained if channels of communication are kept open between the employer and the employees. The employer must be made aware of safety hazards in order to take corrective action, and the employee must be made aware of potential safety concerns as management learns of them in order to protect himself or herself from possible injury. The employee must feel free to voice concerns and must also be assured that the concerns will be given serious consideration.

### (5) Implementation and use of a good reporting system

A good reporting system insures that the employer is notified of a safety hazard as soon as it is discovered. An effective reporting system can decrease the potential that a hazard will be discovered only as the result of an accident by discovering the hazard before an accident occurs and taking corrective action, the possibility of personal injury can be decreased. Employees should be provided with instructions on how to report a potential or acknowledged safety hazard, and the employer should encourage employees to submit such reports. In order for a reporting system to remain effective, the employer must respond quickly to reports of safety hazards and must indicate to the employee the measures that have been or will be taken to correct the hazardous condition. Regular self-inspections are an excellent means of insuring that safety regulations and policies are being followed and also for uncovering potential safety hazards that may not have been evident before the inspection. Taking corrective action as the result of a reported hazard is a decisive act that confirms the company's commitment to maintaining a safe workplace environment.

### (6) Balancing Productivity and Safety

Neither the employer nor the employee should sacrifice safety for productivity. An employer or employee will often claim that productivity will be sacrificed if safe work habits are followed or safety equipment is used. In the long run, an increase in productivity is often realized when an effective safety program is in place; there are usually fewer injuries and less lost time of employees and equipment, and employees are often more productive when they know that the employer is committed to maintaining a safe work environment for them.

## IV) Establishing a Safety Program in the Weights and Measures Workplace -- Where to Start

Because of the variability in the design of equipment used by weights and measures officials and servicepersons and various other factors in the workplace that can affect the safety of its use, it is difficult to provide comments about the potential hazards associated with a particular task or about the structure of a safety program for an individual jurisdiction. However, there are several general areas to consider when establishing a safety program or evaluating the potential safety risks associated with a particular task. *These recommendations are provided only as guidelines and suggestions. These recommendations are not intended to describe the only means of establishing a safety program or describe the elements of a program which is ideal or appropriate for every jurisdiction. Conditions and circumstances are different for every jurisdiction as are many local and state safety requirements. It is essential that an agency work closely with the local or State OSHA official or departmental safety officer when developing a safety program to insure*



*that all potential safety hazards have been adequately addressed for the unique situation of the agency, to insure that the program meets the specific needs of the agency, and to insure that all local and State safety requirements are met.*

#### Appoint a safety officer.

One of the first steps in establishing a safety program in an organization is to designate a person as the "safety officer." By addressing all safety concerns through a single person, an organization can help insure that safety policies and decisions will be uniformly and consistently implemented. The safety officer should be given responsibility for overseeing the organization's safety program; this should include the organization, management, and regular maintenance of the safety program. The safety officer should also be responsible for working with any existing safety committees within the organization as well as local and State safety officials as deemed necessary. The safety officer should also be given the authority to make decisions necessary to maintain an effective program. When selecting the safety officer, the administrator should be sure that the individual understands the time commitment necessary to properly maintain the safety program and that the individual will be permitted to set aside the time required. The safety officer can perform the duties associated with the title on a full time or part-time basis depending upon the size of the agency and the workload of the agency's staff.

If a program is part of a larger organization, there may already be a safety officer designated for the entire organization as well as a structured safety program for the organization. If this is the case, the administrator of a program should work with that person to ensure that the program meets all departmental safety requirements and to discuss any specialized needs which the program may have. The administrator may still wish to designate a safety officer for his or her own program to act as a liaison with the departmental safety officer and to facilitate the resolution of specific safety issues within the individual program.

If a program has personnel located at more than one facility, the program administrator may find it advantageous to appoint a safety officer at each location. This would help to insure that safety information is distributed and safety concerns are addressed as quickly as possible at each site. This can improve the implementation of safety practices at each facility since the safety officer is able to monitor the activities of the facility on a daily basis. In addition, this can be helpful in establishing organizational policies to address specific circumstances within the organization since the safety officer at each facility is familiar with the geographical layout of the site and the equipment located there.

Some weights and measures programs have more than one major **type** of activity (e.g., a motor-fuel testing division and a packaging and weighing division). If this is the case, the program administrator may consider appointing a safety officer in each division to monitor the division's activity. Since the potential safety hazards associated with different types of activities can vary, the establishment of a safety officer for each activity can help to insure that these potential hazards are adequately addressed. Since the safety officer works in the division being monitored, it is likely that he or she will be very familiar with the procedures used in the division and can better respond to questions concerning the establishment and implementation of organizational safety policies.

#### Developing the Basic Structure

After appointing a safety officer, an overall structure for the safety program must be developed.

In a letter dated March 29, 1991, Mr. Thomas J. Shepich, U.S. Department of Labor, OSHA, outlined four main areas to consider when establishing a safety program. (This letter was sent to the Task Force by Mr. Shepich in response to a request from the Task Force to review the safety information added to the EPO's in NCWM Publication 12.)

Using the recommendations contained under each of the headings in Mr. Shepich's letter, the Task Force has expanded these ideas into the following suggestions. OSHA's recommendations for each heading are indicated by *italicized type* immediately following each of the four lettered headings:

##### **(a) Conduct a job hazard analysis.**

*Information regarding actual job conditions should be used to identify potential hazards.*

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A job hazard analysis can help to identify potential safety hazards associated with a specific task. The information obtained from the job hazard analysis can then be used to determine what actions are required to reduce the potential risk to the person performing the task.

### Collect Information on Current Practices and Procedures

Information on current practices and procedures should be collected and a detailed description of how each job or task is performed should be documented. This should be done for various tasks using different types of equipment which is available within your jurisdiction (e.g., testing a vehicle scale using two different types of weight movers). This information should also be gathered for various environmental conditions to insure that potential hazards from environmental conditions are addressed (e.g., testing a vehicle tank meter in icy weather introduces the hazard of slipping on icy surfaces when mounting the prover and moving around and requires extra care in locating a stable surface for setting up the prover). A review should be made of the examination procedure outline used for each testing procedure within your jurisdiction to insure that all conditions specific to your jurisdiction are considered in the safety reminders and instructions.

An agency may find it helpful to develop a checklist or form for gathering information about the details of a procedure and for recording observed or potential safety hazards. Such a form or checklist could provide a uniform method of documenting all of the inspection or laboratory procedures used by an agency's employees, and the completed checklists could be used to facilitate the development of safety policies for the agency.

It may be helpful also to document the procedures of a particular activity on videotape. For example, a videotape might be made of the inspection and testing of a retail-motor fuel dispenser, starting at the time that the inspector or serviceperson arrives at the test site and ending when he or she leaves the site. The videotape can be reviewed repeatedly and it serves to document the procedure in great detail. The videotape can be reviewed by the safety officer and/or a departmental safety committee when establishing safety policies to help identify potential safety hazards in the procedure. The agency may find the videotape useful when working with local OSHA officials or consultants to develop a safety program which will address the safety hazards which are present in the jurisdiction. The agency may also consider using videotapes of procedures as a means to emphasize the use of proper testing procedures. Videotapes can be shown during training sessions or safety meetings to point out the "right" way to perform a procedure, using correct test procedures and adhering to all safety policies and also to point out the "wrong" way of performing the procedure.

### Review the Procedures and Identify Potential Safety Hazards

When the information has been collected, a thorough review of the current procedures and practices should be made to identify potential safety hazards. Once the potential hazards are identified, additional steps can be taken to reduce or eliminate the potential risks.

A review by an individual or individuals outside of your program can be valuable; potential hazards may be inadvertently overlooked by someone who is very familiar with your procedures, but quite obvious to another person who is not connected with your program. A job hazard analysis should include input from an individual or individuals with training in safety to insure that no potential safety hazard is disregarded.

A review of the EPO's in NCWM Publication 12 with your local OSHA official is useful in helping you to determine how to address the hazards present in individual situations in your jurisdiction. The Task Force has developed suggested revisions to NCWM Publication 12 to include safety information. The revisions include the addition of an introductory section on safety, "Safety Considerations"; revisions to each EPO to include safety reminders; and a "Glossary of Key Safety Phrases" to further define the reminders in the EPO's. When the revised NCWM Publication 12 is issued, a review of the safety reminders in each EPO and in the glossary may help you to identify potential safety hazards that may be present during routine inspection activities in your agency.

### Collect Related Safety Information

During the process of performing the job hazard analysis you may find it useful to collect information pertaining to safety hazards associated with the various procedures used in your jurisdiction. Several of the organizations listed in

Section VI maintain safety libraries that contain information on a wide variety of safety-related subjects as well as information about the hazards associated with exposure to various products.

**b) Determine what safety and health training is needed.**

*As a result of the job hazard analysis, areas where training is necessary for the NCWM inspectors can be identified.*

By identifying potential safety hazards associated with a particular task, the job hazard analysis will help you to identify the types of training that would help to reduce the risk of personal injury to the people who routinely perform that task. For example, an inspector or serviceperson testing a medium capacity scale is exposed to the potential risk of back injury when moving 50-lb weights during the test procedure; providing safety training in the use of proper lifting techniques may decrease the risk of a back injury for that person.

When you have completed your job hazard analysis, you should contact your local and/or State OSHA representatives to determine if they can assist you in determining what types of safety training are needed (or even required by law) for your employees for the various tasks performed within your jurisdiction. Consultants are also available in many areas to assist you in devising a training plan or obtaining safety training for your employees. When working with agencies other than OSHA to arrange for safety training, your safety officer should verify that the training will meet all the requirements established by OSHA.

**Schedule Training on a Regular Basis for All Employees**

Regular safety training for employees is essential both for establishing a new safety program and maintaining an existing program. Formalized safety training for employees will insure that all employees receive uniform, consistent information pertaining to safety hazards and how to minimize the risk of personal injury. Ideally, the training should be presented by someone who is an expert in the field of workplace safety and who is familiar with all applicable state and local OSHA requirements.

When new equipment is purchased or current equipment is modified, training must be provided to all employees who will use the equipment to insure that they understand the safe and proper use of the equipment. This is especially essential if the new equipment operates differently or has different features from equipment currently used by the employee. Similarly, if the modification of current equipment changes the operation of the equipment, it is important that the employee be familiar with the changes and understand the proper and safe operation of the modified equipment.

Training should be presented to all employees both new and experienced on a regular basis. New employees should receive proper safety training before engaging in any activity which involves a potential safety risk. Even employees who have been employed with the agency for a long period of time can benefit from routine safety training. Safety requirements periodically change as new information is discovered, and procedures to protect an individual from potential safety hazards can change accordingly. Only through routine training can employees receive the updated training needed to help them take proper precautions to protect themselves and their coworkers from hazardous conditions. Many times an experienced employee who has been performing a particular task on a routine basis can lapse into bad habits and become careless in following required safety procedures; regular training can help to reinforce the importance of good safe work practices and can reduce the possibility that these bad habits will be passed on to other employees. Conversely, many experienced employees are extremely conscientious about adhering to safety practices and can provide a good example to new employees. Such employees can often emphasize the necessity for adhering to a particular safety practice by relating to other employees a personal experience with a hazardous condition, thus underscoring the importance of safe work habits.

Reviewing with employees the safety information proposed for inclusion in NCWM Publication 12 and NIST Handbooks 143 and 145 may be useful in emphasizing the importance of safety in the workplace and in conveying information about potential safety hazards. The "Safety Considerations" section, the EPO's with safety revisions, and the "Glossary of Key Safety Phrases" in Publication 12 may be helpful in highlighting potential safety hazards which are associated with various types of inspection activities for inspectors and servicepersons. Similarly, the proposed safety revisions for NIST Handbook 143 and the proposed addendum for NIST Handbook 145 may be helpful in emphasizing the importance of safety to laboratory metrologists.



The agency may consider videotaping examples of inspections and testings and of laboratory procedures as a means to emphasize the use of proper testing procedures. These videotapes can be shown during training sessions to point out the "right" way to perform a procedure, using correct test procedures and adhering to all safety policies and also to point out the "wrong" way of performing the procedure.

Safety training should not be limited to just teaching employees about the proper use of equipment and safety procedures. Other types of training which relate to the health and safety of the employee are also very beneficial. For example, classes in first-aid and cardiopulmonary resuscitation can help to prepare coworkers to assist an injured employee.

**(c) Determine the control (administrative, engineering, and personal protective) method needed.**

*The Material Safety Data Sheets and the job hazard analysis should be helpful in the proper selection of personal protection equipment and the reduction of exposure time. If engineering controls are utilized on a site, lesser measures of protective equipment and administrative controls may be needed.*

When a safety hazard has been identified it is necessary to determine the type of control that will be most effective in minimizing the risk involved. In order to reduce the safety risk it may be necessary to change the way a procedure is carried out or to obtain personal protection equipment for the person performing the task. **Before making changes to a procedure or purchasing new equipment, you should carefully consider the results of the job hazard analysis and other tools available to you such as the Material Safety Data Sheets (MSDS's) provided by manufacturers of hazardous products (for more information see page 42);** prudent use of these tools to evaluate the situation can save time and money and will help you to identify the most effective way of reducing the risk. After modifying existing equipment or purchasing new equipment, training on the safe and proper use of the equipment should be provided to those individuals who will be using it.

**Selecting the Control Method**

A potential safety risk can often be minimized or eliminated completely simply by changing the established policy or procedure to be followed for a given task. Use the information obtained in the job hazard analysis of the task to determine how the task is currently performed, then examine alternative means of performing the task which would eliminate that part of the procedure which precipitates the safety hazard or would minimize the risk associated with the activity. For example, if an inspector or serviceperson stores a weight kit on the top shelf of a rack in the rear of his vehicle, there is a potential for a back injury due to the height to which the weight kit must be lifted. By changing the designated storage location for the weight kit to the bottom of the rack, the potential for injury due to lifting the weight kit to a higher level is reduced. The potential risk can be further reduced by providing the inspector or serviceperson with training in the use of proper lifting techniques.

**Purchasing Equipment**

Before purchasing any equipment, check to be sure that the equipment meets all local, State, and Federal safety requirements. Evaluate the equipment carefully before purchasing, and be sure that the manufacturer or supplier understands the intended application for the equipment. Documenting the safety requirements in written specifications for the equipment will help to insure that the manufacturer or supplier understands the safety requirements applicable to the intended use of the equipment.

When purchasing **new test equipment**, consideration should be given to ways in which equipment design can minimize potential safety hazards; the job hazard analysis can provide information about the potential hazards which were identified for any procedure in which the new equipment might be used. For example, the design of the steps on trailer-mounted prover should be reviewed to insure that they minimize the risk of slipping or falling from the prover.

**Personal protection equipment** should only be purchased after determining that potential safety hazards have been minimized as much as possible by a careful review and modification of procedures. In some cases changing the policies for procedures to be used to perform a given task may eliminate the risk in question completely; purchasing equipment without first carefully reviewing alternative controls can be a costly and sometimes ineffectual action. Use the information obtained in the job hazard analysis and input from your local and State OSHA officials to determine



whether or not other means of controlling the safety hazard as discussed earlier in this section will adequately minimize the risk; once these other means have been addressed, personal protection equipment can be considered.

There are many sources of personal protection equipment available. Only personal protection equipment that meets all local, state, and federal safety requirements and that will mitigate the safety hazard should be considered. The proper use of personal protection equipment can not be overemphasized. Once appropriate personal protection equipment has been purchased, it is essential that employees be given adequate training on the use of the equipment; improper use can render the equipment ineffectual and even hazardous to the employee.

The results of the job hazard analysis may indicate that new testing equipment or the modification of current equipment is not necessary; the hazard may be mitigated by the purchase of **supplemental equipment** which will make a task easier and less hazardous to perform. For example, the purchase of a roller table to facilitate the movement of heavy weights; the use of small hand carts to reduce the amount of lifting and carrying required in transporting provers during the inspection of retail motor-fuel dispensers; the use of caution signs, safety cones, or fluorescent vests to reduce the potential of personal injury or equipment damage during the testing of retail motor-fuel dispensers, taximeters, vehicle-tank meters, or large scales; the purchase of 25-lb weights to replace 50-lb weights; or the purchase of first-aid kits for installation in all vehicles and in the metrology laboratory. *As with the purchase of new equipment or the modification of equipment, the individual requirements of a jurisdiction must be carefully considered before purchasing supplemental equipment to determine that the equipment is appropriate and necessary for the task.*

#### Modification of current equipment

In some cases, it may be possible to modify existing equipment to minimize or eliminate a potential safety hazard. The decision to modify equipment should be made based on information obtained from the job hazard analysis and information from local and State OSHA officials; this information should indicate that modification of the equipment provides the most effective means to minimize the potential safety hazard. *Prior to making any modification to equipment, an agency must take appropriate precautions to insure that the proposed modification does not violate any local or State safety requirements or change the equipment manufacturer's design in a manner which might render the equipment unsafe in another way.*

In the course of its work, the Task Force was provided with a number of examples of how weights and measures jurisdictions or service agencies have modified existing equipment to address a safety concern. Some of the many examples brought to the attention of the Task Force are listed below. **NOTE: *These modifications may not be appropriate for every jurisdiction. Check with local and State OSHA officials to determine whether these modifications would be appropriate for the specific circumstances in your jurisdiction before making any such modifications.***

- Metal cage enclosure around an LPG prover -- The cage prevents tampering with the prover and valves when the prover is unattended, yet provides adequate ventilation to prevent the accumulation of product fumes. The cage also reduces the possibility of damage to the prover.
- Securing of weights on a vehicle -- Securing of weights can be accomplished in a number of ways: using a separate enclosure or box in which to store weights; using weights that can be locked down with specialized fasteners.
- Modification to vehicles -- Installation of a separate enclosure with venting to the outside of the vehicle for storing 5-gallon test measures. Installation of a partition between the driver and the area where equipment is stored to reduce the possibility of injury from the equipment in the event of a vehicle collision.
- Extension of height on funnels used in testing retail motor-fuel dispensers -- The added height may help to reduce stress on the back when returning product to storage.

#### Training Employees to Use the Equipment

New equipment may operate differently from equipment currently in use or have features which are unfamiliar to the employee, and modified equipment may operate differently from the original version. It is important that adequate training be provided to all employees who will use the equipment to insure that they understand how to safely and properly operate the new equipment and also to insure that safety hazards are not created by the improper use or

operation of the equipment. Check to see if the manufacturer or supplier of new equipment is willing to provide instructions on the use of the equipment. Other sources to check include local or State OSHA offices, consultants, organizations which provide safety training, and local industry groups. Without proper training on the safe use of equipment, the care taken in the selection and purchase of the equipment will be ineffectual, and the use of the equipment may even be hazardous to the employee.

**(d) Provide a written safety and health program.**

*An effective method for emphasizing safety and health is to have a written program as exemplified in your document [The EPO's in NCWM Publication 12 as revised by the Task Force and the introductory section on safety and glossary of terms]. We recommend that it would be made available to all inspectors for pre-inspection planning.*

Even the most carefully designed safety program can be ineffectual if the program is not adequately documented. Documentation of the program's structure and policies helps to promote consistency in adhering to safety regulations and to emphasize the safety and health policies established by the organization. All employees should receive written copies of the documentation and the information should be communicated and reinforced through training seminars and safety meetings. Once the documentation is complete, the policies and procedures can be communicated to the management and employees and implementation of the safety program can progress.

The structure and format used to document the safety program depends on the needs of the agency. Documentation might be in the form of a single safety manual with separate sections to address different areas, or in the form of separate publications that each address a particular area. Documentation should include a statement of purpose; a clear indication of the agency's commitment to the safety and health of the employees; an overview of how the program is structured; the local, State, and/or Federal safety requirements which must be followed or a source where the regulations can be obtained; a description of safety policies established by the organization; procedural information such as how to report unsafe conditions, how to obtain safety information on hazardous materials, and the scheduling of safety meetings; information on obtaining copies of MSDS sheets for materials used by the employees and how to obtain an explanation of the information on the MSDS sheet; and any other information pertinent to the safety program.

Although the documentation may include a variety of safety issues which are specific to an individual program, there are several areas that should be included in any safety program. Information pertaining to these procedures should be included in the documentation and implemented as part of the safety program as it is established:

**- How to Report Unsafe Conditions and Potential Safety Hazards**

Instructions should be provided to advise the employee how to report an observed unsafe condition or potential safety hazard including who to contact, what observations to make, what documentation and information to provide to the contact person or persons, and any other required actions.

**- What to Do in the Event of an Accident**

Specific instructions should be given to assist the employee in preparing to respond to an accident. More than one set of instructions may be required to address different types of inspection activities. These instructions should include basic information such as where to go; the names and phone numbers of the people or agencies to be contacted and the information to provide to them.

**- How to Submit Recommendations to Reduce Risks or Hazards**

This should include a step-by-step description of how to submit recommendations on reducing risks or hazards, including: the name(s) of the person(s) to submit the recommendation to; the type of information to provide; the required format of the submission; and the time frame in which the employee should receive a response to the submission. (NOTE: When establishing the time frame for responding to an employee submittal, management should be particularly careful to select a time frame which can reasonably be met by management. Failure to respond within a stated time frame may send the message that management does not consider safety a high priority issue. This apparent lack of management commitment to maintaining a safe work environment can discourage

employees from submitting recommendations in the future and may even discourage the reporting of safety hazards.)

#### **- Safety Meetings**

Information should be provided that details how frequently meetings will be held, who will attend, how issues should be presented for discussion, and other relevant information.

In addition to documenting these procedures, the success of the safety program is dependent upon both management and employees consistently following the procedures. If management does not respond to an employee's report of an unsafe condition in a timely manner or does not acknowledge the submission of a suggestion for reducing a safety risk, it is unlikely that the employee will go to the trouble of reporting future incidents or making future submissions. Likewise, by failing to report an observed unsafe condition employees may endanger themselves and other employees and set a poor example for other employees to follow.

Copies of the documentation should be distributed to all employees. The effective operation of the safety program is dependent upon all employees operating under the same safety policies and requirements. Distribution of the documentation to all employees is an effective way of communicating to employees all of the safety policies and procedures that must be followed and insures that all employees receive the same information. The documentation can also serve as a reference document that the employee can use to become familiar with the potential safety hazards to which he or she is exposed. The documentation should be updated on a regular basis as needed to reflect changes in safety requirements or policies and other information included in the documentation.

#### **Communicating Safety Information to Employees**

In addition to the four main elements outlined earlier in this section, there are several other components which should be considered and included in an effective safety program. These additional components provide an effective means of encouraging participation in the safety program and of insuring that information about the safety program and its implementation is communicated to management and employees.

Effective communication between management and employees is essential to the smooth operation of the safety program, and lines of communication must be established to insure that pertinent safety information reaches those affected by it as quickly as possible. Management must be able to quickly notify the employee of any unsafe conditions or changes in safety requirements, and employees must be able to quickly and easily inform management of observed hazards or potential hazards. A good communication system is also effective for the interchange of ideas concerning the implementation of safety policies and how the program can be improved. The communication link between management and employees can be facilitated by the agency's safety officer.

An effective safety program employs a variety of communication forms, including written, visual, and verbal to emphasize vigilance and safety awareness and to motivate people to participate in the safety program. The additional elements which are outlined below use various means to communicate the importance of safety in the workplace.

#### **Written Communication**

Provide employees with copies of the written documentation of the safety program as indicated in the basic element that describes documentation for a safety program. Written communication of safety information can help management and employees to better visualize the structure of the safety program. The documentation can also serve as a reference to help resolve questions about safety issues as they arise.

#### **Safety Meetings**

Safety meetings and seminars facilitate the verbal communication of safety information and can be used to emphasize the commitment of management and the employees to maintaining a safe work environment. These meetings can be used in addition to safety training to communicate the application and use of policies and procedures in the written safety documentation provided to the employee. Safety meetings can also be used to examine and revise existing



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policies and procedures. Safety meetings should be scheduled as needed or as required by local requirements and should be scheduled to include all employees who are affected by the topics of discussion.

Safety meetings also provide an excellent forum for responding to and discussing input from management and employees on ways in which the safety program can be improved. Employees are encouraged to present their views on the current program based on personal experience and management can obtain feedback on how the program is actually functioning.

## **Motivating People to Participate**

The presentation of certificates, awards, and other incentives can help to encourage the participation of employees and management in the safety program. By publicly recognizing contributions to the operation and improvement of the safety program, people are encouraged to participate and contribute new ideas. Similarly, publicly recognizing accomplishments involving safety practices helps to generate enthusiasm about participation in the safety program and emphasizes the importance placed on maintaining a safe work environment by management.

The use of posters, videotapes, and various audio-visual aids can help to generate interest and participation in the safety program and can help the employee to better retain the information in memory. Items such as posters also provide a constant, visible reminder of the importance of safety. These items can help employees to better visualize proper safety techniques and practices and to relate to how the techniques are used.

## **Safety Committees**

Safety committees (either existing or newly established) can be useful in evaluating safety issues and communicating information to employees and management. A safety committee can be appointed as a permanent body or in response to a specific safety issue which needs to be reviewed. While the composition of these committees varies, it is often helpful to include management as well as employees who represent various interests (e.g., a large-capacity scale inspector, a laboratory metrologist, an LPG meter inspector, a field supervisor, etc.) in the agency according to the tasks assigned to the committee. By including representation from all of the groups which are affected by an issue, the views of the committee tend to be more balanced and the decisions may be more readily accepted by the groups represented on the committee.

## **Obtain and post current Material Safety Data Sheets (MSDS's)**

MSDS's are provided by the manufacturer of a product to identify the product's basic characteristics and hazardous information. MSDS's typically provide information pertaining to the characteristics of a product such as hazardous ingredients, physical data, fire and explosion hazard information, health hazard information, reactivity data, spill or leak procedures, special protection information, special precautions, toxicological information, and other relevant information. MSDS's can be obtained from the manufacturer of the product. For further information on MSDS's, contact your local OSHA office.

MSDS's are used widely to determine the potential hazards exposed to an employee who is working with or near a particular product. As new information is discovered concerning the properties of a product and the effects of various levels of exposure to it, MSDS's can change. The manufacturer of a product is responsible for providing updated copies of these sheets to individuals who have requested MSDS's for that product. In order to insure that your agency does in fact have a copy of the most current MSDS sheet for reference, it is suggested that the safety program have its own mechanism for updating the agency's MSDS files on at least an annual basis.

Employees and management should receive training in the use and interpretation of the information on an MSDS; this will insure that they adequately understand the potential hazards associated a product and are aware of the necessary precautions to take when working with the product. MSDS's should be made accessible to employees at all times. Posting MSDS's in a location available to everyone and advising employees of the location insures that all employees will have access to the information. Check with your local or State OSHA representative to determine whether or not your agency is required to meet specific requirements concerning providing the information in MSDS's to employees.



## Obtain Information from Outside Agencies

The resources of outside agencies can be helpful in trying to determine the most appropriate way to address a safety concern, and sharing information with other agencies can be helpful to them. As mentioned earlier in this document, OSHA representatives can be of great assistance in resolving safety concerns. Other resources are also available as indicated in Section VI of this document. Another source of information is that of input from agencies which may have encountered a similar problem; contacting an agency which has successfully dealt with the safety concern saves the resources involved in researching and devising ways to resolve the issue. For example a weights and measures jurisdiction in one State may have reduced the hazards associated with transporting a 5-gallon test measure; sharing their findings with other States with similar concerns can help those States avoid the costs and delays associated with researching the issue. Establishing and maintaining cooperation and information exchange with the NCWM, private industry, and other W & M jurisdictions can benefit everyone.

## ✓) Evaluating the Effectiveness of a Program and Making Modifications

*Many policies and regulations will vary from jurisdiction to jurisdiction. It is essential that the inspector or serviceperson be aware of all safety regulations and policies in place at the inspection site and to practice the safety policies established by the inspector's or serviceperson's employer. When modifying an existing program or establishing a new program, it is necessary to verify that all State and local safety requirements as well as any safety policies within the agency are satisfied.*

Once a safety program has been established it is necessary to evaluate the effectiveness of the program to insure that the program and its policies and procedures meet the objective of maintaining a safe work environment and minimizing potential safety hazards. A safety program must be flexible enough to respond to the changing needs of the workplace environment, and if a procedure is no longer effective in minimizing a safety risk it must be modified. OSHA is the expert in analyzing the effectiveness of a safety program; check with the local or State OSHA representative for input on the effectiveness of a program.

To begin the evaluation of a program, it is first necessary to monitor what is practiced -- not what is supposed to be practiced. This can be done in several ways. Regular self-inspections are an excellent means of monitoring a safety program and of insuring that safety regulations and policies are being followed. Request input from the local or State OSHA representative and check to see if there is a hygienist employed within the agency who might evaluate the program. It may be possible to contract an industrial hygienist to evaluate the effectiveness of the safety program.

Many jurisdictions and service agencies have well established safety programs which continue to operate effectively and require few changes. Even these organizations recognize the benefits of continual evaluation of the effectiveness of the safety program. The safety programs of such organizations usually include a mechanism for providing a periodic evaluation of the operation of the program, and a mechanism for making changes to the program to respond to changes in requirements and to the dynamic workplace environment.

If the evaluation indicates the existence of a potential safety hazard, it is necessary to determine why the potential exists. If the hazard is present because an employee has failed to follow the policies and procedures established by the program, additional training or reinforcement of the policy may be needed. Attempts should be made to determine why the employee is not following the procedure and inquiries made into possible ways of correcting the problem. For example,

- Is the procedure impractical? If so, does an alternative means of accomplishing the task exist?
- If no alternatives to the procedure exist, ways must be found to encourage the employee to use the procedure.
- Can a related procedure be changed to make the safety procedure more practical and more likely to be followed by the employee?
- Is the procedure not being followed because of a lack of commitment from management (e.g., lack of resources such as proper safety equipment)? If so, ways of obtaining and demonstrating a positive commitment must be obtained from management.
- Is a lack of employee involvement in establishing the safety procedures the cause of the problem? If so, attempt to involve employees in evaluating the program and work to encourage their suggestions for improvements of the program; they are the ones working with the procedures. Ask the employee for suggestions on how the procedure could be improved to be a practical means for minimizing the safety hazard.

If the hazard is present because the policies and procedures of the safety program have not adequately addressed the problem, it is necessary to reevaluate the situation and discover a way to minimize or eliminate the risk. Can the procedure be modified to adequately address the safety concern? Would new testing equipment or personal protection equipment correct the problem? Any changes made to the policies and procedures of the safety program as a result of the evaluation and reanalysis should be included in the next revision of the safety program's documentation; until such time as the documentation is revised, a written description of the modified procedure should be provided to employees and they should also be notified verbally.

As part of the normal maintenance of a safety program, it is necessary to periodically review the policies and procedures to insure that they comply with all local, State, and Federal safety requirements, especially any new requirements which have gone into effect since the establishment of the safety program. Changes to the policy and procedures must be made to address any changes in the safety requirements, and all employees must be properly notified of the change.

Changes to a safety program may also be necessary to address any new equipment or modifications to current equipment. An evaluation should be made of the operation of the new or modified equipment to determine whether or not changes are needed in the safety procedures to adequately address any potential safety hazards.

#### **VI) Resources for Maintaining an Effective Safety Program**

There are many resources available for safety training or safety information which can help to maintain an effective safety program. These resources can be in the form of training to insure that proper safety procedures are known and followed or in the form of information about a product or test procedure which may prevent potential injury to an employee.

##### **Safety Training and/or Information Resources**

Listed below are a number of resources which can provide safety training or safety information. This is not intended to be a complete list of all possible resources for safety information, rather this is a list of some of the agencies that the Task Force has worked with or obtained information from in the course of its work.

Occupational Safety and Health Administration (OSHA)

(Check for local and State listings; Federal OSHA is located in Washington, DC)

National Safety Council

Chicago, IL

National Institute Occupational Safety and Health (NIOSH)

American Petroleum Institute (API)

Washington, DC

National Conference on Weights and Measures (NCWM)

Gaithersburg, MD

National Institute of Standards and Technology (NIST)

Gaithersburg, MD

American Industrial Hygiene Association

Akron, OH

American Meat Institute

Arlington, VA

In addition to these and other agencies which are not listed, local industry trade groups conduct many training seminars which may be open to W&M. For example local distributors of liquefied petroleum gas (LPG) often

conduct safety training for employees; this information may be useful for weights and measures officials who inspect PG meters. Equipment suppliers and consultants also conduct training seminars concerning the safe use of equipment and safe procedures.

Another resource for maintaining a safety program is a regular review and update of all procedures by a group within your agency (e.g., safety committee). Such a group would be familiar with your equipment, personnel, and any constraints which you have, and can provide excellent feedback about the effectiveness of your current safety practices.

## Attachment A - Safety Notes

This attachment contains a glossary of safety considerations and reminders that were identified by the Task Force in the course of its work. Many of these safety reminders will be incorporated into the 1992 version of NCWM Publication 12, Examination Procedure Outlines for Weighing and Measuring Devices. Many of these reminders will also be added to future editions (or issued as addenda to current editions) of NIST Handbooks 143, State Weighing and Measures Laboratories Program Handbook, and 145, Handbook for the Quality Assurance of Metrologic Measurements. Those safety reminders which are specifically oriented toward the laboratory environment are identified with the notation (\*L).

This attachment is not intended to include all possible safety precautions which should be taken before proceeding with the inspection of a weighing or measuring device, nor are the listings of safety information and contacts a comprehensive source of safety information and guidance. Additional information is available on various safety topics in the National Conference on Weights and Measures (NCWM).

Many policies and regulations will vary from jurisdiction to jurisdiction. Prior to beginning any inspection or testing activity, it is essential that the inspector, metrologist, or serviceperson be completely familiar with all safety regulations and policies in effect at the inspection site or in the laboratory; such regulations and policies include federal, state, or local Occupational Safety and Health Administration (OSHA) regulations, safety policies established by the firm in which the inspection is taking place, and safety policies established by the inspector, metrologist's, or serviceperson's employer. The inspector, metrologist, or serviceperson must practice and adhere to these requirements and policies at all times during the inspection and testing process. This attachment identifies general guidelines for safety which are useful in alerting inspectors, metrologists, and servicepersons to the importance of taking adequate precautions to avoid personal injuries. These guidelines can only be effective in mitigating safety hazards if inspectors and servicepersons receive training in hazard recognition and controls.

### Chemicals, Petroleum Products, and Hazardous Materials:

Be familiar with the nature of the products at an inspection site that is located in a plant or other facility which handles, uses, or packages chemicals, petroleum products, or hazardous materials; it is essential that the inspector or serviceperson be familiar with the nature of the product and any protective measures which should be taken prior to working around the product. For example, some products may cause injury through exposure to the skin or through inhalation of the fumes or airborne particulates. Similarly, caustic products may also damage fine standard weights or measures or equipment used in the test process.

Determine whether or not protective clothing or equipment is needed prior to working with the product.

Material Safety Data Sheets (MSDSs) can provide much of the basic information about the hazards involved with a product. The manufacturer of the product should be able to provide further information about the product. Several sources of information concerning chemicals, petroleum products, and hazardous materials are listed below. Some additional sources of information are included in the NCWM Safety Library.

American Chemical Society  
1155 16th Street, NW  
Washington, DC 20036  
(202) 872-4600

Chemical Manufacturer's Association  
2501 M Street, NW  
Washington, DC 20037  
(202) 887-1100

American Petroleum Institute  
1220 L Street, NW  
Washington, DC 20005  
(202) 682-8000  
FAX#: (202) 682-8036



Look for leakage or spillage of chemicals, petroleum products, or hazardous materials at or near the inspection site. Leakage or spillage of these products can be potentially hazardous if the inspector/serviceperson or facility employee is exposed to the product and is not wearing personal protection equipment. Additionally, any product collecting on the ground surface can result in slippery, unsafe conditions for an individual moving about the inspection area. If leaking or spilled product results in unsafe conditions at the inspection site, it is recommended that the testing procedure be discontinued until the unsafe conditions are corrected.

#### **Chemicals, Petroleum Products, and Hazardous Materials (\*L):**

Be familiar with the nature of the chemicals being used in the laboratory. It is essential that the metrologist be familiar with the nature of the product and any protective measures which should be taken prior to working with the product. For example, some products may cause injury through exposure to the skin (acids and caustics) or through inhalation of the fumes or airborne particulates (molten lead fumes, lead dust, and mercury vapors). Similarly, caustic products may also damage field standard weights or measures or equipment used in the test process.

Determine whether or not protective clothing or equipment is needed prior to working with the product. Material Safety Data Sheets (MSDSs) can provide much of the basic information about the hazards involved with a product. Look for leakage or spillage of chemicals, petroleum products, or hazardous materials. Leakage or spillage of these products can be potentially hazardous if the metrologist is exposed to the product and is not wearing personal protective equipment. Additionally, any product collecting on the ground surface can result in slippery, unsafe conditions for an individual moving about the inspection area. If leaking or spilled product results in unsafe conditions at the inspection site, it is recommended that the testing procedure be discontinued until the unsafe conditions are corrected.

#### **Clothing:**

Synthetic clothing should not be worn when working around flammable products. Synthetic clothing melts at high temperatures; if the person wearing the synthetic clothing is exposed to flames, the clothing may melt and stick to the person's skin to result in severe burns.

*Combustion can result when an ignition source is present and fuel and oxygen are also available.*

Many types of synthetic clothing also tend to build up a static charge; this can be dangerous as a potential ignition source around flammable products.

Use caution when wearing loose clothing (or hanging jewelry) around machinery such as conveyor belts, weight movers, meat hooks, gears, etc. The clothing (or jewelry) may become entangled in the machinery and result in personal injury.

#### **Electrical Hazards:**

Be particularly aware of potential electrical hazards in or near the inspection site when testing electronic devices or working in the vicinity of electrical equipment. Loose or exposed wiring and a frayed or worn electrical cord should be brought to the attention of management at the inspection site. Avoid standing on wet surfaces unless the electrical equipment is properly insulated and grounded.

*Combustion can result when an ignition source is present and fuel and oxygen are also available.* Electrical hazards may also be potential ignition sources when testing devices which dispense flammable products or working near flammable products. Be sure that provers and other test equipment are equipped with explosion-proof motors. Always check the electrical supply lines for testing equipment carefully for signs of wear or damage, and correct any potentially hazardous conditions. Take steps to protect these supply lines from damage during use.

### **Emergency Procedures:**

Always be familiar with emergency procedures BEFORE beginning an inspection. After an emergency has developed, crucial time can be lost if emergency procedures are not known. Be familiar with the procedures to follow in the event of an equipment malfunction or the development of a dangerous situation with the equipment or in the vicinity of the inspection site when operating specialized testing equipment.

Be familiar with the nature of any product being dispensed by a device or being used in or near the inspection area. Know the emergency procedures to be followed when a spill has occurred or a person has been exposed to the product. Knowledge of emergency procedures and related information should include the correct selection and use of fire extinguishers, the location of emergency shut-offs, and evacuation procedures.

Keep a list of emergency phone numbers handy at all times in a notebook or on a card. Examples of numbers to keep are the local fire department, emergency medical facility, and other appropriate public safety agencies.

### **Eye Protection:**

Appropriate eye protection is recommended when working around hazardous products which may inadvertently splash into the eyes, and eye-wash facilities should be considered. Contact lens wearers should be particularly careful to follow the instructions of their eye-care practitioner and local OSHA representative when working around hazardous products.

Appropriate eye protection should also be worn when working in an area with overhead projections such as meat hooks or other sharp objects or where there is a potential of flying projectiles (e.g., when working near tools that grind, chip, etc.).

### **Fire Extinguisher:**

Know the proper use and selection of fire extinguishers for a given application. Contact your local fire department for current information and training.

### **First Aid Kit:**

An appropriate first aid kit or kits should be provided for every vehicle and in every laboratory. Consideration should be given to the type of work that the inspector, metrologist, or serviceperson typically performs and the types of hazards typically encountered in these types of activities. Items in addition to those contained in a basic first aid kit may need to be added to address the potential hazards which may be encountered by the person who will be most likely to use the first aid kit. Check with your local OSHA office or with your departmental safety officer for input on the items to be included in each kit.

### **First Aid Kits (\*L):**

Appropriate first aid kits should be located throughout the laboratory in highly visible locations. All laboratory personnel should be familiar with the location and contents of each of these kits. Consideration should be given to the type of work that the metrologist typically performs and the types of hazards typically encountered in these types of activities. Items in addition to those contained in a basic first aid kit may need to be added to address the potential hazards which may be encountered by the metrologist who will be most likely to use the first aid kit.

### **First Aid Training (\*L):**

An adequate number of laboratory personnel should be trained and certified in first aid procedures (including Cardiopulmonary Resuscitation - CPR) to assure that any accident victim will receive proper first aid treatment. This certification should be maintained through periodic training as recommended by each program.

### Grounding:

It is essential to properly ground the prover being used when inspecting meters which dispense flammable products. Be sure to connect the grounding wire or jumper cable to bare metal surfaces, not to painted or plastic surfaces.

#### Retail Motor Fuel Dispensers:

When testing retail motor fuel dispensers, be sure to:

- Ground the nozzle against the prover neck when dispensing product.
- Ground the neck of the prover against the metal funnel when returning product to the storage tank.
- If a test measure is left on a cart when dispensing product or returning product to the storage tank, be sure the card is properly grounded.

#### Vehicle Mounted Tank, Loading Rack, or Wholesale Meters:

- Use a grounding wire, jumper cable, or terminal ground to ground the prover to the vehicle from which the product is obtained.
- Use a grounding wire, jumper cable, or terminal ground to ground the prover to the vehicle or tank when returning product to storage.
- These guidelines also apply when testing liquefied petroleum gas liquid-measuring devices. Although these devices are tested as a "closed system", the possibility of leaks is always present and can present a potential hazard.
- Always ground yourself to an above ground storage tank before climbing onto the tank by touching the tank or the hand rails.

### Ignition Sources:

*Combustion can result when an ignition source is present and fuel and oxygen are also available.* It is necessary to avoid possible sources of ignition when testing meters which dispense petroleum products or other flammable materials. Possible sources of ignition include, but are not limited to: open flames or smoking, metal to metal contact which causes sparking (e.g., metal wrench or hammer on a pipe fitting), a running motor, static discharge, worn or faulty electrical wiring, improper grounding, and the wearing of synthetic clothing. Also be sure that provers and other test equipment are equipped with explosion-proof motors. If ignition sources cannot be eliminated at the time of the inspection, it is recommended that the testing procedure be discontinued until the hazardous conditions are corrected.

Because disposable lighters can spark upon impact, the inspector should avoid carrying a lighter in his or her front shirt pocket.

**ALWAYS USE A METAL FUNNEL TO RETURN PRODUCT TO PRODUCT STORAGE TANKS. NEVER USE A PLASTIC SAFETY CONE AS A FUNNEL!!** Pouring product into the return fill can build up static electricity; a proper ground must be made by placing the metal neck of the prover against the metal lip of the funnel.

### Lifting:

Be familiar with and use proper lifting techniques when lifting test weights or heavy equipment to prevent personal injury. To reduce the possibility of back injury, use equipment which would decrease the amount of lifting required whenever possible (For example: an extended height funnel, carts for transporting weights, platforms suspended from monorail scales instead of overhead meat hooks, etc.).

Periodic training in proper lifting techniques is encouraged.

#### **Location:**

Carefully examine the inspection site prior to beginning an inspection and testing procedure. Look for potentially dangerous situations such as wet areas which may be slippery (see also **Wet/Slick Conditions**), the use or presence of hazardous and/or flammable materials and any spillage or leakage of these products (see also **Chemicals, Petroleum Products, and Hazardous Materials**), adjacent activities which may contribute a potential hazard to the inspection (e.g., welding near the inspection area would provide a potential ignition source when testing devices which dispense flammable liquids), obstructions in the area which may prove to be safety hazards (e.g., objects on the ground which the inspector might trip over, objects in the path of the inspector to and from the device being tested, exits blocked by test equipment or vehicles, etc. -- see also **Obstructions**), pedestrian or vehicle traffic (see also **Traffic**), steep or narrow stairways, overhead hazards (e.g., feed bins, loading rack equipment, low-hanging beams in feed mills and warehouses, overhead activities, low doorways, etc. -- see also **Overhead Hazards**), lack of or defective handrails, and loose or exposed wiring (see also **Electrical Hazards**). Use great care when moving around and working in areas in which these potential hazards are present. When using flammable products (e.g., testing metering devices), note the location of the fire extinguisher, emergency shut-offs, etc. prior to beginning the inspection.

#### **Material Safety Data Sheets (MSDS):**

MSDSs are provided by the manufacturer of a product to identify the product's basic characteristics and hazardous information. MSDSs typically provide information pertaining to the characteristics of a product such as hazardous ingredients, physical data, fire and explosion hazard information, health hazard information, reactivity data, spill or leak procedures, special protection information, special precautions, toxicological information, and other relevant information. MSDSs can be obtained from the manufacturer of the product. As new information is discovered concerning the properties of a product and the effects of various levels of exposure to it, MSDSs can change. It is recommended that updated versions of the MSDSs be obtained on at least an annual basis. For further information on MSDSs, contact your local OSHA office.

#### **Nature of Product:**

Be knowledgeable about the nature of the product being dispensed by a device prior to beginning a test on the device. For all hazardous materials it is recommended that a copy of the Material Safety Data Sheet (MSDS) be obtained for that product and reviewed prior to testing the device. Carefully read and follow the instructions on any warning labels posted on the device or affixed to a packaged product for precautions which should be taken when working around the product.

#### **Obstructions:**

Care should be taken to avoid injury from obstructions in the work area during the course of an inspection. Obstructions which might prove to be safety hazards include objects on the ground which the inspector might trip over, objects in the path of the inspector to and from the device being tested, steep or narrow stairways, exits blocked by test equipment or vehicles, etc.

#### **Overhead Hazards:**

Note any overhead hazards such as feed bins, loading rack equipment, low-hanging beams in feed mills and warehouses, activities overhead, and low doorways prior to the inspection. Take precautions (such as wearing a hardhat) to avoid potential injuries as the situation dictates.

#### **Personal Protection Equipment:**

Included among the many types of personal protection equipment which is available are items such as non-synthetic clothing, coveralls, gloves, barrier cream, non-permeable safety aprons, safety sleeves, safety shoes, respirators goggles or safety glasses, hearing protection, and hardhats. OSHA and safety-clothing and safety-equipment manufacturers can provide additional information concerning the selection of personal protection equipment for a given type of inspection activity.



Before providing personal protection equipment (PPE), management should determine whether or not PPE is actually required for a particular inspection activity. If it is determined that an employee is exposed to a hazard, the management should first try to minimize the hazard by examining and modifying work methods and conditions. If it is determined that the employee is still exposed to the hazard after modifying work methods and conditions, consideration should be given to purchasing PPE. It should be realized that certain types of PPE such as respirators can require employee physicals and extensive ongoing training and maintenance; failure to follow these requirements may render the PPE ineffective or even dangerous.

#### Safety Shoes:

Safety shoes are recommended to be worn when performing certain weights and measures activities to prevent personal injury. Safety shoes are available to prevent possible injury to the foot from falling weights or equipment and also to provide protection from slippage and static discharge. Many styles and types of safety shoes are available. The American National Standards Institute and safety-shoe manufacturers can provide additional information concerning the selection of safety shoes for different types of inspection activities.

#### Safety Cones/Warning Signs:

Safety warning signs or safety cones should be positioned to block off the work area when the inspection site is exposed to vehicular or pedestrian traffic. These precautions should also be taken when working around flammable liquids to warn people of a potential hazard; in this instance, it is also recommended that "No Smoking" and "No Open Flame" signs be posted.

#### Static Discharge:

*Combustion can result when an ignition source is present and fuel and oxygen are also available.* Sources of static discharge introduce the potential of an ignition source into the testing area. Avoid all sources of static discharge when testing flammable products.

#### Support:

- Scales: Be certain that the installation is adequate to support the scale, test weights equal to the capacity of the scale, and any weight carts, test platforms, platters, chains, hooks, or other accessories used to suspend or support the test weights prior to proceeding with a testing procedure. Any test platforms, platters, chains, hooks, or other accessories must be capable of supporting the test weights necessary for the inspection.
- Meters: Be sure the inspection site surface is rigid enough to support the weight of a large volume prover when the prover is filled with the test liquid. Chocks should be used to secure the wheels of the prover during the testing procedure.

#### Switch Loading:

Do not use a test measure that has been used for drafts of gasoline to measure diesel fuel until you are certain that all gasoline vapors have dissipated. This practice, called "switch-loading" is extremely hazardous because diesel fuel is likely to produce a static charge while being dispensed. Sparks from this charge could easily ignite gasoline vapors inside the measure.

#### Traffic:

Be aware of vehicular and pedestrian traffic patterns in and around the inspection site. Mark the test spot appropriately by using safety cones, flags, etc.

**Transportation of Equipment:**

Consideration must be given to isolating the inspector/serviceperson from weighing and measuring equipment during the transportation of the equipment to and from the work site. The inspector/serviceperson must be isolated from hazardous fumes; means of such isolation include, but are not limited to, vehicles outfitted with protective barriers; equipment carriers located outside of the vehicle; vehicles with separate driver/equipment compartments, etc.

All equipment must be properly secured to avoid exposing the inspector/serviceperson to the potential of flying projectiles.

**Wet/Slick Conditions:**

Caution should be exercised when working in wet, slippery, or icy conditions to avoid slipping or possible injury from electrical sources. Shoes with non-skid soles should be worn to provide adequate traction and prevent slipping.

Absorbent material should be used on any product spills to prevent possible injury due to slipping on a slick surface.

## Appendix F - Report on Activities of 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 Secretariats. Its last meeting was held in Porto, Portugal from October 3-5, 1990. Representatives from 37 of the 50 member nations attended. At that meeting the following significant decisions were made:

Six new OIML Recommendations were approved, including the revision of R60 on "Load Cells."

The proposed "OIML Certificate System for Measuring Instruments" was approved for implementation. Since its approval, the following OIML Member Nations have indicated their intention to participate in the System and have named their OIML representative as the "Issuing Authority" for the System: Belgium, France, Germany, Hungary, People's Republic of China, Sweden, and the U.S.S.R.

It was decided to revise the "Working Method of OIML Secretariats" to provide more specific guidelines for organizational structure and in work procedures. The revision will use as its basis the IEC/ISO Directives on "Participation in Standardization Activities" and "Guide for Style and Preparation of International Standards."

The next meeting of CIML is scheduled for October 7-9, 1991 in Paris, France.

### OIML Presidential Council

The Presidential Council of CIML is its executive steering committee. Its last meeting was held February 11-13, 1991 in Paris, France. The principal agenda items were:

A review of the current technical work of the Secretariats.

A review of draft revisions of the "Working Method" for OIML Secretariats and a guide to the drafting and presentation of OIML Recommendations. New drafts of both items are now available.

A review of the current organizational structure of the technical work with the view of reorganizing.

### Activities of OIML Secretariats

This part of the report provides: (1) an identification of specific work, either Recommendations or Documents, being developed in Secretariats of specific interest to the NCWM and (2) a schedule of meetings of the International Working Groups (IWGs) of those Secretariats that have been recently held or planned for the near future. More details of these activities are being reported by Otto Warnlof to the Specifications and Tolerances Committee.

#### PS5D "Dynamic Measurement of Liquids" (Germany)

PS5D/RS1 "Meters with Measuring Chambers or Turbines" (Germany and France): An IWG meeting was held at NIST in October 1990 at which a second preliminary draft Recommendation combining R5, R27, R57, R67, and R77 (Volume Meters, Ancillary Equipment, General Provisions, Particular Assemblies, and Metrological Controls, respectively) was discussed. A third preliminary draft is being developed on the basis of the decisions made at that meeting and is expected to be distributed to members of the IWG for review and comment in July or August 1991. An IWG meeting has been scheduled for October 25-27, 1991 in Paris, France.

## Executive Committee

- PS5D/RS7 "Methods and Devices for the Verification of Measuring Instruments for Liquids" (Japan): An IWG meeting has been scheduled to discuss the second preliminary draft Recommendations on "Pipe Provers and Measuring Assemblies" and "Fuel Dispensers for Motor Vehicles" in Tokyo, Japan on November 25-27, 1991.
- PS5D/RS9 "Vortex Meters" (Japan): An IWG meeting has been scheduled to discuss a first preliminary draft on the subject during November 25-28, 1991.
- PS5D/RS10 "Direct Mass Flow Meters" (U.S.A.): An IWG meeting was held at NIST on October 22-23, 1990 at which the second preliminary draft Recommendation on the subject was reviewed. A third preliminary draft was prepared on the basis of the decisions of the meeting and distributed to members of the IWG for review and comment in February 1991. The United States held a meeting of the IWG to review that draft on May 13-15, 1991 in England. On the basis of the decisions at that meeting, a first draft Recommendation is being prepared for distribution for simultaneous review and vote by the Pilot and Reporting Secretariats.
- o PS5S "Static Measurement of Quantities of Liquids" (Portugal)
  - PS5S/SR12 "Static Direct Mass Measurement of Quantities of Liquids" (Australia): A second preliminary draft Recommendation on the subject was prepared and discussed at an IWG meeting held on May 16-17, 1991 in England at which the United States was represented. A third preliminary draft will be prepared on the basis of the decisions of that meeting.
- o PS7 "Measurement of Mass" (U.S.A.)
  - PS7/RS2 "General Problems - Electronic Devices" (U.S.A.): An IWG meeting was held at NIST on July 16-18, 1991. At that meeting a draft revision of R74 on "Electronic Weighing Instruments" was reviewed. On the basis of the decisions of the meeting, a new draft revision of R74 has been prepared and distributed to members of the IWG for review and vote. A final response by the Pilot and Reporting Secretariats on this revision is due in August 1991.
  - PS7/RS4 "Non-automatic Weighing Instruments" (Germany and France): A special meeting was called by the Secretariat of some key members of the IWG in Germany in August 1990 to discuss a revision of R76. Otto Warnlof attended that meeting. A subsequent IWG meeting was held to discuss this revised draft Recommendation in January 1991 in Germany. The United States was represented at that meeting by Mr. Warnlof, NCWM, SMA, and four persons representing scale manufacturers. As a result of the decisions of the January meeting, the Secretariat prepared another draft and sent it to the Reporting and Pilot Secretariats and Members of CIML for simultaneous review and vote. The result of those ballots were positive, hence the revised R76 will be on the agenda for approval at the October 1991 meeting of CIML.
  - PS7/RS5 "Automatic Weighing Instruments" (United Kingdom): Several Recommendations are at various stages of revision or development. These include the following: (a) a revision of R50 on "Continuous Totalizing Automatic Weighing Instruments (Belt Weighers);" (b) a revision of R51 on "Checkweighing and Weight Grading Machines;" (c) a revision of R61 on "Automatic Gravimetric Filling Machines (Hoppers);" (d) a preliminary draft R on "Automatic Rail-weighbridges;" and (e) a preliminary draft R on "Discontinuous Totalizing Automatic Weighing Instruments (Catchweighers)." All drafts were reviewed at a meeting of the IWG from May 20-24, 1991 in England. As a results of the meeting, were that the draft revision of R50 was approved; new draft revisions of R51 and R61 will be prepared based on the decisions agreed upon. The preliminary drafts will also be revised according to the decisions of the meeting. An IWG meeting has been scheduled to discuss the revised work in February 1992 in England.
  - PS7/RS8 "Load Cells" (U.S.A.): The revised R60 was approved at the last CIML meeting in Portugal. The Secretariat is now drafting "test methods" and a "format of the test report" so that this Recommendation can become a part of the "OIML Certificate System."



## PS8 "Weights" (U.S.A.)

PS8/RS5 "Weights Used in Trade and Industry" (Belgium and U.K.): A third preliminary draft Recommendation on "Weights of Classes E1, E2, F1, F2, M1, M2, and M3" has been prepared on the basis of consolidating the requirements of R1, R2, R20, and R25 as well as the Monographs I, II, III, and IV related to weights. This draft was discussed at an IWG meeting at NIST on July 19, 1990. A fourth preliminary draft was prepared by the Secretariat on the basis of the decisions at that meeting and distributed to the members of the IWG in September 1990 for review and comment. Comments received on that draft served as a basis for a first draft sent out for simultaneous review by the Pilot and Reporting Secretariats. The U.S.'s response was positive on both ballots.

## PS22 "Principles of Metrological Control" (U.S.A.)

PS22/RS4 "Principles of Initial and Subsequent Verification" (U.S.A.): The Secretariat prepared a first preliminary draft Document on "Quality Assurance as Applied to Metrological Control of Measuring Instruments" and distributed it to members of the IWG for review and comment in August 1990. A meeting of the IWG was held to review that draft in France on October 8-10, 1990. A second preliminary draft is being prepared on the basis of the decisions at that meeting and has been limited to initial verification. The Document establishes principles whereby a manufacturer may provide a "declaration of conformity" of newly produced measuring instruments to the performance requirements of international recommendations or other documented standards. The next meeting of the IWG has been scheduled for October 10-12, 1991 at BIML in Paris, France.

## Appendix G

## Summary of State Laws and Regulations in Weights and Measures (as of July, 1991)

This is an overview of the status of adoption of NCWM standards by the States. In earlier editions of Handbook State laws and regulations were compared to the NCWM standard from the prior year. This did not indicate whether the standard as printed in the current edition had been adopted by any given State. The table below has been improved by listing those States that adopt NCWM-recommended updates automatically ("YES"); see Sections 4 through 10 of the Uniform Weights and Measures Law. This means the State's regulations are current with those printed in this edition of the Handbook. If a State has adopted an NCWM recommendation in whole or in part from a particular year, updates are not incorporated automatically, a lower case "yes" is shown. We have also incorporated the status of adoption of NIST Handbook 44.

State	Laws			Regulations							
	Weights and Measures Law	Weighmaster Law or Regulation	Motor Fuel Law	Packaging and Labeling	Method of Sale	Unit Pricing	Registration of Service Agencies	Open Dating	Type Evaluation	Motor Fuel Requirements	
Alabama	yes	yes	yes*	yes	yes	NO	yes	NO	yes	yes*	YE
Alaska	yes	NO	NO	yes	yes	NO	yes	NO	NO	NO	YE
Arizona	yes	yes	yes*	yes	yes	yes	yes	NO	yes	yes*	ye
Arkansas	yes	NO	yes	yes	yes	yes	yes	yes	yes	yes	YE
California	yes	yes	yes*	yes	yes	NO	yes	yes*	yes	yes	ye
Colorado	yes	yes	yes*	yes	yes	NO	yes	NO	NO	yes*	YE
Connecticut	yes	yes	yes*	yes	YES	yes*	yes*	yes*	yes	yes	YE
Delaware	yes	yes	yes*	yes	yes	NO	NO	NO	NO	yes*	YE
District of Columbia	yes	yes	NO	yes	yes	NO	NO	yes*	NO	NO	ye
Florida	yes	NO	yes*	yes	yes	yes*	yes	yes*	NO	yes*	ye
Georgia	yes	yes*	yes*	yes	yes	NO	yes	yes*	yes	yes*	YE
Hawaii	yes	yes	yes*	yes	yes	yes	yes	yes	yes	yes*	ye

Key: YES automatically adopted and updated on an annual basis  
 yes Law or regulation in force, NCWM standard used as basis of adoption, but from an earlier year.  
 yes\* Law or regulations in force, but not based on NCWM standard.  
 NO No law or regulation.

State	Laws			Regulations							
	Weights and Measures Law	Weighmaster Law or Regulation	Motor Fuel Law	Packaging and Labeling	Method of Sale	Unit Pricing	Registration of Service Agencies	Open Dating	Type Evaluation	Motor Fuel Requirements	Handbook 44
Alabama	yes	yes	yes*	yes	yes	NO	yes	NO	NO	yes*	YES
Alaska	yes	NO	yes*	YES	YES	NO	yes	NO	yes	yes	YES
Arizona	yes	yes	yes*	yes	yes	NO	NO	NO	NO	yes*	YES
Arkansas	yes	yes*	yes*	yes	yes*	NO	yes*	NO	yes	yes*	YES
California	yes	NO	yes*	yes	yes	NO	yes	NO	yes	yes*	yes
Colorado	yes	NO	NO	yes	yes	NO	yes	NO	NO	NO	YES
Connecticut	yes	yes	yes*	yes*	yes	NO	NO	NO	NO	yes*	YES
Delaware	yes	yes	yes*	YES	YES	NO	yes	NO	NO	yes*	YES
District of Columbia	yes	NO	yes*	yes	yes	yes*	NO	yes*	NO	yes*	YES
Florida	yes*	yes*	yes*	yes	yes	yes*	NO	NO	yes	yes*	yes
Georgia	yes*	yes*	yes	yes	NO	NO	NO	yes*	NO	yes	yes
Idaho	yes	NO	yes*	yes	NO	NO	yes	yes	NO	yes*	yes
Illinois	yes	yes	yes	yes	yes	yes	yes	NO	yes	yes	YES
Indiana	yes	NO	yes	YES	YES	NO	yes	yes*	yes	yes	YES
Iowa	yes	NO	yes*	NO	NO	NO	yes	NO	NO	yes*	YES
Kansas	yes	NO	NO	yes	yes	NO	yes	NO	yes	yes	yes
Kentucky	yes	yes	yes	yes	yes*	NO	yes	NO	NO	NO	yes
Louisiana	yes	yes	NO	YES	YES	YES	YES	YES	YES	YES	YES
Maine	yes	yes	yes*	yes	yes	yes*	yes*	NO	yes*	NO	YES

Key: YES automatically adopted and updated on an annual basis  
 yes Law or regulation in force, NCWM standard used as basis of adoption, but from an earlier year.  
 yes\* Law or regulations in force, but not based on NCWM standard.  
 NO No law or regulation.

State	Laws			Regulations							
	Weights and Measures Law	Weighmaster Law or Regulation	Motor Fuel Law	Packaging and Labeling	Method of Sale	Unit Pricing	Registration of Service Agencies	Open Dating	Type Evaluation	Motor Fuel Requirements	Handbook 44
New Mexico	yes	yes	yes*	NO	yes	NO	yes	yes*	NO	yes*	YES
New York	yes	yes	NO	yes	yes	NO	yes	NO	yes	yes	YES
North Carolina	yes	yes*	yes	YES	YES	NO	yes	NO	yes	yes	YES
North Dakota	yes	yes	yes*	yes*	yes*	NO	yes	NO	NO	yes*	yes
Ohio	yes	NO	NO	yes	yes	NO	yes	NO	yes	yes	YES
Oklahoma	yes	yes*	yes*	yes	yes	yes	yes	yes*	yes	yes*	YES
Oregon	yes	NO	NO	yes	yes	yes*	NO	yes*	NO	yes	yes
Pennsylvania	yes	yes*	NO	yes	yes	NO	NO	NO	yes*	NO	YES
Puerto Rico	yes	yes	NO	yes	yes*	yes*	yes	NO	NO	yes*	yes
Rhode Island	yes*	NO	NO	yes*	yes	yes*	NO	yes*	NO	yes*	YES
South Carolina	yes	yes*	yes*	yes	yes	NO	yes	NO	NO	yes*	YES
South Dakota	yes	NO	yes*	yes	yes	NO	yes	NO	yes	yes	yes
Tennessee	yes	yes	yes	yes	yes	NO	yes	NO	NO	yes*	YES
Texas	yes	yes*	NO	yes*	yes	NO	yes	NO	NO	yes	YES
Utah	yes	NO	yes*	yes	yes	NO	yes	NO	yes	yes*	YES
Vermont	yes	yes	NO	YES	yes	yes*	yes	NO	NO	yes	YES
Virginia	yes	yes	yes*	yes	yes	NO	NO	yes*	NO	yes*	YES

Key: YES automatically adopted and updated on an annual basis  
yes Law or regulation in force, NCWM standard used as basis of adoption, but from an earlier year.  
yes\* Law or regulations in force, but not based on NCWM standard.  
NO No law or regulation.



State	Laws			Regulations							
	Weights and Measures Law	Weighmaster Law or Regulation	Motor Fuel Law	Packaging and Labeling	Method of Sale	Unit Pricing	Registration of Service Agencies	Open Dating	Type Evaluation	Motor Fuel Requirements	Handbook 44
Virgin Islands	yes	NO	yes*	yes*	yes*	NO	NO	NO	NO	NO	yes
Washington	yes	yes	yes	yes	NO	NO	NO	NO	NO	yes	YES
West Virginia	yes	NO	NO	yes	yes	NO	NO	NO	NO	yes	yes
Wisconsin	yes	NO	yes*	yes	yes	NO	NO	NO	NO	yes*	YES
Wyoming	yes*	NO	yes*	yes*	yes*	NO	yes	NO	NO	yes*	YES
Totals: YES				6	6	1	1	1	1	1	36
yes	49	24	8	39	37	5	34	3	20	17	17
yes*	4	9	31	6	6	9	3	13	2	28	
NO		20	14	2	4	38	15	36	30	7	
<p>Key: YES automatically adopted and updated on an annual basis</p> <p>yes Law or regulation in force, NCWM standard used as basis of adoption, but from an earlier year.</p> <p>yes* Law or regulations in force, but not based on NCWM standard.</p> <p>NO No law or regulation.</p>											

## **Appendix H - Report on the Task Force on Planning for the 21st Century**

Darrell Guensler, CA, Chairman

### **BACKGROUND**

The Task Force on Planning for the 21st Century (also known as "The Blue Sky Task Force") was appointed by the 76th NCWM Chairman, N. David Smith.

The members of the Task Force are:

Tom Geiler, Town of Barnstable, Massachusetts  
Mary Heslin, Consultant for Consumer Services and Regulatory Affairs  
Chip Kloos, Hunt-Wesson Inc.  
Bruce Martell, State of Vermont  
Darrell Guensler, State of California, Chairman

The responsibilities of the Task Force are to:

**Make predictions on the future of Weights & Measures and recommendations on meeting the challenges of that future.**

**Make recommendations for new areas to come under the weights and measures umbrella.**

**Investigate avenues that will put the value of Weights & Measures and the Conference before the political and civic "movers and shakers" in our states and at the national level.**

**Suggest how we can take the Conference to the membership rather than bringing the members to the Conference.**

**Determine the need to include a session on motor-fuel quality at the Annual Meeting.**

**Consider the impact of biodegradable, recyclable, and safety packaging on existing Weights & Measures requirements.**

**Generally "rock the boat" and get us "sailing in the right direction" now and in the future.**

### **MEETINGS**

The first meeting of the Task Force was held December 13-14, 1990 in Raleigh, NC. In addition to the Task Force members, NCWM Chairman, N. David Smith, and OWM representative, Carroll Brickenkamp, participated in the meeting.

The meeting resulted in the group identifying and defining 27 issues on which to do further work. The identified issues are listed at the end of this report.

The second meeting was held March 21-22, 1991 in Stowe, Vermont. In addition to the Task Force members, NCWM Chairman, N. David Smith and NCWM Executive Secretary, Albert Tholen participated.

In order to spend the limited amount of time available on the most important issues, members came to this meeting prepared to identify their top five priority issues. After discussion, the following five items were identified for development:

National Weights and Measures Law  
Transaction Verification/Device Inspection  
Networking  
Identifying With Quality  
Technology Innovations

## RECOMMENDATIONS & CONCLUSIONS

In general, the Task Force feels that Conference members must direct their attention to:

- areas of nonuniformity where trade is affected;
- analysis of current methods of accomplishing responsibilities (with a willingness to accept significant changes in methodology when warranted);
- identification of alternate means of funding programs; and
- self analysis with a goal of improving the quality of program services.

The Task Force feels that much can be learned by reviewing the positive developments of the National Type Evaluation Program (NTEP) as a model for industry/government cooperation. The program has managed to develop an excellent working relationship among the active participants and has made significant strides toward overcoming non-uniform application of applicable regulations. The process may very well adapt to other areas of the Conference's responsibilities.

Due to the large number of issues identified by the Task Force and the need to spend more time properly developing these issues, the Task Force recommends that it be continued in service with possible expansion and/or reorganization.

The following information, recommendations and conclusions are the result of the Task Force's discussion of each of the five items:

### **NATIONAL WEIGHTS AND MEASURES LAW**

The need for considering a national weights and measures law and resulting regulations is based on the assertion that current State laws and regulations lack uniformity and that costs for both government and the regulated industry would be less with such a national system.

In discussing this item, the Task Force felt that such a national law should mandate State and local weights and measures programs much as they exist today with the possible addition of program certification requirements. It was felt that some leeway should be provided to satisfy possible unique needs of particular States.

One concern addressed by the group was that regulations which would result from such a national law may be required to be adopted by a specific federal agency through the Federal Register process as the NCWM may not be considered a sufficient forum to provide the "due process" required for adoption of regulations. This brings into question, the role State and local weights and measures officials will play in drafting and implementing such regulations.

Another concern raised was that such a national law would not necessarily resolve the lack of uniformity resulting from different levels of enforcement and degrees of activity in various enforcement programs. Priorities and staffing levels would still be set at the local level.

The Task Force recommends that, before any development proceeds on this issue, the requirements of "due process," as required by the U.S. Constitution, be thoroughly explored and the benefits of such a proposal be more thoroughly identified. If the Task Force is continued in service it plans to set up a study period wherein specific problems will be identified; solutions including alternatives will be developed; and future actions will be recommended. Ideas such as establishing a peer review board or some program similar to the NTEP for other areas of responsibility will be reviewed.

## TRANSACTION VERIFICATION/DEVICE INSPECTION

"Transaction verification" for purposes of this discussion includes undercover buying and selling, direct sale verifications, scanner and other pricing accuracy, bulk firewood sales, household moving investigations, etc. "Device inspection" includes type evaluation, initial verification, subsequent verification (annual inspection), and non-commercial calibration.

With over sixty percent of State and local weights and measures program resources being devoted to device inspection, it is incumbent upon any planning group such as this to consider alternative ways of accomplishing goals in this area. This is especially true when available resources are continually being reduced.

Consideration must be given to the effectiveness of de-emphasizing routine device inspection (subsequent verification), and placing more resources in the transaction verification area. This might include shifting the burden of device inspection to the owners and users of the devices through a variable frequency of inspection program, a statistical sampling program, or some other approach to assuring accurate devices.

In some cases it seems that transaction verification can adequately supplement or supplant routine device inspection but in other areas it does not seem cost effective. For instance, it is relatively easy to verify the accuracy of a weighed transaction taking place in a grocery store but difficult to accomplish the same thing with any reliable accuracy when monitoring gasoline sales in a service station.

The Task Force recommends that further development of this subject be a continued effort of this group. If the Task Force continues in service it intends, over the next year, to identify a plan for evaluating various existing alternatives to the process of annual device inspection (such as variable frequency and sampling programs currently in use in weights and measures jurisdictions and elsewhere). The plan will include a study of the impact of such alternatives on budgets and personnel. The Task Force currently is of the opinion that actual performance evaluations of such programs are outside the scope of the Task Force's charge.

## NETWORKING

For purposes of this discussion, "networking" includes utilizing various tools or mechanisms to share or disperse information of common interest.

The Task Force identified several mechanisms or tools which may foster networking such as newsletters, magazines, electronic bulletin boards, round table discussions, and central banks.

Types of information which lend themselves to networking for weights and measures interests include legislation, legal cases, new technologies, and training materials.

One example of a prime topic for a networking system is motor-fuel inspection information which is available for sharing from several sources and is extremely valuable to a jurisdiction just beginning a fuels inspection program. It was concluded that the weights and measures community would benefit greatly from improved networking systems.

The Task Force recommends that existing systems such as the bulletin board and round table sessions be examined for improvement possibilities and that the possibility of creating a Conference magazine or dovetailing with an existing magazine be explored. If the Task Force continues in service, it intends to identify the reasons for any shortcomings in the currently used bulletin board and round table sessions; explore the possibility of improving the use of FAX systems as part of the networking tools; identify and communicate with other regulatory associations and consumer groups who work with consumer products and services; and further explore the possibility of creating a Conference magazine or placing articles regularly in some existing publications.

## IDENTIFYING WITH QUALITY

The discussions regarding quality were divided into two sectors. Consumer Product Quality and Process Quality.



"Consumer Product Quality" refers to areas such as motor-fuel performance standards which exist as part of some state's weights and measures programs. The Task Force discussed the possibility that there may be a need to develop similar programs for other products such as brake fluid, anti-freeze/coolant, motor oil, automatic transmission fluid, asphalt, concrete, and lumber. Interfaces with other agencies may also be necessary. This area deserves more exploration.

"Process Quality" refers to the use of quality standards to measure performance within an organization. Representatives of the Task Force met with Dr. Curt W. Reimann at NIST who is in charge of the Malcolm Baldrige National Quality Award. The purpose of the meeting was to explore the feasibility of applying the principles of the Baldrige Award to the NCWM, State and local weights and measures internal programs, and to the process of setting standards of expectations for the industries regulated by weights and measures. The Task Force has begun the process of evaluating the principles for application to weights and measures internal programs.

The Task Force recommends that initially, further development of this item be limited to the internal programs aspect of the "Process Quality" portion. If the Task Force continues in service, it intends, after completion of its evaluation of the internal programs aspect, to continue development of the remainder of the quality issue.

## TECHNOLOGY INNOVATIONS

For purposes of discussion, "technology innovations" includes the use of modern technology in innovative ways to enhance routine or cumbersome tasks. Examples might be utilizing bar code scanners and laptop computers in the field to reduce the need to manually transfer data and therefore reduce errors and save time. Data manipulation and calculations required of the inspector could also be enhanced by such technology. Another, more neoteric example is remote electronic monitoring of packaging processes or measuring systems by the weights and measures official.

The cooperation and participation of industry is essential to the success of any attempt by weights and measures officials to institute new technology.

The Task Force recommends that individual Conference members (active, associate and advisory members) give consideration to the use of modern, innovative technology and present their success stories to forums such as round table discussions, bulletin boards, etc. The Task Force plans to take additional steps in identifying and evaluating candidates for further development in this area. Consideration is being given to inviting outside experts to consult with the Task Force to further develop this issue.

## ISSUES IDENTIFIED FOR FURTHER CONSIDERATION

Program Evaluation - examining the effectiveness and efficiency of weights and measures programs.

Program Certification - assuring that weights and measures officials are technically qualified, properly trained, and certified to perform regulatory inspections.

Marketplace Audit - conducting coordinated surveys of the marketplace to assure regulatory compliance and to identify areas needing surveillance.

Identification With Quality - expanding the image and activities of regulatory officials to include quality measures as well as quantity measures. Associating the activities of the NCWM with nationwide quality programs such as the Malcolm Baldrige Award.

Publicity Management - fostering consumer and industry awareness of the NCWM and weights and measures through media and other public contacts.

Management/Leadership Development - self-explanatory.

National Weights & Measures Law (Uniformity without compromising States' rights) - achieving regulatory enforcement uniformity among federal and State jurisdictions through a national law.

## Executive Committee

8. Development of Model Process for Complaint Investigation - standardizing the process of investigating consumer and industry complaints.
9. Future of Transaction Verification/Device Inspection - giving consideration to alternate methods of accomplishing the goal of accuracy in the marketplace.
10. Training/Education - establishing minimum training standards and improving application methods and abilities.
11. Future of Approval Seals -determining the appropriateness of applying paper seals to equipment tested by weights and measures officials.
12. Quality Measurements of Consumer Products - determining the appropriateness of expanding NCWM activities into more consumer product quality standards.
13. Examination of Mandated Functions versus Service Functions - identifying and determining the appropriateness of those activities which are mandated by law and those that have evolved as a service to our constituency.
14. Networking - utilizing various tools or mechanisms to share or disperse information of common interest with regulatory officials, industry representatives, and consumers.
15. Technology Innovations - using modern technology in innovative ways to enhance routine or cumbersome tasks.
16. E Mark Concept - facilitating the movement and inspection of consumer goods across federal, State and local jurisdictions through the application of in-plant certification programs such as are currently used in Europe.
17. New Packaging Materials - identifying the impact of new packaging concepts and materials on weights and measures responsibilities.
18. New Marketing Approaches - assessing the impact of new methods of sale such as door-to-door, mail order, etc.
19. Value of Garbage or Recycled Materials - determining the level of involvement necessary as a result of changes in handling methods evolving in the garbage/recycling industry.
20. Medical Measurements - determining the need for weights and measures involvement in the standardization and inspection of medical measurement instruments.
21. Public Utilities/Distributed Energy - assessing the need to broaden weights and measures involvement in the measurement of energy distributed by public and private utilities.
22. New Commodities - keeping up with the development of new products and services insofar as they impact weights and measures regulatory responsibility.
23. Interaction With World Markets (Metrics, OIML, Pacific Rim, EC) - identifying issues that affect world markets such as metrication, import/export regulations and trading standards.
24. Explore New Methods of Taking the Conference To Members - increasing the level of Conference participation by identifying better ways of reaching those members who are not able to attend annual meetings.
25. Anticipate Future - promoting creative thinking and actions among conference members.
26. New Ways of Financing Weights and Measures Programs - identifying alternate means of funding programs which do not depend on general tax revenues.
27. Access to Manufacturers' Databases - utilizing manufacturers' records to assess compliance criteria and direct resources to areas of greatest need.

## Appendix I - NTEP Weighing Sector Technical Committee Reports

Weighing Sector Technical Committee Reports  
November 2, 1988 through June 26-27, 1990  
With Indices

Constantine Cotsoradis, Editor

NTEP Technical Meeting Reports prior to November 2, 1988 were published in the 72nd and 73rd National Conference on Weights and Measures Reports and are not re-published in this document.

No indices are provided for the Reports from January 20, 1986 to June 26-27, 1990. One index is in alphabetical order referenced to the one in chronological order. The more significant issues are bolded.

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**Multiplier for multiple cell tolerances based upon the change to the proposed change to Handbook 44**

Agreement of test data from manufacturers' test facilities to NIST for the purpose of establishing the acceptability of the manufacturers' laboratory

Definition of adjacent to the display for capacity by division statements

Permanence of identification badges

**Scale features and parameters to be sealed under the revised G-S.8. and S.1.11.**

**Modular vehicle scale parameters**

Scale checklist criteria: Key sequence on computing scales and POS systems and tare override

Computers incorporated into weighing systems

Computers checklist criteria

Bulk-weighing systems checklist

## MEETING SUMMARY

Technical Committee on National Type Evaluation  
Weighing Sector  
November 2, 1988

There were two mailings (October 10 and October 17) for the meeting agenda. The second mailing was needed to provide clarification on some items contained in the initial mailing, additional items were submitted, and written comments were received on several items. The background information should be referenced in conjunction with this summary since the information is not generally repeated.

There were significantly different positions on the issues and the discussions were extensive. In some cases there was not a clear consensus, consequently, either the existing policy was not changed or the issue remains unresolved. The results of the meeting are given first under each heading and a summary of the discussion is then provided to document the issue. The combined agenda is given below to consolidate the issues for ease of reference. Not all of the issues were addressed at the meeting due to the number of issues and the length of discussions.

### Meeting Agenda for November 2, 1988

- I. Test loads for load cells at 500 and 1,000v
  - A. Review of policy specifying test loads near 500v, 1,000v, 4,000v, near 75 percent of cell capacity, and near 100 percent of cell capacity.
  - B. General discussion of appropriateness of the performance requirements for Class III L.
- II. The value for  $v_{min}$  for multiple load cell applications.
- III. Tolerances for repeatability for scales and load cells
  - A. Tolerances for class III and III L for scales and load cells
  - B. Allow individual data values for load cells to be outside the tolerance limits; the average value shall be used to evaluate load cell performance
- IV. Strain load test: test procedure and tolerance application.
- V. Creep test
  - A. The timing of the first reading has a significant effect on the results
  - B. Consider changing to the proposed OIML IR 60 test procedure
- VI. NIST load cell test capabilities
  - A. The 112,000 lbf machine is operational
  - B. Considerations for initiating round robin testing
- VII. Range of vehicle scale parameters to be covered on a Certificate of Conformance
  - A. Number of divisions to be covered
  - B. Concentrated load capacity (CLC)
  - C. Width of platform
- VIII. Relationship of concentrated load capacity to section capacity  
Not discussed; carried over to next meeting.
- IX. Methods of sealing and accessibility for sealing  
Not discussed; carried over to next meeting.
- X. Verifying the version of software used in a device  
Not discussed; carried over to next meeting.

- XI. Split pricing on point-of-sale systems  
Not discussed; carried over to next meeting.

## Summary

### I. Test loads for load cells at 500 and 1,000v

- A. Review of policy specifying test loads near 500v, 1,000v, 4,000v, near 75 percent of cell capacity, and near 100 percent of cell capacity.
- B. General discussion of appropriateness of the performance requirements for Class III L.

#### Results of the Meeting:

- 1. Specific test loads should not be mandated to manufacturers by NTEP due to equipment limitations.
- 2. At least five test loads are required when submitting data to NTEP. This is consistent with existing NTEP policy.
- 3. Add the recommendation to NCWM Publication 14 that test loads for class III L load cells be selected near 500v, 1,000v, 4,000v, near 75 percent of cell capacity, and near 100 percent of capacity. These test loads were originally recommended and adopted at the June 24, 1987 meeting of the Technical Committee. The test loads near 75 and 100 percent are required. When load cells are tested by an NTEP laboratory, it is likely that test loads near 500 and 1,000 v will be applied.
- 4. A review of the performance requirements for class III L scales and load cells is to be initiated by the Specifications and Tolerances (S&T) Committee of the NCWM. Input from industry and any other interested parties is requested.

#### Discussion:

The performance of class III L load cells at 500v and 1,000v is critical to the evaluation of a load cell to Handbook 44. Because of the performance requirements are most stringent at these values, it is important to test at these points. Regardless of the dead load of the scale, the performance at 500 and 1,000v will be one of the limiting characteristics of the cell. It was suggested that test loads of approximately 10 percent of cell capacity may be sufficient to evaluate the performance of load cells at the low end and would reduce the costs of modifying existing dead weight machines to collect the desired data.

The cost of modifying hardware and software on the dead weight machines is very high. It was argued that the cost is not justified by the benefits. The problem appears to be that the performance requirements at the low end are much more stringent than what is needed for the application of class III L load cells. The tolerance at 500 and 1,000v for a class III L load cell is the same as for a class III load cell with 10,000 divisions. It was argued that the requirements for class III L scales and load cells are not logically consistent with the original intent to establish class III L as a less stringent accuracy class than class III. A graph is attached that illustrates the acceptance tolerances for a class III load cell with 3,000 divisions compared to the acceptance tolerances for a class III L load cell with 10,000 divisions. The tolerances for class III L scales are essentially the same (0.1 percent acceptance and 0.2 percent maintenance) as they were for large capacity scales without an accuracy class marking, however, the scales must now comply with the influence factors requirements.

Although the manufacturers have the option of offering fewer scale divisions by increasing the value of the scale division, it was claimed that the market demands a 20-lb scale division and a 200,000-lb capacity scale. Consideration was given to separating performance requirements for class III L scales from those for class III L load cells, but the idea was rejected. This idea was motivated by a desire to relax the requirements at 500 and 1,000v for load cells but to retain the tolerance structure for scales.

It was concluded that the cost to manufacturers to modify existing dead weight machines was not justified, but that NTEP could apply test loads of any value whenever they test a load cell. This may result in NTEP discovering a problem that is not known to the manufacturer but that is the risk taken if the manufacturer is

unable to test a load cell at the low end. Ultimately, it was decided that both the S&T Committee and the industry should look at the inconsistency of the logic behind class III L. The objective should be to resolve the problem of the inconsistencies rather than try to find complex type evaluation interpretations to circumvent the basic problems that exist. The effect on field enforcement of possible changes must be considered.

## II. The value for $v_{\min}$ for multiple load cell applications.

### Results of the Meeting:

There is a technical inconsistency in NTEP policy that currently allows the statistical concept of the cancellation of random errors to be used twice in multiple load cell applications when it should be applied only once. Some load cell manufacturers wanted to retain the double application of the concept because it reduces the cost of manufacture and is claimed to have an insignificant effect in practical application. Consensus on this issue could not be reached. In light of the review of the performance requirements for class III L scales and load cells reported in Item I, the decision was to leave the current technical policy as it is and consider this issue in the review of the requirements.

### Discussion:

It was agreed that a technical problem exists. The proper application of the concept for the cancellation of random errors was summarized in the following table illustrating two possible approaches to the issue.

Analysis Table

1. A complete scale gets 100% of the tolerance specified in Handbook 44 (T.N.3.1.).
2. A separate main element gets 70% of the tolerance when the main element undergoes type evaluation as a separate main element (T.N.3.5.).
3. There are three main categories of error:
  - a. the error envelope (T.N.3.1.)
  - b. the temperature effect of zero (TEZ) (T.N.8.1.3.)
  - c. creep (T.N.4.5.)
4. There is the precedent that NTEP has recognized the statistical concept of the cancellation of random errors in multiple load cell applications.

Applying these facts to two alternative approaches, A and B, to recognize the cancellation of random errors leads to the following.

	AB	
Complete scale	100% of the tolerance	100% of the tolerance
Main element	70 % of the scale tolerance	70% of the scale tolerance
Individual load cell	$\sqrt{N} \cdot 70\%$	70% of the scale tolerance
$v_{\min}$ relationship	$v_{\min} \leq c/N$	$v_{\min} \leq c/\sqrt{N}$

Approach A requires that the minimum number of load cells for which the load cells may be used in multiple load cell applications must be specified by the manufacturer at the time the cell is submitted for type evaluation. This minimum number of load cells to be used would have to be used to determine if the load cells are applied properly in scale designs. This is considered to be difficult to control.

Approach B avoids the problem specified in Approach A, but has a very stringent requirement on load cell performance at the low end for class III L load cells with 10,000 divisions. Approach B applies the cancellation of random errors at the scale level.

There was significant support by some load cell manufacturers to retain the larger limits on load cell performance despite the technical inconsistency. Because the class III L requirements and the logic behind class III L is to be reviewed, discussion of this issue was discontinued.

## III. Tolerances for repeatability for scales and load cells



- A. Tolerances for class III and III L for scales and load cells
- B. Allow individual data values for load cells to be outside the tolerance limits; the average value shall be used to evaluate load cell performance

#### Results of the Meeting:

A consensus could not be reached on this issue so the repeatability requirements have not changed. The existing NTEP policy is retained, that is, all data values must be within tolerance. However, during the data analysis, consideration will be given on a case-by-case basis to any random statistical outliers that may exist in the load cell data.

#### Discussion:

A recommendation of possible repeatability tolerances for class III and III L scales was given in the background information mailed before the meeting. The table is repeated below to correct some errors that were in the original table.

The following table gives the applicable acceptance tolerances for both scales and load cells.

Strain Load	Class III		Class III L	
	Scales	Load Cells	Scales	Load Cells
0 - 500 d	0.5 d	0.35 v	0.5 d	0.35 v
501 - 1000 d	1.0 d	0.70 v	1.0 d	0.70 v
1001 - 1500 d	1.0 d	0.70 v	1.5 d	1.05 v
1501 - 2000 d	1.0 d	0.70 v	2.0 d	1.40 v
2001 - 2500 d	1.5 d	1.05 v	2.5 d	1.75 v
above 2500 d	1.5 d	1.05 v	2.5 d	1.75 v

There was an extremely wide range of views on the proposal and little progress came from the discussion. The proposal had suggested that the tolerance requirement be changed in Handbook 44, but little support existed for the change. A vote was taken but a consensus did not exist. The existing policy to require all test values to be within tolerance was retained, however, consideration to outliers should be given during data analysis.

### **Strain load test: test procedure and tolerance application.**

#### Results of the Meeting:

It was concluded that the test procedure and tolerance application that had been used by NTEP for many years was technically flawed. Another procedure was established that was deemed technically valid. A copy of the revised test procedure as it is formatted for the next edition of NCWM Publication 14 is attached. The revised text is shaded.

#### Discussion:

It was concluded that the strain load test procedure and tolerance application that has been applied by NTEP is technically flawed because the performance curve for the decreasing load test as part of the initial strain load test would follow the hysteresis curve for the return to the gross load zero. It was stated that if the reference value for the strain load test was reestablished after the initial strain load test, then the scale should return to this reference value within one-half of a scale division if the strain load test was repeated. When evaluating the return to the strain load reference value, consideration must be given to any creep or temperature change that may have occurred during the test.

Based upon this additional information, a different strain load test was proposed. It was concluded that this proposed strain load test was technically valid and it has been incorporated into NCWM Publication 14.

### **Creep test**

- A. The timing of the first reading has a significant effect on the results
- B. Consider changing to the proposed OIML IR 60 test procedure

**Results of the Meeting:**

The Committee considered whether or not Handbook 44 should be changed to unify the test procedures for creep for both scales and load cells with the proposed test procedure under consideration for IR 60. There was support to apply the table when testing load cells but that the creep test for scales specified in Handbook 44 should not be changed. This raised concerns of the affect on scale performance of having one creep test for load cells and another test for scales. A conclusion could not be reached in the time available and the issue was to be carried over to the next meeting.

**Discussion:**

The time periods specified in the table in IR 60 is intended to apply to any "change in load". During the test for determining the load cell error, the change in load is between any increment of the test load. When the creep test is being conducted, the change in load is the application of all of the weights when going from zero load to full load. Ideally, half of the time period specified in the table should be used for loading (or unloading as the case may be) and the remaining time should be used to stabilize the reading. The initial reading for the creep test or the reading for the load cell error test should be taken at the end of the time period specified in the table.

The results for a creep test may be significantly affected by the timing of the first reading. Some loading systems are unable to apply the full-capacity load to a cell in the time periods specified while other systems can apply the load "instantaneously". There was support to use the table times for load cell testing but not to change Handbook 44 so that the existing creep test would still apply to scales. If the table was applied to load cells, then it would include the words "when practical" to allow some deviation from the stated times for those systems that were unable to apply the test loads in the specified times. Definitive conclusions could not be reached so the issue was carried over to the next meeting.

**VI. NIST load cell test capabilities**

- A. The 112,000 lbf machine is operational
- B. Considerations for initiating round robin testing

**Results of the Meeting:**

An extremely brief update on the status of the test capabilities of NIST to conduct load cell testing for NTEP. The NIST is prepared to begin the testing of load cells in the relatively near future. Subsequent to the meeting, some problems with the test machine were experienced which is delaying the implementation of NTEP testing. Manufacturers are reminded that when NIST has operational test facilities to perform the NTEP testing of load cells, then the NIST testing of load cells with Provisional Certificates of Conformance will be initiated. Only the load cells for which NIST is capable of testing will be required to be submitted. Manufacturers will have 60 days after the announcement of NIST test capability to submit a letter stating that they are prepared to submit the load cells for test. The NIST testing will be scheduled as the calibration workload permits.

The cost of NIST testing for NTEP Certificates is estimated to be \$4000 for the one cell and \$2000 for a second cell in the same family if multiple load cell tolerances are to be applied.

**VII. Range of vehicle scale parameters to be covered on a Certificate of Conformance**

- A. Number of divisions to be covered
- B. Concentrated load capacity (CLC)
- C. Width of platform

**Results of the Meeting:**

A manufacturer of a vehicle scale should strive to have the scale with the largest number of scale divisions tested for type evaluation. Based upon the current parameters for scale capacity, NTEP will issue a Certificate of Conformance to cover the number of scale divisions that would exist for scales included in the range of capacity provided that:

1. the scales have scale division values equal to or greater than the value of the scale division in the scale that was tested; and

the number of divisions for the scale does not exceed the maximum for which the load cells and indicator have been separately evaluated.

Certificates of Conformance are currently being issued for scale widths of 10 to 12 feet based upon the testing of a scale with a width of 10 feet. A scale width greater than 12 feet is considered by NTEP to be significantly different in design from a 10-foot-wide scale that it is considered a modification of design and would require a separate type evaluation. More formalized guidelines were sought but, due to the lack of time, specific criteria were not established at this meeting. The NTEP will continue to use its judgement to make decisions on the width of scales to be included on a Certificate of Conformance.

Agreement was not reached on the range of concentrated load capacities (CLCs) to be included on a Certificate of Conformance. One suggestion was that NTEP would cover CLCs from 50 percent of the CLC of the scale that was tested up to a maximum of five tons higher. The Technical Committee did not reach a final position on this issue.

**Discussion:**

Many members of the Technical Committee had the understanding that if a vehicle scale with a particular number of scale divisions was tested, then the number of divisions in the scale family could vary to accommodate the number of divisions that would fall within the range of capacities that were permitted under existing NTEP guidelines. The concern was expressed that the performance of a scale with 10,000 divisions may be different from the performance of a scale with 6,000 divisions. It was stated that the amount of friction in the system is the limiting consideration and that if a scale was tested with a 20-lb scale division, then the scale division should not be smaller than 20 lb on other vehicle scales in the family because the friction and inertia of the basic design remains relatively constant for a given design.

The proposal to require scales to be tested with the maximum number of divisions for which the scale would be used or to apply the tolerances as if the scale had the maximum number of divisions was considered impractical. It was thought that limiting the value of the scale division in the scales to be covered by the Certificate of Conformance to be greater than or equal to the scale division of the scale that received the type evaluation would be appropriate. The justification for this policy is that most of the vehicle scale divisions are 20 lb, there is no market for vehicle scales with 10-lb divisions, and the friction for a scale design will not change significantly so that a scale division smaller than the value actually tested would not be appropriate.

I. Relationship of concentrated load capacity to section capacity

**Not discussed; carried over to next meeting.**

Methods of sealing and accessibility for sealing

**Not discussed; carried over to next meeting.**

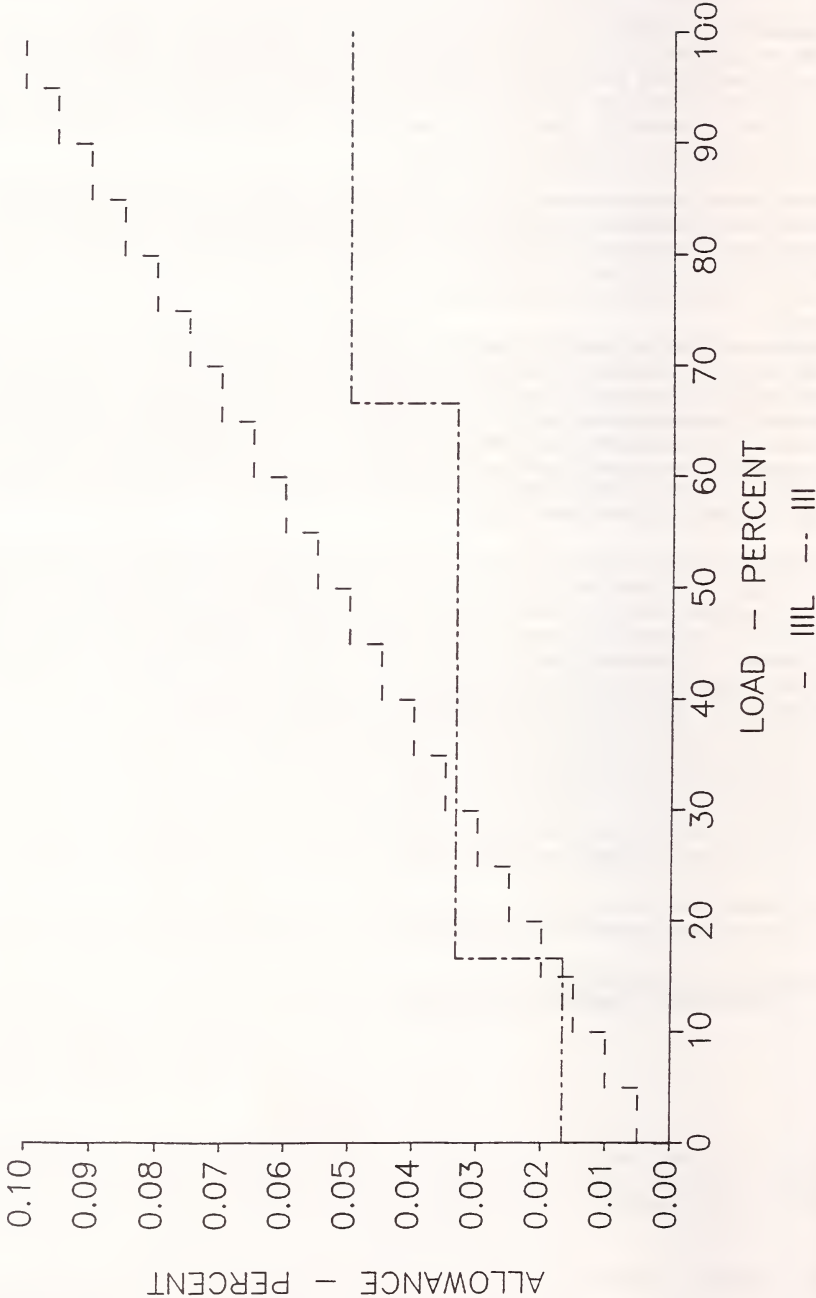
Verifying the version of software used in a device

**Not discussed; carried over to next meeting.**

Split pricing on point-of-sale systems

**Not discussed; carried over to next meeting.**

# COMPARISON OF TOLERANCES





# PERFORMANCE AND PERMANENCE TESTS FOR VEHICLE SCALES AND PERMANENTLY-INSTALLED AXLE-LOAD SCALE WEIGHING ELEMENTS

Performance tests are conducted to determine compliance with the tolerance and, in the case of nonautomatic indicating scales, sensitivity requirements specified in NIST Handbook 44. The tests described here apply only to the weighing element. It is assumed that the indicating element used during the test has already been examined and found to comply with the applicable requirements. If the performance of the indicating element is to be determined during the same examination, the applicable requirements for weighbeams and poises, dials, electronic digital indicators, etc., must be referenced.

## Initial Type Evaluation (Field) Performance Tests

The minimum amount of known test weight needed for the initial type evaluation test is equal to at least 90 percent of the concentrated load capacity of the scale. Substitution testing may be used to reach the necessary test load.

### 1. Indicator Tests

#### Beam Scale

If the indicating element is a weighbeam and poise, sensitivity tests should be conducted as follows:

The sensitivity tests are conducted at zero load and at the maximum test load. The sensitivity test is conducted by determining the actual test weight value needed to bring the beam from a rest point at the center of the trig loop to rest points at the top and bottom of the trig loop. The maximum load applied to a scale to determine sensitivity near scale capacity does not have to be a known weight.

#### Digital Indicator

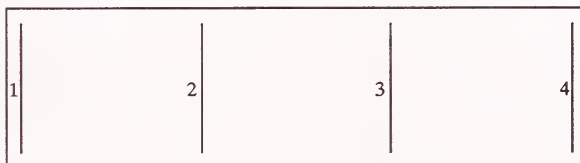
If the indicating element is a digital indicator, width-of-zero tests, zone of uncertainty tests, and appropriate tests for the automatic zero-setting mechanism (if so equipped) should be conducted as indicated in other sections of this document.

### 2. Shift Tests

An example of a four-section scale:

Vehicle Scales - 4 Section

Section



VEHICLE SCALES AND PERMANENTLY-INSTALLED  
AXLE-LOAD SCALE WEIGHING ELEMENTS Page 2 of 3

At least two complete sets of shift tests shall be conducted over each section to at least 90 percent of the concentrated load capacity (CLC) of the scale. This is to determine the repeatability of the scale. The scale error should be determined at a minimum of five equally spaced test loads. Scale errors may be determined at more points if desired. If two weight carts are used, they should travel along the paths the wheels of a vehicle would take when moving across the scale. Decreasing load tests are to be avoided when testing a section. A truck may not be backed onto the scale in order to place weights on the inner sections. Decreasing load tests shall be conducted after the sections have been tested to their maximum load and the weights are being removed from the scale. Do not exceed the CLC capacity. The load is to be distributed across the section.

At least one complete set of shift tests to at least 90 percent of the CLC shall be conducted at midspan between sections.

If a scale consists of modules that are connected together to comprise the weighbridge, shift tests shall be conducted by placing the load so that it straddles the connection between the modules. Later, at least one shift test is to be conducted on the scale with the test load is placed first on one side of the connection line off the module, then on the other side of the connection line.

The results of shift tests are required to agree within the absolute value of the applicable maintenance tolerances and must be within acceptance tolerances

### 3. Strain Load Test

At least one strain load test shall be conducted at each end of the scale. The maximum load applied during the strain load shall be in the range of 80 to 100 percent of scale capacity. The load is to be distributed over the load receiving element.

Load the scale with a vehicle or vehicles so the addition of test weights will provide a gross load of 80 to 100 percent of scale capacity. Determine the "reference point" for the start of the strain load test. Add the test weights to one of the ends of the scale without exceeding the CLC.

Do not conduct a decreasing load test or a return to the strain load reference weight as part of this particular strain load test. After removing the test weights from the end of the scale, reestablish the strain load reference value and reapply the test weights to verify that the strain load values repeat the initial values. Conduct a decreasing load test and return to the strain load reference value as the weights are removed as part of this test cycle. The return to the strain load reference value shall be within one-half of a scale division with consideration given for the creep and for any temperature changes that may have occurred during this last test cycle.

Remove the known test weights and the strain load. Zero the scale, place the strain load on the other end of the scale, and establish the strain load reference value. Do not use the zero-setting mechanism to set the strain load to zero; the tare mechanism may be used to tare out the strain load. The gross load zero value is needed to conduct a decreasing load test as the strain load is removed in the next test.

Repeat the strain load test on the other end of the scale. After reaching the maximum test load for the strain load test, remove the strain load but leave the known test weights on the scale. The weight indication for the decreasing load test must be within tolerance for the known test load. Continue the decreasing load test by removing the known test weights. Take several readings as the weights are being removed. When all the weights are removed, record the return to zero. The scale must return to zero within one-half of a scale division. When analyzing the return to zero consideration must be given for the length of time the load was on the scale and for possible temperature change that may have occurred during the test.

VEHICLE SCALES AND PERMANENTLY-INSTALLED  
AXLE-LOAD SCALES WEIGHING ELEMENTS Page 3 of 3

Acceptance tolerances are applied only to the known test load in the strain load test.

SUBSEQUENT TYPE EVALUATION (FIELD) PERMANENCE TESTS

A minimum of 40,000 lb of known test weights are needed, or 50 percent of the CLC, whichever is greater.

At least one complete set of section tests shall be conducted over each section and at midspan between each section using the known test weights.

At least one strain load test shall be conducted at each end of the scale. The maximum applied load shall be in the range of 65 to 100 percent of scale capacity.

The time between the initial field performance test and the subsequent field test will be 20-30 days. Performance during both tests must be within acceptance tolerances.

If a device fails subsequent permanence tests, the entire permanence test must be repeated.

Caution Regarding Load Concentration

Concentrating large loads on scale platforms by using weight carts or test equipment using hydraulic jacks may exceed the maximum pound per square inch load specification for the deck. This condition may arise because the small tire area of the weight cart in contact with the deck surface could result in a very large load concentration over an unusually small area. This could cause damage to the scale deck.

This situation may occur with a weight cart having a very narrow or short wheel base and small solid rubber tires. This is particularly likely to cause a problem on steel plate decks and could also result in damage to manhole covers. If the load capacities of weight carts are increased beyond 25,000 lb, while maintaining solid tread wheels, it is possible that some concrete decks could be damaged.

## Executive Committee

## Meeting Participants

<u>Name</u>	<u>Organization</u>
Michael Adams	Fairbanks Scales
Ross Andersen	New York Bureau of Weights and Measures
Girish R. Bera	Artech
Manny Bera	Artech
Bob Brumbaugh	Systems Associates, Inc.
Tina G. Butcher	NIST
James M. Conn	Rice Lake Weighing Systems
Steve Cook	California Division of Measurement Standards
Sy Feinland	Pitney Bowes, Inc.
Joe Giannina	GEAPS
Bill Goodpaster	Cardinal/Detecto
Rolf P. Haggstrom	FLINTAB, Inc.
Khalil Haker	BLH Electronics
John Hodges	HBM
Dick Hurley	Fairbanks Scales
Terry James	Cardinal/Detecto
Ted Johnson	Sensortronics
Philip Katz	HBM
John Lacy	Packers & Stockyards Administration
Dennis J. Mahoney, Sr.	USDA/FGIS
Bob McCarty	NCR Corporation
Nigel Mills	Toledo Scale
Karl Newell	NIST
Gary Patterson	Superior Load Cell Co., Inc.
Peter Perino	Transducers, Inc.
Millard Polivka	Toledo Scale
Dave Quinn	Fairbanks Scales
Amir Rahav	Tedea, Inc.
John W. Reimer	Weigh-Tronix
Bob Reinfried	SMA
Thomas Rhodes	Maryland Weights and Measures
Maarten Spoor	Precision Force, Inc.
Daryl Tonini	SMA
Jim Truex	Ohio Division of Weights and Measures
Gary Uthenwoldt	A. H. Emery Co.
O. K. Warnlof	NIST
Stanley Wulf	HBM
Ken Yee	NIST
Walter Young	A. H. Emery Co.



## Meeting Summary

Technical Committee on National Type Evaluation  
Weighing Sector  
January 8, 1989

One-day meeting was held to discuss the agenda below.

Relationship of concentrated load capacity to section capacity

Methods of sealing and accessibility for sealing

Verifying the version of software used in a device

Split pricing on point-of-sale systems

Range of vehicle scale parameters to be covered on a Certificate of Conformance

A. Concentrated load capacity (CLC)

Creep test

A. The timing of the first reading has a significant effect on the results

B. Consider changing to the proposed OIML IR 60 test procedure

Substitution of metrologically equivalent load cells in scales

## Results and Discussion

### Relationship of concentrated load capacity to section capacity

#### Results of the Meeting

Relationship between the concentrated load capacity (CLC) and the section capacity of a scale is not specified. Scales that have received type evaluation before the CLC marking requirement became effective may be rated with CLC specified by the manufacturer. It is up to State enforcement to verify the validity of CLC ratings.

#### Discussion

Beginning January 1, 1989, vehicle scales must be marked with a concentrated load capacity. Although the concentrated load capacity was generally discussed to be 80 percent of the section capacity, there is no requirement in Handbook 44 that specifies the relationship. New scale types submitted for evaluation will be tested for accuracy with the CLC rating. There is concern that the CLC rating for scale models with Certificates of Conformance may have their CLCs set equal to the section capacity without verifying the weighing accuracy to the CLC. This could result in unfair competition.

It was suggested that the CLC rating could be determined by looking back on the amount of weight that was used in the type evaluation of the scale. The rating could be limited to 1.25 times the maximum load that was applied.

It was concluded that scales currently in production must carry a CLC. A manufacturer may request an addendum to a Certificate of Conformance (CC) but it is not necessary to issue a new CC. It was concluded that State enforcement would be adequate to control the validity of CLCs for these scales. If there is any question about the validity of the CLC rating on a scale, then the States should test up to the CLC to determine if the scale meets the accuracy requirements.

## II. Methods of sealing and accessibility for sealing

### Results of the Meeting

There should be reasonable limits on method of sealing a device to assure that the device can be sealed with unusual difficulty. The NTEP laboratories are to develop guidelines for the location of the sealing mechanism. However, consideration should be given as to whether or not the security seal is losing its significance since the software for a device can be changed very easily and is being changed frequently during the life of a product. All the Sectors of the Technical Committee should review this issue.

### Discussion

Manufacturers have used a wide range of methods to provide for security seals. Some scales can be sealed very easily from the outside of the scale; others require some disassembly to apply security seals to some part inside the indicating element of the scale. Weights and measures officials are beginning to raise questions regarding whether a device constitutes an appropriate design for provision for sealing. Weights and measures officials do not want to disassemble a device, turn it upside down, or move the device for the purpose of sealing it because of the potential for damage.

The value of sealing a device was questioned. Manufacturers are generally using microprocessors that facilitate changing of software during the production of a device type. Several people thought it is not possible to assure the integrity of a device type simply by sealing the device. It is fairly common for manufacturers to change software, but it is not practical to have every minor change to the software reviewed through a type evaluation. Sealing provides a "trail" or "evidence" of when and, perhaps, the frequency with which a device is adjusted. Sealing is particularly important during a type evaluation when it is not to be adjusted during the permanence test. It is essential to the evaluation of device performance and to assess possible fraudulent practices when it is not possible to do surprise inspections on some devices.

It was concluded that guidelines are needed in the type evaluation checklist to advise manufacturers of the acceptable practical locations and methods of sealing devices. Some initial guidelines on sealing are provided below for discussion and development. The NTEP laboratories have not had an opportunity to discuss these sealing guidelines so they may change and additions may be made. The guidelines will be presented to the Technical Committee for review, however, NTEP may begin using these guidelines prior to the next meeting of the Technical Committee.

### Guidelines for Sealing

1. The provision for sealing must be located such that a security seal can be applied without disassembly of the device or exposing electronics. Any disassembly must be simple and not require excessive effort, for example, removing a protective cover plate to seal a junction box is acceptable. In general, it is desirable to be able to seal a device without the need for disassembly.
2. The bottom of a device is not an acceptable location for a security seal. Weights and measures officials do not want to turn a device upside down or on its side to seal the device because this increases the potential for damage.
3. When two bolts are used for a lead and wire seal, the bolts must be such that the lead and wire seal will be broken when an attempt is made to unscrew the bolts. The use of a "free-standing bolt" to serve as the second screw for threading a lead and wire seal is not acceptable. A "free-standing bolt" is one that simply passes through a panel and is held in place by a nut on the opposite side of the panel but is not holding any parts together, because the free-standing screw may be loosened to the extent that the bolt will rotate in its position, thereby permitting the other bolt to be turned and the wire of the seal maneuvered around the top of the bolt while turning the free-standing bolt to keep the wire from twisting. In this case, the security seal can be removed to gain access to the adjustments without breaking the seal.

In lieu of the second fixed bolt, a metal tab fixed to the case or a plastic tab molded into the case may be used. The fixed nature of the tab usually causes the wire to twist and break before the bolt can be removed.

4. If the lead and wire seal is located under the platform of a scale, then there must be ample clearance to eliminate the possibility of interference between the seal and the platform. Access to the provision for sealing must not require a tool for disassembly of any parts.
5. An indicating element that utilizes a NEMA 4 enclosure shall be sealed in a manner that prevents the seal from being circumvented. This may be achieved by threading a lead and wire seal through the head of the bolt through one of the hinges and the lip of the cover of the indicator. It is not sufficient for a lead and wire seal to be threaded through the head of the bolt and the opening in the hinge because it can be circumvented by loosening the screw slightly and pressing down on the cover to compress the sealing material and slipping the hinge off the cover.

### III. Verifying the version of software used in a device

#### Results of the Meeting

It is not necessary for a manufacturer to provide a means of displaying the software version that is being used in a device. There was virtually no support for putting the version of software that was evaluated on the CC.

#### Discussion

The view was expressed that the ease with which manufacturers can change software, implement these changes into production, and the frequency with which manufacturers change the software indicates that devices that have undergone type evaluation may often have their software changed at some time during production. Additionally, there may be numerous "small" changes to the software during the life of a product. As a practical matter, NTEP cannot verify every change to device software.

The increasing use of computers in weights and measures applications introduces a new level of flexibility to software. This concept is not new to weighing and measuring devices, but the situation is more prevalent than in the past. It is not possible to control software or to control a device by attempting to control the software. It appears that only thorough and effective enforcement will ultimately ensure that devices and device features used in commercial measurement are appropriate and comply with Handbook 44.

### IV. Split pricing on point-of-sale systems

#### Results of the Meeting

The Technical Committee did not support the concept of requiring stand-alone point-of-sale systems to keep a count of split-priced items that may be separated during the checkout process. This would be adding a requirement that does not now exist for stand-alone systems. There is adequate means at the field enforcement level to deal with this problem.

#### Discussion

Requiring this capability on stand-alone systems would increase the cost of the systems without substantial benefits. Scanning systems are required to have this capability but it has always been provided in the past because the scanning systems have the additional memory to incorporate this feature.

### V. Range of vehicle scale parameters to be covered on a Certificate of Conformance

#### Results of the Meeting

Add a criterion to NCWM Publication 14 specifying that Certificates of Conformance will cover a range of CLCs from 50 percent of the CLC of the tested scale to a maximum of 5 tons higher. Scales with a larger capacity than the scale that was tested may have a higher CLC rating, however, the scale that was tested is limited to the CLC rating that applied at the time of the test. The Committee affirmed the position it had taken at the last meeting of allowing the

## Executive Committee

number of scale divisions for a large capacity scale to increase to the number needed to cover the range of capacities that may be included on a CC provided the load cells and the indicator have been tested to at least that many divisions.

### Discussion

There was virtually no discussion of this item. The Committee supported the recommendation that was presented.

## **VI. Creep test**

- A. The timing of the first reading has a significant effect on the results
- B. Consider changing to the proposed OIML IR 60 test procedure

### Results of the Meeting

The Committee decided not to take or recommend any action on this item.

### Discussion

The Committee considered whether or not Handbook 44 should be changed to unify the test procedures for creep for both scales and load cells with the proposed test procedure under consideration for IR 60. It was reported that the test procedures for IR 60 are still developing. While IR 60 specifies a 30-minute test, IR 3 still requires a four-hour test.

It was stated that the 30-minute creep test was more meaningful than a 1-hour test, however, Handbook 44 does not require the 30-minute creep or return to zero test. The view was expressed that the load cell tests do not reflect the results that would exist when testing a complete scale. It was also suggested that the requirements for class III L load cells were beyond what was needed for the scale application, however, no change was proposed.

Without a definite uniform test in the OIML IRs, there was no motivation to change the NTEP procedures.

## **VII. Substitution of metrologically equivalent load cells in scales**

### Results of the Meeting

It was decided to clarify the conditions under which load cells may be substituted in a scale design. The changes to the current NTEP policy are shown below with the new text underlined and striking out the deleted text.

Load cells from the same or a different manufacturer may be substituted into a scale provided that the load cells to be substituted:

1. have been evaluated separately and have a Certificate of Conformance;
2. have as many or more verification scale divisions for the same (single or multiple load cell) application as the load cells originally used in the scale;
3. have a minimum verification scale division that is suitable for the application;
4. are of the same basic type as the cells being replaced; and
5. the load cells can be placed in the scale without ~~any~~ modification to the basic design of the load cell mounting assembly.

These criteria will be included in the next edition of NCWM Publication 14.



## Discussion

current NTEP policy permits a scale manufacturer or scale repair agency to substitute load cells in scales with metrologically equivalent or better" load cells. This policy was questioned as not being sufficiently restrictive. The concern was that just because load cells have the same outside physical dimensions and are of the same basic type (basic design principle of the cells is the same e.g., shear beam) that the internal design of the load cells coupled with the scale design may affect the performance of a scale. For example, the internal webbing of a cell and the cement of the strain gauges may result in a particular sensitivity or lack of sensitivity to side loading that may be considered when the load cell mounting is designed. Substituting another load cell that has the same physical dimensions may not have the same characteristics to side loading so the use of that load cell in the mounting assembly for a particular scale may not be appropriate.

Though members agreed that all load cells will have different characteristics to some extent, it was thought that NTEP testing would uncover significant side-loading sensitivity. It was thought that the original four NTEP criteria for its policy captured the spirit of the concept. There was a concern that if the substitution of load cells was not permitted, then a scale manufacturer would be locked into a single load cell and load cell supplier.

The Committee agreed that load cells of different basic types (e.g., shear beam, bending beam, or compression beam) should not be mixed in a scale; substitution should only be permitted for the same basic type of load cell with similar physical dimensions. There was concern that minor differences in load cell design within the same basic type of cell would preclude the substitution of load cells. The Committee agreed that it would be appropriate to substitute load cells if the only difference resulted in minor changes to the load cell mounting assembly. The examples given were a change to the mounting assembly to accommodate a slightly different hole alignment from one cell to another or to add a filler block to accommodate possible nonmetrological differences. If a significant change was made to the load cell mounting assembly, then this would constitute a modification to the design of the scale and another type of evaluation would be required.

## Next Meeting

The next meeting is scheduled for June 13 - 14, 1989. The dates were selected to be consecutive with the next meeting of the Belt Conveyor Scale Sector. It is tentatively planned that one day, June 13, will be dedicated to discussing load cell issues with scale issues being discussed on June 14. The site of the next meeting will be held at the Crystal City Marriott in Arlington, VA. The meeting is being held in the Washington, D.C. area because of the lack of travel funds available to some of the representatives from federal government agencies.

## Participants

### Name

### Organization

Michael Adams	Fairbanks
Robert Bradley	The A. H. Emery Company
John A. Butcher	NIST
Warren Clegg	Transducers, Inc.
John Elengo	Revere Corporation of America
David Gerk	NM Weights and Measures
Giannina	Port of Corpus Christi
Frederick Guensler	California Div. of Measurement Standards
John Geiler	Hyannis, MA Weights and Measures
Ray Helmick	AZ Weights and Measures
Mark Hurley	Fairbanks
Henry James	Cardinal/Detecto
David Johnson	Sensortronics

## Executive Committee

John Lacy  
Ying-Hsiung Lin  
John MacDonald  
Steve Malone  
Bob McCarty  
Karl Newell  
Peter Perino  
Bob Reinfried  
Thomas Rhodes  
Tom Stabler  
Daryl Tonini  
Jim Truex  
Gary Uthenwoldt  
O. K. Warnlof  
David Watson  
Ken Yee

USDA Packers and Stockyards Administration  
BLH Electronics  
Howe Richardson  
NE Weights and Measures  
NCR Corporation  
NIST  
Transducers, Inc.  
SMA  
Maryland Weights and Measures  
Toledo Scale Corporation  
SMA  
Ohio Weights and Measures  
The A. H. Emery Company  
NIST/OIML  
City of Ft. Worth Weights and Measures  
NIST

## MEETING SUMMARY

Technical Committee on National Type Evaluation  
Weighing Sector  
June 13-14, 1989

### Introduction

Three items were added to the tentative agenda. The three issues addressed data from another national laboratory, parameters for covering modular scale designs, and a discussion of draft changes to the NTEP appeal process to provide information to the NTEP Board of Governors. The agenda is listed below.

#### Load Cell Testing Program Operation With NIST Testing

- A. Update on the status of NIST test capability
- B. NTEP operation after NIST has test capability

#### Data from another national laboratory

#### Visibility of load cell markings after installation in scales

#### Permanence of identification badges (plates) on scales and load cells

#### Order of conducting the temperature tests and creep tests on scales

#### Multiple weighing elements interfaced with a single indicating element

- A. Number of scale divisions allowed for the summed weight indication
- B. Proper operation of the displays for individual weighing elements and the summed display
- C. Clarify the S.4.3. requirement for indicating which weighing elements are included in the summed display

#### Function keys on scales

- A. Appropriateness of "function" keys that do not have specified functions
- B. Proper marking to identify the operation of the keys

#### Guidelines for sealing devices

#### Protection of scale levers from the environment and human interference

#### Out-of-level tests for wheel-load weighers and portable axle-load scales

#### Manual gross weight input

- A. Postal and shipping scales
- B. Computers interfaced with scales

#### Type evaluation checklist for computers interfaced with scales

#### Certificate parameters for covering modular scale designs

#### Board of Governor's issue: Appeal process

## I. Load Cell Testing Program Operation With NIST Testing

### A. Update on the status of NIST test capability

Ken Yee reported on the status of the NIST capability to test to NTEP requirements and the results of the tests to evaluate the automated test system. A summary of the test results is attached.

Ken Yee described the criterion used by NIST to determine when the load cell reached thermal equilibrium. He reported that three temperature sensors are attached to the load cell at points judged to give the greatest temperature difference to reach thermal equilibrium. When the three temperature sensors register the same temperature within 0.3 °C, the cell is considered to be in thermal equilibrium. Allowing additional time for the load cell to "soak" at the same temperature has not resulted in significantly better agreement of the temperatures at three points on load cell.

The 112,000 lbf machine has been modified and automated. The machine can be used to test load cells with capacities from 30,000 lb to 110,000 lb. The system has been running well. It is expected that an announcement is imminent on the NIST capability to conduct NTEP tests for load cells used in compression over the range of 30,000 lb to 110,000 lb. Decisions must be made within NIST before the program is announced. A memorandum announcing NIST test capability will be sent to all companies holding Certificates of Conformance for load cells when NIST is ready to begin testing.

Fourteen tests were conducted on one load cell. The results revealed that the performance of the load cell is dependent on the orientation of the load cell when it was mounted in the force machine. Several tests were run to evaluate the performance of the cell and the test system when the load cell was removed and installed again in the force machine. Although the load cell repeated very well in any one orientation, the variation in test results from independent tests was significant relative to the cell tolerance. It was suggested that the best repeatability that can be expected for a load cell in the same set-up is 0.1 % for  $n = 3,000$ . The combined random and systematic errors for this cell were approximately one-third of the load cell tolerance. Additionally, slight changes in cell performance were noted when the load cell was left at rest at 40 °C for approximately 8 hours after the cell had reached the equilibrium. This appeared to be a reversible characteristic.

No manufacturer offered data to indicate that their test systems generated a smaller uncertainty than was obtained by NIST. Until information to the contrary is provided, the estimate of uncertainty in load cell testing, based on the NIST data, is assumed to be approximately one-third of the load cell tolerance for class III L when  $n = 10$ . Since other test systems are expected to have uncertainties similar or larger than the NIST value, this large uncertainty indicates that there is a high probability that test results may not agree among laboratories within the limits of tolerance. Cells that the manufacturer believes meet the NTEP requirements may not pass the same tests in another test machine. Additional variation in test results are expected when different fixtures are used to mount the load cell.

Henry Oppermann reported that NTEP will routinely require data from two load cells when a manufacturer is requesting 5,000 scale divisions for a class III cell used in single load cell applications.

### B. NTEP operation after NIST has test capability

When NIST begins NTEP testing, the interim NTEP program will end for load cells within the range of NIST's test capability. Load cell manufacturers will have to provide any test fixtures that NIST does not have. It is anticipated that only two to three load cell families per month can be tested by NIST in addition to their regular calibration work.

The load cells that were originally tested by the manufacturer (assuming that they are still available) are to be submitted to NTEP when the load cells are being tested for an upgrade from a provisional to a full Certificate of Conformance. When load cells with provisional Certificates are being submitted for NTEP testing, the manufacturer does not have to resubmit the original data for the load cell(s) because NIST will still have the data on file. If the original load cells are not available, then the manufacturer will have to select load cells from production to be tested by NTEP. The manufacturer must submit test data with these load cells to provide documentation of test capability and to provide a basis for comparing test results from NIST to the manufacturer's data. In the future, manufacturers should retain the load cells tested for a provisional Certificate of Conformance for later testing by NTEP.



There was discussion over whether or not test data must be submitted with load cells submitted for NTEP testing after the interim program ends. It was stated that test data should not be required because test data is not required when other devices are submitted for type evaluation. The requirement that manufacturers must demonstrate that they have the capability to test load cells to determine whether or not production cells comply with Handbook 44 requirements was referenced. It was concluded that the manufacturer must submit test data to demonstrate their capability to test load cells. The manufacturer must test the load cells submitted to NTEP so that NTEP laboratories are not used as quality control laboratories. The use of the data was the next issue.

If a manufacturer is not requesting an assessment of the manufacturer's test capability to permit the use of the manufacturer's facility to obtain full Certificates of Conformance, then the data will simply be referenced by NTEP to document that the manufacturer has access to test facilities to monitor production. The data will be supplementary information and may be used as a basis to determine if general agreement exists among the manufacturer's facility and NIST. General agreement may simply be that the load cells meet NTEP requirements for the requested maximum number of verification scale divisions.

If a manufacturer wants to have his facilities accepted as a test facility as a basis for receiving full Certificates of Conformance, then the data must be analyzed by NTEP and compared to NIST data to determine if the results agree with NIST data. The extent of agreement that will be used as a basis for acceptance of a manufacturer's facilities has not been established due to an absence of comparison testing. The cost for this analysis has not been established.

#### **Round-Robin Testing**

The establishment of a round-robin experiment with the load cell manufacturers and other test laboratories will require considerable effort, planning, and time. It is not expected to be established in the near future. Consequently, the following approach will be followed until a round-robin program can be established.

After NTEP announces the capability to test load cells, manufacturers will have 60 days to notify NTEP that they are ready to submit their load cells. NTEP will give priority to testing load cells in the order that the Provisional Certificates of Conformance were issued. The second priority will be to test load cells in the order that the manufacturers notify NTEP that they are prepared to submit their load cells. Consequently, if a manufacturer received an early provisional certificate but fails to notify NTEP that they are ready to submit the cells, they will be scheduled for test after those companies that have submitted their notice for test. The load cells are not to be submitted with the request for testing; manufacturers will be notified by the Force Group when the load cells are to be submitted. Requests received within the first two weeks after the announcement of the availability of testing will be considered to have been received at the same time; consequently, the order of priority to test these cells will be based upon the order in which the provisional certificates have been issued.

The load cells to be submitted for test are those that were tested as the basis for issuing the Provisional Certificate of Conformance. Load cell manufacturers will have to provide any test fixtures that NIST does not have. When load cells with provisional Certificates are being submitted for NTEP testing, the manufacturer does not have to resubmit the original data for the load cells because NIST will still have the data on file. If the original load cells are not available, then the manufacturer will have to select load cells from production to be tested by NTEP. The manufacturer must submit test data with these load cells to provide documentation of test capability and to provide a basis for comparing test results from NIST to the manufacturer's data. In the future, manufacturers should retain the load cells tested for a provisional Certificate of Conformance for later testing by NTEP.

The number of load cell families that can be tested in one month will be limited because of the normal calibration workload for load cells. It is anticipated that many months will be required to test all of the load cell families with provisional certificates. It is anticipated that only two to three load cell families can be tested per month by NIST in addition to their regular calibration work.

Manufacturers that have obtained full Certificates of Conformance based upon an evaluation of their test facilities and the witnessing of repeat testing may still qualify to continue to receive full certificates

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provided agreement with NIST testing can be demonstrated. This can be achieved in the following manner.

- a. The manufacturer conducts the complete NTEP sets of tests and submits the test data and the load cell(s) to NTEP. The NIST Force Group will review the test data for NTEP and will determine which tests should be repeated to verify the test results obtained by the manufacturer. The repeat testing will be determined consistent with past practices. This process must be repeated for each test machine used to collect NTEP data.
- b. If the NIST test results agree with the manufacturer's results, this will establish the manufacturer's test machine as an acceptable test machine. The manufacturer may then use the test machine to continue to collect data for a full Certificate of Conformance provided that all or part of the original testing of the load cell (as specified by NTEP) is witnessed by an NTEP representative or repeat testing is witnessed by an NTEP representative. The data analysis performed by the manufacturer will be accepted based upon previous evaluations; however, NTEP retains the right to check the data or the load cells when justification is provided.
- c. Acceptable agreement with NIST will permit the manufacturer to continue using the test machine to collect NTEP data for full certificates for a period up to two years. Agreement with NIST test results must be demonstrated every two years for each machine to maintain the process. It was suggested that a three- to five-year period would be appropriate. The time period will be reassessed after more comparison testing has been completed.

## II. Data from another national laboratory

Load cell data collected by the national laboratory in The Netherlands were submitted to NTEP for evaluation. The load cell manufacturer requested that the data be accepted as a basis for issuing a full Certificate of Conformance.

The Technical Committee and the Board of Governors have previously concluded that NTEP would not accept certificate from another country as the basis for issuing an NTEP certificate. The basis of the decision was that there was no formal agreement among countries to accept each other's certificates.

Otto Warnlof reported that the international round-robin test on load cells indicated that agreement among the laboratories was achievable up to 3,000 scale divisions. He stated that the issue of reciprocity was a political one.

John Elengo reported that Holland and Germany share load cell data and France and Germany have reciprocity. This indicates that precedent exists for accepting data from another national laboratory; however, it has always been based upon reciprocity. Each country retains the right to make the final decision of whether or not to accept the data.

It was suggested that accepting data from other national standards laboratories as a basis for upgrading provisional Certificates of Conformance to full Certificates would reduce the time needed for NTEP to upgrade provisional load cell certificates.

It was agreed that foreign manufacturers must meet the same requirements and follow the same procedures as U.S. manufacturers. The discussions on accepting data from a national laboratory focussed on whether or not the load cell manufacturer had access to test equipment to monitor production and the need for reciprocity between countries before accepting data from another national laboratory as a basis for issuing a full Certificate of Conformance.

It was concluded that:

1. NTEP would issue only provisional certificates based on test data taken by another national standards laboratory provided:
  - a. the data satisfies NTEP requirements; and

- b. the manufacturer submits sufficient evidence that it has reasonable access to test equipment needed to perform quality control. NTEP does not consider testing by a national standards laboratory as meeting the requirement of reasonable accessibility since a national laboratory is not to be used as a quality control laboratory.

establishing reciprocity with another country will require:

establishing the formal NTEP policy regarding the acceptance of data obtained from another national laboratory; and

developing the criteria to determine from which countries NTEP will accept test data because the quality of load cell testing varies from country to country.

The Technical Committee had agreed at an earlier meeting that reciprocity must exist between countries before NTEP would accept a certificate from another country as the basis for issuing an NTEP Certificate of Conformance for a load cell family.

## II. Visibility of load cell markings after installation in scales

Weights and measures officials have reported problems with the visibility of the identification information on load cells after the load cells have been installed in scales. The load cell identification badges may have been installed by the load cell manufacturer in a location that is not normally visible after installation or the scale manufacturer does not take care to position the load cell such that the identification information is visible after installation. Access to the marking information is needed so the enforcement official can verify that the load cells are appropriate for the application and that the scale parameters are consistent with the information marked on the load cell, indicating element, and the weighing element.

It was suggested that the documents provided with load cells to comply with the Scales Code paragraph S.6.10. should satisfy the needs of the enforcement official. Weights and measures officials stated that the documents are rarely available when the enforcement inspections are conducted so the documents are not a realistic solution. It was suggested that the User Requirements in Handbook 44 should be enforced so the documents would be available at the time of inspection.

There was no apparent resolution to the problem, consequently, the Technical Committee discontinued discussion of this item.

## V. Permanence of identification badges (plates) on scales and load cells

### Permanence

The criteria for "permanence" of identification badges on scales and load cells was submitted to the Technical Committee for clarification. Several manufacturers have disagreed with the interpretation of this requirement by the type evaluation laboratories. The interpretation has been that the identification badge must be destroyed (be removed in pieces) when it is removed.

The reasons given for the requirement that identification badges be destroyed upon removal were:

the badges provide a unique identification of the devices for weights and measures records, to identify a device for court cases, maintain a history on each device, and for manufacturer warranty;

to prevent the transfer of a badge to another device;

to identify stolen equipment; and



## Executive Committee

4. to establish the date of manufacture of a device to determine if nonretroactive requirements apply. This last objective usually involves contacting the manufacturer for assistance in determining the date of manufacture.

It was suggested that the fraud aspects of manipulating identification badges were not valid. Many other possibilities exist for fraud and are easier to perpetrate if someone chooses to do so. Tampering was not considered significant relative to the marking requirement.

The consensus of the Committee was that "permanent" should mean that the identification information must be sufficiently durable to withstand normal wear and tear throughout the life of the device. An identification badge must be difficult to remove. Blind rivets to attach a badge to a device are acceptable, but removable screws are not.

### Location

Objections were raised to the checklist requirement that the identification badge be an integral part of the device. Additionally, an objection was raised to require a security seal to attach the cover of a device to the chassis when the identification information is on the cover.

To provide some standardization in the location of the identification information, the following locations were suggested.

1. The identification information shall be located near the point where the signal leaves the weighing element of vehicle, axle-load, livestock, and railway track scales. This would be on the transverse lever on a mechanical scale.
2. The information should be on or near the junction box nearest the point where the signal leaves the scale on an above-ground scale.

The Committee concluded that the second sentence in the second paragraph on page 69 of NCWM Publication shall be deleted.

## V. Order of conducting the temperature tests and creep tests on scales

The need for specifying the order of conducting the temperature and creep tests was discussed. The only reason given for possible concern about the temperature tests is that if the humidity in the chamber is not controlled, high humidity could affect a scale that is sensitive to humidity. If humidity is controlled, then the results of the tests should be the same regardless of the order in which the tests are conducted.

Concern was expressed regarding the sequence of the creep test and the accuracy test at each temperature. If the creep test is conducted before the accuracy, the creep recovery characteristics of the load cell could affect the results of the accuracy test.

The Committee concluded that:

1. it was not necessary to specify the temperature sequence for the temperature tests as long as the relative humidity is controlled so moisture does not condense on the device;
2. the accuracy tests shall be conducted before the creep test;
3. a recovery time period equal to the accuracy test time shall be permitted before conducting the creep test;
4. a scale should be exercised before conducting the creep if an extended period of time has passed since the scale was last tested; and



the temperature testing can continue from the point of the last temperature test in the event that the temperature chamber should fail. It is not necessary to repeat the temperature tests that have been completed.

### **Multiple weighing elements interfaced with a single indicating element**

- A. Number of scale divisions allowed for the summed weight indication
- B. Proper operation of the displays for individual weighing elements and the summed display
- C. Clarify the S.4.3. requirement for indicating which weighing elements are included in the summed display

number of vehicle scales consisting of three or more individual weighing elements used simultaneously to obtain gross weight for commercial transactions are increasing. The individual weighing elements are used to obtain axle weights to determine compliance with highway laws and, because the entire vehicle is weighed as a single draft, summed weight can be used for commercial transactions.

This approach to weighing has raised a question of how the number of scale divisions permitted in class III or III L scales should be applied. The Technical Committee was strongly divided on this issue. A number of weights and measures officials and industry representatives supported treating each weighing element as a separate scale and the summing of the indications from each weighing element is the same as summing the indications from separate scales.

Others believed that the use of multiple platforms in an application determines how it is classified. The argument was that the multiple platforms are being used in the same application as a class III L scale. If the platforms were separate, the 10,000 division limit for class III L scales would apply. Consequently, a system consisting of multiple weighing elements must be considered as a single system and is limited to 10,000 divisions.

It was decided that this issue was not a type evaluation issue. The issue was referred to the Specifications and Standards Committee.

### **I. Function keys on scales**

- A. Appropriateness of "function" keys that do not have specified functions
- B. Proper marking to identify the operation of the keys

An increasing number of scales with function keys have been submitted for type evaluation. The function of these keys is often custom programmed for an individual user. Obviously, NTEP is unable to determine if the functions of these keys comply with Handbook 44.

The Technical Committee concluded the following.

Programmable keys may be included in a Certificate of Conformance if the keys are not metrologically significant.

If programmable keys perform metrologically significant functions, then the functions of the keys must be evaluated under NTEP.

Function keys that are used in a transaction must be marked specifically to reflect the operation of the key.

The manufacturer must notify NTEP if, after the NTEP evaluation, metrologically significant features are added to a device through these keys.

### **II. Guidelines for sealing devices**

The recommended guidelines for sealing devices were reviewed. The Committee agreed to add the guideline that a scale shall be sealed in a manner that prevents disassembly of the device by removing a cover or cabinet to gain access to the adjustments. It was also agreed that hanging scales may be sealed on the bottom since the bottom of these scales is normally readily accessible.

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The appropriateness of permitting the provision for sealing on the bottom of the device was discussed extensively. Some scales have a very low profile so the only available surfaces for sealing are the top and the bottom. In some applications, it was argued that the bottom of the scale is the only reasonable location for the provision for sealing. The bottom access to switches is very convenient for many manufacturers. On the other hand, weights and measures officials are concerned about liability if they must lift a device or turn a device upside down to apply a security seal.

The consensus of the Committee was that the bottom of a scale may be used for sealing; however, the scale must be designed such that seals can be removed and added without damaging the scale. Scales designed to have the security seal on the bottom of the scale, shall be designed such that the scale will not be damaged when turned on its side or upside down.

The following sealing guidelines were accepted by the Committee.

### Guidelines for Sealing

1. The provision for sealing must be located such that a security seal can be applied without disassembly of the device or exposing electronics. Any disassembly must be simple and not require excessive effort, for example, removing a protective cover plate to seal a junction box is acceptable. In general, it is desirable to be able to seal a device without the need for disassembly.
2. A scale shall be sealed in a manner that prevents disassembly of the device by removing a cover or cable to gain access to the adjustments.
3. The bottom of a device is an acceptable location for a security seal; however, the scale shall be designed so that it is not damaged when turned on its side or upside down to remove and apply security seals.
4. When two bolts are used for a lead and wire seal, the bolts must be such that the lead and wire seal cannot be broken when an attempt is made to unscrew the bolts. The use of a "free-standing bolt" to serve as a second screw for threading a lead and wire seal is not acceptable. A "free-standing bolt" is one that simply passes through a panel and is held in place by a nut on the opposite side of the panel but is not holding any parts together. Because the free-standing screw may be loosened to the extent that the bolt will roll out of its position, thereby permitting the other bolt to be turned and the wire of the seal maneuvered over the top of the bolt while turning the free-standing bolt to keep the wire from twisting. In this case, the security seal can be removed to gain access to the adjustments without breaking the seal.

In lieu of the second fixed bolt, a metal tab fixed to the case or a plastic tab molded into the case may be used. The fixed nature of the tab usually causes the wire to twist and break before the bolt can be removed.

5. If the lead and wire seal is located under the platform of a scale, then there must be ample clearance to eliminate the possibility of interference between the seal and the platform. Access to the provision for sealing must not require a tool for disassembly of any parts.
6. An indicating element that utilizes a NEMA 4 enclosure shall be sealed in a manner that prevents the enclosure from being circumvented. This may be achieved by threading a lead and wire seal through the head of the bolt through one of the hinges and the lip of the cover of the indicator. It is not sufficient for a lead and wire seal to be threaded through the head of the bolt and the opening in the hinge because it can be circumvented by loosening the screw slightly and pressing down on the cover to compress the seal material and slipping the hinge off the cover.

## IX. Protection of scale levers from the environment and human interference

There was considerable opposition to providing protection to exposed levers. It was stated that the issue had been raised in the 1960s, tests were run, and the results did not indicate any problems with exposed levers. Although there was some support to protect levers from human interference, it was reported that tank and hopper scales have exposed levers. Usually, the transverse lever on scales and all of the levers on livestock scales are protected.

Committee agreed that protection would not be required on exposed levers, however, protection from environmental effects is a User Requirement. If a weights and measures official encounters a problem in the field, need for protection will be left to the judgement of the enforcement official.

### Out-of-level tests for wheel-load weighers and portable axle-load scales

Portable wheel-load weighers and portable axle-load scales are normally used in areas where the ground is not level, consequently, NTEP has required these scales to be accurate when placed out of level by 5 percent or 3 degrees. The inclusion of a level-indicating mechanism (e.g., bubble level) has not exempted these scales from the out-of-level accuracy requirement.

Committee discussed the appropriateness of the out of level test. Because these scales are routinely used along ways where the surface is not level (but is reasonably level), the Committee concluded that accuracy is required for the suitability of equipment requirement.

number of directions that a scale must be tested for accuracy when out-of-level was discussed. The Committee decided that it was necessary to test the scales when out-of-level in at least two directions, but that a scale may be tested in as many directions as deemed necessary. It may not be necessary to test a scale in an out-of-level condition every time that the scale tested.

Handbook 44 paragraph S.2.4. states that a portable scale shall either be accurate when out of level by 5 percent or be equipped with a level-indicating means. The use of a level-indicating means is not realistic for wheel-load weighers or portable axle-load scales because the scales cannot be leveled once they are set in position. Consequently, scales must be accurate within the 5 percent specification. To remove this conflict, the Technical Committee recommends that the S&T Committee change Handbook 44 to clearly state that wheel-load weighers and portable axle-load scales be accurate when placed out-of level by 5 percent.

### Manual gross weight input

- A. Postal and shipping scales
- B. Computers interfaced with scales

need and appropriateness of the manual entry of gross weight values on postal and shipping scales were discussed. It was concluded that the manual entry of gross weight values is inappropriate on most scales. The justification for omitting the feature on shipping and postal scales is that shipping companies issue call tags to schedule package pickup when the package is at a customer's site and cannot be weighed by the shipper. This requires the printing of a manifest which includes the weight and the shipping charges. It was stated that manual gross weight entries are needed for express shipping when many packages with the same contents. The manual gross weight entry permits generating the labels without repeat keyboard entries.

Technical Committee agreed to permit manual gross weight entries under the following conditions.

Manual gross weight entries are permitted only on postal and package shipping scales.

The manual gross weight entries cannot interact with the scale weighing element, that is, the scale must be at zero before manual weight entries are permitted.

The scale indications and recorded weight values must be adequately defined so it is clear that the gross weight values are manual gross weight entries. Scale weight indications must be identified as "manual weight" either through the use of an annunciator or through an alphanumeric display. Recorded weight values shall be identified as "Manual Weight."

### Type evaluation checklist for computers interfaced with scales

A draft checklist for computers interfaced with scales has been developed for review by the Technical Committee. The Committee was divided on whether or not computer systems should be subject to type evaluation. The decision



not to require the version number on software was referenced as precedent not to evaluate computer systems since the software could always be changed. It was suggested that a dedicated weight indicating element should always be required with any computer system to prevent computer manipulation before the weight information is displayed. Others opposed this suggestion because it would be perceived as restricting new technology.

It was suggested that computers do not fall under the jurisdiction of weights and measures. The controlling computer may be at a remote location so a physical evaluation will not be possible during a field inspection. Some weights and measures officials insisted that if a computer is performing the functions that a scale would normally perform, then the computer must meet the same requirements of Handbook 44.

Because of the ease of changing software, it was suggested that the field verification may be sufficient to control the use of computerized systems. Field inspections would concentrate on evaluating a system based upon its display and recorded information.

Since the Technical Committee could not reach a consensus, it was suggested that the issue be taken to the NCW for resolution.

### **XIII. Certificate parameters for covering modular scale designs**

The Technical Committee was requested to review the range of parameters for a vehicle scale of modular design that may be included on a Certificate of Conformance. Some manufacturers of "modular" scales can vary the length of platforms extensively by simply attaching more modules. Consequently, a vehicle scale may consist of several modules but independent small modules will not be covered by a Certificate of Conformance because the length falls below 50 percent of the length of the scale that was tested. The scale capacity does not always increase with length because a scale may be installed under a series of hoppers. The long platform may be needed to permit the loading of a vehicle under any one of the several hoppers; a higher scale capacity is not needed.

It was agreed that the agreement among sections still applies to a modular scale. The practicality of achieving agreement among sections was questioned when a scale that has 10 or 12 sections.

The term "modular" has different meanings to different people. Some consider that the design of each weighing element must be identical with the only difference being in the length of each weighing element. Others permit the design in one weighing element and the other modules may be attached but have only one pair of load bearing points in each "module" that is attached. It was stated that scales have always been articulated so the term is not correct. Contractor's scales may be modular in that the scale consists of two weighing elements that act independently. The forces from the separate weighing elements are then summed to provide a single indication.

It was stated that the problems with the modular approach in type evaluation is that actual scale installation frequently will be custom designed to meet the specific needs of some customers. This will result in variations in odd sizes. It was suggested that modular scales should not receive special consideration. It was suggested that the weighing element of a modular scale be identical and have the same concentrated load capacity.

The members were more concerned that a cap be placed on the length of modular scales rather than a lower limit on the size of an individual module. It was suggested that a cap of 150 percent of the length of the scale that was tested for type evaluation be retained as an upper limit. It was also suggested that the module with the greatest distance between sections would have to be evaluated.

No consensus was apparent. It was recommended that Ross Andersen and Henry Oppermann develop criteria and examples for consideration by the Technical Committee at a later date.

### **XIV. Board of Governor's issue: Appeal process**

An appeal on a load cell had been submitted to the NTEP Board of Governors. Because of the significant costs associated with testing load cells, a more detailed set of procedures for resolving appeals had been drafted for review by the Technical Committee and the NTEP Board of Governors.



The Board of Governors had received several letters from industry opposing the draft procedures. It was explained that current NTEP policy permits third-party appeals. Considerable opposition to the draft procedures was expressed at the meeting.

The Board of Governors met following the meeting of the Technical Committee. The Board decided to table the proposed changes and proceed to handle appeals using the existing procedures.

#### VARIATIONS IN REPEATABILITY OBSERVED IN NIST NTEP TESTS (3000 DIVISIONS)

- Random error - Same set-up  $\Delta = 0.1v = 33$  ppm of full scale
- Mounting variation - Same orientation in dead-weight machine (DWM) (variation in centering)  
 $\Delta = 0.25v = 80$  ppm
- Rotation variation in DWM (Off axis load and centering)  
Two Sigma  $= 0.38v = 0.013\% = 125$  ppm
- Soak time in chamber after reaching equilibrium  
 $\Delta = 0.12v = 40$  ppm
- Cell aging (10 NTEP test cycles)  $\Delta = 0.1v = 33$  ppm

For reference: Allowable Instrumentation and Force Generating Equipment Error (2 Sigma) = 1/3 allowable tolerance

$$1200v = 1/3 (0.7v) = 0.23v = 76 \text{ ppm}$$

$$3000v = 1/3 (1.05v) = 0.35v = 116 \text{ ppm}$$

#### Next Meeting

The next meeting is scheduled for October 31 - November 1.

#### Participants

Name	Organization
Michael Adams	Fairbanks
Ross Andersen	New York
Joseph Antkowiak	HBM, Inc.
Girish R. Bera	Artech Industries
Manny Bera	Artech Industries
Tina Butcher	NIST
Bob Cheyne	National Scale
Jim Conn	Rice Lake Weighing Systems
Carl Conrad	New Jersey
Steve Cook	California
John Elengo	Revere
Sy Feinland	Pitney Bowes
Joe Giannina	Port of Corpus Christi
Bill Goodpaster	Cardinal/Detecto
Darrell Guensler	California
Khalil Haker	BLH Electronics, Inc.

## Executive Committee

Mic Hendrick	Richards Scale Co.
Shaun Seymour II	Pennsylvania Scale Company
Terry James	Cardinal/Detecto
Ted Johnson	Sensortronics
John Kicks	Scaime USA
Bob Kinzie	Gilbarco
John Lacy	USDA/P&SA
Tom Leahy	Rice Lake Weighing Systems
John MacDonald	Howe Richardson
Bob McCarty	NCR
Karl Newell	NIST
Patrick Nichols	Alameda County, CA
Anthony Nosike	HBM, Inc.
Henry Oppermann	NIST
Millard Polivka	Toledo Scale
John W. Reimer	Weigh-Tronix
Bob Reinfried	SMA
Daryl Tonini	SMA
Barbara Umbenhauer	Pennsylvania Scale Company
O. K. Warnlof	NIST
Dick Whipple	Gilbarco
Stanley Wulf	HBM, Inc.
Ken Yee	NIST

## MEETING SUMMARY

Technical Committee on National Type Evaluation  
Weighing Sector  
October 31 - November 1, 1989

### Introduction

The item on the marking requirements for load cells was added to the agenda. The agenda of the meeting is listed below.

Cell capacity to be tested to cover a range of capacities

Marking requirements for load cells

Sealing of electronic components

Multiple weighing devices interfaced with a single indicating element

Multiple loading patterns for vehicle scales

Scale calibration for influence factors testing

I. Computer checklist

II. Requirements for labels on standard weight packages

Item II in the draft meeting summary for the June 1989 meeting regarding the policy of accepting data from another national laboratory was discussed. Based upon this discussion and a review of notes from the meeting, changes were made to this portion of the summary which was included in the summary of the June meeting.

### Cell capacity to be tested to cover a range of capacities

It was suggested that NTEP should test the smallest load cell in a range of capacities to be included in a Certificate of Conformance because it is usually the most difficult capacity to manufacture to the requirements of Handbook 44. The current NTEP policy is to test a cell that has a capacity near the middle of the range of capacities to be covered by the certificate. As a working guideline, a load cell is judged to be in the middle of the range of capacities if the ratio of the cell that was tested is not more than 4:1 (at worst 5:1) from the extreme capacities to be included in the range of capacities. This was discussed at the June 1987 meeting and concluded that the 4:1 ratio should not be established as a policy but to be used as a guideline. This was done to permit greater flexibility to determine which cell should be tested because manufacturers may be limited by the test equipment available for testing or there may be some other reason to consider a different load cell to be tested.

It was stated at this (October 1989) meeting that in some cases the largest capacity cell may be the most difficult to manufacture within Handbook 44 requirements. It was reported that the decision in 1987 was a compromise to establish an acceptable policy. It was the consensus of the Technical Committee to reaffirm the current NTEP policy to test load cells that are approximately in the middle of the range of cell capacities to be included on the Certificate of Conformance.

### I. Marking requirements for load cells

It was reported that a load cell manufacturer had marked only the serial number on load cells and the remainder of the marking information was in an accompanying document. Under the current language of the Scales Code paragraph S.6.10., this would comply with the requirement. The General Code paragraph G-S.1. is interpreted to apply to complete devices or main elements. Additionally, the requirements in specific codes supersede those of the

General Code. Consequently, it was requested that the Technical Committee recommend a change to Handbook 44 to require the load cell be marked with the manufacturer's name or trademark, model designation, and serial number prefaced by an abbreviation that clearly identifies the serial number. The remaining information could be contained in an accompanying document provided that the document also contained the serial number of the load cell.

The need to record the serial number on the accompanying document was questioned. It was reported that NTEP permits a manufacturer to market load cells at number of divisions less than the maximum and with  $v_{min}$  values larger than those stated on the Certificate of Conformance (October 1987 meeting). Consequently, the serial number must be marked on the load cell and recorded on the accompanying document to relate the document to a specific load cell.

The Technical Committee concluded that this issue is not specifically an NTEP issue and should be submitted to the Specifications and Tolerances Committee for consideration.

### III. Sealing of electronic components

The Technical Committee was requested to discuss the features that are required to be sealed as a result of the changes made to General Code paragraph G-S.8. at the 1989 Annual Meeting of the National Conference on Weights and Measures. Varying interpretations of the scope of the features to be sealed exist.

It was the intent of the S&T Committee that any selectable features that may affect whether or not a device complies with Handbook 44 or any selectable parameters that may affect the suitability of a device for use in a specific application shall be sealed based upon the revised G-S.8. Others have suggested that only those adjustments that affect performance or facilitate fraud should be sealed. The Technical Committee discussed this subject at length. The discussion is documented below to provide information to the S&T Committee further information for its review of the issue at the Interim Meeting in January 1990.

The consensus of the Technical Committee was that the requirement in Handbook 44 should be stated in broad terms and NTEP should use judgement and determine the specific features to be sealed. The features to be sealed may vary from scales to metering devices depending upon the decisions of each Sector within the Technical Committee. A list of features to be sealed as recommended by the NTEP laboratories and the S&T Committee should be developed and submitted to the Technical Committee Sectors for consideration and inclusion in the type evaluation checklists.

To assist the S&T Committee in its review of the G-S.8. items on its agenda, the discussion of the Technical Committee is included.

#### Discussion:

Henry Oppermann explained the intent of the S&T Committee as stated in the last two S&T reports and which was verified in an additional discussion of the S&T Committee on October 12, 1989. Some people have stated that the only features to be sealed should be those affecting device performance. The language of G-S.8. prior to the 1989 change limited provision for sealing to those adjustments that affected performance requirements as defined in Handbook 44. It was the intent of the S&T Committee to expand the scope of the features to be sealed, which is the language in G-S.8. was broadened beyond performance requirements. If the provision for sealing requirements as adopted for the 1990 Handbook 44 was strictly applied, then the temperature compensation feature on computerized wholesale loading-rack meters and the selection of the round-off algorithm in electronic cash registers would be required to have provision for sealing. This discussion assumes that the use of an audit trail is an acceptable method of sealing. Under the strict interpretation of the requirement, then it is likely that audit trails would have been incorporated into these systems.

**Paul Peterson:** The Packers and Stockyards Administration recommends that the automatic zero-setting mechanism (AZSM) be disabled on livestock scales because people handling the gates on these scales could activate the AZSM when there was not a zero change. This would result in a false zero-balance condition. It is my opinion that this feature should be sealed on livestock scales.



**John MacDonald:** More examples should be given to provide a better basis for the discussion.

**Jim Truex:** The Central Weights and Measures Association voted that the following features should be sealed.

#### Scales

Automatic zero-setting mechanism  
 Settings for motion detection  
 Internal selection of measurement units  
 Accuracy adjustment mechanism  
 Selection of the value of a quantity division  
 Scale capacity and number of divisions in a scale  
 Selection of scale options

#### Liquid-Measuring Devices

Octane blend setting for blend dispensers  
 Selection of pump characteristics  
 Selection of features (method of operation)  
 Temperature compensating systems for VTMs  
 Temperature compensating systems of wholesale meters  
 Setting for value of pulses sent from dispenser  
 Pressure or density correction settings  
 Flow-control settings  
 Meter indications in gross or net gallons  
 Totalizer mechanism

**Ina Butcher:** The Measuring Sector concluded that operator features would not be sealed. Some members wanted sealing limited to performance requirements, but a consensus was not reached on this point.

**Ross Andersen:** The listing of the features to be sealed should be in the NTEP checklists. The list should be established by the Technical Committee. If all settings for a particular feature, e.g., AZSM, would result in device compliance for a given application, then the feature would not have to be sealed.

**Tom Stabler:** The scope of the provision for sealing should be kept as narrow as possible. It is not practical to seal everything that is selectable. The meaning of metrological integrity should be defined by providing a list of features to be sealed for scales and metering devices.

**Otto Warnlof:** In OIML the term "metrological integrity" means that a device is designed to maintain its accuracy and operational performance in a normal environment over a period of use. A different term should be used in Handbook 44 to represent the features to be sealed. Let the Technical Committee list which features are to be sealed and include it in the checklist.

**Ferry James:** The list should be established by the Technical Committee.

**Ross Andersen:** The provision for sealing does not require that each selectable feature had to have its own seal. One provision for sealing could seal all of the parameters required to be sealed.

**Dennis Mahoney:** A list can not anticipate other features that should be sealed as technology advances. Consideration must be given to make changes to the list as necessary.

**Joe Giannina:** A list developed at this time would not be all-inclusive; the list is likely to grow in the future. Also, the term "metrological integrity" is vague. I support the use of "metrological characteristics."

**Darrell Guensler:** A list of features to be sealed should be developed, but avoid putting it in Handbook 44. The list should be in the checklist. The NTEP labs should draft a list and submit it to the Technical Committee for review to provide an opportunity for industry to review and modification.

**By Feinland:** Will this require that a computer disk drive be sealed since the program could be changed and change the operation of the device?

**Henry Oppermann:** It was not the intent of the S&T Committee to require that disk drives be sealed; however, manufacturers have the responsibility under the NTEP policy to notify NTEP of when changes are made to a program that may require a new type evaluation.

## Executive Committee

John Elengo summarized the discussion, distilled the common ground, and stated the position of the Technical Committee as reported at the beginning of this item.

### IV. Multiple weighing devices interfaced with a single indicating element

The number of vehicle scales consisting of three or more individual weighing elements used simultaneously to obtain a gross weight for commercial transactions are increasing. The individual weighing elements are used to obtain axle-load weights to determine compliance with highway laws and, because the entire vehicle is weighed as a single draft, the summed weight can be used for commercial transactions.

This approach to weighing has raised a question of how the number of scale divisions permitted in class III or III L scales should be applied. For example, a vehicle scale may have three platforms with the following capacities: 100,000 x 20 lb, 100,000 x 20 lb, and 60,000 x 20 lb. The sum of these scale capacities is 260,000 lb for a total of 13,000 divisions. Should the maximum number of divisions for class III scales apply to the summed indication? An argument could be made that since the total weight is only the sum of digital indications, then the 10,000 division limitation should not apply. However, a request had been received to permit four 20,000-lb x 5-lb capacity scales be used in combination to provide a scale with a capacity of 80,000 x 5 lb to essentially circumvent the class III L limit on the number of scale divisions. Consequently, the 10,000 division limit should apply to the summed indication because the summed indication is being used as the basis for commercial trade.

The S&T Committee briefly discussed this item at the 1989 NCWM. The Committee concluded that a multiple platform scale system is a single system and shall be treated as a single scale. The S&T Committee requested that the Technical Committee continue to discuss this item to see if a consensus could be reached on the requirement that should apply.

There was a reluctance from several members of the Technical Committee to accept the position of the S&T Committee without further review. Consequently, the Technical Committee did not reach a consensus on this issue. The discussion is documented below to provide input to the S&T Committee to review the issue.

**Discussion:** Henry Oppermann reported the position of the S&T Committee. The S&T position is that three permanently installed axle-load scales used to obtain the gross weight of a truck from three axle-load scales is to be treated as a single system and that class III L requirements apply to the indicator that is totalizing the weights from the other weighing devices. This means that all of the sections in the three weighing devices must agree within the limit set by T.N.4.4.

Jim Truex distributed the Ohio memorandum stating the Ohio policy regarding these devices. The Ohio position is consistent with the criteria proposed for consideration by the Technical Committee.

**Ross Andersen:** The criterion "simultaneously displayed" is not sufficient to define which devices are to be treated as a single weighing system. For example, multiple sets of hopper scales, e.g., 1,000 x 1 lb and 10,000 x 10 lb, are often used to batch asphalt and the individual weight indications could be added together to get an accurate weight. I agree that a multiple-weighing-device vehicle scale should be treated as a single system, but two or more independent hopper scales used to batch asphalt should not be considered a single system.

**Joe Giannina:** Why should the division values on multiple weighing devices be the same? If a system consists of independent weighing devices, then each device should be tested separately.

**Henry Oppermann:** The division values for all of the weighing devices should be the same, otherwise anyone testing the complete system would not know what tolerance to apply to the system if each weighing device has a different scale division.

**Tom Stabler:** Under the General Code, all of these weighing devices must have the same scale division value.

**Terry James:** It is the normal practice of weights and measures enforcement officials to test multiple-weighing-device systems as if each weighing device is an independent scale. Permitting each weighing device to have 10,000 divisions

Does not violate Handbook 44. Using a multiple-weighing-devicescale and adding up the values to obtain a gross weight is no different than adding the weights on a calculator.

**Dennis Mahoney:** The indicator summing the weights from three other indicators is not a scale and should not be a limiting factor in the number of divisions in the scale.

**Jim Truex:** The 10,000-divisionlimit on the totalizingdisplay must apply or the multiple-weighing-devicesystems will defeat the intent of class III L. Ohio already had a company that wanted to install several smaller capacity scales with 2-lb divisions for use in combination as a vehicle scale. This is not appropriate.

**Constantine Cotsoradis:** It is Maryland's policy that if each weighing element has its own indicatingelement, we treat each weighing device as a separate device. If multiple weighing elements have only one indicator, then the multiple weighing elements are a single scale. Maryland does not apply T.N.4.4. to all of the weighing elements in the system; it is applied only to those sections that are part of one weighing device.

**Ross Andersen:** The application will determine how the system should be treated. If a truck is being weighed as a single object, then the multiple weighing devices must be treated as a single system. Multiple hopper scales are different in that they are weighing different commodities which are to be mixed. You cannot dissociate a scale from what is being weighed.

**Otto Warnlof:** There is no difference in scale operation whether the scale is divided or not. The intent of the process is to get weights for an individual vehicles.

**Terry James:** Manufacturers can meet the requirements to test the system as a single scale, but if enforcement officials test each weighing device as a single scale, it defeats the purpose of the requirement.

**John Elengo:** If you are weighing a single object, then you should meet Handbook 44 for the particular class applicable to weighing the object. It doesn't matter how the object is weighed; it must meet Handbook 44 for the application.

**Tom Stabler:** An installation must not violate the maximum number of divisions, the nominal capacity, agreement among sections, and  $v_{min}$  for the application. Then, conclusions regarding the installation can be based on whether or not the system complies with Handbook 44.

**Ross Andersen:** Individual axle weights are used to determine compliance with the highway laws and are not relevant to commercial transactions. The concentrated load capacity for each weighing device must be addressed. Must the CLCs be equal for all of the weighing elements?

[Note: It appeared that the Technical Committee agreed that the CLC must be the same for all of the weighing elements in the system because the truck axles move over all of the sections of the scale.]

**John Elengo:** The issue raised by weights and measures officials is that when multiple weighing elements are installed to weigh a truck and the system has more than 10,000 divisions, then it appears that the system has circumvented the class III L maximum limit of 10,000 divisions for the scale.

**Mike Adams:** It is incorrect that the manufacturer is trying to circumvent the Code. The manufacturer may just be trying to get more accuracy out of the system.

**Ross Andersen:** It is appropriate to test each individual weighing device to capacity and then test each section down the scale to determine if all sections in the system agree within T.N.4.4.

**John Elengo:** It is our job to judge a device based upon what the device is to do. This type of system provides multiple indications and sums the values to obtain the weight for the complete vehicle. Based upon the single weight for the vehicle, it is a class III L system. The individual weighing devices were not intended to be used independently.



## Executive Committee

**Terry James:** If someone installs six 15,000 x 2 lb scales and they are accurate, then the six scales used in combination should be permitted to be used to weigh a vehicle without the 10,000 division class III L limitation. If the scales are tested independently, then the requirement of the 10,000 divisions and agreement among sections is meaningless.

**Darrell Guensler:** We already have a ruling from the S&T Committee that the system is to be treated as a single scale. Let's proceed on that basis. We must look at it as a single device and test it as Ross has described.

**Henry Oppermann:** I agree with Terry James that the system must be tested as a single scale and all sections must agree within T.N.4.4.

**Paul Peterson:** If we have digital load cells in a scale, the digital outputs will be summed rather than an analog signal. Will each cell be considered a separate scale? Are we considering this issue philosophically or from the viewpoint of regulatory problems?

**Otto Warnlof:** We must think in terms of the device application; not its design.

**John Elengo:** We are looking to apply the requirements to a device submitted for type evaluation. The device that would be submitted is the complete system. The combined weights are the basis for the transaction so the system must meet class III L requirements.

**Daryl Tonini:** I am troubled by the statements that you don't get a break on the tolerance when you treat each weighing device separately. I agree that the summed weight display should be limited to 10,000 divisions; however I have some difficulty accepting the analysis.

**Bill Goodpaster:** There is no difference between summing the digital indications from several scales and summing the indications using a calculator, consequently, each weighing device should be considered to be a separate scale.

**John Elengo:** That is an S&T or an L&R issue. We are here to establish the criteria applicable to the system.

**Henry Oppermann:** This issue falls under the principles of T.N.1. of the Scales Code. The classification of a device or system is not dependent upon the technology or the design.

**Sy Feinland:** The proposed requirement that all division values for each weighing device must be the same is not justified. As long as the scale division in the summing display is the same as the largest division value in the different weighing elements, there is no flaw in the implied accuracy.

[Note: To clarify terminology, the Committee agreed to refer to these devices as multiple weighing devices interface with a single indicator. This permits each weighing device to have its own indicator as well.]

**Ross Andersen:** From a purely technical point, class III L scales may display more than 10,000 divisions because a scale may indicate up to 105 percent of its rated capacity.

**Mike Adams:** Each scale should be considered separately because one scale may be used to weigh pick-up trucks, two of the weighing elements may be used to weigh a larger truck, and all weighing elements may be used to weigh other trucks. Smaller trucks can be weighed more accurately if the scale has a smaller division. Each weighing device should be permitted to have different scale division values, but the summing indicator should have a scale division equal to the largest division of the individual weighing devices.

**Jim Truex:** Commercial measurement is only interested in the single totalized weight.

**John Elengo:** Each individual weighing device must meet class III L as a stand-alone device. Then if the combination of devices also meets class III L, then the system is acceptable.

**Sy Feinland:** I continue to support allowing each weighing device to have different scale division values and to require the value of the scale division for the summing indicator to equal the largest scale division value for individual weighing devices.



**Henry Oppermann:** This would violate the requirement that there be mathematical agreement in the digital indications because different scale divisions could not add mathematically to a single scale division value.

**Wes Andersen:** Manufacturers could use manual multi-ranging scales to get the desired resolution for smaller loads.

**Mike Adams:** The only reason to require mathematical agreement is to reduce confusion. Mathematical agreement not needed.

**Joe Giannina:** I don't agree that all scale division values must agree. It would be acceptable to have three scales in 10-lb divisions being summed to a 20-lb division. Handbook 44 should not apply to auxiliary summing indications.

**John Elengo:** We are at an impasse. It is time to return this issue to the S&T Committee.

**Harry James and Sy Feinland:** As a final comment, we should not require the other weight displays to blank if the summing indicator overloads. This would require communication from the summing indicator to the individual indicators which would be expensive without adequate benefits.

**Harrell Guensler:** It seems that to have such a uniform loading pattern would be unlikely so it isn't worth the expense.

**Wes Andersen:** We must remember that the individual devices could have different capacities and that the sum of the individual capacities may exceed the capacity of the summing indicator.

**Bill Goodpaster:** I favor deleting this requirement (#5) because numbers 1 and 4 cover it. It would cost too much for the little benefit that would result.

**Mike Adams:** If #5 is retained, this is saying that the multiple weighing devices could not be operated as independent scales. You should be able to operate them independently and add up the values.

### Multiple loading patterns for vehicle scales

The proper loading of multiple patterns when testing a vehicle scale is not specifically defined in Handbook 44. Multiple pattern loading may be done in a manner consistent with the method of use as stated in Scales Code paragraph N.1.3.4. The definition of concentrated load capacity (CLC) specifies that the capacity rating applies to both test and use. There is a considerable variety of axle configurations for trucks.

The Technical Committee concluded that Handbook 44 contains all the information needed to address this question. The proper application of this section permits multiple test loads up to the CLC to be placed on a scale in each area where the axles of the truck may be positioned, including when the vehicle is in the worst case position. Each loading pattern shall be an area at least four feet long and equal to the width the scale. The application of this conclusion results in the following.

In the case of single axles, for example, a single steering axle with one wheel on each side, the center of the loading pattern should be positioned to coincide with the axle position.

In the case of tandem axles, for example, a series of 2 or 3 axles on a single suspension system that distributes the load reasonably equally from axle to axle (such tandem axles are usually no more than 96 inches in length from center to center of the outermost axles), two adjacent 4-foot patterns, centered on the tandem axle configuration, should be used. Each pattern should be loaded equally. The loads should total to the maximum load allowable for the vehicle's tandem axle configuration, and should not exceed the CLC in any one pattern. In the event that the tandem axle configuration is greater than 96 inches length from center to center of the outermost axles, each axle shall be treated as a single axle as described in point 1.

The Federal Highway bridge formula is not a limitation on how a scale may be loaded.

## VI. Scale calibration for influence factors testing

Some scale manufacturers have wanted their scales calibrated at a specific test load before the scale was subjected to influence factors testing. At times, the manufacturer has wanted the scale to be set to read either high or low of the actual value of the test load. There is concern on the part of the NTEP laboratories that a scale may be adjusted in the laboratory to pass the temperature test but the scales in the field would be adjusted differently because the service agent may not know to set the scale to have an error at a specific load.

It was suggested that scales should be tested initially to determine the performance curve of the scale and then select the adjustment point to minimize the scale errors (both increasing and decreasing load errors) over the entire weighing range of the scale. It was stated that the service technician will not have the knowledge of the scale performance curve with respect to temperature when a scale is installed in the field to be able to minimize the scale errors over a temperature range.

The Technical Committee concluded the following.

1. Unless the load for calibrating a scale is specified by the manufacturer, a scale shall be adjusted to have its errors minimized at ambient temperature.
2. If the manufacturer specifies the calibration load, this information must be stated in the service manual (and the operator's manual if the operator is to adjust the scale). If a manufacturer specifies a test load for calibration, then this test load may not necessarily minimize the performance errors of the scale.
3. A manufacturer cannot select a particular calibration point for a scale submitted for type evaluation unless the test load is specified in the manual as applicable to all scales of this model designation. A manufacturer must advise the NTEP laboratory of the optimum point for adjusting a scale at ambient temperature to minimize performance errors to save time in the calibration process. This recommendation will be based upon the manufacturer's test results for tests conducted prior to submitting the device to the NTEP laboratory.

As a result of these decisions, paragraph 3.2 on page 125 of the NCWM Publication 14 will be changed to read as follows.

- 3.2. Prior to the start of the test, the scale shall be adjusted after it has reached thermal equilibrium with power applied to the scale. Unless otherwise specified by the manufacturer in a manual, the laboratory will adjust the scale to optimum performance for the performance curve obtained at:
  - (a) 20 °C (or at the midpoint of the temperature extremes if the operating range for the device is significantly different from -10 °C and 40 °C); and
  - (b) at a moisture content not greater than 50 percent relative humidity.

## VII. Computer checklist

At a previous meeting of the Technical Committee, a draft checklist for computers interfaced with scales was presented for review by the Technical Committee. The Committee was divided on whether or not a computer system should be subject to type evaluation. A consensus could not be reached at that time and the review did not take place. The matter was brought forward again at this meeting.

A review of the proposed checklist was initiated in an effort to test its content and determine if consensus might be achieved. The review progressed to a point but was tabled to enable more discussion to take place relative to the appropriateness of conducting type evaluations on the computer portion of the scale system and to address other issues on the meeting agenda.

The following points were made during the discussion and are believed to represent a consensus of the Technical Committee.

The subject is more appropriately handled by addressing those additional requirements for scales which have computers as part of the weighing system, than by developing a checklist for computers.

Where the computer portion of a scale system performs solely non-metrological functions, that portion is considered to be outside of weights and measures jurisdiction and not subject to NTEP evaluation.

Where the computer portion of a scale system performs functions which fall under weights and measures jurisdiction, there is a practical limit on how far NTEP can and should go in the type evaluation process. For example, it appears wasteful that NTEP be required to evaluate a recognized standard personal computer (or companion printer) because it is used in a scale system.

Additionally, it was emphasized that computers without analog-to-digital (A/D) converters are already exempt from certain type evaluation tests, specifically, influence factor testing (See page 31 of NCWM Publication 14). Likewise, digital indicators without A/D converters are not required to undergo error testing over a temperature range, though they may indicators may be tested over a temperature range to verify that all keys and features operate correctly.

There is general support for the view expressed in Canada that, although computer systems fall under weights and measures enforcement when they perform weighing or metering functions, if adequate controls are applied through field enforcement, it may not be necessary to submit all computer systems for type evaluation.

Reliance on field enforcement would require that an Examination Procedure Outline (EPO) be developed for field verification of scale systems incorporating a computer as part of the system. Such development is outside the scope of the NTEP Technical Committee as defined in the Administrative Procedures contained within NCWM Publication 14.

To separate field verification criteria from type evaluation criteria, it is necessary to establish:

- a. what constitutes a scale function when it is performed by a computer;
- b. what criteria should be used to check software functions in the field; and
- c. what features can be adequately controlled through field enforcement.

There remains the question as to where to establish the boundary between type evaluation and the substitution of field enforcement in its place. Because the answer deals with field enforcement issues, considered by many as inappropriate for discussion within the Technical Committee, as well as technical issues, the Committee does not appear able to achieve a solution. The Board of Governors will be so advised and asked to provide necessary guidance, particularly with respect to items 5 and 6, above.

The following points were mentioned but a consensus was not reached.

It may be possible to establish EPO criteria for simple printers so not all printers must be submitted for type evaluation. Simple printers would be subject only to field verification.

The software used to process the weight information for a commercial transaction, that is, the primary weight indications and the recording of the weight values for weight tickets should be in a fixed part of the computer program and not be accessible for change after the system leaves the manufacturer of the weighing device.

A "one-of-a-kind device" must be defined for systems incorporating computers because software is often customized for a specific application.

The following is a summary of the review of the proposed checklist to the point that further discussion was tabled.



## Discussion of Checklist Criteria Applicable to Computers incorporated into Scales

### **Page 2, Testing Modes**

There was concern that a separate test mode may utilize software that is different from the normal operation. It was suggested that a void key be required to permit weights and measures officials to test the computer portion of a scale in the normal operating mode. This proposal was opposed because void transactions in the normal operating mode go into the operator's records. Similarly, if a "dummy" account is used for test purposes, the operator's records would be affected. Consequently it was decided to permit a manufacturer to provide either a training (test) mode or provide a void feature.

### **Page 5, Number 2**

The word "weight" is changed to "tare" so it reads: 2. *Negative numbers shall not be accepted as tare values.*

### **Page 6, Number 1**

This criterion required the simultaneous display of gross, tare, and net on the computer display. It was stated that the usual indicating elements are not required to display this information. It was concluded that the criterion exceeded the requirements of Handbook 44 so the criterion was deleted.

### **Page 6, Number 2**

This criterion prevents adding two or more tare weights together for a single transaction to get a final net weight. The objective is to reduce the potential for fraud. Multiple tare memories for one transaction could give the appearance that one tare weight is taken when, in fact, two tare weights may be subtracted from the gross weight. This could happen if tare is taken in a separate indicating element and another tare weight is taken by the computer.

The Committee concluded that:

1. the word "clear" is to be replaced by the word "replace";
2. multiple tare-weight values held in memory must be identified by some type of identification code to relate each tare weight to a specific vehicle or transaction;
3. weights held in memory in a weigh-in/weigh-out system must be used to obtain a net weight before the tare weight may be cleared from memory; and
4. corrections to weight tickets may be made in a nonweighing (accounting) mode. These tickets must identify the weight ticket that the ticket was generated in the nonweighing mode.

### **Page 6, Number 4**

This requirement was accepted. A comment was made clarifying that the gross or net may be displayed as a negative number, but mathematical agreement must still be satisfied under these conditions.

### **Page 6, Number 5**

This criterion was to require the identification of the method of tare input and establish acceptable symbols to identify the type of tare entry used in a transaction. There was support for this requirement on the basis that it would help customers and enforcement officials understand and trace transactions. It was argued that any weight values stored in memory should be printed at the time of weighing and storage to provide documentation and hard-copy information to verify the validity of the weight values. There were several people who felt that the criterion exceeded reasonable interpretations of Handbook 44 and, therefore, exceeded the requirements of Handbook 44. A communication problem was identified because if the tare is taken on a separate indicator and sent to the computer, it would be necessary to transmit a code identifying the method used to take tare. This information is not normally transmitted by existing indicators.

The Technical Committee did not agree on this item. It was agreed that the item should go to the S&T Committee and be incorporated into Handbook 44 if it is to become a requirement.

### **Page 6, Number 6**

Because of the large amount of memory available in a computer incorporated into a weighing system, multiple memories are often used to process transactions. The tare may have been stored as part of a weigh-in/weigh-out operation or the tare may have been programmed into memory for repeated use, where permitted.



It was agreed that this requirement should be added to page 46 of NCWM Publication 14 to keep the requirements consistent and to reword the criterion as follows:

6. Whenever multiple weight memories are used, the gross, tare, and net weight values shall be recorded automatically when the net weight value is recorded.

**Page 7, Number 7**

The criterion was clarified as follows:

7. The scale divisions and tare divisions on a computer and any other primary indicating element shall be the same for the same weighing device.

The discussion of the checklist was stopped at this point to address the remaining issues on the agenda and discuss the appropriateness of conducting type evaluations on computers incorporated into scales. The discussion of this latter subject was reported earlier.

**VIII. Requirements for labels on standard weight packages**

The requirements for labels on standard weight packages were distributed at the last meeting. Since the labeling requirements are based upon the Federal Fair Packaging and Labeling Act and the NCWM Uniform Packaging and Labeling Regulation, the requirements cannot be changed without Congressional action or the action of the NCWM. The requirements themselves were not discussed because very few people attending the meeting were involved with the design of random weight label printers used to label standard weight packages. Instead, the discussion concentrated upon whether or not it was appropriate for NTEP to evaluate printers for compliance with these requirements. The arguments on both sides of the discussion are listed below.

**Reasons given not to evaluate printers for labeling requirements**

1. Type evaluation is only to determine compliance with Handbook 44 requirements and the requirements of field standards under the Handbook 105 series.
2. Section A of the NTEP administrative procedures specifically states the scope of the NTEP program relative to the documents referenced in point 1.
3. Before NTEP can evaluate devices for labeling requirements, if it appropriate to do so, the NTEP Board of Governors/NCWM Executive Committee must revise Section A of the administrative procedures.

**Reasons given to evaluate printers for labeling requirements**

1. The labeling requirements fall in the domain of the NCWM and should be evaluated. Requirements that are generated outside the NCWM should not be part of the NTEP evaluation process.
2. It would be short-sighted not to evaluate printers submitted for type evaluation for compliance with these labeling requirements since weights and measures officials are often responsible for enforcing the labeling requirements.
3. The evaluation of label printers to the labeling requirements would be very efficient and would reduce enforcement problems. It would benefit the manufacturer to catch problems early in the design process rather than after the printers are installed in the field.

The Technical Committee agreed that a ruling from the NTEP Board of Governors is needed to resolve this issue.

**IX. Next Meeting**

The next meeting of the Weighing Sector is scheduled for June 19 - 20, 1990. The accommodations of the Sheraton National Hotel were considered acceptable. The hotel is tentatively scheduled as the meeting site.

## Participants

October 31 - November 1, 1989

Name	Organization
Michael Adams	Fairbanks Scales
Ross Andersen	New York
Girish R. Bera	Artech Industries
Manny Bera	Artech Industries
Claude R. Bertrand	Legal Metrology Branch, Canada
Tina Butcher	NIST
James M. Conn	Rice Lake Weighing Systems
Carl Conrad	New Jersey
Steve Cook	California Division of Measurement Standards
Constantine Cotsoradis	Maryland Weights and Measures
John Elengo	Revere Transducers
Sy Feinland	Pitney Bowes
Joe Giannina	Port of Corpus Christi
Bill Goodpaster	Cardinal/Detecto
Terry Grimes	NIST
Darrell Guensler	California Division of Measurement Standards
Khalil Haker	BLH Electronics, Inc.
Terry James	Cardinal/Detecto
Ted Johnson	Sensortronics
John C. Kicks	Scaime USA
Tom Leahy	Rice Lake Weighing Systems
John MacDonald	Howe Richardson
Dennis J. Mahoney, Sr.	USDA/FGIS
Bob McCarty	NCR Corporation
Nigel Mills	Toledo Scale
Karl Newell	NIST
Henry Oppermann	NIST
Paul L. Peterson	USDA Packers & Stockyards Administration
John W. Reimer	Weigh-Tronix
Bob Reinfried	SMA
Tom Stabler	Toledo Scale
Daryl Tonini	SMA
Jim Truex	Ohio Weights and Measures
O. K. Warnlof	NIST/OSM
Simone L. Yaniv	NIST, Force Group
Ken Yee	NIST

## MEETING SUMMARY

Technical Committee on National Type Evaluation  
Weighing Sector  
June 26 -27, 1990

### Introduction

The following represents the agenda for the meeting.

#### Load Cell Issues

- I. Clarification of NTEP load cell test procedures
- II. NTEP/NIST Load cell test results
- III. Multiplier for multiple cell tolerances based upon the change to the proposed change to Handbook 44.
- IV. Agreement of test data from manufacturers' test facilities to NIST for the purpose of establishing the acceptability of the manufacturers' laboratory.

#### Scale Issues

- V. Define adjacent to the display for capacity by division statements
- VI. Permanence of identification badges
- VII. Scale features and parameters to be sealed under the revised G-S.8. and S.1.11.
- VIII. Modular vehicle scale parameters
- IX. Devices requiring model numbers and serial numbers
- X. Scale checklist criteria
  - A. Key sequence on computing scales and POS systems
  - B. Tare override
- XI. Computers incorporated into weighing systems
- XII. Computer checklist criteria
- XIII. Bulk-weighing systems checklist

Agenda item IX was not discussed during the meeting and will be scheduled for discussion at the next meeting.

Subtopics discussed under the subjects listed above are identified in the summary that follows.

### I. Clarification of NTEP load cell test procedures

- A. Changes to load cell test procedures

Based on experience drawn from the evaluation testing of load cells at NIST, changes were made to the load cell test procedures. The changes can be characterized as refinements to result in better correlation with less uncertainty. The changes to NCWM Publication 14, Part II, Section 2 are identified below. The text in **bold** indicates the changes to the existing requirements.

1. It is necessary to tie the test temperatures to the specified nominal test temperatures to prevent someone from taking advantage of the initial test temperature to "split" the temperature effect at the temperature extremes. The choice of 2 °C above or below the nominal temperature can make a significant effect at the extreme temperatures. Consequently, load cell manufacturers are encouraged to test at -12 and 42 °C to assure that the cells will test at the temperatures used by another test laboratory, assuming all other effects are equal.

The extremes in the temperature variation during a test shall not exceed 2 °C. Additionally, the test temperature for shall be within 2 °C of the specified nominal value. This will make the NTEP procedure consistent with the proposed change to OIML R 60. It was agreed to change all references to 2.5 °C to 2 °C and to change L.4. to read:

Environmental conditions - Perform tests under stable environmental conditions. The ambient temperature is deemed to be stable when the difference between extreme temperatures noted during the test does not exceed one fifth of the temperature range of the considered cell and not greater than 2 °C and all temperatures are within 2 °C of the nominal test temperature.

2. Different cells have been found to have significantly different temperature rise above ambient due to internal power dissipation. It is the intent of the NTEP procedure to have the test temperature inside the environmental chamber to be equal to the test temperature. The load cell temperature must be uniform although it may not be at the same temperature as the ambient temperature. To clearly indicate that the temperature of the air around the load cell is to be at the specified temperature, regardless of the temperature of the load cell, it was agreed to change L.8. to read:

Temperature conditions - Allow sufficient time to achieve temperature stabilization of the load cell particularly for large cells. The loading system design must not introduce significant thermal gradients within the load cell. It is recommended that the temperature of one or more points on the load cell be monitored, in addition to the ambient (air) temperature, to determine that the cell has stabilized. The load cell and its connecting means (cables, tubes, etc.) which are integral or contiguous shall be at the same ambient test temperature. The indicating instrument shall be maintained at room temperature. The temperature effect on auxiliary connecting means shall be considered in determining results.

3. To unify test procedures used to test load cells and to be consistent with the proposed changes to OIML R 60, change O.I.1. to read:

At 20 °C ambient, insert the load cell into the force-generating system and exercise by applying a load to maximum capacity three times, returning to minimum dead load after each load application. Wait 5 minutes. If the operating temperature....

4. At a past meeting the Technical Committee had agreed that all load cells are to be tested to 90 percent of cell capacity in addition to the minimum dead load; however, this point was not incorporated into Publication 14. The manufacturer may test at a maximum test load that exceeds the load cell capacity but NTEP/NIST will not test NTEP load cells above the stated capacity.

The capacity of a load cell includes the minimum dead load. The measuring range of a load cell is the load cell capacity minus the minimum dead load. The minimum load for a test shall be equal to or greater than the minimum dead load.

The Technical Committee agreed to change O.I.5. to read:

Apply increasing loads to least 90 percent but not more than 100 percent of maximum cell capacity  
....

5. To be consistent with the proposed change to OIML R 60 which recommends a 1-hour wait between the accuracy tests and the creep test to allow recovery time for the load cell, O.II.1 to be changed to read:



At 20 °C ambient, insert the load cell into the force generating system and load to the minimum dead load. If Procedure O.I. (increasing and decreasing load test) has just been completed, wait 1 hour. If a separate creep test is being conducted, perform Procedure O.I.1 and then wait 1 hour.

6. The plot of the test results shall be for the measuring range of the load cell used in the test, not the cell capacity. This means that the 75 percent point used to normalize the data will vary depending upon the test equipment available in the laboratories testing the same load cell. To emphasize this point, P.11.3. is changed to read:

The load axis of the plot passes through both the mean minimum dead load output and the mean output for a load of 75% of the measuring range (not necessarily the cell capacity) both measured during the ascending load and during the initial test at room temperature....

7. To clarify the statement in P.12.1. to agree with O.I.12. which requires that all individual-run data points must be within the applicable tolerances, P.12.1. is changed to read:

Load cell error - ...The critical test result is the measured mean output, or the mean output linearly interpolated between test load (...), or any output at a test load that has the greatest absolute value in relation to the tolerance....

8. An error exists in I.2. The multipliers should be 1.0 instead of 0.7. The error should be corrected, but the tolerance may be changed based upon action pending at the Annual Meeting of the NCWM in July. (See Item III.)
9. It was suggested that a marking requirement be added to S.6.10. of the Scales Code in Handbook 44 to identify if the load cell is for 4-wire or 6-wire operation. This is considered necessary because a load cell must be installed in scales in the same manner in which it was tested by NTEP to get the same performance characteristics. The proper installation of the load cell should be enforced by weights and measures officials. There was some opposition to the proposal because the proper use of a load cell is indicated by its design, i.e., 4 or 6 wires, and the cell should be installed in the manner in which it is designed. It was also suggested that marking only the 6-wire load cells is sufficient since the default design is 4-wire connection.

It was also noted that the excitation voltage can also affect load cell performance. Other factors were also mentioned as affecting the load cell performance, but that it is not realistic to expect the weights and measures officials to check all of these parameters to verify the correct installation of the load cells.

It was agreed that the load cell manufacturer should specify the number of wires of the load cell design and the excitation voltage for which the load cell is designed for use. These entries in the NTEP application will be added to the next edition of Publication 14.

Ken Yee of NIST presented a list of "1001 factors that affect test results". It is a comprehensive summary of equipment and procedure considerations for guidance in conducting tests. A copy of the list is attached.

### Load cell test results

NIST has conducted several NTEP tests on load cells from 30,000 to 100,000 lb. Ken Yee provided a report summarizing a sampling of the results. The summary included:

- Test results from load cells submitted for type evaluation
- Test results from production load cells

There have been occasions where NIST test results, associated with the upgrading of certificates from provisional status, have differed from manufacturer's test results due to equipment design, range, and procedure differences. For example, one manufacturer's set up was found to have excessive thermal loss to test machine, affecting results.

In another case, the range of test loads was smaller than available at NIST. In some cases, this made a difference between the load cell marginally passing or marginally failing.

NTEP obtained some representative samples of manufacturer's NTEP grade load cells on the open market. Cells were submitted to the NTEP type evaluation tests. Where special hardware was required, the manufacturer was asked to supply same and did. Types included canisters, double ended beams, and single ended beams (in the range of 30,000 to 60,000 pounds capacity). Generally, the load cells failed to comply, the only difference being that many were marginally out, while some were way out. Despite results, the tests were considered beneficial; they appear to have initiated corrective action among the parties concerned.

### III. Multiplier for multiple cell tolerances based upon the proposed change to Handbook 44.

- A. Change the multiplier for class III L multiple cell applications for TE of MDLO
- B. Change the multiplier for class III multiple cell applications to 0.7 for TE of MDLO
- C. Relationship of  $v_{min}$  to the displayed scale division
- D. Combination vehicle and railway track scales; combination livestock and vehicle scales
- E. Different  $v_{min}$  values for cells used in the same scale

#### Multiplier for Class III and III L Load Cells Used in Multiple Cell Applications (Points A, B, and C)

The S&T Committee is recommending a change to Handbook 44 that will make the temperature effect on zero less stringent for class III L scales. The NTEP requirements should then be changed to eliminate the technical inconsistency in the NTEP requirements. John Elengo has provided an analysis of the change and derived the appropriate tolerance application for NTEP.

[Note: The S&T Committee modified its recommendation and the NCWM adopted a change to T.N.8.1.3. to make the performance requirement for class III L scales to be  $3d/5^{\circ}C$ . This means class III L load cells now have a tolerance of 2.1 times  $v_{min}$  for the temperature effect on MDLO. The tolerance multiplier for class III and III L load cells used in both single and multiple load cell applications is now 0.7 times the tolerance for load cells for temperature effect on minimum dead load output. A memorandum distributed with this meeting summary describes how NTEP proposes to update Certificates of Conformance to reflect the change in the performance requirement.

The current version of Publication 14 contained a technical error which applied the concept of the cancellation of random errors twice; (1) a tolerance multiplier of 1.0 has been used in the type evaluation of the performance requirement for load cells regarding the temperature effect on MDLO, and (2) the relationship of  $v_{min} \leq e/\sqrt{N}$  was used when load cells are installed in scales. Assuming the NCWM adopts the proposed change, the tolerance multiplier will be changed back to 0.7. The relationship of  $v_{min} \leq e/\sqrt{N}$  will be maintained for when load cells are installed in scales.

#### Combination Vehicle/Railway Track and Livestock/Vehicle Scales

Based upon the  $v_{min}$  values stated for load cells with Certificates of Conformance, it is not possible for combination vehicle/railway track and livestock/vehicle scales to satisfy the relationship of  $v_{min} \leq e/\sqrt{N}$  for the scale division  $v$  normally used in these scales. The scale divisions for these combination scales are typically 20 lb/100 lb and 5 lb/20 lb, respectively. If the change to the temperature effect on zero is adopted for class III L scales, it may be possible that load cell manufacturers may be able to provide load cells with  $v_{min}$  values that will permit these load cells to meet the requirements for temperature effect on MDLO to satisfy the relationship of  $v_{min} \leq e/\sqrt{N}$ .

#### Different $v_{min}$ Values for Cells Used in the Same Scale

A scale may have load cells with different  $v_{min}$  values installed. Load cells with different  $v_{min}$  values may be installed in a scale as the result of the manufacturer design for the scale, repair or replacement of individual load cells, or the selection of load cells from available stock. Manufacturers are permitted to manufacture load cells with different divisions and larger  $v_{min}$  values listed on the Certificates of Conformance. Consequently, load cells of the same function and capacity may have different values for  $v_{min}$ .

In the case of multiple cells of differing  $v_{\min}$  and  $n_{\max}$  values, the mixing of  $v_{\min}$  values is permitted provided the following rules are maintained:

- a.  $v_{\min}$  cannot be greater than the scale verification interval "e" divided by the square root of the number of cells; and
- b.  $n_{\max}$  cannot be less than the number of divisions of the scale.

#### IV. Agreement of test data from manufacturers' test facilities to NIST for the purpose of establishing the acceptability of the manufacturers' laboratory.

Several companies are interested in establishing the equivalence of performance characteristics of load cells for test data obtained at their laboratory facilities and NIST facilities. The original NTEP plan for load cell testing was to permit load cell manufacturers to obtain full Certificates of Conformance based upon test data obtained using their own test equipment. This plan is still viable, but the criteria to determine what level of agreement constitutes acceptable agreement has not yet been established.

Ken Yee presented slides showing comparisons between manufacturer's test data and NIST data. In some cases, comparisons were fairly close, in others differences in curve shape and thermal results were evident. There was no correlation between type of equipment (dead weight, lever, hydraulic/transfer cell) and results.

Further discussion indicated that one problem is the ratio of uncertainty to tolerance. Whereas it may be nice to have an uncertainty that is one tenth of tolerance, it cannot always be realized. The tolerances have been set so closely, for example at the lower steps of Class III L, that the uncertainty has become a large portion of the tolerance.

A suggestion was made to overlay the uncertainty of NIST with that of the manufacturer and accept results which fall within these limits, even if marginally out of tolerance. Another suggestion was that manufacturers adopt stricter tolerances internally such that the effect of uncertainty at NIST would still result in performance within tolerance limits.

More experience is required. However, the parties are working to resolve differences and progress is being made.

#### V. Define adjacent to the display for capacity by division statements

NTEP was requested to reexamine what constitutes "adjacent to the display" for the capacity by division statement. Device manufacturers and NTEP laboratory staff often disagree on the acceptability of particular markings. Some manufacturers have placed this information further from the display than the NTEP laboratories find acceptable, but the manufacturers believe the placement is appropriate. Another consideration has been the size of the lettering and lack of color contrast of the values with the background of the marking.

The committee was unable to be more definitive and maintained its opinion that the NTEP Laboratory's judgement remains the best solution. In cases of extreme disagreement, the appeal process (to the Board of Governors) is the avenue to resolve.

#### VI. Permanence of identification badges

- A. Letter from Toledo Scale
- B. Criteria used in Canada

Weights and measures officials in attendance indicated that the durability of labels is a problem in the field, particularly as a result of routine cleaning of equipment by users. Canada has produced a draft test method which addresses three aspects of the label; (1) permanently attached, (2) suitability to be stamped with a die, and (3) permanence of the information on the label. The criteria were reviewed and discussed. Because Canada has a requirement to stamp equipment after inspection and the United States does not have a similar requirement, it was suggested that different requirements for the identification badges may be necessary. Canada does not accept the vinyl



badges because they do not meet their stamping criteria, but a number U.S. manufacturers do not want to use metal badges because of the expense. Although the premise of the identification badge is that the permanence is not needed to counteract fraud, but only to maintain the information under normal wear and tear, it was reported that serial numbers are still being changed in devices installed in the field.

It was suggested that different requirements may be necessary for the United States and Canada since the marking requirements are different and the information is used differently. Since devices are used in different types of environments, it was suggested that two different types of permanence criteria may be needed depending on whether the device is used in a "business office" or an industrial environment. The final position suggested that one standard should be established for all environments.

It was decided that NIST prepare a draft for review incorporating a test based on applying commonly available cleaning materials (detergent, window cleaners, cleanser, etc.). Permanence means durable and difficult to remove.

## **VII. Scale features and parameters to be sealed under the revised G-S.8. and S.1.11.**

### **Audit Trail**

The Committee reviewed a document prepared by the Legal Metrology Branch (Canada) regarding audit trails. The key concepts contained therein are:

- A. access to metrologically related adjustments or features must be through a password unique for this purpose;
- B. the information shall be stored in non-volatile memory so the trail is protected from unauthorized erasure, substitution, or modification;
- C. the audit trail's event counter and storage area (recording medium) to record the changes in adjustments or parameters (time and date recommended but not mandatory) shall have sufficient capacity to record information for at least 1000 events;
- D. the event counter shall not increment if no changes were made when in the "calibration" mode of the device;
- E. an event counter is required in all audit trails, but in some cases only the event counter will be required perhaps on some relatively simple devices with limited memory or devices that do not include downloading capability or access to software by external means (e.g., floppy disk);
- F. means shall be provided for the weights and measures official (and service technician) to easily access and read the audit trail information without going into the "calibration" mode (i.e., the audit trail information shall be accessible through a "read only" mode);
- G. access to the "read only" mode shall not require dismantling or removal of any part of the instrument without requiring the use of a tool separate from the device, and without modification to the instrument or its ability to resume normal operations before or after accessing the audit trail information; and
- H. standardized methods of accessing and scrolling through the audit trail information is recommended for similar types of devices.

The following points were made during the discussion of this item.

1. The requirements being clarified for audit trails are nonretroactive.
2. The lead and wire seal is still an acceptable method of sealing for those devices identified in E above.
3. Sealing does not prevent access to the "calibration" mode, rather it detects when it has been accessed.



## Features to be Sealed

NIST prepared a list of guidelines as to when provision for sealing is required as well as a specific list of features to be sealed. While a consensus was achieved relative to the guidelines, there remained differences of opinion on the specific listing of features. It was agreed that some listed went beyond what most considered as affecting metrological integrity.

The guidelines for provision for sealing are listed below.

The need to seal some features depends upon:

- a. the ease with which the feature or the selection of the feature can be used to facilitate fraud; and
- b. the likelihood that the use of the feature will result in fraud not being detected.

Features or functions which are routinely used by the operator as part of device operation, such as setting the unit prices on gasoline dispensers and maintaining unit prices in price look-up codes stored in memory do not have to be sealed.

If a parameter (or set of parameters) selection would result in performance that would be obviously in error, such as the selection of parameters for different countries, then it is not necessary to seal the selection of these features.

If the selection of individual device characteristics are selectable from a "menu" or a series of programming steps, then access to the "programming mode" must be sealable.

If a device must undergo a physical act, such as cutting a wire and physically repairing the cut to reactivate the parameter, then this physical repair process would be considered an acceptable way to select parameters without requiring a physical seal or an audit trail.

Comments on the specific features to be sealed are listed below.

The position of the decimal point does not have to be sealed because the number of divisions,  $n$ , for a device is the critical parameter. If  $n$  is controlled, then controlling the decimal point and division value are not sufficiently important to require that they be sealed. On the other hand, it was argued that many of these parameters are set at the time of device installation and there is no reason to change them. It was argued on this basis that these are metrological characteristics that should be sealed.

It was suggested and there was significant support that the following features should not be sealed.

- Number of samples averaged for weight readings
- Averaging time for the weight indications
- Display update rate
- Selection of measurement units if through an internal switch

Some features are appropriate for some applications but not others. Features that may not be appropriate for all applications in which the device may be used should have provision for sealing.

Even that agreement exists on the above guidelines and taking into consideration the above comments on specific features, NIST will prepare a new listing for future review by the Committee.

## II. Modular vehicle scale parameters

The design of some vehicle scales using load cells are such that modules of the same design are joined together to obtain scales of the desired length. Examples of different designs of modular scales were reviewed. The design of these scales are essentially the same regardless of the length of the scales. Since NTEP most frequently tests scales 60 feet or 70 feet in length and the NTEP policy states that only scales of 50 to 150 percent of platform area will be covered based upon the test of a single scale, this often leaves the short scales consisting of 1 or 2 modules off the

## Executive Committee

Certificate of Conformance, although the short scales consist of the same type of module that was evaluated in the longer scale.

There was support to extend the range on the low end of the platform areas to include the short scales of the same design, but there was resistance to expanding the upper limit without additional NTEP testing. There was reluctance to allow the capacity of a scale to increase above the 135 percent of the tested scale as stated in existing NTEP policy; however, it was concluded that if the concentrated load capacity (CLC) of the scale is controlled, then the capacity of the scale may increase to the limit allowed by the  $n_{\max}$  and  $v_{\min}$  values of the load cells and the relationship between the CLC, the number of sections in the scale, and the nominal scale capacity.

It was concluded that a wider range of platform areas may be covered on a Certificate of Conformance for modular load-cell vehicle scales. The following criteria must be satisfied in the scale design and the scale to be tested.

1. Load cells of the same design and capacity must be used throughout the family.
2. The CLC in the family must be not less than 40% of the sum of the capacity of two load cells or 80% of the capacity of one cell.
3. A scale with at least two modules must be tested. The module with the largest CLC is to be tested. Strive to test the module with the longest distance between two sections. If the longest span between sections is not tested, the Certificate of Conformance will include up to 120 percent of the span between sections that was tested. Arrangements regarding the specific scale in the family to be tested will be established in consultation with NTEP representatives.

The following range of parameters will be used to establish the sizes of modular load-cell vehicle scales that will be covered on a Certificate of Conformance based upon the test of a single scale.

1. Capacities from 1.5 times CLC to 135% of capacity of the device evaluated.
2. Platform area not less than 50% of smallest two section (four cell) module incorporated in the device evaluated to 150 percent of the scale evaluated.
3. CLCs complying with the minimum (not less than 40% of the sum of the capacity of two load cells or 80% of the capacity of one cell) to 5 tons above device evaluated, but not exceeding twice the capacity of one load cell.
4. Module spans up to 120 percent of largest two-section, four load-cell module will be included.
5. Nominal capacity equal to or less than CLC times the quantity equal to the number of sections less one half.
6. Platform construction and material similar to that of the device evaluated.
7. Scale division values equal to or greater than the value of the scale division used in the scale that was evaluated.

## IX. Devices requiring model numbers and serial numbers

- A. Guidelines developed by OWM
- B. Application to keyboards and printers in POS systems

Due to the lack of time, this item was not discussed.

## X. Scale checklist criteria

- A. Key sequence on computing scales and POS systems

On some point-of-sale systems, entering an incorrect key sequence for multiple items sales resulted in an error message transaction without giving an indication of an error in the entry. Specifically, one system switched the unit price into

the count if the number key (#) was not pressed before the "For" key. The Committee agreed to add a requirement for both POS systems and computing scales with the multiple item entry feature to require the numeric entry in multiple item transactions before the "For" key is hit. Example: PLU, 3, For, print means 3 for \$.50 where the \$.50 came from the PLU. Incorrect: PLU, For, print gave 50 at \$.50 for a total of \$25.

#### B. Tare override

An NTEP laboratory encountered a system where the PLU performed a tare override without the process being obvious. The Committee agreed to clarify the checklist to state that a computing scale or POS system cannot override manually input tare without providing an obvious indication of the action. Currently this is covered by the requirement that the tare cannot be replaced without an obvious indication. This clarification will be added to the "tare" section of the scale checklist.

Some considerations on this issue are:

A computing scale shall not override a keyboard tare entry unless there is a separate display of the tare. If the tare is set to zero, there must be a clear indication that tare has been removed. If a smaller preprogrammed tare replaces a larger manually entered tare and there is no tare display, the scale will still indicate that it is in the net mode, so fraud may be perpetrated.

Preprogrammed tare stored with a PLU is not required to be displayed before the item is weighed, but the preprogrammed tare cannot replace a manually entered tare without an obvious indication. A scale may give an error signal and permit a preprogrammed tare entry to proceed only if the tare value in the transaction memory register is set to zero prior to the entry of the PLU.

#### I. Computers incorporated into weighing systems

- A. Features and operations to be checked during type evaluation
- B. Features and operations that can be adequately checked during field enforcement inspections
- C. Features to be sealed
- D. Checklist criteria

Following consideration by the Board of Governors, NIST was requested to coordinate work on this issue with Canada. This coordination is in progress. Agreement has been reached that it is not necessary to conduct type evaluations on all aspects of computers used as part of a weighing or measuring device, provided the metrological characteristics can be adequately controlled through field enforcement. If a computer is submitted as part of a weighing device, its metrological functions will be evaluated as part of the evaluation of the complete system. Consequently, OWM is considering extracting criteria from type evaluation checklists to be incorporated into Examination Procedure Outlines so that not all devices need be submitted for type evaluation.

As a first step to that goal the committee reviewed certain specific proposed additions to the checklists to be applied generally to weighing systems. For example:

to facilitate inspections by W&M officials, the system must have adequate means for test and inspection purposes without interfering with inventory and accounting records; and

the name of the "manufacturer" and the model designation of software must be displayed on demand in some manner so the software can be compared to a listing of software that has been evaluated through NTEP.

me precluded completing this work, hence it is being carried over.

#### II. Computer checklist criteria

Item XI.

### XIII. Bulk-weighing systems checklist

FGIS, a NTEP Participating Laboratory, completed a bulk weighing checklist containing the type evaluation criteria currently being applied to the type evaluation of automatic bulk-weighing systems. To facilitate review by the committee, Dennis Mahoney explained the highlights. The checklist will be sent to committee members along with a mail ballot. The results will then be tabulated so that the committee can concentrate on only those points where agreement has not been reached.

### Next Meeting

The next meeting of the Weighing Sector is scheduled for November 7-8, 1990.

#### National Type Evaluation Technical Committee Meeting

#### Weighing Sector

NTEP Meeting June 26 - 27, 1990

#### Participants

Michael Adams	Fairbanks Scales
Ross Andersen	New York Weights and Measures
Joseph Antkowiak	HBM, Inc.
Robert Badenhop	Ohio Weights and Measures
Manny Bera	Artech
Raj Bera	Artech
Claude Bertrand	Canada Legal Metrology Branch
Carroll Brickenkamp	NIST
Tina Butcher	NIST
Sidney Colbrook	Illinois Weights and Measures
Carl Conrad	New Jersey Weights and Measures
Steve Cook	California Weights and Measures
Constantine Cotsoradis	Maryland Weights and Measures
John Elengo	Revere Transducers, Inc.
Sy Feinland	Pitney Bowes
Kevin Fruechte	Weigh-Tronix
Thomas Geiler	Town of Barnstable (MA) Weights and Measures
Fred Gerk	New Mexico Weights and Measures
Joe Giannina	Port of Corpus Christi, TX
William Goodpaster	Cardinal/Detecto
Khalil Haker	BLH Electronics
Bill Hess	Sensortronics
Rainer Holmberg	Eaton Corp./Consolidated Controls
Wm. Terry James	Cardinal/Detecto
Ted Johnson	Sensortronics
John Lacy	USDA Packers and Stockyards Administration
Tom Leahy	Rice Lake Weighing Systems
Tom Luna	Scales Unlimited, Inc.
Dennis J. Mahoney, Sr.	USDA Federal Grain Inspection Service
John MacDonald	Howe Richardson
Robert McCarty	NCR Corporation
Nigel Mills	Toledo Scale



## Executive Committee

Karl Newell . . . . .	NIST
Henry Oppermann . . . . .	NIST
Peter Perino . . . . .	Revere Transducers, Inc.
John Reimer . . . . .	Weigh-Tronix
Bob Reinfried . . . . .	Scale Manufacturers Association
Ken Simila . . . . .	Oregon Weights and Measures
N. David Smith . . . . .	North Carolina Weights and Measures
Don Stagg . . . . .	Alabama Weights and Measures
Daryl Tonini . . . . .	Scale Manufacturers Association
Michael Tovey . . . . .	Interface, Inc.
James Truex . . . . .	Ohio Weights and Measures
Otto Warnlof . . . . .	NIST/OIML
Simone Yaniv . . . . .	NIST
Ken Yee . . . . .	NIST

Appendix J - OIML Certification Plan

An OIML Initiative for International  
Voluntary Certificates of Pattern Approval

Samuel E. Chappell (NIST) and Henry E. Sostmann (Consultant)

Abstract -

OIML

Organization

-

Conference

-

Pilot and Reporting Secretariats

-

CIML

-

BIML

Objectives

-

Harmonize national regulations for performance requirements for legal measuring instruments

-

Facilitate international commerce of measuring instruments as well as affected products

-

Ensure quality measurements for public health and safety and protection of the environment

The International Organization of Legal Metrology (OIML) has developed a proposal for an "OIML Certificate System for Measuring Instruments." This proposal is expected to be adopted by the organization at a meeting of its International Committee of Legal Metrology (CIML) in October 1990. [A copy of this proposal is attached to this appendix.]

The System will be maintained through voluntary participation by OIML member nations that establish and follow impartial procedures for acceptance, review, and approval of applications from manufacturers, or their representative for a Certificate of conformance of a pattern, or type, of instrument covered.

The Certificate provided would attest conformance of a pattern to performance requirements of relevant OIML Recommendations. A participating OIML member nation will administer its participation through its CIML member and an Issuing Authority or Authorities with assistance of nationally recognized testing laboratories. Certificates and test reports will be issued to manufacturers who apply for a pattern that conforms to requirements. The International Bureau of Legal Metrology (BIML) will register each Certificate and will maintain and publish a current list of Certificates issued within categories of instruments covered by the System. CIML, which is composed of a representative of each member nation, will implement and supervise the System overall. A means for appealing

Decisions within the System will be provided by each participating member nation according to its national laws and regulations. CIML may assist, if requested, in interpreting requirements of OIML Recommendations.

In those nations that require pattern approval of some categories of measuring instruments prior to being placed in service, this System is expected to benefit manufacturers by saving time and expense in achieving national pattern approval, or type, approval of affected instruments and to benefit the various legal authorities by saving the time and expense associated with the required testing of instruments for pattern approval. The establishment of this System is in accordance with the objectives of OIML in harmonizing and facilitating metrological control of measuring instruments internationally. Furthermore, this process provides equity in international trade of products and services and ensures quality of measurements for achieving and maintaining public health and safety and for protecting the environment.

Scope -

## OIML CERTIFICATE SYSTEM

Voluntary

Issuing authority

Manufacturer, importer, distributor

Nationally recognized testing laboratories

Test report according to OIML format

Registration and published list by BIML

Certificate used by owner

- Application for pattern approval
- Presentation for initial verification

The OIML Certificate System provides a means of attesting the conformity of the pattern of an instrument, as represented by samples, to the requirements of relevant OIML Recommendations. A list of categories of instruments covered by the System with reference to relevant Recommendations is maintained by the International Bureau of Legal Metrology (BIML). The relevant Recommendations shall specify (a.) the metrological and technical requirements of the instruments covered, (b.) a specific overall test, and (c.) the format of a test report. Existing Recommendations cover instruments for measurements for mass, volume, liquid and gas flow, pressure, temperature, electricity, acoustics, optics, pollution, ionizing radiation, mechanical testing, medical applications, and packaging. The categories of instruments and, hence, Recommendations to be included in the System will be determined by the International Committee of Legal Metrology (CIML).

An OIML member nation participates in the System on a voluntary basis. If it chooses to participate, the member nation establishes only one Issuing Authority for each category of instrument covered. A nation's member of the International Committee of Legal Metrology (CIML member) may be the Issuing Authority or one of the Issuing Authorities. Implementation of the System within a member nation shall include operations, supervision, and controls as well as an appeals process consistent with national laws and regulations.

OIML CERTIFICATE SYSTEM

RESPONSIBILITIES

MEMBER NATION	MANUFACTURER
- CIML member	- Application
- Issuing authority	
- Testing laboratory	- Submit samples
- Test report	- Testing fee
- Certificate	- Registration fee
- Appeals process	- May appeal decisions
- Consider other Certificates and test reports to meet national requirements	- Submit Certificate and test report to meet national requirements

Application -

A manufacturer, or its representative, may apply to any participating OIML member for a Certificate. The application shall include an identification of the manufacturer and a complete description of the instrument and its principles of operation. Applicable test results of the manufacturer or of a third party testing laboratory may be submitted in support of the claim that the instrument meets the requirements of relevant Recommendations. After reviewing the application, the CIML member, if not the Issuing Authority, shall refer the application to the appropriate Issuing Authority. The Issuing Authority shall inform the applicant in writing of the decision to accept or refuse an application. An explanation giving reasons for refusal are required. If accepted, the applicant shall be informed of the number of samples to be submitted; the fees for testing the samples, issuing a Certificate, and registering a Certificate; and the approximate time necessary to complete testing and to prepare a test report. The requirement for review and approval of an application may be abbreviated on the basis of prior experience and knowledge of the pattern and information provided by the applicant.

Testing -

The tests of conformity of the samples of the pattern provided shall be performed by a laboratory designated by the Issuing Authority. The testing laboratory should have been selected according to its ability to meet requirements of international guidelines for testing, in particular, ISO/IEC Guide 25 on "General requirements for the technical competence of testing laboratories" and ISO/IEC Guide 38 on "General requirements for acceptance of testing laboratories." The methods of testing shall be compatible with those described in the relevant OIML Recommendations. The testing requirements may be abbreviated on the basis of experience and prior knowledge of the pattern.

After tests are completed, a summary test report shall be prepared according to the format prescribed in the relevant Recommendations. It shall identify the manufacturer and pattern tested and generally describe the conditions and results of tests. The test report shall be in either French or English (preferably both) and dated, each page numbered and provided a unique identification number. In those cases when the samples do not meet the testing requirements the applicant shall be informed in writing about the reasons for failure. It is expected, however, that in most cases of failure a manufacturer may resubmit an application and samples whose testing will mainly be restricted to those requirements not previously met.



**Approval -**

If a pattern of a measuring instrument is found to conform to all requirements of relevant Recommendations, a Certificate and its associated test report shall be issued to the applicant who becomes their owner. A prescribed format shall be followed that includes a unique number. Uniform pre-printed Certificate Forms will be available for use from BIML. The Certificate shall be in either French and English and signed by the CIML member or Issuing authority or both. The criteria for approval may be abbreviated depending on the circumstances regarding the status of relevant Recommendations.

**Registration -**

The CIML member shall send a copy of the issued Certificate to BIML for registration. After review to determine if all necessary information has been provided, BIML shall notify the owner of the Certificate of its registration. In addition, BIML shall maintain and publish periodically a list of currently registered Certificates.

**Use of a Certificate -**

A Certificate and its associated test report may be used by its owner as follows: (a.) in support for application for pattern approval in any country or regional association of countries, (b.) in support of the presentation of an individual instrument for initial verification in a country in which pattern approval is not required, and (c.) to inform potential buyers and users of the instrument through catalogues and other marketing literature. An individual instrument, however, may not indicate approval or any other reference to OIML.

Responsible legal authorities are encouraged to take into consideration in the process of evaluating an instrument for pattern approval the Certificate and its associated test report when submitted by a manufacturer with an application for type samples.

**Supervision -**

## OIML CERTIFICATE SYSTEM

### RESPONSIBILITIES

BIML	CIML
- Administers System	- Supervises System
- Lists instrument categories and relevant Recommendations	- Establishes instrument categories
- Registers Certificates	- Approves relevant Recommendations
- Maintains and publishes list of approved Certificates	- Reviews and revises System periodically
	- Assists in appeals, if requested

The CIML shall monitor the implementation of the System and adopt changes or amendments that might be necessary to improve its operation and effectiveness. BIML and CIML may be called upon by a CIML member in a participating nation to assist in resolving technical issues, involving mainly interpreting relevant Recommendations, associated with an appeals process.

## Executive Committee

CIML will have in place a means to investigate for delisting a registered Certificate if it is misused by its owner. When relevant Recommendations are revised, CIML will interpret what an owner of a Certificate attesting conformity to the previous Recommendation needs to do in order to get a Certificate attesting conformity to the revised Recommendation.

BIML will maintain a current list of participating member nations and their Issuing Authorities. Member nations will promptly inform BIML of any change in their status of participation or of a desire to participate in the System.

## Conclusions -

The objective of the System is to harmonize and improve the effectiveness and efficiency of the metrological control of measuring instruments by responsible authorities among member nations. The System already has provisions to reduce the steps required to be taken during the application for and the testing and issuing of a Certificate based upon experience with previous patterns and testing information provided by a manufacturer that submits an application. With time and experience, the System should improve in effectiveness and efficiency as Issuing Authorities and testing laboratories in participating member nations gain confidence among themselves for mutual recognition of the credibility of Certificates and their associated test reports. It is expected that Certificates may also benefit users of measuring instruments in areas of application not subject to legal metrological controls in various nations.



# ORGANISATION INTERNATIONALE DE MÉTROLOGIE LÉGALE

BUREAU INTERNATIONAL DE MÉTROLOGIE LÉGALE

## OIML CERTIFICATE SYSTEM FOR MEASURING INSTRUMENTS

### EXPLANATORY NOTE

This document was approved by the International Committee of Legal Metrology at its twenty-fifth meeting in October 1990.

The *OIML Certificate System for Measuring Instruments* was launched on 1991.01.01 for categories of instruments covered by International Recommendations that satisfy the provisions of subclause 1.2 of this document. Its field of application will be extended to other categories of instruments as and when the International Committee of Legal Metrology approves, for those categories, new or revised Recommendations satisfying those provisions.

Work on the *OIML Certificate System for Measuring Instruments* started in 1987 on the initiative of the International Committee of Legal Metrology; it was the subject of a resolution of the Eighth International Conference of Legal Metrology in 1988, on the basis of which the Committee continued its work to culminate with its decision of 1990.

In this work the greatest importance has been attached to the international activities in certification of ISO, IEC and ILAC, as well as to the general principles laid down by GATT.

If necessary the rules laid down in this document will be extended or adapted in accordance with future decisions of the Committee; besides which the International Bureau of Legal Metrology has been instructed by the Committee to produce one or several final model certificates, and to assist Member States in solving the problems that may arise in the implementation of the *System*.

First edition  
1991.01.01

## OIML CERTIFICATE SYSTEM FOR MEASURING INSTRUMENTS

### 0. Introduction

The OIML Certificate System for Measuring Instruments (hereafter in brief: "OIML Certificate System" or "System") is a system for the issue, registration, and use, on a voluntary basis, of certificates of conformity of patterns(\*) of measuring instruments with Recommendations of the International Organization of Legal Metrology (OIML). It aims to facilitate, accelerate, and harmonize the work of the national or regional bodies that approve patterns of measuring instruments that are subject to state control in OIML Member States or groups of Member States. In the same way, instrument manufacturers, who are required to obtain pattern approval in some countries in which they wish to sell their products, should benefit from the OIML Certificate System if their instruments comply with the requirements of the relevant OIML Recommendations. The OIML Certificate System also aims to facilitate initial verification of measuring instruments in countries where pattern approval is not required, and may help to promote the manufacture, marketing and use of measuring instruments that comply with OIML requirements, for applications that are not subject to legal control.

General rules for the certification of products, processes, and services have been laid down by recognized international organizations (see bibliography). The OIML Certificate System follows these general rules and applies them to patterns of measuring instruments. Those who implement and those who participate in the System shall make sure that the international guidelines on certification and testing are observed.

### 1. Scope

- 1.1. An OIML certificate of conformity of a pattern of a measuring instrument attests the conformity of that pattern, as represented by the sample(s) submitted and tested, with the requirements of the relevant OIML Recommendation(s).
- 1.2. An OIML certificate of conformity may be issued only for the categories of measuring instruments for which the relevant existing OIML Recommendation(s) specifies(y): a) the metrological and technical requirements applicable to the instruments concerned, b) a test method, and c) the format of the test report.

A list of the categories of measuring instruments concerned, with references to the relevant OIML Recommendations, is maintained by the International Bureau of Legal Metrology (BIML) under the supervision of the International Committee of Legal Metrology (CML).

- 1.3. An OIML certificate of conformity is issued by an issuing authority of an OIML Member State. In a given OIML Member State there may be one or several issuing

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(\*) The term "pattern" is most often used in legal metrology whereas the term "type" is now commonly used in other fields of certification; in this document, the term "pattern" is maintained with the same meaning as "type".



authorities; however, for each category of measuring instrument there shall be only one issuing authority. The CIML member of a given Member State may be the issuing authority or one of the issuing authorities in that State.

- 1.4. OIML Member States that choose to implement the OIML Certificate System shall ensure that procedures for the operation, supervision, and control of the System, including appeals, are established and are consistent with national laws.

## 2. Abbreviations and terminology

The following abbreviations and definitions apply:

OIML	means	International Organization of Legal Metrology
CIML	"	International Committee of Legal Metrology
BIML	"	International Bureau of Legal Metrology
Member State	"	an OIML Member State
Recommendation	"	an OIML International Recommendation
System	"	OIML Certificate System for Measuring Instruments
Certificate	"	OIML certificate of conformity

### 2.1. Conformity

The fulfilment by a pattern of a measuring instrument of all metrological and technical requirements specified in the relevant Recommendation(s).

### 2.2. OIML Certificate System for Measuring Instruments

The system for the issue, registration, and use, on a voluntary basis, of certificates of conformity of patterns of measuring instruments with the relevant Recommendation(s).

### 2.3. OIML certificate of conformity

A document, issued under the rules of the System by an issuing authority, indicating that adequate confidence has been provided through testing that a duly identified pattern of a measuring instrument, represented by identified samples submitted to test, is in conformity with the relevant Recommendation(s).

### 2.4. Test report

A report that summarizes, as appropriate, the various test results obtained for an identified pattern, and that is prepared according to the format provided in the relevant Recommendation(s).

### 2.5. Issuing authority

A body or a person, in a Member State, that issues OIML certificates of conformity for all or for certain categories of measuring instruments.

Notes: 1) A CIML member may be an issuing authority.

- 2) A list of all the issuing authorities in the various OIML Member States is maintained by BIML and is permanently available to Member States and other interested parties on request.

### 3. Issue of certificates

#### 3.1. Application

- 3.1.1. The manufacturer, his representative or the importer of a pattern of measuring instrument may apply to any CIML member for a certificate.

The application shall include:

- the name and address of the manufacturer and, if appropriate, of his representative or importer,
- a statement that no concurrent application for a certificate for the pattern has been made by the applicant to any other CIML member,
- a description of the pattern, sufficiently detailed to identify the pattern as distinct from other patterns, and any information related to testing,
- a description of the instrument's operation, including the manufacturer's operating instructions,
- if applicable, results of previous pattern-evaluation tests (see 3.3.3).

The applicant may also submit his own test results, or those of a third-party testing laboratory, in support of the claim that the instrument meets the requirements of the relevant Recommendation(s).

- 3.1.2. The CIML member shall refer the application to the appropriate issuing authority in his country or shall consider it directly on his own authority, and shall inform the applicant accordingly. The applicant shall be informed that his application cannot be processed if:

- the pattern of the instrument does not belong to one of the categories within the System (see 1.2),
- an issuing authority does not exist in the Member State for the category of instrument concerned; in this case the CIML member may refer the applicant to another CIML member, without obligating the latter thereby.

#### 3.2. Consideration of the application

- 3.2.1. The issuing authority receiving the application shall review it and may ask the applicant for additional information and documents prior to further processing the application.

- 3.2.2. The issuing authority shall refuse the application if:

- the pattern does not correspond to the category of instrument covered in the relevant Recommendation(s),
- the information required for the application is incomplete.

The application may be refused for other, clearly identified reasons.

- 3.2.3. The issuing authority shall inform the applicant (and, if applicable, the CIML member) in writing of its decision concerning the acceptance or refusal of an application. If the application is refused the reason shall be given.

3.2.4. If the application is accepted the issuing authority shall inform the applicant of the number of samples of the pattern that are required for testing. This number is usually specified in the relevant Recommendation(s) but, if not, it shall be mutually agreed between the issuing authority and the applicant. In certain cases the issuing authority may be satisfied with the results of previous pattern evaluation tests (see 3.3.3) and therefore new samples of the pattern may not be necessary; however, the issuing authority shall obtain evidence that pattern for which a certificate is requested is identical to the previously-evaluated pattern.

The issuing authority shall provide the applicant with an estimate that is as accurate as possible of the fees for testing and for issuing the certificate, and the exact amount of the fee for registration; the amounts of the fees for testing and issuing shall be decided according to national practice; fees for registration shall be decided by the CIML.

The issuing authority shall inform the applicant in writing of the approximate time necessary to complete all testing and prepare a test report.

### 3.3. Test of conformity

3.3.1. The tests of conformity shall be performed in the laboratory(ies) designated by the issuing authority that accepted the application. In the choice of this (these) laboratory(ies) the issuing authority shall observe the principles established in international guidelines on testing, in particular in ISO/IEC Guides 25 and 38 "General requirements for the competence of calibration and testing laboratories", "General requirements for the acceptance of testing laboratories" respectively.

3.3.2. The methods of test shall be compatible with those described in the relevant Recommendation(s).

3.3.3. The tests of conformity may be abbreviated or omitted if the issuing authority considers that the conclusions necessary for issuing the certificate may be drawn from previous pattern evaluation tests, provided that they were carried out according to the requirements of 3.3.1 and 3.3.2 above. Where applicable, relevant test results of a manufacturer or of a third-party testing laboratory may be considered.

3.3.4. A test report summarizing, as appropriate, the various test results obtained for the pattern shall be prepared in the format provided in the relevant Recommendation(s). The test report shall include at least the following:

- the name and address of the laboratory(ies) that performed the tests, with a statement of compliance with the guidelines mentioned in 3.3.1, e.g. details of any accreditation,
- reference (number and year of edition) to relevant Recommendation(s),
- identification of the pattern of instrument (e.g. designation, description, external and internal photographs, marking, inscriptions, specifications, electronic circuitry and parts list, etc. including, if applicable, the accuracy class),
- identification of the samples tested,
- the name and address of the manufacturer,

- the name and address of the applicant for the certificate,
- the date (period) of the tests,
- the place of testing,
- the specific conditions of the tests, if applicable,
- the test results,
- a conclusion as to whether the samples meet all the requirements of the relevant Recommendation(s).

The test report shall be dated, signed, and provided with a unique identification number by the responsible person(s) of the laboratory(ies) or of the issuing authority.

The test report shall be in French or English (preferably both).

Note: In some cases translation of the test report into an additional language other than French or English may assist in national or regional implementation and interpretation of the System.

3.3.5. The issuing authority shall keep on file the information provided with the application and a copy of the test report (see also 3.4.5). In addition, by agreement with the applicant, the tested samples may be kept by the issuing authority or by the testing laboratory(ies), or by the applicant, the decision taking into account the size and the commercial value of those samples.

3.3.6. If it is concluded that the samples meet all the requirements of the Recommendation(s), a certificate shall be issued in accordance with 3.4.

If not, the applicant shall be informed in writing of the reason for failure, and the test report may be given to the applicant, if requested. The applicant may submit a new application with samples of a modified and newly-identified pattern. New tests shall be conducted but may be limited to those requirements for which the previous pattern was found not to comply, provided that evidence supports the conclusion that the instrument's performance according to all other requirements is not likely to have been affected by the modification of the pattern.

3.3.7. The fees for testing shall be collected in accordance with national practice.

#### 3.4. OIML certificate of conformity

If the pattern of a measuring instrument is found to conform to all the requirements of the relevant Recommendation(s), a certificate shall be issued at the conclusion of the tests.

3.4.1. The certificate shall be prepared according to the model given in Annex 1, or preferably by completing a pre-printed certificate form available from BIML. It shall be signed by the issuing authority or the CIML member or both.

3.4.2. The certificate shall be in French or English (preferably both).

3.4.3. The certificate shall bear a unique reference number indicating:

- the relevant Recommendation(s),
- the name of the Member State in which the certificate was issued,
- the year of issue,
- a serial number.

This reference number shall be established according to the form specified in Annex 2.



3.4.4. The certificate shall also include a mention of the identification number of the associated test report.

3.4.5. The certificate and the associated test report shall be given to the applicant, who then becomes their owner. The CIML member and the issuing authority shall keep a copy.

3.4.6. The fees for issuing the certificate shall be collected in accordance with national practice.

#### 4. Registration of a certificate

4.1. The CIML member shall send a copy of each certificate issued in his country to BIML for registration. BIML shall check the certificate to ensure that all the required information is correctly provided.

4.2. BIML shall send the owner of the certificate an invoice for the registration fee. A certificate shall be registered only after the fee has been collected.

4.3. Periodically BIML shall inform the Member States and any other interested parties of the registration of certificates, through appropriate publications, and shall maintain lists of registered certificates, permanently available to CIML members on request(\*).

#### 5. Use of a certificate

5.1. A registered certificate and the associated test report may be used by its owner:

- in support of an application for pattern approval in any country or group of countries; it is the responsibility of the applicant to give evidence upon request that the pattern presented for approval is identical to the pattern identified by the certificate;

Note: The legal metrology service (or other responsible body) to which an application for pattern approval is made should take into consideration the certificate and the associated test report to the extent that is possible; the attention of the legal metrology services of Member States is especially drawn to the advantages that may accrue from the recognition of certificates and the acceptance of the reported test results to facilitate, accelerate and harmonize the processes of national or regional pattern approval.

- in support of the presentation of an individual instrument for initial verification in a country where pattern approval is not required; it is the responsibility of the applicant to give evidence upon request that the instrument presented for verification is of the pattern that is identified in the certificate;

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(\*) In addition to the reference number referred to in 3.4.3, BIML may apply a special number to each registered certificate to facilitate the maintenance and use of its lists of registered certificates.

- to inform buyers, users and other interested parties that the pattern of measuring instrument (represented by the tested samples) was found to conform to the requirements of relevant Recommendation(s). Such evidence of conformity (and the name of the OIML Member State in which the certificate was issued) may be referred to or included (however, see 5.2) in e.g. manufacturer's catalogues and other marketing literature but shall not be used as a proof of conformity of an individual instrument to the requirements of relevant Recommendation(s). In particular neither a certificate's reference number nor any other reference to OIML shall be affixed to an individual instrument.

5.2. Apart from the mention of the certificate's reference number with the name of the OIML Member State in which the certificate was issued (see 5.1), partial quotation of the certificate or of the associated test report is not permitted, but they may be reproduced in full.

## 6. Supervision and control

### 6.1. General

The CIML shall supervise the implementation of the general rules, their adaptation to changing needs, and the formulation of additional rules that may be necessary for the effective operation of the System.

### 6.2. Appeal

Each issuing authority shall have procedures for accepting, considering, and resolving appeals against its decisions.

A CIML member may act as a technical advisor and may request assistance from BIML, the responsible OIML working group(s), or CIML in resolving technical issues associated with appeals and disputes of decisions of an issuing authority in his country.

### 6.3. Role of a CIML member

In addition to the various tasks described above, a CIML member shall promptly:

- inform BIML about the establishment or change of an issuing authority in his country,
- provide the issuing authority(ies) in his country with current information concerning the operation of the System.

### 6.4 Misuse of a certificate by its owner

When documented and substantiated evidence is presented to BIML that the owner has used a certificate in a manner that does not conform to the requirements of clause 5, BIML shall, after consultation with the CIML member of the Member State in which the certificate was issued, inform the Member States and other interested parties accordingly. In addition BIML shall directly inform the owner that continued misuse of the certificate will initiate corrective actions by CIML that could result in the delisting of the certificate by BIML.

#### 6.5. Certificate issued on the basis of wrong conclusions

When documented and substantiated evidence is presented to BIML that the tests providing the basis for issuing a certificate were performed or interpreted incorrectly, BIML shall, after consultation with the CIML member of the Member State in which the certificate was issued, delist the certificate and inform its owner, the Member States and other interested parties accordingly. In such cases the conditions under which the fees for the tests and for the issue of the certificate are reimbursed shall be determined by an agreement between the issuing authority or the CIML member of the Member State involved, and the owner.

#### 6.6. Revision of Recommendations

After revision of the relevant Recommendation(s) for a given category of measuring instrument for which certificates may be issued, the responsible OIML working group(s) shall declare, and the CIML shall confirm, whether instruments complying with the previous relevant Recommendation(s) also comply with the revised Recommendation(s), or whether they may not comply with those revisions.

If the instruments are declared to comply, an owner of a certificate provided in accordance with the previous Recommendation(s) may apply for a certificate referring to the revised Recommendation(s); a new certificate shall be provided to the owner by the relevant issuing authority and shall be registered by BIML, at no charge.

If it is declared that the instruments may not comply, an owner may apply for a new certificate according to the revised Recommendation(s), by submitting the same pattern or a modified pattern of the instrument concerned, following the same procedure as in 3.3; the tests required for issuing a new certificate may be abbreviated according to 3.3.3.

ANNEX 1

(This Annex forms an integral part of this document)

GENERAL MODEL FOR AN OIML CERTIFICATE

Below is a general model of an OIML certificate of conformity. It may be used directly by issuing authorities and CIML members of OIML Member States either by simply reproducing it or by creating certificate forms based on the model. The French version of this document includes the same general model in French. Bilingual certificates in which the text is in both English and the language of the Member State may be produced.

Model certificates proper to certain categories of instruments will possibly be established by BIML as and when the OIML Certificate System applies to those categories. Those models will then be made available by BIML.



Member State

OIML Certificate N°

OIML CERTIFICATE OF CONFORMITY

Issuing authority

Name:

Address:

Person responsible:

Applicant

Name:

Address:

Manufacturer of the certified pattern (if the manufacturer is not the applicant)

Name:

Address:

Identification of the certified pattern

(identification continued overleaf if necessary)

This certificate attests the conformity of the above-mentioned pattern (represented by the samples identified in the associated test report) with the requirements of the following Recommendation(s) of the International Organization of Legal Metrology (OIML):

R

edition

for accuracy class (if applicable).

This certificate relates only to the metrological and technical characteristics of the pattern of the instrument concerned, as covered by the relevant OIML International Recommendation(s).

This certificate does not bestow any form of legal international approval.

OIML Certificate N°

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The conformity was established by tests described in the associated test report N° , that includes pages.

Identification(s) and signature(s) or stamp(s), of (as applicable):

The issuing authority

The CIML member

Date

Date

★  
★ ★

Identification continued (if necessary)

Important note: Apart from the mention of the certificate's reference number and the name of the OIML Member State in which the certificate was issued, partial quotation of the certificate or of the associated test report is not permitted, though they may be reproduced in full.

## ANNEX 2

(This Annex forms an integral part of this document)

## REFERENCE NUMBER OF AN OIML CERTIFICATE

The reference number of an OIML certificate includes three parts:

- the number(s) and year(s) of publication(\*) of the relevant Recommendation(s), as specified in a separately published list of measuring instruments that are included in the OIML Certificate System,
- a two-letter code indicating the Member State in which the certificate was issued (in accordance with ISO code: see below), and
- the last two figures of the year of issue of the certificate, followed by a sequential number, restarting from 1 each year for each Member State.

Example: reference number "R76/1988 - AA - 91.14" represents the 14th certificate issued in 1991 in the Member State for which the code is AA for the instruments covered by Recommendation R76, edition 1988.

\*  
\* \*

## International codes for names of OIML Member States

Algeria	DZ	Japan	JP
Australia	AU	Kenya	KE
Austria	AT	Rep. of Korea	KR
Belgium	BE	Dem. People's Rep. of Korea	KP
Brazil	BR	Lebanon	LB
Bulgaria	BG	Monaco	MC
Cameron	CM	Morocco	MA
Canada	CA	Netherlands	NL
People's Rep. of China	CN	Norway	NO
Cuba	CU	Pakistan	PK
Cyprus	CY	Poland	PL
Czechoslovakia	CS	Portugal	PT
Denmark	DK	Romania	RO
Egypt	EG	Saudi Arabia	SA
Ethiopia	ET	Spain	ES
Finland	FI	Sri Lanka	LK
France	FR	Sweden	SE
Germany	DE	Switzerland	CH
Greece	GR	Tanzania	TZ
Hungary	HU	Tunisia	TN
India	IN	United Kingdom	GB
Indonesia	ID	United States of America	US
Ireland	IE	U.S.S.R.	SU
Israel	IL	Yugoslavia	YU
Italy	IT		

(\*) When the years of publication of the French and English versions of a Recommendation are different, the reference number shall mention the year of publication of the French version.

Bibliography

ISO/IEC Guide 2	General terms and their definitions concerning standardization and related activities
ISO/IEC Guide 16	Code of principles on third party certification systems and related standards
ISO/IEC Guide 25	General requirements for the competence of calibration and testing laboratories
ISO/IEC Guide 28	General rules for a model third-party certification system for products
ISO/IEC Guide 38	General requirements for the acceptance of testing laboratories
ISO/IEC Guide 40	General requirements for the acceptance of certification bodies
GATT	Agreement on technical barriers to trade (the Standards Code).

Other reference documents

OIML D 19	Pattern evaluation and pattern approval
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## Appendix K - USDA Certification Plan

### Standardizing Commercial Inspection

Richard Pierce, Leader  
Type Evaluation Group  
Federal Grain Inspection Service

The Grain Quality Incentives Act of 1990 was passed as part of the 1990 Farm Bill. The Grain Quality Incentives Act outlines a broad-based approach for addressing grain quality concerns and enhancing the competitiveness of U.S. grain exports. Specific issues addressed by the Grain Quality Incentives Act include better coordination between government agencies involved with grain quality, development of grading standards that promote grain cleanliness and reflect economic value-based characteristics meeting the requirements of the end user, and the need for greater uniformity in commercial grain inspection. Standardization of commercial inspections is specifically addressed in Section 2009 of the Grain Quality Incentives Act which amends the U.S. Grain Standards Act to authorize the Federal Grain Inspection Service (FGIS) to participate in the standardization of commercial grain inspections. Previously, FGIS activities were restricted to the Official Inspection System.

#### SEC. 2009. STANDARDIZING COMMERCIAL INSPECTIONS.

The United States Grain Standards Act (7 U.S.C. 71) is amended by adding at the end the following new section:

##### "SEC. 22. STANDARDIZING COMMERCIAL INSPECTIONS.

(a) TESTING EQUIPMENT -- To promote greater uniformity in commercial grain inspection results, the Administrator may work in conjunction with the National Institute of Standards and Technology and the National Conference on Weights and Measures to --

- (1) identify inspection instruments requiring standardization under subsection (b);
- (2) establish performance criteria for commercial grain inspection instruments;
- (3) develop a national program to approve grain inspection instruments for commercial inspection; and
- (4) develop standard reference materials or other means necessary for calibration or testing of approved instruments.

(b) GENERAL INSPECTION PROCEDURES -- To ensure that producers are treated uniformly in delivering grain, the Administrator shall develop practical and cost-effective procedures for conducting commercial inspections of grain with respect to the application of quality factors that result in premiums and discounts. The procedures shall be made available to country elevators and others making first-point-of-delivery inspections.

(c) INSPECTION SERVICES AND INFORMATION -- To encourage the use of equipment and procedures developed in accordance with subsections (a) and (b), the Administrator shall provide for official inspection services by the Service, States, and official inspection agencies and provide information on the proper use of sampling and inspection equipment, inspection services, including appeals under this Act.

(d) STANDARDIZED AFLATOXIN EQUIPMENT AND PROCEDURES -- The Administrator shall--

- (1) establish uniform standards for testing equipment; and
- (2) establish uniform testing procedures and sampling techniques;

that may be used by processors, refiners, operators of grain elevators and terminals, and others to accurately detect the level of aflatoxin contamination of corn in the United States."

There are two provisions in the amendment concerned with standardizing commercial inspections that should be of particular interest to the National Conference on Weights and Measures (NCWM). First, FGIS has been tasked with developing practical and cost-effective procedures for conducting commercial inspections [subsection (b)]. These procedures are currently under development, and may be available as early as this spring for use by country elevators and others making first-point-of-delivery inspections. It is important to note that it will not be mandatory that these procedures be followed for commercial inspections, and that FGIS will not be certifying commercial inspection results. The Commodity Credit Corporation (CCC), however, will be required to use these procedures when inspecting and evaluating the condition of grain it acquires from producers. Even then, it is specifically stated that Official Inspections are not required unless requested by the producer. Thus, it is clearly not the intent of the Grain Quality Incentives Act that commercial inspection procedures be identical with those used for Official Inspections.

The provision of the Grain Quality Act that should have the greatest impact on the NCWM is subsection (a), which authorizes FGIS to work with the National Institute of Standards and Technology (NIST) and the NCWM to test and approve equipment for use in commercial grain inspection. As with the inspection procedures developed for commercial inspections, it is not anticipated that equipment approval for the commercial system will be identical with the approval process used for FGIS. FGIS feels that separate systems will be required to address the unique requirements of the commercial and Official inspection systems. FGIS will continue to evaluate and approve equipment intended for the appropriate groups to regulate testing and approval of commercial grain inspection equipment. Although FGIS does not feel that it is our responsibility to provide approval for equipment used in the commercial system, we do recognize an obligation to participate in this process. Provisions in the Grain Quality Incentives Act give us the authority to increase our activities in this area.

The Grain Quality Incentives Act specifies that development of a cooperative equipment testing program for the commercial system by FGIS, the NCWM and NIST would include identifying inspection instruments requiring standardization, establishing design and test criteria, developing a national testing program for instruments used in commercial inspections, and, where necessary, providing for the calibration of approved instruments. Again, FGIS feels that these activities should be carried out within the framework of the NCWM, with FGIS assisting in the development and, possibly, the execution of the testing program. The following working arrangement is envisioned

(1) Identifying equipment requiring standardization.

It is suggested that a committee consisting of NCWM members and NIST and FGIS personnel be appointed to identify grain inspection equipment requiring standardization for use in the commercial systems. The committee should also establish a timetable for initiating a testing program for commercial grain inspection equipment, including the order in which equipment testing needs should be addressed. Types of equipment that may require standardization include moisture meters, NIR (near-infrared) analyzers (used to measure protein, oil and moisture), dockage testers, test weight apparatus, and aflatoxin test kits.

(2) Establish performance criteria for commercial grain inspection instruments.

This effort should be coordinated through appropriate technical committees within the National Type Evaluation Program (NTEP) and the NCWM. It is anticipated that FGIS and the NCWM will work together to develop basic design requirements and tolerances, with each group developing additional requirements to meet their specific needs. FGIS will support this effort by making available existing FGIS design criteria and performance specifications that can be used as a starting point. FGIS personnel are also prepared to provide technical input and leadership in the development of design requirements and tolerances for commercial grain inspection equipment.

(3) Develop a national program to approve grain inspection instruments for commercial inspection.

Rather than developing a new program, it is envisioned that NTEP activities will be expanded to include a wider variety of grain inspection equipment. FGIS would like to limit its equipment approval activities to those pieces of equipment best meeting the needs of the Official Inspection System. The extent to which FGIS can participate as an NTEP approved laboratory in the testing of commercial inspection equipment will depend upon resource availability and our ability to recover the cost of testing. FGIS does not currently have the authority to charge for testing grain inspection equipment not intended for use

the Official Inspection System, but is requesting legislative changes which would allow us to recover the costs of testing commercial inspection equipment for NTEP.

- (4) Develop standard reference materials or other means necessary for calibration or testing of approved instruments.

Many types of grain inspection instruments, such as moisture meters and NIR analyzers, make indirect measurements and must be calibrated before a meaningful result can be obtained. When type evaluating instruments that make indirect measurements, a decision must be made on whether to limit testing to instrument capabilities or to also test the performance of the calibration. In addition, ongoing calibration efforts often far exceed the work required to test and approve an instrument. Extending NTEP activities to include instruments making indirect measurements may require related calibration activities to ensure consistent results among instrument types. FGIS has requested legislative changes which would allow us to supply calibration data to instrument manufacturers on a fee basis. Pending approval of this program, FGIS may be able to help address ongoing calibration needs.

To summarize, the provisions of the Grain Quality Incentives Act provide FGIS with an opportunity for increased participation in NCWM and NTEP efforts to standardize commercial grain inspections. We feel that the NCWM and NTEP are the appropriate groups to regulate testing and approval of commercial grain inspection equipment, but we are prepared to contribute to a joint effort by helping to (1) identify equipment requiring standardization; (2) develop design requirements and tolerances; and (3) participate in testing and calibration efforts as resources allow.

## Final Report of the Laws and Regulations Committee

Allan M. Nelson, Chairman  
Director, Weights and Measures  
Department of Consumer Protection, Connecticut

Reference  
Key Number

### 200 Introduction

This is the final report of the Laws and Regulations Committee for the 76th Annual Meeting of the National Conference on Weights and Measures (NCWM). This report and the recommendations adopted by the active members at the Annual Meeting are based on the Committee's deliberations at its Interim Meeting, January 13-17, 1991, the data and testimony provided prior to, at, and after that meeting, and the deliberations and information supplied 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 in the Committee's report are assigned from the subject series listed below. Voting items are indicated with a "V" after the item number. At the Annual Meeting, voting items were grouped into a consent calendar and voted upon as a group. They are marked with a "VC." One item, 232-11, was voted upon separately. Items marked with an "I" after the reference key number are information items. The item marked with a "W" were withdrawn by the Committee. Table B lists the appendices. Results of the voting are reported in Table C.

Much of the Report contains recommendations to revise or amend National Institute of Standards and Technology (NIST) Handbook 130, 1991 edition, "Uniform Laws and Regulations," or NIST Handbook 133, Third Edition "Checking the Net Contents of Packaged Goods," together with the Supplement issued in 1990. Proposed revisions to handbooks are shown in **bold face print** by ~~crossing out~~ what is to be deleted, and underlining what is to be added. Entirely new paragraphs proposed for handbooks are designated as such and shown in **bold face print**.

HANDBOOK 130	210 Series
LAWS	220 Series
Uniform Weights & Measures Law	221 Series
Uniform Weighmaster Law	222 Series
Uniform Motor Fuel Inspection Law	223 Series
REGULATIONS	230 Series
Uniform Packaging and Labeling Regulation	231 Series
Uniform Regulation for the Method of Sale of Commodities	232 Series
Uniform Unit Pricing Regulation	233 Series
Uniform Regulation for the Voluntary Registration of Servicepersons & Service Agencies for Commercial Weighing & Measuring Devices	234 Series
Uniform Open Dating Regulation	235 Series
Uniform Regulation for National Type Evaluation	236 Series
Uniform Regulation for Motor Fuel	237 Series
POLICY AND GUIDELINES	238 Series
 HANDBOOK 133	 240 Series
OTHER ITEMS	250 Series



**Table A**  
**Index to Reference Key Items**

Reference Key No.	Title of Item	Page
<b>21</b>	<b>Uniform Weights and Measures Law (UWML) . . . . .</b>	<b>194</b>
21-1	VC 1.10. Net Weight, 12.(n); Include Services in Definition of Net Weight and in Powers of Director . . . . .	194
21-2	VC 1.9. Package . . . . .	195
21-3	VC 12. Powers and Duties of the Director - Minimum Training Requirements . . . . .	196
21-4	VC 18. Sale from Bulk . . . . .	196
<b>31</b>	<b>Uniform Packaging and Labeling Regulation . . . . .</b>	<b>197</b>
31-1	VC 2.1. Change "Commodity in Package Form" to "Package" . . . . .	197
31-2	VC 2.12. Spot Label . . . . .	198
31-3	VC 2.XX. Standard Package . . . . .	198
31-4	VC 6.11.3. Rounding; How to Round for the Net Weight Declaration . . . . .	199
31-5	I 10.5. Combination Packages and 10.6. Variety Packages . . . . .	199
31-6	I 10.X. Mechanical Pump Dispensers . . . . .	200
<b>42</b>	<b>Uniform Regulation for the Method of Sale of Commodities . . . . .</b>	<b>201</b>
42-1	VC 1.1. Berries and Small Fruits; Define "Small Fruits" . . . . .	201
42-2	VC 1.2. Bread - Permit 6-Oz Loaves of Microwaveable Bread . . . . .	202
42-3	VC 1.5.2.3. Fresh Oysters, Clams, Mussels, or Other Mollusks Removed from the Shell . . . . .	203
42-4	I 1.5.X. Meat, Poultry, Fish, and Seafood -- Packaged with Other Packages of Food . . . . .	204
42-5	W 1.7.1. Factory-Packaged Ice Cream and Similar Frozen Products . . . . .	204
42-6	VC 1.9. Advertising and Price Computing of Bulk Food Commodities . . . . .	205
42-7	I 1.X. Home Food Service Plan Sales . . . . .	205
42-8	VC 2.4. Fireplace and Stovewood . . . . .	206
42-10	W 2.16. Liquefied Petroleum Gas Cylinder Tare Weights; Acetylene . . . . .	207
42-11	V 2.20. Gasoline-Alcohol Blends; Add Labeling of All Oxygenates . . . . .	207
42-12	W 2.22. Liquid Oxygen Used for Medical Purposes . . . . .	209
42-13	VC 2.X. Wiping Cloths . . . . .	210
42-14	I 2.XX. Glass . . . . .	210
42-15	I 2.XXX. Baler Twine . . . . .	211
42-16	I 2.XXXX. Products Disposed from Mechanical Devices . . . . .	212
<b>7</b>	<b>Uniform Motor Fuel Regulation . . . . .</b>	<b>212</b>
7-1	W Use of Qualitative Terms for Motor Fuel . . . . .	212

**Table A (Continued)**

Reference Key No.		Title of Item	Page
<b>238</b>		<b>Interpretations and Guidelines</b> .....	<b>212</b>
238-1	VC	Ready-to-Eat Food - Guideline on Selling Whole Chicken by Count .....	212
238-2	W	2.3.2. Fresh Fruits and Vegetables .....	213
238-3	VC	Typewriter and Computer Printer Ribbons and Tapes .....	213
238-4	I	Hardwood Labeled by the "Board Foot" .....	213
<b>240</b>		<b>Handbook 133: Package Testing</b> .....	<b>214</b>
240-1	VC	Moisture Loss for Bacon and Luncheon Meats; Definition of "Fresh Poultry" ..	214
240-2	I	Moisture Loss for Ice-Packed Poultry .....	214
240-3	I	Moisture Loss for Pet Foods .....	214
240-4	I	Moisture Loss for Pasta .....	214
240-5	I	Polyethylene/Test Methods for Bags .....	214
240-5A	I	MAV's for Polyethylene Bags .....	214
240-6	I	Aerosol Products -- Testing Procedure for Foam and Nonfoam .....	22
240-7	I	Moisture Loss for Rice .....	22
<b>250</b>		<b>Other Items</b> .....	<b>22</b>
250-1		Enforcement Issues .....	22
250-1A	I	Labeling of Time on Compact Discs .....	22
250-1B	I	Labeling of Products Intended for Wholesale and Retail .....	22
250-1C	I	Candy Sold to Businesses for Resale .....	22
250-1D	I	Survey on the Use of Codes in Lieu of Actual Price Entry .....	22
250-2	VC	Other Modifications to the Handbook .....	22

**Table B  
Appendices**

Appendix	Title	Reference Key No.	Page
A	Home Food Service Plan Sales	232-7	
B	Prohibited Trade Practices	232-7	
C	Section 3.18 Handbook 133	240-1	

### Order of Presentation

The report was presented to the membership as follows:

The Consent Calendar was presented and adopted.

Item 232-11 was presented. An amendment from the floor was made to add to Section 2.20.1. after "...MTBE/ETBE." the sentence "Spark ignition engine fuel containing less than 1% oxygenate may also be labeled." and to add to Section 2.20.2. before the sentence beginning with "This documentation..." the sentence "Spark ignition engine fuel containing less than 1% oxygenate may also be declared." The vote to hear the amendment was passed, but the vote on the amendment (requiring 2/3 of each house to pass) failed. The recommendation proposed by the Committee was adopted. Additional clarifying language was presented by the Technical Advisor to be added to the body of the Committee's report on this item. Language added to the report is as follows: "As measurement capabilities improve, there is nothing to preclude labeling engine fuel less than 1% (but not zero) as containing oxygenates."

The report in its entirety was then ratified.

#### Table C

#### Voting Results

Reference Key No.	House of State Representatives		House of Delegates		Results
	Yes	No	Yes	No	
Consent Calendar	35	0	39	0	Passed
232-11 Motion to repeal amendment	23	9	40	1	Passed
232-11 Motion to amend	10	27	11	36	Failed
232-11 original item	36	2	42	2	Passed
Entire Report	38	0	47	0	Passed

## Details of All Items

(In order by Reference Key Number)

### 221 Uniform Weights and Measures Law (UWML)

#### 221-1 VC 1.10. Net Weight, 12.(n); Include Services in Definition of Net Weight and in Powers of Director

(This item was adopted as part of the consent calendar.)

**Background:** This was Item 221-1B in the Report of the 75th NCWM, 1990. At the 75th Annual Meeting, the Conference adopted a change to Section 1.2. Weight, clarifying that trade by weight either in services or in commodities requires trade by net weight. For example, if a laundry charges by weight, to be in compliance it may charge only for the weight of the clothing to be cleaned (and not for the wrapping or bag into which the clothes are placed). A moving service, when charging by weight, may charge only for the weight of the goods placed into the truck (and not for the tare weight of the truck). Similarly, a shipping or mailing service charging by weight may charge only for the weight of the package to be shipped.

The pricing practices for services are not required to be by weight, measure, or count.

In its study of the UWML, the Committee noted that several of the sections already specifically refer to "service":

Section 11.(b) "...unfair or deceptive dealing by weight or measure in any commodity or service..."

Section 12.(j)(1) "...in determining the weight, measure, or count of commodities or things sold..." (2) "...in computing the basic charge or payment for services..."

Section 16. "no person shall misrepresent the price of any commodity or service sold, offered,..."

Other sections have been interpreted as including service even though service is not specifically mentioned. For example, Section 18. Sale from Bulk has been used to require a receipt for a waste-hauling service that charges by weight if neither party to the transaction is present at the weighing. After some discussion, the Committee decided that no change was needed to the definition of sale from bulk (Section 1.8.) or Section 18. Sale from Bulk, to recognize its application to services. In fact, it is difficult to conceive of a sale of service from a "bulk supply" of service; on the other hand, sale of a service based on weighing something (person, trash, etc.) is readily conceivable.

In contrast, Section 12. Powers and Duties of the Director is silent in subsection (n) concerning the power to prescribe by regulation, methods of sale for services, when those services are priced by weight, measure, or count. In the opinion of the Committee, this subsection should be revised to clarify this application. The Committee also recommends including time as a unit of measure for service charges. Examples would include car wash timers and clothes dryers in self-service applications.

Section 1.10. Net Weight also should be revised to recognize the special interpretations for properly applying this section to net weight.

The term "net weight" in conjunction with services does not mean that a service company (such as a shipper) may charge only for the goods inside a package: the service is the transportation of the total package; that is, the service includes the shipping of the packing materials. Charging for the total weight of the package does not imply selling a service by gross weight.



Committee Recommendation: Revise the UWML as follows:

10. Net Weight. -- The term "net weight" means the weight of a commodity excluding any materials, substances, or items not considered to be part of the commodity. Materials, substances, or items not considered to be part of the commodity include, but are not limited to, containers, conveyances, bags, wrappers, packaging materials, labels, individual piece covering, decorative accompaniments, and coupons, except that, depending on the type of service rendered, packaging materials may be considered to be part of the service. For example, the service of shipping includes the weight of packing materials.

Committee also recommends that Section 12.(n) include time as a unit of measure for service charges. Examples would include car wash timers and clothes dryers in self service applications. Therefore, amend Section 12. Powers and Duties of the Director as follows:

The director shall:

2.(n) Prescribe, by regulation, the appropriate term or unit of weight or measure to be used, whenever ~~he the Director~~ determines ~~in the case of a specific commodity~~ that an existing practice of declaring the quantity of commodity or setting charges for a service by weight, measure, numerical count, time, or combination thereof, does not facilitate value comparisons by consumers, or offers an opportunity for consumer confusion.

## 1-2 VC 1.9. Package

(This item was adopted as part of the consent calendar.)

Background: This was Item 231-1 in the Report of the 75th NCWM, 1990. Section 1.9. of the UWML defines "package" using the terms "packaged" and "put up." Both terms need further clarification and definition. Also, the definition in the law is not as comprehensive as the definition for "commodity in package form" in the Uniform Packaging and Labeling Regulation (UPLR), which defines a commodity in package form as not necessarily wrapped. In addition, Section 1 of the UPLR defines certain types of containers as outside the definition of package in that regulation. In Section 2.1. of the Uniform Packaging and Labeling Regulation (which is also being amended - see Item 231-1), an individual item on which there is marked a selling price is also considered a package. This should be added to the definition for package in the Law. In addition, references to both standard and random packages in the definition of package (see Item 231-3) should be added, and the phrase "in units suitable for wholesale or retail sale" should be deleted, because the term "suitable" is too subjective and may be questioned as to what units are suitable.

Committee Recommendation: Amend the definition for "package" in the Uniform Weights and Measures Law as follows:

1.9. Package. -- Except as modified by Section 1, APPLICATION of the Uniform Packaging and Labeling Regulation, the term "package," whether standard package or random package, means any commodity: put up or packaged in any manner

(a) enclosed in a container or wrapped in any manner in advance of wholesale or retail sale in units suitable for either wholesale or retail sale; or

(b) whose weight or measure has been determined in advance of wholesale or retail sale.

An individual item or lot of any commodity on which there is marked a selling price based on an established price per unit of weight or of measure, shall be considered a package or packages.

Discussion: The definition exempts from labeling requirements all wrapped or contained commodities exempted in Section 1 Application of the UPLR, for example, auxiliary containers, retail tray pack displays, clear overwrap with printed matter on it, etc. This would exclude lettuce wrapped in a clear bag as being a package.

The definition replaces "put up or packaged" with "enclosed" or "wrapped." The definition also encompasses the definition in the UPLR for "commodity in package form," that is, a commodity whose weight or measure has been determined in advance of sale. Note that subparagraph (b) does not pertain to commodities whose count has been determined in advance of sale (only weight or measure is mentioned); items sold by count (other than a count of "one") would have to be bundled (enclosed or wrapped in any manner). A commodity sold by "the each" does not fit the definition of package unless wrapped. Thus, a hammer (unless wrapped) hanging from a hook in a hardware store is not deemed to be a package because it is not sold by weight nor measured in advance of sale. See Item 232-1 for parallel recommendations for the UPLR.

The Committee also recommends deleting the phrase "in units suitable for wholesale or retail sale" since the term "suitable" is subjective and questions may be raised as to what units are suitable. See Item 232-1 for parallel recommendations for the UPLR.

### **221-3                    VC    12. Powers and Duties of the Director - Minimum Training Requirements**

(This item was adopted as part of the consent calendar.)

**Background:** There is no authority in the Uniform Weights and Measures Law to set minimum training performance requirements for the State or local field official, nor is it specifically recognized in the Law that training is a responsibility of the Weights and Measures Director. The Committee believes that adding such requirements will upgrade staff qualifications and performance and will promote uniformity and professionalism within jurisdiction. Due to concerns expressed at the Southern Weights and Measures Conference that States having limited funds for training may not want to establish minimum training requirements at this time, the Committee has inserted the word "may" in front of "...establish minimum training requirements...". In addition, the National Training Program of NCWM will be recognized. At the present time, the standards referenced include the requirements for obtaining CEU's and for field certification.

A local official expressed concern that a state might abuse its power in setting performance requirements, and a state official expressed concern that the performance standards might conflict with civil service hiring and firing rules. The Committee did not share these concerns because (1) the recommended language only permits, but does not require, performance standards; and (2) the extent of these performance standards is unspecified; hence they may be customized to conform with existing personnel standards.

The Committee revised its Interim Report to change "inspector personnel" to "weights and measures personnel". This change ensures that the broad range of job titles used to carry out weights and measures activities are covered by the requirement for training.

**Committee Recommendation:** Amend Section 12. "Powers and Duties of the Director," to include authority to adopt rules and regulations to establish minimum training requirements. Add a section (p) to read:

The director shall:

(p) Provide for the training of weights and measures personnel and may establish minimum training and performance requirements, which shall be met by all weights and measures personnel, whether county, municipal, or State. The Director may adopt the training standards of the National Conference on Weights and Measures National Training Program.

### **221-4                    VC    18. Sale from Bulk**

(This item was adopted as part of the consent calendar.)

**Background:** During the December 1989 fuel price increases, many fuel customers in North Carolina were charged more than the rates quoted at the time of placement of the order or delivery. Not until several days or weeks later, when the invoices were received, did customers learn of the higher prices. However, there was no written proof at

lower price had been quoted nor what price was in effect when the fuel was delivered. During periods of rapidly rising prices, customers may schedule heating fuel deliveries to take advantage of a particular price. Section 18. The Law does not now require the unit price to be part of the information supplied on a delivery ticket. The Committee recommends that the unit price be part of the information supplied on a delivery ticket. Unless the unit price appears on the delivery ticket, customers must wait until receiving the fuel company's invoice before they know the amount charged for fuel. With the unit price on the delivery ticket, customers will know immediately if they are being charged the quoted price. The recommendation below would at least provide the customer with the unit price at the time of delivery, rather than later.

At the discussion at the Interim Meeting, the Committee was persuaded that buyer and seller might at times not want the delivery personnel to know the price of the delivered commodity, but might want the billing to be confidential; therefore, a clause is proposed to exempt the requirement for unit price and total price on the ticket when both buyer and seller consent.

In addition, a clarification is recommended that when a commodity is sold from bulk but delivered in packages, the number of packages must also be declared on the delivery ticket.

**Committee Recommendation:** Amend Section 18. as follows:

All bulk sales in which the buyer and seller are not both present to witness the measurement, all bulk deliveries of heating fuel, and all other bulk sales specified by rule or regulation of the Director, shall be accompanied by a delivery ticket containing the following information:

- a) the name and address of the buyer and seller;
- b) the date delivered;
- c) the quantity delivered, and the quantity upon which the price is based, if this differs from the delivered quantity, for example, when temperature compensated sales are made;
- d) the unit price, unless otherwise agreed upon by both buyer and seller, and
- e) the identity in the most descriptive terms commercially practicable, including any quality representation made in connection with the sale.
- f) the count of individually wrapped packages, if more than one, in the instance of commodities bought from bulk but delivered in packages.

## Uniform Packaging and Labeling Regulation

### VC 2.1. Change "Commodity in Package Form" to "Package"

(This item was adopted as part of the consent calendar.)

**Background:** This item concerns a proposal for a uniform definition of "package" in both the See Item 221-2 for the discussion concerning the Uniform Weights and Measures Law. With the definition proposed for package in the Law, there is no longer any need to distinguish between "package" and "commodity in package form" in the Uniform Packaging and Labeling Regulation. Therefore, a single definition is proposed.

**Committee Recommendation:** Revise Section 2.1. Commodity in Package Form as follows:

**2.1. Package.** -- ~~Commodity in Package Form. — A Commodity put up or packaged in any manner in advance of sale in units suitable for either wholesale or retail sale.~~ Except as modified by Section 1. APPLICATION, the term package, whether standard package or random package, means a commodity;



(a) enclosed in a container or wrapped in any manner in advance of wholesale or retail sale, or

(b) whose weight or measure has been determined in advance of wholesale or retail sale.

An individual item or lot of any commodity ~~not in package form as defined in this section, but on which there is marked a selling price based on an established price per unit of weight or of measure, shall be considered a commodity in package or packages form. Where the term "package" is used in this regulation, it shall mean "commodity in package form" as here defined.~~

Replace all references to "commodity in package form" with the term "package."

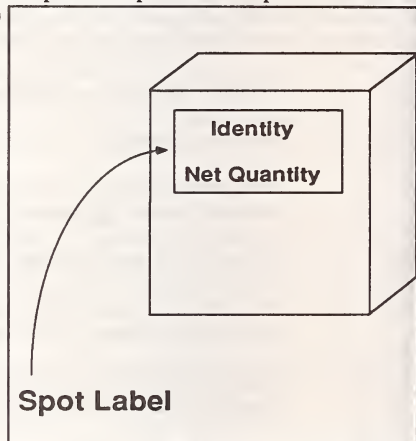
## 231-2 VC 2.12. Spot Label

(This item was adopted as part of the consent calendar.)

**Background:** The Conference adopted Section 2.12. at the 75th Annual Meeting. The picture (see below) accompanying the definition shows the spot label with a clearly defined border, but the border is not specifically required by the text. The definition should be precise to ensure that a package merely by location of the printed information on the package surface would not be exempted from the requirement for the net quantity to appear in the lower 30 percent of the label. (Section 11.32 provides an exemption for spot labels for placement of the net contents in the lower 30 percent of the principal display panel.)

**Committee Recommendation:** Amend the definition for spot label to reflect that it is a clearly defined part of the principal display panel:

**2.12. Spot Label.** -- A spot label is a label, clearly defined by means of a border, indentation, or other means, that covers only a small portion of the surface of a principal display panel of a package; the entire portion of the principal display panel outside the area of the label contains no printed or graphic matter of any kind. A spot label may contain all required labeling information on it (identity, responsibility, and net contents), but it must have the identity and net contents. See Section 11.32. for net contents placement exemption for a spot label. Also see figure below. [Editor's Note: This is the figure shown at right.]



## 231-3 VC 2.XX. Standard Package

(This item was adopted as part of the consent calendar.)

**Background:** Although "random package" is defined in both the Uniform Weights and Measures Law and Uniform Packaging and Labeling Regulation, there is no definition for "standard package." The definition being proposed contrasts with the definition for random package, and adds examples for clarity. Whole rounded sizes are not required to be standard packages; therefore, one of the examples is a weight that is not a whole number of units. Neither the Law or Regulation makes reference to "standard package;" hence this definition might not be required. However, the Committee believes that a definition for standard package should be in both the Law and the Regulation since random package is defined in both places. Therefore, references to both standard and random packages have been added to the definition of package (see Items 221-2 and 231-1). One of the Committee's recommendations below also adds reference to standard package to the UWML.

**Committee Recommendation:** Add a definition for "standard package:"



2.XX. Standard Package. -- A package that is one of a lot, shipment, or delivery of packages of the same commodity with identical net contents declarations. For example, 5-lb bags of sugar, 1-liter bottles of carbonated soda, or 9.4 oz packages of luncheon meat.

Add this same definition to the Uniform Weights and Measures Law, since random package is also defined in the law.

1.12. Standard Package. -- A package that is one of a lot, shipment, or delivery of packages of the same commodity with identical net contents declarations. For example, 5-lb bags of sugar, 1-liter bottles of carbonated soda, or 9.4 oz packages of luncheon meat.

Add a reference to standard package in the definition for package (see Items 221-2 and 231-1).

Add a reference to standard and random packages in Section 19. INFORMATION REQUIRED ON PACKAGES in the Uniform Weights and Measures Law:

Except as otherwise provided in this Act or by regulations promulgated pursuant thereto, any package, whether a random package or a standard package, kept for the purpose of sale... [continue with rest of Section.]

### 31-4 VC 6.11.3. Rounding; How to Round for the Net Weight Declaration

(This item was adopted as part of the consent calendar.)

Background: This was Item 231-11A in the Report of the 75th NCWM, 1990. The last two sentences of Section 6.11.3. read "As a general rule, converted values should be rounded down by dropping any digit beyond the first three. Example: 196.4 grams becomes 196 grams or 1.759 feet becomes 1.75 feet." The Industry Committee on Packaging and Labeling had supported the truncation of converted values when the original recommendation was written. Since then, the Food and Drug Administration provided a policy guideline recommending a procedure that rounds down when the final digit is 4 or less, and rounds up when the final digit is 5 or more. Therefore, the Committee recommends dropping advice concerning rounding, permitting the packager to follow any appropriate procedure.

The weights and measures enforcement officer should test package net quantities according to the largest declaration on the label.

Committee Recommendation: Revise Section 6.11.3. of the UPLR as follows:

6.11.3. Rounding. -- In all conversions for the purpose of showing an equivalent metric or inch-pound quantity to a rounded inch-pound or metric quantity, or in calculated values to be declared in the net quantity statement, the number of significant digits retained should must be such that accuracy is neither sacrificed nor exaggerated. ~~As a general rule, converted values should be rounded down by dropping any digit beyond the first three. (Example: 196.4 grams becomes 196 grams or 1.759 feet becomes 1.75 feet.)~~

### 31-5 I 10.5. Combination Packages and 10.6. Variety Packages

This was Item 231-12 in the Report of the 75th NCWM, 1990.

An increasing number of packages are being introduced into the marketplace with confusing net weight declarations. Part of the problem seems to be that variety and combination packages (for example, meat products in combination with cheeses) are not labeled with separate net weights for the individual items in the package. Such packages are not distinctive food items (such as pizza with meat and cheese topping) nor integral packages (such as frozen dinners with meat in one compartment, potatoes in another, and dessert in a third). The problem arises when two or more commodities are separately packaged, but joined together for retail sale.

Last year, the Committee proposed adopting the requirements promulgated by the FTC concerning variety and combination packages because (1) they are more specific than existing requirements in the UPLR; and (2) the FTC

requirements are essentially the same for combination and variety packages. Such a change would consequently eliminate the need to make judgments concerning packages composed of "dissimilar" (combination) or "similar" (variety) commodities. Unfortunately, the FDA does not have definitions or requirements for combination or variety packages. Thus, consumers see packages of "variety" meats or cereals labeled only with a total net weight; if State requirements tracked the FTC regulations for variety packages, the net weights of each style or type of product in a variety package would also have to be labeled. The Committee has written FDA for a formal interpretation as to whether State regulations patterned after FTC's requirements may be imposed on products under FDA jurisdiction. A letter has also been written to the Food Safety and Inspection Service, USDA, asking for assistance in achieving uniformity of interpretation and requirements. The Committee believes that the purchaser cannot make value comparisons without a separate declaration for different commodities separately packaged and then joined together into a combined package. The objective is to reach an agreement among FDA, FTC, USDA, and the NCWM on the appropriate requirements for variety and combination packages. The Committee has received information from the Food and Drug Administration that indicates no agency objection to the Committee's proposal, but further clarification of their response will be requested. This item will be carried over.

#### **Nutrition and Food Labeling Act of 1990**

Related to this issue, but of broader impact to the entire labeling arena, the Nutrition Labeling and Education Act of 1990 will specifically preempt States from net weight, identity, declaration of responsibility, nutrients, serving size standards of identity labeling requirements which differ from those in the Food, Drug and Cosmetic Act unless the State petitions the Secretary of Health and Human Services for an exemption. The Act gives enforcement authority to the State of certain sections of the Food, Drug and Cosmetic Act in the State's own right, even if the State has not specifically adopted those sections of the Food, Drug and Cosmetic Act. The Committee urges every State director to study this Act to determine if the State should file a petition. Copies may be obtained from the NIST Office of Weights and Measures. The impact of the Act on State regulations is under study by the Committee.

### **231-6**

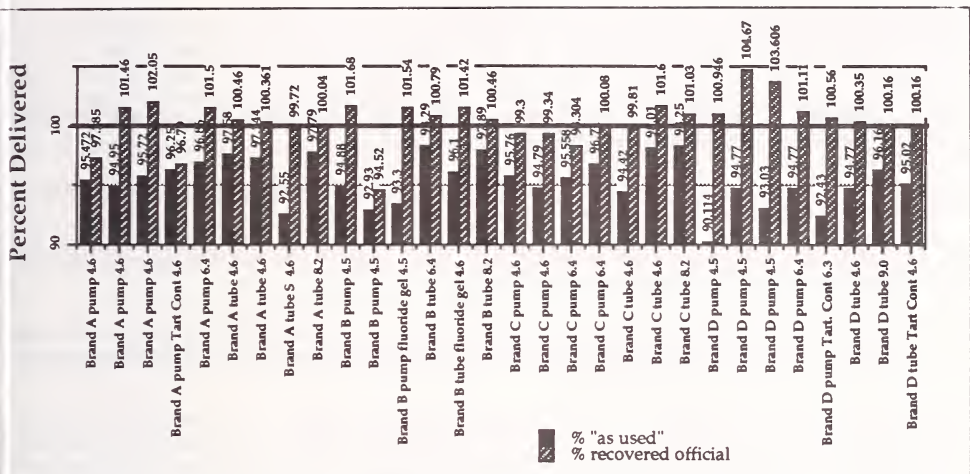
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### **10.X. Mechanical Pump Dispensers**

**Background:** This was Item 231-13 in the Report of the 75th NCWM, 1990. Sealed, non-removable mechanical pump dispensers are a relatively new dispensing package system for toothpaste and other viscous products, such as honey. The sealed head will always retain a small amount of product.

Aerosol containers are the only packaging systems that are required to deliver the amount declared on the label. Therefore, all weights and measures compliance testing procedures for all types of packages, except for aerosols (and meat and poultry products in "wet tare" jurisdictions), determine the amount of product that was put into the package, not the amount that the consumer is expected to obtain under normal usage. Aerosol packages must deliver, not just contain, the amount declared on the label because the consumer is specifically warned against opening the package to obtain any remaining product.

Several States volunteered to test commodities with mechanical pump dispensers; data from Illinois, Kansas, Michigan and North Carolina were reviewed at the Interim Meeting. Volunteers were asked to test both mechanical pump toothpaste packages and tubes of toothpaste. They were asked to determine the amount of toothpaste dispensed without breaking into the dispensers - the maximum amount that could be readily obtained by a consumer. They were also asked to determine the amount of toothpaste that could be removed from the package when cut open and cleaned out by a compliance testing official. The only product the testing official did not remove was that remaining in the reservoir of the pump head of the mechanical pump dispenser. Thirty lots were sampled: 10 packages were tested from each of 24 of the lots; sample sizes of 5 to 7 packages were taken from the other 6 lots. The results are shown in the figure below. One major brand from each of 4 major manufacturers was tested. Of the 30 lots tested (6 pumps, 13 tubes), none delivered 100% of the labeled net contents to the consumer and 8 provided less than 100% of the labeled net contents when the packages were cut open and cleaned out (6 pumps, 2 tubes).



Tests on Toothpaste Pumps and Tubes, Maximum Amount Obtained by Consumer (% "as used") vs. Amount Determined by Opening and Cleaning Container (% recovered official)

is clear that the 2 lots of tubes that provided less than the labeled net contents actually contained less, hence were out of compliance. It is not clear whether the 8 lots of pumps that provided less than 100% of the labeled quantity were out of compliance even when using extraordinary means to remove the maximum amount of product that could be obtained from these packages. This is of great concern to the Committee. In addition, the difference between the delivered amount (what the consumer can obtain) and the amount obtained by opening and cleaning out the packages ranged from less than 2% to more than 10% for pumps, and from less than 3% to more than 5% for tubes. This indicates that some pumps are much less efficient than tubes in delivering the contained product.

fairness and full disclosure of information to the purchaser are of great importance, and the Committee is committed to achieving regulatory interpretations or changes that will provide this. A letter to the FDA will transmit the results of these tests and request (1) a change to the regulations requiring that mechanical pump package systems deliver the labeled weight and, in the interim, (2) an interpretation that at least the labeled amount must be obtained when cutting open and cleaning out the package during testing. The Committee is also considering a requirement or testing procedure that would require at least X obtained from the container following prescribed procedures, where X is perhaps 99%; this too is seen only as an interim approach. As a spokesman for one manufacturer said, when product dispensing is controlled by package design, there is reason to require the labeled net weight to be the amount delivered.

## Uniform Regulation for the Method of Sale of Commodities

### VC 1.1. Berries and Small Fruits; Define "Small Fruits"

(This item was adopted as part of the consent calendar.)

background: See Item 232-1 in the Report of the 75th NCWM, 1990, pages 92 and 93. Neither "berries" nor "small fruits" is defined in Section 1.1. The Committee was asked whether grapes on the stem were small fruit; there was no consensus among the Committee members as to whether grapes were or were not covered by this section. Therefore, the recommendation below leaves the issue of grapes on the stem subject to interpretation by the jurisdiction. The Western Weights and Measures Association pointed out that the botanical definition of berry is "a simple fruit having a pulpy pericarp in which the seeds are embedded, such as the grape, gooseberry, currant, tomato, etc." The problem is that grapes on the stem have a size and rigidity that do not permit packing in small measure containers without large amounts of free space left in the containers.



Committee Recommendation: Revise Section 1.1. as follows:

1.1. Berries and Small Fruits. --

1.1.1. Definitions. -- "Small fruits" includes, but is not limited to cherries, currants, and cherry tomatoes. "Berries" includes all fruit whose names end in the term "-berry."

1.1.2. Methods of Sale. -- Berries and small fruits shall be offered and exposed for sale and sold by weight, or by volume. If sold by volume, they must be

(1) if in measure containers that are either open or else covered by uncolored transparent lids or other wrappings that do not obscure the contents and

(2) have capacities per subsection 1.1.2.(2)(a) or subsection 1.1.2.(2)(b). When selling berries and small fruits by volume in measure containers, whether or not covered, the measure containers themselves shall not be packages for labeling purposes.

(a) (b) Metric Capacities - 250 milliliters, 500 milliliters, or 1 liter.

(b) (a) Inch-Pound Capacities - 1/2 dry pint, 1 dry pint, or 1 dry quart.

1.1.3. Marking Requirements for Shipping Containers. -- If two or more measure containers are placed in a shipping package, the crate or package shall show the number of measure containers and the quantity of contents of each.

232-2 VC 1.2. Bread - Permit 6-Oz Loaves of Microwaveable Bread

(This item was adopted as part of the consent calendar.)

**Background:** A newly developed partially-baked 6-oz "loaf of bread" is intended to be cooked in the home microwave oven. The size is limited to fit the typical microwave oven cavity. Section 1.2. currently requires bread to be sold in inch-pound sizes starting at 8 oz, defining products weighing 4 oz or less as "biscuits, buns, or rolls." The Committee was asked to consider amending Section 1.2. to permit the 6-oz size to adapt to the demographics of smaller consumer households and increased demands for "convenience" foods. The submitted proposal also requested the Conference to consider whether this product is "bread," since it is partially baked and not ready-to-eat. The Committee members believe that the product is bread and also that a 6-oz size should be permitted. Several years ago, the Committee was asked to consider adding a 12-oz size because of smaller household sizes. The Committee wanted to remove constraints against various sizes of bread at that time, but did not completely remove the size requirement because the baking industry had long lobbied individual States to maintain fixed standard sizes. The Committee therefore now recommends deleting standardized sizes under 6 ounces. The Committee cannot define what is meant by a "loaf" or a "twin or multiple loaf;" hence recommends that these terms should be dropped. In addition, the Committee wants to prohibit bread sizes between 6 and 8 ounces. The Conference should also note that the Committee is switching the metric sizes with the inch-pound sizes in order to encourage the shift to metric usage in package labeling.

Committee Recommendation: Revise Section 1.2. Bread to read:

1.2 Bread.

This section does not apply to

(1) bread of metric sizes of 200 grams or less,

(2) bread of inch-pound sizes of 6 ounces or less,

(3) "stale bread" sold and expressly represented at the time of sale as "stale bread", and when so sold, the wrappers shall not be considered packages for labeling purposes.



~~Bread Each loaf and each unit of a twin or multiple loaf made or procured for sale, kept, offered, or exposed for sale, or sold, whether or not wrapped packaged or sliced, and each portion of a loaf that is prepackaged, shall have a weight per subsection 1.2(a) or subsection 1.2(b); Provided, that the provisions of this section shall not apply to biscuits, buns, or rolls of inch-pound sizes 4 ounces or less or of metric sizes 100 grams or less or to "stale bread" sold and expressly represented at the time of sale as such, and when so sold, the wrappers shall be deemed not to be packages for labeling purposes.~~

(a) Metric Weights - 250 grams, 375 grams, 500 grams, 750 grams, or a multiple of 500 grams.

(b) Inch-Pound Weights - 1/2 pound, 3/4 pound, 1 pound, 1-1/2 pounds, or a multiple of 1 pound.

## 2-3 VC 1.5.2.3. Fresh Oysters, Clams, Mussels, or Other Mollusks Removed from the Shell

(This item was adopted as part of the consent calendar.)

**Background:** At the 1990 Interim Meeting, the State of Maine alerted the Committee that this subsection (in the 90 edition of the recommended regulation) required fresh mollusks, including scallops, that are removed from the shell "and placed in a container [to] be sold by fluid volume." This subsection needs to be clarified: it was never the intent of the Committee to forbid direct sale from bulk of these items by weight. In addition, the phrase "placed in container" should be clarified to explain that it means packaged in advance of sale. After some discussion, the Committee decided that sale by weight should also be allowed, along with sale by volume for all mollusks. The Committee recommends that the maximum of 15% free liquid be applied only to oysters; the appropriate amount of free liquid for such other mollusks as scallops may be much less.

In its Interim Report, the Committee recommended that mollusks be permitted to be sold by drained weight when sold from bulk. The Committee has been persuaded since that time that fresh mollusks should be allowed to be sold by drained weight, whether from bulk or packaged. In fact, it is probably more difficult to sell mollusks from bulk by drained weight due to the time needed to drain the product properly prior to weighing. Packaging fresh mollusks and selling them by drained weight would allow the packager time to drain the product prior to filling and weighing.

The Committee reminds officials to use a 2-minute drain on a No. 8 sieve, described in Handbook 133 when testing product sold packaged or from bulk labeled by drained weight.

Additional input prior to the Annual Meeting from the Central Weights and Measures Association, the Northeastern Weights and Measures Association, and California Weights and Measures has led the Committee to the conclusion that several items of information will have to be determined before recommending a method of sale for all fresh mollusks removed from the shell. For example: (1) Are any fresh mollusks other than oysters sold by fluid volume? (2) If fresh mollusks are allowed to be sold by weight that is not drained weight, what amount of free liquid should be permitted? (If mollusks are allowed to be sold by other than drained weight, then the seller may include any amount of free liquid.) Weights and measures officials and trade industry representatives are encouraged to share data at the Conference concerning the appropriate maximum amounts of free liquid in this general category of commodities.

At this Annual Meeting, the Committee recommended addressing only oysters in Subsection 1.5.2.3. this year, the issues with oysters having been resolved. The recommendation below will eliminate regulation of the method of sale for all other fresh mollusks removed from the shell. This will effectively permit sale by weight, drained weight, or volume, the methods of sale proposed in the Committee's Interim Report. The Committee intends to pursue this item in its next year's work.

**Committee Recommendation:** Revise Section 1.5.2.3. as follows:

**1.5.2.3. Fresh oysters, ~~clams, mussels, or other mollusks~~ removed from the shell and placed in a container shall be sold by ~~weight, drained weight, or by fluid volume~~. For oysters sold by weight or by volume, a maximum of 15 percent free liquid by weight is permitted.**

### Acidity Test of Oysters

In related discussions, Virginia Weights and Measures alerted the Committee that large amounts of free liquid in oyster packages might be due to water added at the time of packing, or due to product decomposing and expelling water. For example, the product might not have been handled properly after packaging. When oysters deteriorate their pH drops to below 5.8. Virginia Weights and Measures check the pH of the oyster liquor when checking contents to determine, when the amount of free liquid exceeds the 15% limit, where the fault may lie, that is, whether excessive liquid was in the product when packaged or whether the product was mishandled, is at the end of its shelf life, and should no longer be sold. This can be done by simply dipping easily-obtainable litmus paper into the liquor. The pH test cannot be used in place of an actual determination of the amount of free liquid. If the product is out of compliance, it may provide additional information concerning the source of the free liquid; industry representatives warn that this test can only be used as an indicator.

### 232-4 I 1.5.X. Meat, Poultry, Fish, and Seafood -- Packaged with Other Packages of Food

This was Item 232-3 in the Report of the 75th NCWM, 1990. The Conference requested the U.S. Department of Agriculture (USDA) to revise its regulations to require that packaged meat or poultry be labeled with a separate net weight when packaged with other packages of food. In its Final Rule adopting Handbook 133, USDA responded as follows: "FSIS [Food Safety and Inspection Service, USDA] believes this proposed change would set a new precedent in the direction of labeling products by the percentage of components or contents. Labeling each component in a product has major implications for the regulators, the public, and the industry. Any change in the current FSIS policy on component labeling would warrant a comprehensive evaluation extending beyond the scope of this rulemaking. The Committee will continue to pursue this issue and determine the level of evaluation necessary to prove the need for this regulation change.

### 232-5 W 1.7.1. Factory-Packaged Ice Cream and Similar Frozen Products

**Discussion:** The Committee considered three proposals:

1. Delete Section 1.7.1. This would allow factory or retail store packages to be sold by any measure. This proposal was offered and rejected at the 75th Annual Meeting because industry representatives (of factory-packaged ice cream) wanted factory-packaged ice cream to be required to be sold by volume.
2. Revise Section 1.7.1. as follows:

1.7.1. **Factory Packaged Ice Cream and Similar Frozen Products.** -- Ice cream, ice milk, frozen yogurt, and similar products packaged in advance of sale shall be kept, offered, or exposed for sale, or sold in terms of fluid volume

This proposal would reverse the change made at the 75th Annual Meeting. The 1991 Uniform Regulation for Method of Sale of Commodities requires only that factory-packaged ice cream be sold by volume. Store packaged frozen desserts may be sold by weight, measure, dip, scoop, etc. Weights and measures agencies wanted to permit frozen desserts to be sold by weight.

3. Revise Section 1.7.1. as follows:

1.7.1. **Factory Packaged Ice Cream and Similar Frozen Products.** -- Ice cream, ice milk, frozen yogurt, and similar products packaged in advance of sale shall be kept, offered, or exposed for sale, or sold in terms of fluid volume or by weight.

This proposal is similar to the one recommended by the Committee to the 75th Annual Meeting, which was rejected. The International Association of Ice Cream Manufacturers requested the Conference to maintain requirements for the sale of factory-packaged ice cream by volume.

its 75th Annual Meeting, the NCWM voted to delete the requirement that hand-packed ice cream and similar products be sold by volume. For States that automatically adopt this regulation, the new rule became effective January 1991. In these States, only "factory-packaged" ice cream must be sold by volume.

The Northeastern Weights and Measures Association requested that the term "factory" be dropped from the new requirement. The issue was said to be one of fairness. They argued that it is not fair to require that a brand of frozen dessert packaged at a factory be labeled by volume but a brand packaged at the retail supermarket not be required to be similarly sold by volume. By analogy, retail bakeries selling left-over bread crumbs or packaging their cookies, brownies, pies, etc., or mall stores that package dinners, salads, meats, etc., are required to sell their products by weight since "factory" packaged cookies, etc., are labeled by weight. Thus, determining the appropriate method of sale should not depend on whether the product is "factory packaged." In fact, the term "factory" is not defined. This requirement should apply to all packaged ice cream.

The Committee decided that the new requirements were specifically adopted to permit retail stores to package and sell frozen desserts by any reasonable units. Many weights and measures officials would like to require all sales by weight, but as demonstrated in several earlier Annual Meetings, there is by no means a consensus on this issue. Only the ice cream industry putting up ice cream at "factories" desired the method of sale to be maintained by volume. Many retailers wanted to package frozen desserts by weight, being unable to package such desserts accurately by volume. The issue of whether consumers can make adequate value comparisons with various methods of sale has now been opened and should be studied over time; however, the Committee recommends that States adopt the new requirement and put it into effect and then report to the Conference if problems arise. It is the opinion of a majority of Committee members that the requirement is too new to gauge the final effect in the marketplace. The Committee would also like to encourage regional weights and measures associations to define the term "factory packaged," which has been part of this requirement since its addition in 1979.

## 12-6 VC 1.9. Advertising and Price Computing of Bulk Food Commodities

(This item was adopted as part of the consent calendar.)

**Background:** This item was Item 232-10 in the Report of the 74th NCWM, 1989, and 232-5 in the Report of the 75th NCWM, 1990. It originated in the State of Utah and was intended to require that the price of bulk food commodities be prominently displayed. The problem stemmed from stores selling cookies by the pound, but not displaying the price per pound. Section 1.9.2. requires the price of food commodities to be advertised or displayed in terms of whole units of kilograms or pounds. Some jurisdictions interpret the subsection as requiring price posting; others applying only if prices are advertised, but not requiring the display of price at the point of sale. It was therefore recommended to make the requirement for posting prices explicit. Lacking consensus within the Committee, it was decided to leave this section open to interpretation and to propose only editorial modifications at this time.

**Committee Recommendation:** Revise Section 1.9. as follows:

**1.9.1. Total Price Computing.** -- The price of ~~bulk food commodities or food commodities not in package form~~ and sold ~~from bulk~~ by weight shall be computed in terms of whole units of weight (i.e., grams, kilograms, pounds, ounces, grams, kilograms, etc.) and not in common or decimal fractions.

**1.9.2. Unit Price Advertising.** -- The price of ~~bulk food commodities or food commodities not in package form~~ and sold ~~from bulk~~ by weight shall be advertised or displayed in terms of whole weight units of kilograms or pounds or kilograms only, not in common or decimal fractions or in ounces. A supplemental declaration is permitted, in print no larger than the whole unit price. This supplemental declaration may be expressed in common or decimal fractions, or in ounces, in print no larger than the whole unit price, is permitted.

## 12-7 I 1.X. Home Food Service Plan Sales

**Background:** The home food service industry markets a variety of food products that are not specifically covered by current requirements. Marketing practices in the industry suffer from lack of a clear understanding of what is required for full disclosure and from clear prohibition of many disreputable practices. A new section has been proposed to be



added to regulate the sale of any food item or items alone or in combination with non-food products or service, whether or not a membership fee or similar charge is involved. Section 1.11. Sale of Meat by Carcass, Side, or Prime Cut deals specifically with bulk meat sales; this new section would encompass much more varied "food service" sale. It might possibly replace Section 1.11. The proposal is accompanied by a section on prohibited trade practices that may be more appropriate for recommending for adoption by the State's Attorney General or Consumer Protection Agencies. The proposal defines such terms as "home food service plan," "contract," "item price," and "service charge." Of some controversy is the provision that the item price may exclude the service charge for delivery. The State of Vermont asserts that this can amount to 40% of the cost of the item, and that the allocation of charges between service and item is arbitrary, permitting the home food service company to claim competitive item pricing while charging very high service fees. The proposal is patterned after the provisions of the Wisconsin Administrative Code, Freezer Meat and Food Service Plan Trade Practices, and the New York statute dealing with home food service plans. The proposal and the section on prohibited trade practices are printed in Appendices A and B.

## 232-8 VC 2.4. Fireplace and Stovewood

(This item was adopted as part of the consent calendar.)

**Background:** Based on a review of this section, the Committee believes that the last sentence in 2.4.3. should not apply to natural wood. During the 60th NCWM, a regulation was developed to require that all fireplace and stovewood be sold by volume. This section was amended in 1976 at the 61st NCWM in deference to the Federal Trade Commission allowing artificial logs intended for burning to be sold by weight. This has caused some confusion since the sentence amending the original regulation was added directly to the regulation without specifically mentioning compressed fireplace logs. This amendment was not originally intended to allow natural firewood logs to be sold by weight; natural firewood is subject to large amounts of moisture loss. In addition, the regulation needs to specifically address stovewood pellets manufactured for special wood-burning stoves designed to accommodate them and which are now sold by weight. Moreover, since natural wood in small packages must be sold by cubic feet, the requirement must specify a limiting size for labeling by fractions of a cord. The requirement needs to set a limiting value when packaged natural wood should be labeled by fractions of a cord rather than cubic feet.

The Committee revised its Interim Report to clarify that this section applies only to stove wood pellets and chips, and not to flavoring chips.

**Committee Recommendation:** Amend Subsections 2.4.1.1. and 2.4.3. and add a new subsection 2.4.3.1.:

**2.4.1.1. Fireplace and Stovewood.** -- Any kindling, logs, boards, timbers, or other wood, natural or processed, split or not split, advertised, offered for sale, or sold for use as fuel.

**2.4.3. Quantity.** -- Fireplace and stovewood ~~Wood, of any type, for use as fuel~~ shall be advertised, offered for sale, and sold only by measure, using the term "cord" and fractional parts of a cord, or the cubic meter; except that:

(a) Packaged Natural Wood. -- Natural wood, ~~natural or processed~~, offered for sale in packaged form in quantities less than 1/8 cord (16 cubic feet) shall display the quantity in terms of cubic feet, to include fractions of cubic feet; or cubic meters, to include decimal fractions of cubic meters. ~~A single log shall be sold by weight, and packages of such individual logs containing less than 4 cubic feet (1/32 cord), or less than one-tenth cubic meter, may be sold by weight plus count.~~

(b) Artificial Compressed or Processed Logs. -- A single fireplace log shall be sold by weight, and packages of such individual logs shall be sold by weight plus count.

(c) Stove Wood Pellets or Chips. -- Not greater than 6 inches in any dimension shall be sold by weight. This requirement does not apply to flavoring chips.



## W 2.16. Liquefied Petroleum Gas Cylinder Tare Weights; Acetylene

This was Item 232-15 in the Report of the 75th NCWM, 1990. A survey was to be conducted to get answers to the questions posed in the Committee's final report before any recommendations were made. The Committee has not been able to do the survey and does not intend to pursue this issue further, since no weights and measures jurisdiction or association has communicated with the Committee that the issue has a high priority and should be pursued.

## V 2.20. Gasoline-Alcohol Blends; Add Labeling of All Oxygenates

(This item was adopted.)

**Background:** This subject was Item 232-16 in the Report of the 75th NCWM, 1990, pages 102-103. It was proposed that the requirement for labeling the presence of ethanol or methanol (alcohols) in gasoline be broadened to include all oxygenates. Other than alcohols, common oxygenates added to gasoline are ethers. At the Interim Meeting in January 1990, the Committee received testimony on the need for deleting or expanding motor fuel labeling from the points of view of the gasoline manufacturers, oxygenate additive proponents, consumer groups, and motor vehicle manufacturers. Increasing use in gasoline and higher amounts of an oxygenate commonly known as MTBE (methyl-*t*-butyl ether), especially in areas mandating the addition of oxygenates to reduce air pollutants, has led a small number of auto manufacturers to set limits in their warranties on the amount of MTBE tolerated by their vehicles. Since this was and is the reason for requiring gasoline-alcohol labeling, the Committee decided that it appears necessary to require the labeling of other oxygenates in motor fuel.

At the January 1991 Interim Meeting, the Committee sought information concerning the impact of any motor fuel labeling of oxygenates on purchasers of fuel for motors used in boats, airplanes, and small engines such as single-stroke oil-and-gasoline fueled engines. The Experimental Aircraft Association, speaking for the General Aviation Manufacturers Association, explained by telephone that the Federal Aviation Administration requires type certification of all aviation motors and motor fuels. The FAA will not approve ethanol in gasoline as a motor fuel for airplane motors. Sixty-five to seventy percent of the civilian fleet can use 80 octane gasoline. Forty thousand aircraft have been given supplemental type certificates permitting the use of 80 octane motor gasoline. This segment of the purchasing public must be informed as to whether there is any ethanol or methanol in the gasoline. Although not as clear-cut, there appeared to be general concerns still prevalent in the boating community about the long-term effects of ethanol-blended gasoline in marine environments. Although both pro and con statements were made at the Interim Meeting concerning the drivability of new marine engines using gasoline-ethanol blends, a greater concern is for the potential separation of ethanol from a gasoline-ethanol blend in the high-humidity marine atmosphere or when stored for extended periods of time, as often done by recreational boaters.

The Committee also heard from several delegates concerning the impact of the U.S. Clean Air Act Amendments of 1990 on labeling motor fuel. In particular, Mr. James Peeples, Information Resources, Inc., summarized the requirements and their impact on labeling. Beginning in 1992, in 41 carbon monoxide "nonattainment" areas during the winter months, gasoline will have to contain at least 2.7% oxygen by weight. If the carbon monoxide standard is not met by a certain date, 3.1% oxygen by weight must be added to the gasoline in those areas. Beginning in 1995, in the nine worst ozone polluted areas, a minimum of 2% oxygen by weight must be added. The ordinary 10% by volume ethanol-gasoline blend contains 3.5% oxygen by weight, far exceeding the 2% minimum. Gasoline must contain at least 11% MTBE by volume to have 2% oxygen by weight and 15% MTBE by volume to have 2.7% oxygen by weight. Required labeling under the Clean Air Act Amendments for all these oxygenated blends is "with a notice that the gasoline is oxygenated and will reduce the carbon monoxide emissions from the motor vehicle." Further regulations may be proposed by the Environmental Protection Agency (EPA) to implement the Clean Air Act Amendments.

Other information was provided concerning the Clean Air Act Amendments' prohibition of lead or lead additives in gasoline after December 31, 1995; requiring the registration and test evaluation of additives as lead substitutes for reducing valve seat wear or engine deposits; and limiting the volatility of all gasoline to a maximum of 9.0 psi (permitting 10% ethanol blends a 1-psi exemption) by the summer of 1992.

Since the boating community and civil airplane pilots using motor fuel must know the presence of even small amounts of alcohols, it is the Committee's opinion that labeling of ethanol or methanol above 1% must continue, and the blending agent, whether ethanol or methanol, must be identified by name (not just "contains an oxygenate").

At the time of the 1991 Interim Meeting, the Committee believed that labeling all oxygenates above 1% by volume did not appear to be an appropriate solution, however. Since small amounts of MTBE are added to a large proportion (20% or more) of all gasoline to "trim out" the fuel to meet octane minimums, and since auto manufacturers warn against MTBE in large amounts, the Committee believed that a "trigger level" should be set, above which MTBE and other oxygenates should be labeled. The question was to determine the appropriate trigger level. One weights and measures official proposed a trigger of 2% by volume for MTBE since that is the maximum level of MTBE in gasoline into which blenders can still add ethanol. Data from his State's motor fuel analysis records show that 50% of its premium grades contained 2% MTBE by volume, and that only 6% of its "plus" grades had this level of MTBE. The Committee believed at that time that if they proposed a trigger level of 2% by volume, this would change the purpose of the labeling requirement from informing the final user/purchaser of the ingredients of the motor fuel to informing the potential blender as to the contents of the motor fuel for blending purposes. Therefore, the Committee rejected this suggestion to retain the original purpose of the labeling to provide essential information to the purchaser.

In a few cases the final purchaser is warned about high levels of MTBE. As far as the Committee was aware at the time of the Interim Meeting, two automobile manufacturers (Hyundai and Saab) warrant their cars up to 11% MTBE by volume; equivalent to 2% oxygen by weight. The Committee believed that the trigger level of 2% oxygen by weight was an appropriate level for other oxygenates, such as ethyl-t-butyl ether (ETBE) (and others bound to be studied as potential blending agents). This was the basis for the revision recommended below.

Committee Interim Meeting Recommendation: Revise Section 2.20. of the UMSCR and Section 3. of the Uniform Motor Fuel Regulation:

2.20.1. Method of Retail Sale. -- All motor fuel kept, offered, or exposed for sale, or sold, at retail containing

(a) at least one percent by volume of ethanol, methanol, or a combination, or  
(b) any other oxygenate or combination of oxygenates in a concentration, combined or singly, equal to at least two percent by weight of oxygen (for example, this is 11% by volume MTBE).  
shall be identified as "with" or "containing" (or similar wording) "ethanol," "methanol," ~~or~~ "ethanol/methanol," "MTBE", "ETBE", or other identification of the oxygenate or oxygenates contained in the motor fuel 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 1/2 inch in height, 1/16 inch stroke (width of type).

2.20.2. Documentation for Dispenser Labeling Purposes. -- The retailer must be provided, at the time of delivery of the fuel on an invoice, bill of lading, shipping paper, or other documentation, the presence and maximum amount of:

(a) ethanol, methanol, ~~or~~ any combination of ethanol/methanol or  
(b) MTBE, ETBE, or other oxygenate when present in the amounts requiring labeling  
(in terms of percent by volume) contained in the fuel. This documentation is only for dispenser labeling purposes; it is the responsibility of any potential blender to determine the total oxygen content of the motor fuel before blending.

The Committee received considerable input from the Central and Northeastern Weights and Measures Association and affected industries concerning this issue. In particular, the Committee requested input on the ability of weights and measures motor fuel quality testing programs to enforce such labeling requirements. Consultation with Arizona Weights and Measures indicates that the amount of MTBE can be determined only with a gas chromatographic (GC) method, requiring that samples be sent to a testing laboratory or that a gas chromatograph be purchased. Therefore the Committee was interested in hearing from the six States that automatically adopt the latest version of the Uniform Regulation for the Method of Sale of Commodities, and the impact of this revision on their enforcement program.

Since the January 1991 Interim Meeting, the Committee was persuaded that some motor fuel users (boaters, c aircraft operators) must be informed whether there is ethanol or MTBE in the fuel. For example, the Federal

aviation Administration does not presently approve of the use of gasoline with any oxygenate for general aviation engines (although it is expected that ethers will be approved eventually). In addition, some small engine, motor cycle, and automobile owner's manuals caution the owner to switch to motor fuels without oxygenates if "driveability problems" are noticed. The Committee therefore recommends labeling of the presence of all oxygenates over 1% by volume (selecting 1% as the amount which can be measured). As measurement capabilities improve, there is nothing to preclude labeling motor fuel containing less than 1% oxygenates (but not zero) as containing an oxygenate or oxygenates.

**Committee Recommendation:** Revise Section 2.20 of the Uniform Regulation for the Method of Sale of Commodities and Section 3 of the Uniform Motor Fuel Regulation as follows:

**2.20. Gasoline-Alcohol Oxygenate Blends. --**

**2.20.1. Method of retail sale. --** All spark ignition engine motor fuel kept, offered, or exposed for sale, or sold, at retail containing at least one percent by volume of any oxygenate or combination of oxygenates ethanol, methanol, or a combination shall be identified as "with" or "containing" (or similar wording) the specific type of oxygenate(s) in the engine fuel. For example, the label may read "contains ethanol" or "with MTBE/ETBE." "ethanol", "methanol", or "ethanol/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 one half inch in height, 1/16 inch stroke (width of type).

**2.20.2. Documentation for dispenser labeling purposes.--**The retailer must be provided, at the time of delivery of the fuel, on an invoice, bill of lading, shipping paper, or other documentation, a declaration the presence of any oxygenate or combination of oxygenates present in concentrations of at least 1% by volume and maximum amount of ethanol, methanol, or any combination of ethanol/methanol (in terms of percent by volume) contained in the fuel. 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 motor fuel before blending.

**32-12 W 2.22. Liquid Oxygen Used for Medical Purposes**

See Item 232-17 in the Report of the 75th NCWM, 1990, for background on this subject. California Weights and Measures indicated that the San Luis Obispo County Sealer has found that many home medical devices are not calibrated, and that there may be problems not only with liquid oxygen, but other areas as well. No data or statements of problems have been submitted to the Committee or to a Regional Weights and Measures Association. The Committee has not moved forward in explicitly requiring a sealed meter to be used to deliver liquid oxygen since commercial exchange by volume would require that Handbook 44 tolerances be met for the accuracy of delivery; the Committee is not aware whether Handbook 44 tolerances can be met by other than a sealed meter. However, requiring a sealed meter does not solve another significant problem raised. It was contended that the actual amount of liquid oxygen received may be considerably less than indicated by a meter located on a delivery truck if the hoses carrying liquid oxygen are long enough to permit volatilization of the product from the truck to the receiving tank. Other parts of Handbook 44 requirements must be enforced to ensure accuracy of delivered volume in these instances, such as the G-UR. User Requirements section. The location of the meter and length of discharge hose may be critical to the accuracy of the measurement of delivered volume. This may be an issue for the regional weights and measures associations to explore in their Specifications and Tolerances Committees. No response or alternative recommendation has been forthcoming from any party concerning this problem since the Committee pointed it out in its report to the 75th NCWM. Due to the demands of other work, the Committee does not intend to pursue this issue.



232-13 VC 2.X. Wiping Cloths

(This item was adopted as part of the consent calendar.)

**Background:** At the 75th Annual Meeting, the Conference was alerted to the continuing practice of selling and labeling wiping cloths by gross weight. The Central Weights and Measures Association reported to the Conference that packages of wiping cloths have been found in the retail marketplace, such as hardware and paint stores. A letter was transmitted to the International Association of Wiping Cloth Manufacturers voicing the Conference's concern about industry labeling practices that might be interpreted as violations of general packaging and labeling and method of sale requirements. Section 15 of the UWML prohibits anyone from representing the quantity in any manner calculated or tending to mislead or in any way deceive another person. Since the only usable quantity of wiping cloths being declared is the net weight, a gross weight on the label could be interpreted as misleading and deceiving. Furthermore, there is some concern that net weight is not an appropriate declaration, since wiping cloths are used by the "each" or by count and size.

**Committee Recommendation:** Add the following new section to the Uniform Regulation for the Method of Sale of Commodities:

**2.X. Wiping Cloths.** -- Wiping cloths shall be sold by net weight or by count plus size of wiping cloths. When sold by count plus size, and the wiping cloths are of assorted sizes, the term "irregular dimensions" and the minimum size of such cloths must be declared. The gross weight may not be printed on any package, either consumer or nonconsumer.

232-14 I 2.XX. Glass

**Background:** California Weights and Measures received a complaint from a retailer against a glass fabricator about the practice of taking an order for a certain size of glass and calculating the area of the glass upon which the charge is based using only even inch increments. For example, someone ordering 10 1/2 by 10 1/2-in glass would be charged according to the price for a 12 by 12-in sheet. However, when California officials met with representatives of the California Glass Association, they discovered this is a practice nationally. The glass manufacturers supply tables with prices based on even-inch increments: historically, window glass stock sheets always came in even inches, but this is no longer the case. There are other legitimate reasons for charging for a size larger than that of the finished piece. The industry contends that there is no efficient method to calculate area for glass with fractional dimensions; for example, most calculators use decimals, not fractions. The reason that glass dimensions must be rounded up is because an extra amount of glass is needed as a lever or break-off strip when custom-cutting to the required final dimensions. Moreover, there is an analogy with other building supply products: a supplier of wood sells only a full piece of wood or sheet of material in the available stock sizes. The buyer assumes the responsibility for cutting loss and spoilage due to miscuts.

Representatives from the Flat Glass Marketing Association, Glass Tempering Association, Laminators Safety Glass Association, Primary Glass Manufacturers Council, and the Glazing Industry Code Committee met with the Committee to discuss possible solutions to the issue. According to a California Weights and Measures representative, the glass supplier was charged with the violation that the invoice listed only the requested size of glass (18 7/16 inch x 34 13/16 inches), a calculated area of 4.457 sq. ft. The invoice did not indicate that the buyer was actually charged for a 5 sq. ft. (20 in x 36 in) piece of glass. It was suggested that a change in the information shown on the invoice might be sufficient. For example, "20 in x 36 in glass cut to customer's dimensions of 18 7/16 in x 34 13/16 in."

The Committee does not see any reason to ban the long-standing practice of calculating and charging for the large piece of glass which is cut to the custom-ordered size. However, full disclosure to the purchaser is mandatory. The glass associations' representatives expressed their intent to review their invoicing, price lists, and signage to ensure that computations and charges are fully disclosed to both retailers and ultimate purchasers. The Committee will review the industry practices after the industry representatives have had an opportunity to recommend possible improvements to their methods of disclosure and advertising; it may be necessary to establish a method of sale for glass sold from bulk, but the Committee will defer this decision.



Prior to the Annual Meeting, the Flat Glass Marketing Association submitted proposed language for a glass standard based on "traditional trade practice" of rounding measurements up to the next even or full inch for purposes of calculating charges for flat glass sheets. The Committee will review this proposal as part of next year's work.

In addition, Maryland Weights and Measures alerted the Committee that another industry practice indicates a nominal thickness of glass that is not, in some cases, equal to the declared thickness. This issue will also be included in the Committee work on this item.

## 232-15 I 2.XXX. Baler Twine

**Background:** Baler twine, either polypropylene or sisal, is used by farmers in automatic baling machines. The sisal product is imported. Prior to the 64th NCWM, a method of sale requirement for baler and binder twine required its sale by length, net weight, and knot strength. A tolerance of 5 percent of the declared length had been allowed as part of that requirement. The entire requirement was revoked at the 64th NCWM in order to remove the tolerance of 5 percent of the declared length.

There is not a close correlation between the declared net weight and the length. The farmer needs to be assured of the length and knot strength. Packages of baler twine have been found with net weight declarations and without length declarations. Instead of length, some packages are marked with a "Model No. 9000," implying 9000 ft in the package. Canadian weights and measures officials conducted a survey indicating a serious shortfall between the actual length and that implied to be in the package or declared to be the length. Several years ago, when the lengths were tested, weights and measures officials were alerted to probable shortages in these packages. In many instances, the lengths are no longer declared. Some members of the industry complain that States have conflicting requirements for what the net quantity statement should indicate.

At the 1991 Interim Meeting, the Committee recommended adding the following information as an Interpretation and Guideline to Handbook 130:

Subsections 6.4.1.(a) and (b) of the Uniform Packaging and Labeling Regulation read:

### 6.4.1. Combination Declaration. --

(a) A declaration of quantity in terms of weight shall be combined with appropriate declarations of the measure, count, and size of the individual units unless a declaration of weight alone is fully informative.

(b) A declaration of quantity in terms of measure shall be combined with appropriate declarations of the weight, count, and size of the individual units unless a declaration of measure alone is fully informative.

Neither weight alone nor length alone is fully informative on packages of baler twine. Both weight and length must appear. Knot strength is an element of identity and must therefore appear on the principal display panel, but separate from the net quantity.

Knot strength as an element of identity is derived from the FTC interpretations on twine and cordage products. The Committee invited input on whether a new section needed to be added to the Uniform Regulation for the Method of Sale of Commodities to require that baler twine be sold by weight, length, and knot strength. In addition, the Committee asked for information on the appropriate tension for measuring the length in baler twine. In the absence of such information, it was recommended that weights and measures officials use a tension of 5 kg or 10 lb.

At the Annual Meeting, the Committee made this an information item, with the intent to incorporate baler twine requirements into the Uniform Regulation for the Method of Sale of Commodities next year. Further work will include determining the appropriate tension to be applied to the twine for length measurement and the appropriate label declarations. The Committee will consider whether a length declaration alone is adequate or if net weight should also be required. The Conference will collaborate with Canada's Legal Metrology Branch in this area.

**232-16                    I            2.XXXX. Products Dispensed from Mechanical Devices**

See Item 231-6 in this report and Item 232-18 in the Report of the 75th NCWM, 1990, for background on this subject. The Committee will focus its attention on Item 231-6 first in its priorities for work. The Committee did not address this item at the Interim Meeting, but will keep the issue in its work plan for later development.

**237                                    Uniform Motor Fuel Regulation**

**237-1                    W            Use of Qualitative Terms for Motor Fuel**

**Background:** Some States have regulations defining the names that may be used to designate the quality (expressed as the anti-knock index or octane level) of motor fuel. A proposal was made to add a requirement to the Uniform Motor Fuel Regulation defining customary grades or quality designations of motor fuels; for example, define "regular" for automotive gasolines and gasoline/oxygenate blends as having a minimum octane index of 87 and define "premium" or any word or term of equivalent meaning as having a minimum octane index of 91. The reason given was that the motoring public needs standardized definitions for clear understanding across State lines.

Title 15 of the U.S. Code Sections 2821-2824, Title II of the Petroleum Marketing Practices Act and regulations under the Act, 16 CFR Sections 306.0 - 306.11, require the posting of the gasoline AKI (anti-knock index). All vehicle owners' manuals, foreign and domestic, refer to fuel requirements using the AKI. Since a nationwide reference point (the octane posting) is already in place, there is no need for standardized definitions recognizable across State lines.

The Committee is therefore withdrawing this item from its report.

**238                                    Interpretations and Guidelines**

**238-1                    VC            Ready-to-Eat Food - Guideline on Selling Whole Chicken by Count**

(This item was adopted as part of the consent calendar.)

This was Item 232-7 in the Interim Meeting Agenda.

**Background:** The Massachusetts Food Association and Connecticut Food Stores Association requested that Section 1.12. Ready-to-Eat Food of the Uniform Regulation for the Method of Sale of Commodities be modified so that whole ready-to-eat chickens held in a hot holding unit with or without thermal protection packaging and not intended for self service be permitted to be sold by weight, measure, or count. They argued that customer convenience demanded that the customer know the cost to feed the family prior to the sale. Permitting the sale of whole chickens only by a specified cost per pound may act as a psychological obstacle to purchasing at the retail food store, which competes with the fast food restaurant with respect to this product. The Northeastern Weights and Measures Association did not support the food associations' request. They recommended that whole chicken be labeled as if it were a standard package, for example, "net weight 2 1/2 lb - \$3.85 each" as signage adjacent to the product. The majority of the Committee endorses this approach.

**Committee Recommendation:**            Add the following guideline:

Supermarkets have complained that being required to sell items such as fully-cooked ready-to-eat chickens or ribs or other "carry-out" items by the pound puts them at a competitive disadvantage to other "fast-food" outlets that can post a final price on a menu board so that the potential customer knows ahead of selection what the final price of the item will be.

It is not necessary, however, to sell these items from bulk and have to individually weigh and mark every chicken or slab of ribs. An alternative method of sale is to weigh the finished, cooked item, say the whole chickens, determine the minimum net weight, and sell them as if they were "standard" packages, that is, of a

fixed (the minimum) weight. For example, retailers could post a sign "Whole Barbecued Chickens, net weight 2 1/2 lb - \$3.85 each."

This would meet the requirement that meat, poultry, fish, and seafood be sold by weight and would permit stores to compete with fast food outlets while still providing net quantity information to the purchaser.

## 238-2 W 2.3.2. Fresh Fruits and Vegetables

**Background:** It was recommended that the guidelines on the method of sale of fresh fruits and vegetables appearing in the section "Interpretations and Guidelines" of Handbook 130 be updated to address more products and methods of sale based on current good marketing practices. Input was provided from the Central Weights and Measures Association, South Carolina Weights and Measures, and Winn-Dixie Stores. Unfortunately, the Committee did not have time to give this item proper study. Because of the press of other high priority issues, the Committee is withdrawing this item from its report.

## 238-3 VC Typewriter and Computer Printer Ribbons and Tapes

(This item was adopted as part of the consent calendar.)

This was listed in the Committee's Interim Agenda under Item 250-1 Enforcement Issues.

**Background:** Packages of typewriter and computer printer ribbons and tapes have been found in the marketplace with no declaration of quantity of any kind. Information on the package about the type of machine the ribbon or tape is designed to fit is not a declaration of quantity. Purchasers have been misled as a result of the failure of some manufacturers to disclose the length; ribbons designated for a particular machine may be sold at a low price, but with substantially less length than ribbons ordinarily produced for the machine.

The Committee met with Mr. Charles Sabatt representing the Copying Products and Inked Ribbon Association Inc. (CPIRA). The association endorsed the requirement to disclose the length of the ribbon. CPIRA also expressed the concern of its membership that disclosing ribbon length may not fully inform the purchaser about "character yield", namely the number of characters that will be produced by a ribbon, or the ribbon life. CPIRA may submit proposals, when they have been worked out, that permit labeling by character yield, although at present the concept of character yield is complex. For example, ribbons with "seamless loop" technology incorporating re-inking systems may be 1/12th the length of a non-re-inking welded ribbon, yet provide 1 1/2 to 2 times the useful life. In another example, the three basic types of nylon (flat, textured, twisted) used to make ribbons and tapes hold various amounts of ink and provide different terms of life at the same yardage. A third aspect of this issue relates to the width of the ribbon, especially if it incorporates a moebius loop (a twisted continuous loop), which can dramatically alter the life of a ribbon. For one particular machine, some manufacturers provide a 1/8-in ribbon, and others a 3/8-in ribbon that lasts 50% longer at the same length. CPIRA will inform its members that they must disclose ribbon length and, in addition, may inform the purchaser that character yield may not be related to ribbon length.

**Committee Recommendation:** Add the following to the Guidelines and Interpretation section of Handbook 130:

**Typewriter and computer printer ribbons must be labeled by length. In addition, character yield information may be disclosed on the principal display panel.**

## 238-4 I Hardwood Labeled by the "Board Foot"

This was listed in the Committee's Interim Agenda under 250-1 Enforcement Issues.

**Background:** Mr. Paul Everitt, weights and measures official of Seattle, WA, contacted NIST concerning a complaint received about the purchase of hardwood lumber. The price of this lumber was quoted as a certain amount per board foot; however, the actual dimensions of the hardwood lumber were considerably less than the stated amount when converted to board feet (1 board foot = 12 x 12 x 1 in = 144 cu in). For example, a 6-foot by 7-inch by 3/4-inch



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board was labeled 4 board feet, an amount corresponding to dimensions of 6 feet by 8 inches by 1 inch. Mr. Everitt contacted a retail wood supply firm as well as Mr. Bob Sabistina, the chief inspector of the National Hardwood Lumber Association. All of those contacted agreed that it was industry practice to declare the number of board feet in a piece of lumber as the dimensions before surfacing the lumber.

The Committee recommended in its Interim Report to add the following interpretation to the section on "Interpretations and Guidelines" of Handbook 130:

**Interpretation:** In 1977, the National Hardwood Lumber Association collaborated with the National Conference on Weights and Measures in the writing of the following paragraph that appears in the Uniform Regulation for the Method of Sale of Commodities as printed in NIST Handbook 130, "Uniform Laws and Regulations." This paragraph reads:

2.12. Hardwood Lumber. -- Sales of hardwood lumber measured after kiln drying shall be quoted, invoiced and delivered on the basis of net board footage, with no addition of footage for kiln drying shrinkage. Sales of hardwood lumber measured prior to kiln drying shall be quoted, invoiced, and delivered on the basis of net board footage before kiln drying. If the lumber is to be kiln dried at the request of the purchaser, the kiln drying charge shall be clearly shown and identified on the quotation and invoice.

Weights and measures laws of all 50 States require that the sale of any commodity by weight or measure be by net weight or measure, not prior to processing or including the weight or measure of other than the commodity being sold. Although paragraph 2.12. does not specifically mention subsequent surfacing of the lumber, the principles of net quantity still apply.

**Further Discussion:** Since Mr. Everitt has found what might be a widespread practice that may be in conflict with legal requirements, the association was notified in writing and asked to notify their members. Any quotation, invoice or sale of hardwood lumber must be by net board footage, not by board footage prior to further processing, such as surfacing. Based on discussions with the hardwood manufacturers before and during the Annual Meeting, the Committee revised its plans to add an interpretation to Handbook 130, and now intends to clarify and broaden paragraph 2.12. in the coming year to include any subsequent processing of the lumber, rather than just kiln drying. Members of the trade and retail associations will be invited to comment.

The Committee agreed to change this to an information item and carry it over for consideration next year. Several issues must be addressed, including development of methods of sale for industrial and retail sales based on the "board foot" or actual dimensions.

## 240 Handbook 133: Package Testing

### 240-1 VC Moisture Loss for Bacon and Luncheon Meats; Definition of "Fresh Poultry"

(This item was adopted as part of the consent calendar.)

**Background:** NIST Handbook 133 incorporates the use of "gray areas" for those jurisdictions using wet tare for net weight determinations of meat or poultry products from Federally-inspected packaging plants. There is no gray area for jurisdictions that employ "used dried tare." The gray area approach has also been adopted by the U.S. Department of Agriculture. The magnitudes of the gray areas are based on procedures and pilot studies developed and conducted under the auspices of the National Conference on Weights and Measures' Task Force on Commodity Requirements.

The protocol for the original pilot studies that were conducted to determine the size of the gray areas for meat and poultry products was designed by first questioning wet tare jurisdictions as to how they would determine the net weight of packages of bacon or packages of luncheon meat such as bologna. California and Michigan jurisdictions respond



that, as long as there was no free-flowing liquid in the packages, they would clean the packages of clinging fat and other solids before determining the tare weight.

In subsequent discussions with the Task Force on Commodity Requirements, representatives of the meat industry and the U.S. Department of Agriculture said that there should be no free flowing liquid in packages of bacon. As a result, bacon was excluded from the pilot study with the understanding that jurisdictions that employ wet tare would clean bacon packages of clinging fat (bacon) before determining the tare weights just as jurisdictions that employ dry (used or unused) tare would do. Bacon was given a gray area of zero because the test methods and tare weights for bacon were identical for wet tare and dry tare jurisdictions.

In the pilot study conducted on luncheon meats, sausage, and franks, the data collected by weights and measures jurisdictions using wet tare tests indicated that there was no free-flowing liquid in the packages of luncheon meats tested (including bologna, pimento loaf, sliced turkey, and sliced ham) and in sausage packages. Therefore, these products too were given gray areas of zero with the understanding that the tare materials for these types of packages are to be wiped clean of clinging product before determining the tare weight. This is the same procedure employed by jurisdictions that normally use dry tare (used or unused). This was the intent of the procedures adopted by the National Conference and incorporated in Handbook 133.

In this year, the American Meat Institute (AMI) conducted a study to determine if there really should be a zero gray area for bacon and for luncheon meats for jurisdictions employing a wet tare in their testing. Some wet tare jurisdictions have cited AMI member companies in the recent past, and AMI believes that the cited short weights were due to the techniques these jurisdictions employed that differed from those intended to be used by wet tare jurisdictions. AMI contends that the jurisdictions appear to have taken the bacon or luncheon meats out of the package and weighed the product, but with no efforts to clean the tare materials and subtract the tare weight from the gross weight of the package. AMI duplicated this procedure (not cleaning out the package, but only weighing the solids that came out of the package) to derive a proposed moisture loss (not actually moisture in the instance of bacon, but clinging fat) of 3 1/2% if bacon packages are not cleaned and wiped before determining the tare weight. Similarly, gray areas of 0.75% for salami to 4% for ham and turkey breast were recommended by the AMI if packages of luncheon meats are not cleaned and wiped before determining the tare weight.

AMI simply removed the solids from the packages of bacon and luncheon meats, but did not clean the tare materials any way: a non-zero gray area appears to be warranted if tests are conducted in this manner.

Jurisdictions using wet tare do not clean and wipe the tare materials for bacon or luncheon meats prior to determining their tare weights, they cannot apply a zero gray area, which applies only if the tare materials are cleaned and wiped. The original reasoning behind this approach was that, as long as there were no "puddles" of free-flowing liquid in the package, the package could be cleaned before determining the tare weight, similar to cleaning a ketchup bottle of clinging ketchup before determining its tare weight.

The language in Handbook 133 needs to be clarified. The confusion arises because Section 3.18.2. Types of Products, Bacon, states: "Wet tare and dried used tare are equivalent. Wipe all packaging material dry of fat and clinging moisture before weighing tare." Section 3.18.2. b. Fresh Sausage and Luncheon Meats, also says "carefully clean and wipe all tare materials. Wet tare and dried used tare are equivalent." However, Section 3.18.3. Procedure, e. Tare (Wet Tare), states "(a) gross weigh two packages opened for tare, (b) weigh solids inside, (c) get wet tare by subtracting solids weight from gross weight...". Inadvertently, references to 3.18.2. a. and b. were left out of Section 3.18.3. In addition, Section 3.18.3. e. does not make clear that packages of bacon, sausage, and luncheon meat are to be wiped clean before determining their tare weights.

Other problems also need resolution. "Unused tare" and "dried used tare" are equivalent only when there is no absorption of fat or grease into the packaging material; some bacon, for example, is packaged on paperboard backing rather than on plastic. In addition, packages that contain a soaker pad (for example, microwaveable bacon) will also absorb moisture during distribution; the Committee was asked to address this problem by requiring that the pad be dried (by "dry tare" jurisdictions) and by establishing an appropriate gray area for these products (for "wet tare" jurisdictions). In the interest of clarifying Handbook 133, the Committee recommends that the gray area of zero for bacon not apply to packages with absorbent materials. Many products are subject to moisture loss without gray areas

having yet been established. In those instances, "reasonable variations" must be applied until further data can be collected and analyzed. The Committee requests jurisdictions that test bacon to report the appropriate time for drying out absorbent materials for dry tare jurisdictions.

Wet tare jurisdictions are asked to report the incidence of free-flowing liquid in packages of bacon and luncheon meats. These jurisdictions are also asked to describe what constitutes "free-flowing liquid": is it a puddle of liquid or miscellaneous globules of moisture clinging to the package when the product is removed, but not coalesced into a "puddle"? The Committee recommends that the zero gray area for bacon, sausage, and luncheon meats be limited in application not only to packages with no absorbent materials, but also to packages with no free-flowing liquid inside

Concerning the definition of luncheon meats, the AMI recommended that luncheon meats be limited to the type of product described in Title 9 of the Code of Federal Regulations, Section 319.180 except for franks and wieners. The title of this section is "frankfurter, frank, furter, hot-dog, wiener, vienna, bologna, garlic bologna, knockwurst, and similar products." This recommendation would therefore limit luncheon meats to bologna, even though the pilot study was conducted on a broader array of products, including those under 9 CFR Subpart K "Luncheon Meat, Loaves, and Jellied Products" and sliced ham and turkey. The Committee believes that a better approach is to narrow the application of a zero gray area to all "luncheon meats," as generally understood by a layman, unless there is free flowing liquid in the package; that is, to limit the application of a zero gray area to those products for which no free flowing moisture is found in the packages.

The AMI also recommended that the advice in Section 3.18.3, Procedure h. What to Do When the Lot Is in the Gray Area (1) Further Information (b) be modified as follows: "If USDA has data on the specific lot in question or if there is an approved TQC or PQC program producing data on the lot, this data may serve as sufficient to substantiate that the lot complied with net weight requirements when it left the plant." The Committee was not provided the recommendation until after the Interim Meeting, but preliminary discussions have led it to conclude that no change should be made to permit maximum regulatory flexibility by the weights and measures jurisdiction. The AMI may wish to propose this or additional changes for the next work year; the Committee requests that these proposals be accompanied by further explanation of the implications of any suggested changes.

Now that the U.S. Department of Agriculture has adopted Handbook 133 (HB133), there is an increased interest in the clarity of instructions and methodology in Section 3.18. of HB133 covering meat and poultry products from Federally inspected plants. A letter sent January 4 to State and local Directors in wet tare jurisdictions details this issue. The substance of this letter appears above. Dry tare jurisdictions are not affected (and do not use the "gray area" approach for meat or poultry products not subject to evaporation of moisture<sup>1</sup>). As long as dry tare jurisdictions dry the absorbent materials and assign any free-flowing liquid to the net weight, they will have accounted for moisture loss and will not have to concern themselves with "gray areas" or "reasonable variations."

To summarize the intent of the revisions shown in Appendix C: (1) for bacon, sausage, and luncheon meats, the "zero gray area" can only be applied by wet tare jurisdictions when the tare materials are non-absorbent (all plastic, for example) and when there is no free-flowing liquid in the packages. Under these circumstances, the tare materials are to be completely cleaned of clinging product before making the determination of tare. Since this is the same procedure employed by dry tare jurisdictions, there is no need to apply an allowance for moisture loss (hence "zero gray area"). (2) When there is free-flowing liquid, or when the tare materials are cardboard or contain a soaker paper, the "zero" gray area does not apply for bacon, sausage, or luncheon meats, and "reasonable variations" (undefined in HB133 but not zero) will have to be recognized by wet tare jurisdictions. (3) Dry tare jurisdictions will have to take precautions to dry out absorbent materials when testing other meat packages just as they normally do for poultry packages.

In a completely separate issue, it was pointed out to the Committee that the Standards and Labeling Division of FSIS updated its policy memo on the use of the term "fresh" in labeling meat and poultry products (Policy Memo 02-01 dated Jan 11, 1989.) This memo permits the term fresh to be labeled on any poultry or poultry part as long as it is not or is not frozen at or below 0 °F. Previous labeling policy did not permit the term fresh to be applied to products

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<sup>1</sup>An example of a meat product subject to moisture evaporation is air-dried sausage.

low 26 °F. After discussions with and advice from the Chief of the Standards Branch at FSIS, the Committee is recommending defining fresh poultry for purposes of net weight and application of the gray area only as that product above 26 °F.

Committee Recommendation: Revise Section 3.18. as shown in Appendix C.

## 10-2 I Moisture Loss for Ice-Packed Poultry

The Task Force on Commodity Requirements completed its work at the 73rd Annual Meeting. Ongoing efforts to fine test methods and define specific approaches for different commodities subject to moisture loss were left to the Laws and Regulations Committee and the Liaison Committee. The Task Force recommended that the Committee take up the issue of moisture-loss for ice-packed poultry shipped in bulk for repackaging by retail stores. Weights and measures agencies have repeatedly found large shortages in bulk shipments of ice-packed poultry and have been frustrated in their efforts to decrease the occurrences of shortages. The Task Force was unable within the time allotted to it to design a data collection study that would shed light on the shortages caused by the loss of moisture during shipping. The U.S. Department of Agriculture (USDA), Food Safety and Inspection Service (FSIS), volunteered help in collecting the necessary data.

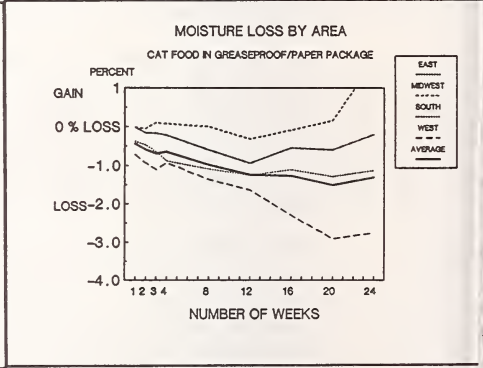
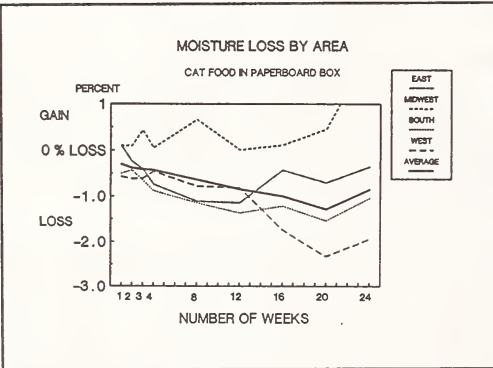
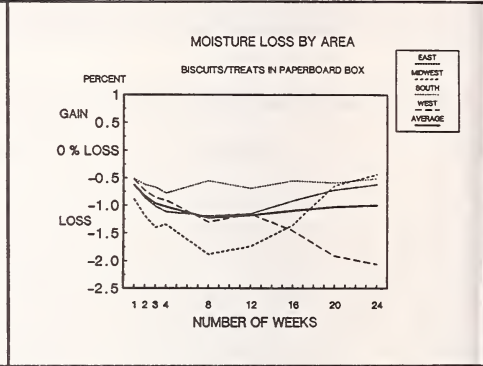
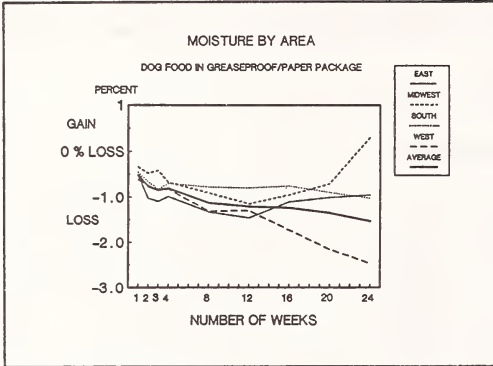
FSIS and the NIST Office of Weights and Measures designed a test protocol for weighing cases of poultry on the packing line, in the plant, at the point of shipping, and as received by the purchaser. A pilot study was conducted in the spring of 1990 with the objective of finalizing the test method prior to asking other States and manufacturing plants to participate. The study sought to determine the amount of moisture lost at each point in the manufacturing and distribution system for a wide variety of products, distribution distances, and times. This study was conducted in the States of Maryland, Delaware, and Connecticut. The Committee expresses its appreciation to these jurisdictions for their fine work. Moisture loss on whole chicken in a little over 24 hours was as high as 9%.

The Committee's Technical Advisor met with representatives of the National Broiler Council (NBC) to discuss the findings of the pilot study. The NBC expressed concern because they knew of no members (poultry processors) who could not and do not currently adjust bills to reflect the amount of product received. Retailers who have problems with their bills, NBC maintained, must be dealing with wholesalers or other middlemen who can adjust their bills with a poultry processor but who are not allowing the same adjustment to the retailer. Perhaps a more viable solution would be to help retailers with their contracts with their suppliers, who may be middlemen, not the poultry packagers themselves. Apparently, good distribution practice in all these instances includes backbilling for shortages at the time of delivery; recognition of moisture loss is therefore inconsistent with current distribution practices. The Committee will write weights and measures officials and retailers to determine whether thereported problems can be resolved through better information, communication, and support from the weights and measures community, the retail food market trade associations, and the poultry manufacturers. The Committee affirms its desire to assist retailers with their contracts with suppliers to ensure that they pay only for the net weight of poultry received at the time of delivery.

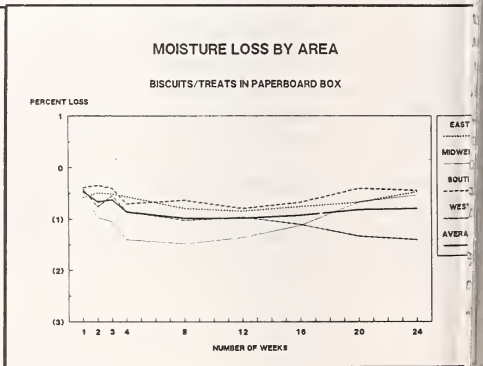
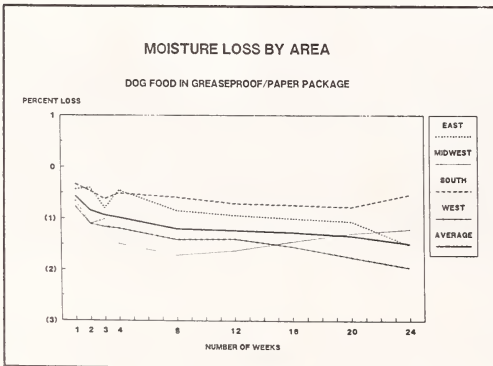
## 10-3 I Moisture Loss for Pet Foods

Members of the Pet Food Institute collaborated with selected weights and measures jurisdictions in the conduct of studies of moisture loss for dry pet foods. Their objective was to provide moisture loss data that can be used to determine the amount of weight loss that may be experienced from the time of packaging. This would not be a "gray-area approach," but would, if successful, be a moisture loss tolerance look-up table. All regions of the country, as well as all representative types and sizes of dry pet foods and packaging materials, were represented in the studies. Weights and measures officials were asked to visit the packaging plants and warehouses where the weight loss studies were conducted, test the scales used to determine the amount of weight loss, and become acquainted with the net weight and other quality control aspects of the packager. The first study began in January 1990 and ended in the summer of 1990; a second study to determine the effects of different seasonal variations began in May 1990 and ended in winter 1990-91.





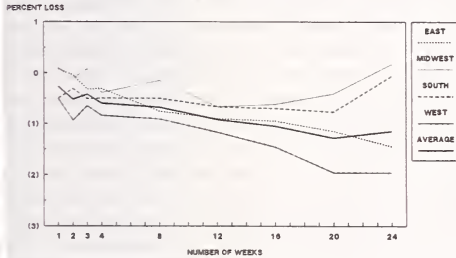
Five companies collected data on moisture loss for dry pet food: Alpo, Heinz, Nabisco, Quaker, and Ralston Purina. The preliminary results of their work were reviewed at the Interim Meeting in January 1991. Results from the first 6-month study are shown above. The objective of these data collection studies is to provide moisture loss data that can be used to determine the amount of weight loss that may be experienced from the time of packaging, rather than requiring the testing official to perform additional tests at the time of finding shortweight. Mr. Robert Fuenhe, Ralston Purina Company, presented preliminary results from the second data collection at the Annual Meeting. The information is shown below.





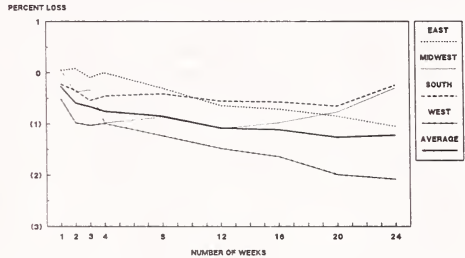
MOISTURE LOSS BY AREA

CAT FOOD IN PAPERBOARD BOX



MOISTURE LOSS BY AREA

CAT FOOD IN GREASEPROOF/PAPER PACKAGE



#### 240-4 I Moisture Loss for Pasta

The National Pasta Association would like to use the gray area approach adopted by the NCWM for flour as a model for moisture loss in pasta. They have provided the NCWM with a list of all U.S. packagers to act as contacts with the packaging plant. A round robin will have to be conducted to make sure that all laboratories obtain the same moisture content on the pasta. The association agreed to sponsor the round robin. The interlaboratory study on moisture measurement comparison will be conducted immediately after the Annual Meeting. State directors will be contacted and asked to participate in this study. The pasta samples have been collected and will be distributed by Mr. James Jacobs of the Northern Crop Institute, Fargo, North Dakota.

#### 240-5 I Polyethylene/Test Methods for Bags

See Item 240-7 in the Report of the 75th NCWM, 1990, page 108 for background on this item. Styrofoam balls are being explored as an alternative test material to vermiculite.

#### 240-5A I MAV's for Polyethylene Bags

Manufacturers of very thin polyethylene bags showed that their manufacturing process controls could not produce packages of bags in the range of 1 mil thickness or less and of low count (low count not defined) so that the MAV of 4% could be met. They showed data collected on products from several different manufacturers. Several problems apparent in the data provided will have to be resolved. The repeatability of a dead-weight dial micrometer as described in Handbook 133 is 0.05 mil; the MAV of 4% for 1-mil-thick product is 0.04 mil. This raises the question of whether the MAV for 1 mil product can be measured using the equipment described in Handbook 133. This also suggests that packagers reporting their inability of conform to the MAV of 4% need to investigate the precision and accuracy of their measuring equipment. Weights and measures enforcement agencies should check the accuracy and repeatability of their equipment before testing polyethylene of 1 mil thickness. Data submitted by polyethylene bag manufacturers indicate that, for example, 40% or more of the packages tested for 3 of 9 brands of tall kitchen twist bags ranging from 0.65 to 1.01 mil labeled thickness did not meet the MAV of 4%. Forty percent or more of the packages tested for those same three brands would not have met an MAV of 7% either. (The 7% MAV had been in force until changed by the 74th NCWM in 1989.) The data submitted were not directly comparable to results under Handbook 133 sampling procedures; there was no indication whether samples of 10 packages from the same lot or delivery would have met the average requirement. Further information and data will be necessary to determine whether changes to the MAV for thin, low count bag products are warranted.

The Flexible Packaging Association notified the Committee before the Annual Meeting that it is collecting further information on bags less than 1 mil thick. The purpose of this study is to determine if existing measurement equipment is suitable for thicknesses under 1 mil and if the MAVs specified in NIST Handbook 133 are appropriate.

## 240-6                    I                    Aerosol Products -- Testing Procedure for Foam and Nonfoam

**Background:** A pan spray aerosol is delivered as a foam (Handbook 133 defines a foam as formed at the valve or when the product hits a surface, with its volume not substantially reduced in 20 seconds), but is so composed that it behaves differently from the traditional foam product, such as shaving cream. (Sacramento County reports that it separates into a foam and non-foam when it hits a surface.) At issue initially was the legitimacy of applying the test allowance given to foam products to this new foam pan spray. The test allowance is applied to foam aerosols because they have a tendency to cling to the walls of the aerosol can and need time to settle to be completely expelled. Since the test method does not provide for time for the product to settle, and actual consumer usage involves intermittent deliveries over time, a test allowance is given to foam aerosols to compensate for the difference between the test procedure and actual consumer use. As this foam pan spray is a new product in the marketplace, limited testing has been done to determine how much is delivered under normal customer use and whether or not an allowance for official testing is necessary. Test results on the new foam pan spray, on a competing non-foam pan spray, and on foam shaving cream were provided by the manufacturer and by Sacramento County CA. See the table on the next page. Both testing groups tested all products using (a) the procedures from Handbook 133 for foam products (but not applying the test allowance to the results); (b) the procedures for non-foam products; and (c) twice daily small deliveries of product until the container was empty to simulate consumer usage. Although only a relatively few packages were tested, unanticipated issues were revealed:

1. Six out of nine lots of the foam products tested by Sacramento County (the foam pan spray and the shaving cream) did not deliver the labeled net weight when tested simulating normal consumer usage. These results were duplicated by Beatrice-Hunt Wesson.
2. In the tests conducted by Sacramento County, the amount of product (whether foam or non-foam) delivered when tested as a foam product was about equivalent to the product delivered when tested as a non-foam product, and both amounts (except for two lots of shaving cream) were greater than the labeled weight. Beatrice-Hunt Wesson results showed larger deliveries by weight for the foam pan spray and for the shaving cream when tested following the foam aerosol test procedures and their delivered weights were all greater than the labeled net weight without applying the test allowance. This may indicate that there may not be a need for the foam product allowance in the test procedures.

**Committee Recommendation:** The Committee encourages other jurisdictions and Regional Weights and Measure Associations to study the data given in this report and to collect their own data on foam and non-foam aerosol products to determine if test methods for aerosols need to be modified. In order to compare data, it will be necessary to follow the procedures used by Sacramento County. The report and procedures used by Sacramento County are available either from Sacramento County or from the Office of Weights and Measures upon request.

Packagers of aerosol products are warned that the legal requirements for the labeled net weight are that the container delivers the labeled weight to the consumer. If packagers have been designing containers to deliver only under the test conditions given in Handbook 133, they should conduct their own consumer usage tests to verify that the containers deliver in an as-used condition.

### Net Weight Data on Aerosols

Product	Container Size (lb)	Net Weights (lb) from Various Test Methods		
		Foam	Non-Foam	Consumer
Foam Pan Spray	0.25	0.290	0.276	0.260
		0.282	0.284	0.210
		0.292	0.288	0.252
	Sacramento Co. Average	0.288	0.2827	0.2407
	Beatrice-Hunt Wesson Average	0.286	0.2826	0.2467
Foam Pan Spray	0.375	0.404	0.412	0.374
		0.404	0.406	0.302
		0.398	0.406	0.378
	Sacramento Co. Average	0.402	0.408	0.3513
	Beatrice-Hunt Wesson Average	0.403	0.403	0.3915
Non-Foam Pan Spray	0.375	0.406	0.400	0.390
		0.408	0.402	0.398
		0.402	0.402	0.398
	Sacramento Co. Average	0.4053	0.4013	0.3953
	Beatrice-Hunt Wesson Average	0.399	0.401	0.4034
Foam Shaving Cream	0.6875	0.682	0.668	0.678
		0.684	0.668	0.684
		0.688	0.682	0.668
	Sacramento Co. Average	0.6847	0.6727	0.6767
	Beatrice-Hunt Wesson Average	0.6975	0.6797	0.6665

### 240-7 I Moisture Loss for Rice

Members of the Rice Millers' Association (RMA) who sell packaged goods have been cited for short weight violations in California, Michigan, Missouri, New Jersey, New York, and Utah within the past year and with an increased frequency during the past 6 months. RMA contends that analyses of the packages removed from the shelves by the weights and measures inspectors and compared to weights and moisture records at time of pack indicate that the weight loss is due to moisture loss. When relative humidities fall below 55% in heated or air-conditioned stores and warehouses, moisture loss will occur. RMA has requested the Conference to address the moisture loss of packaged rice in a manner similar to flour, that is, to establish a gray area for packaged rice.

The Committee's Technical Advisor has communicated with the representatives of RMA and advised that an interlaboratory comparison should be conducted to determine if moisture contents reported by RMA members are equivalent to moisture contents as determined by weights and measures laboratories. A majority of RMA members used the Motomco moisture meter Model 919 rather than oven drying methods to determine the moisture content



at time of pack. Two members use the Dickey-john GAC II. The U.S. Department of Agriculture (USDA) calibrates the Motomco; the Dickey-john is checked against the USDA air oven method at 130 °C. The American Association of Cereal Chemists will administer the interlaboratory exchange. A letter will be sent to weights and measures directors immediately after the Annual Meeting requesting their participation. No field tests will be warranted if the interlaboratory results show a lack of agreement between laboratory results. Interlaboratory exchanges must show that different labs can get equivalent results before any further data can be collected. The Federal Grain Inspection Service (FGIS) of the USDA has volunteered to collaborate in these tests.

The Rice Millers Association has surveyed their membership and determined that grain moisture meters are used at rice packaging plants to measure the moisture content of the rice at time of packaging. An interlaboratory study on moisture measurement comparisons will be conducted.

## **250 Other Items**

### **250-1 Enforcement Issues**

Several individual issues were discussed. The Committee decided to recommend a specific guideline and interpretation for two items concerning (1) typewriter and computer printer ribbon and (2) hardwood lumber. See Items 238-3 and 238-4 under Section 238 for a complete discussion.

#### **250-1A I Labeling of Time on Compact Discs**

The Committee was alerted that many compact disk recordings are not labeled with the playing time and type of recording, whether analog or digital. Although there are no requirements for the labeling of type of audio mastering, and subsequent recording, the Conference amended Section 11.23. of the Uniform Packaging and Labeling Regulation last year to require labeling playing time of all recorded media:

11.23. Camera Film, Video Recording Tape, Audio Recording Tape and Other Image and Audio Recording Media Intended for Retail Sale and Consumer Use. -- Image and audio media packaged and labeled for retail sale are exempt from the net quantity statement requirements of this regulation that specify how measurement of commodities should be expressed, provided that:

(b) Exposed, Recorded, or Processed Media. -- The net quantity of contents of exposed or processed film or prerecorded electronic media shall be expressed in terms of the length of time that is of entertainment value.

"Entertainment value" is defined as that portion of a film, tape, or other media, that commences with the first frame of sound or picture, whichever comes first after the countdown sequence (if any), and ends with either (a) the last frame of credits; or (b) the last frame of the phrase "The End," or (c) the end of sound, whichever is last.

The Committee recommends the adoption of this requirement by the States and enforcement of it by weights and measures officials.

#### **250-1B I Labeling of Products Intended for Wholesale and Retail**

Mr. Max Gray, Florida Weights and Measures, alerted the Committee to two issues.

Nonconsumer packages of paper products, such as toilet paper, very often do not have the net contents on the container. Consumer packages must be labeled with number of plies, count, and dimensions of each sheet, and the total area measurement of the roll. There are no specific requirements for declarations on nonconsumer toilet paper packages; however, after consultation with NIST, Mr. Gray informed packagers of nonconsumer products that they must label the number of rolls, the number of plies, and either the length of each roll if unperforated or, if perforated, the number of sheets and the size of each sheet. They do not have to declare the total area of each roll since that can be calculated from the sheet size and number of sheets. Mr. Gray transmitted his interpretations to the Committee for its endorsement or advice.



Gray also encountered the practice of selling paper products, for example, toilet tissue, in supermarket "warehouse" stores by the case, rather than by the individual consumer packages ordinarily inside such cases. The consumer packages inside these cases are correctly labeled; the multiple packages are in cases with minimal labeling. Such cases have been deemed to be exempted under Section 1.(b) of the Uniform Packaging and Labeling Regulation, which reads:

b) shipping containers or wrapping used solely for the transportation of any commodities in bulk or in quantity to manufacturers, packers, or processors, or to wholesale or retail distributors, but in no event shall this exclusion apply to packages of consumer or nonconsumer commodities, as defined herein,

however, when retail stores sell these cases as the smallest unit available for sale to the consumer, they then become consumer packages and must be labeled accordingly. Consumer paper products fall under State and local weights and measures requirements and under the jurisdiction of the Federal Trade Commission under the Federal Fair Packaging and Labeling Act. This issue includes not only paper products, but all products sold at retail that may have been originally produced for wholesale or institutional (nonconsumer) sales.

Section 2.5. of the UPLR permits the label to be "any written, printed, or graphic matter affixed to, applied to, attached to, blown into, formed, molded into, embossed on, or appearing upon or adjacent to a consumer commodity...." Under FTC rules, the label must be affixed to the package. Since the States are the primary enforcement agents for the FPLA, FTC representative, Mr. Bret Smart, expressed a willingness to permit adjacent labeling in this narrow situation where the packager was not aware that the case was to be sold to the consumer. At the Interim Meeting, however, certain paper packagers have contacted the technical advisor of the Committee to determine appropriate labels for their cases since they now know that such cases are sold directly to the consumer. One packager noted that he intended to label the cases "24 4-roll packages; each package contains 300 sheets, 1 ply, 4 1/2 x 4.5 in, 165 sq ft."

## 1-1C I Candy Sold to Businesses for Resale

A candy packager who buys wholesale candy and then repackages it into consumer packages contacted the Office of Weights and Measures because he discovered, when he weighed his incoming product from the candy manufacturers, that they had declared weights that included the candy wrappers, sticks, etc. He had been informed that when he repackaged the candy for consumers, the weight inside the packages had to average the labeled weight, but that the weight was not to include the candy wrappers, sticks, or other inedible materials. He asked that weights and measures officials enforce net weight on nonconsumer packages of candy so that businesses might compete on a level footing with one another. OWM contacted the National Candy Wholesalers Association to alert it to net weight requirements. Weights and measures officials should note that wholesalers may be labeling nonconsumer packages with weights that include inedible components, and officials need to take enforcement action to correct this problem.

## 1-1D I Survey on the Use of Codes in Lieu of Actual Price Entry

Virginia Weights and Measures representatives shared copies of a "Report of the Department of Agriculture and Consumer Services on the Use of Bar Codes in the Commonwealth to the Governor and the General Assembly of Virginia, House Document No. 20" with the Committee and other delegates at the Interim Meeting. This report is a comprehensive study of the use by retailers (clothing, building, drug, food, convenience, liquor, automotive, department, commissary stores) of the universal product code (UPC) using scanner readable bar code, as well as (1) manual readers reading any digital code to determine the sales price, (2) price look ups (PLU) using manually entered codes to determine a sales price or price per unit charge, and (3) stock keeping unit (SKU) codes using manually entered digital codes. In 1965, it was reported that manual price entries had at least a 10% error rate. The results of Virginia's study indicated that errors resulting from the use of codes were lowest in the retail food industry (3.73%) and highest in the convenience store category (11%). This report has been used to introduce legislation requiring shelf pricing or shelf pricing, requiring accuracy of point-of-sale systems, designating the Virginia Office of Weights and Measures as responsible for all point-of-sales systems, and adding civil penalties as an alternative means for

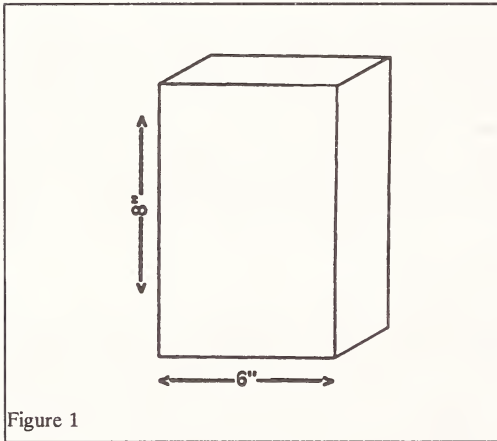
enforcement. Copies of the Virginia study are available from J. Alan Rogers, Program Manager, VA Office of Weights and Measures, PO Box 1163, Richmond, VA 23209, telephone 804-786-2476.

## 250-2 VC Other Modifications to the Handbook

(This item was adopted as part of the consent calendar.)

The following modifications to Handbook 130 are editorial in nature. The technical advisor wants the Committee and the membership to be apprised of them.

1. Pictures (see below and next page) will be added to explain Section 8.2. of the Uniform Packaging and Labeling Regulation. Calculating the area of the principal display panel for the purpose of determining the minimum height of numbers and letters to use in the net quantity declaration on the package can be shown pictorially to assist packagers:



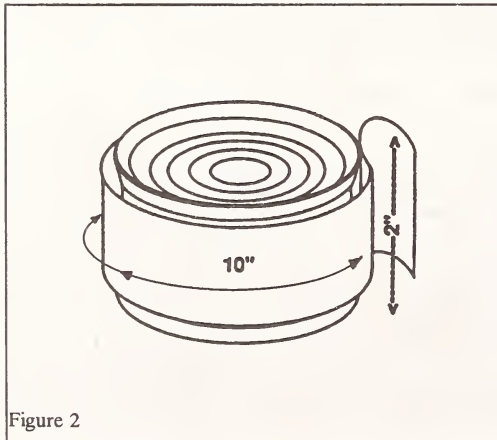
8.2. Calculation of Area of Principal Display Panel for Purposes of Type Size. -- The area of the principal display panel shall be

(a) in the case of a rectangular container, one entire side that properly can be considered to be the principal display panel, the product of the height times the width of that side;

For Figure 1 shown on the left:

$$6 \text{ in} \times 8 \text{ in} = 48 \text{ sq in}$$

This is the area of the principal display panel



(b) in the case of cylindrical or nearly cylindrical container, 40 percent of the product of the height of container times the circumference;

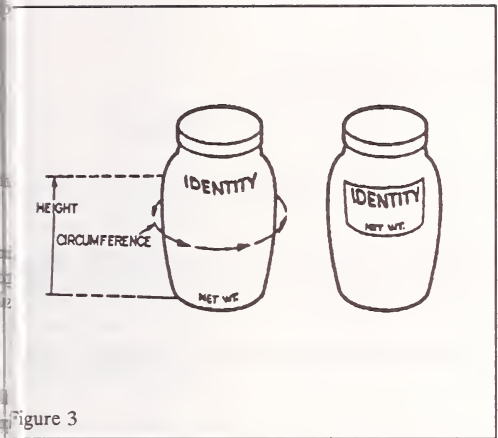
For Figure 2 shown on the left:

$$10 \text{ in} \times 2 \text{ in} = 20 \text{ sq in}$$

$$20 \text{ sq in} \times 0.40 = 8 \text{ sq in}$$

area of principal display panel = 8 sq in

See also Section 10.7.



For Figure 3 on the left:

The area of the principal display panel is the same in both examples. The declaration of net quantity of contents must be of the same height in both cases. It is not the size of the label that is used to determine the minimum type size of the quantity statement, but the size of the surface of the package exposed to view to the customer. The figure on the right is a package with a spot label; see Sections 2.12, and 11.32.

Figure 3

The list of items in the Unit Pricing Regulation will be reprinted alphabetically:

Candy	Price per pound
Cereals	Price per pound
Cheese, Natural and Processed	Price per pound
Coffee, Tea, and Cocoa	Price per pound
Cookies and Crackers	Price per pound
Cooking Oils and Shortening	Price per quart or pound
Deodorants, Personal	Price per ounce
Dry Detergents, Soap Powders, and Dry Household Cleaners	Price per pound
Foil, Film, and Other Rolls of Wrapping (except gift wrap)	Price per 50 sq ft
Fruit and Vegetable Juices and Drinks	Price per quart
Fruits and Vegetables	Price per pound or per individual unit, or whole unit of dry measure
Hair Preparations	Price per ounce
Jams, Jellies, Preserves, and Peanut Butter	Price per pound
Liquid Detergents and Household Cleaners and Disinfectants	Price per quart
Liquid Soups and Condensed Liquid Soups	Price per pound or quart
Meat, Poultry, and Seafood	Price per pound
Net Food	Price per pound
Relishes and Condiments	Price per pound or quart
Rice	Price per pound
Salad Dressings	Price per quart
Sanitary Paper Products	Price per 50 sq ft, or, if by count, per 50 units, including ply

## Laws and Regulations Committee

### Uniform Unit Pricing Regulation (continued)

Shaving Preparations	Price per ounce
Soft Drinks	Price per quart
Syrups, Table and Topping	Price per pound or quart
Toilet Water and Colognes	Price per ounce
Toothpaste	Price per ounce

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3. Clarify that the name, address, and telephone number required to be posted in Section 3.3.(c) of the Uniform Method of Sale of Commodities Regulation refers to the party responsible for the machine, not the parties responsible for the packages sold from the machine.

**3.3. Machine Vended Commodities. -- All vending machines dispensing packaged commodities shall indicate:**

- (a) **product identity;**
- (b) **net quantity;**
- (c) **name, address, and telephone number of party responsible party for the vending machine.**

The requirements for product identity and net quantity can be met either by display of the package or by information posted on the outside of the machine.

In addition, the next edition of the handbook will be revised to place all metric references ahead of inch-pound references.

A. Nelson, Connecticut, Chairman

B. Bloch, California

F. Clem, Columbus, Ohio

S. Rhoades, Indiana

L. Straub, Maryland

G. Vinet, Legal Metrology Branch, Canada, Technical Advisor

K. Butcher, NIST Technical Advisor

C. Brickenkamp, NIST Technical Advisor

### Committee on Laws and Regulations



## Appendix A

### 1.XX. Home Food Service Plan Sales

#### 1.XX.1. Definitions.

As used in this section, the following words and phrases shall have the following meanings:

**Home Food Service Plan.** "Home food service plan" means the offering for sale to a household consumer of any food item, or food item in combination with any non-food product and/or services, whether or not a membership fee or similar charge is involved, for a total price in excess of \$200.

**Seller.** "Seller" means any person, partnership, corporation or association, however organized, engaged in the sale of food through a home food service plan.

**Buyer.** "Buyer" means both the actual and prospective purchaser, but does not include persons purchasing for resale.

**Contract.** "Contract" means all of the collective written agreements subscribed by a Buyer at the time of sale relating to the purchase of a home food service plan, except promissory notes or other financing agreements.

**Food Item.** "Food Item" means each edible product sold as part of a home food service plan, including, but not limited to, each constituent part or kind of meat cut from a primal source, each kind of whole poultry or poultry part, seafood products, and other like products.

**Non-Food Item.** "Non-food item" means each inedible product sold as part of a home food service plan, including, but not limited to, paper products, health and beauty products, detergents, cleaners and disinfectants, rolls of wrapping, and like products. The term means "groceries" or "sundries" and does not include food items and durable consumer goods such as appliances.

**Item Price.** "Item Price" means the price of a food or non-food item sold as part of a home food service plan, computed to the nearest whole cent and exclusive of the service charge and expressed in relation to the appropriate unit of weight, measure, or count of the item.

**Service Charge.** "Service charge" means the aggregate price for the additional features, services, and

processing associated with the purchase of a home food service plan, including, but not limited to, cutting, wrapping, freezing, delivery, and membership fees.

**i. Primal Source.** "Primal source" means the following cuts: (i) for beef, the primal sources are the round, flank, loin, rib, plate, brisket, chuck, and shank; (ii) for veal and lamb or mutton, the primal sources are the leg, flank, loin, rack (rib), and shoulder; and (iii) for pork, the primal sources are the belly, loin, ham, spareribs, shoulder, and jowl.

#### 1.XX.2 Contract and Disclosure Requirements

At the time of sale,

a. The Seller shall provide the Buyer with a single document, referred to in this subsection as the "written agreement", which shall clearly and conspicuously disclose the following:

(i) The name and address of the Seller and the Buyer;

(ii) The date of the contract;

(iii) A statement that no item ordered by the Buyer may be substituted after time of sale without the Buyer's consent, and that any such substitution made will be of comparable price to the item substituted;

(iv) A statement that the Buyer is not obligated to:

(1) enter into any additional home service plan contract or automatically renew the existing contract,

(2) purchase any appliance, including, but not limited to, freezer, refrigerator-freezer, or microwave oven;

(v) The price of the food and non-food items of the home food service plan;

(vi) The price of the service charge associated with the home food service plan;

(vii) The total price of the home food service plan including the price of the food and non-food items, and the price of the service charge; and

(viii) A statement that the Buyer shall have the right to cancel the home food service plan contract until midnight of the third business day after the date on which the Buyer executed the contract or after the day on which the Seller provided the Buyer with a fully executed copy of the contract, whichever is later, by giving written notice of cancellation to the Seller. Compliance with requirements of Federal statutes, rules or regulations governing form of notice of right of cancellation shall be deemed satisfactory notice of the requirements of this regulation.

b. In addition to the above disclosures required on the single document or written agreement, the following disclosures are required to be given to the Buyer in additional contract documents at the time of sale:

(i) A written list of all food and non-food items to be sold, which shall include:

(1) An accurate description of each item and, where applicable, the USDA quality grade of the item, if so graded; the primal source; and the brand or trade name;

(2) The estimated net weight of each meat, poultry and seafood item offered for sale under the home food service plan, provided, however, that such estimates shall not differ from the actual weight at the time of delivery by more than 5 percent, and that the dollar value of the meat, poultry and seafood items delivered is equal to or greater than that represented to the Buyer; and

(3) The weight, measure or count of all other food and non-food items offered for sale;

(ii) A current item price list stating in dollars and cents the price per pound or other applicable standard of measure, of each food item to be delivered and, where applicable, its grade, net weight or measure, brand or trade name. This price list shall clearly, conspicuously and accurately make reference to the fact that there are additional costs disclosed in the written contract relating to any "service charges" associated with the purchase of the home food service program;

(iii) The price of any durable consumer goods sold as part of a home food service plan, which shall be separately itemized in the contract and not merely included in an item price list. In addition the terms and conditions, including price, of any service agreement sold or offered for sale in conjunction with any durable consumer goods; and

(iv) If a membership is sold, a written statement of all terms, conditions, benefits, and privileges applicable to the membership.

**At the Time of Delivery --**

a. Except where preempted by applicable Federal packaging and labeling law, the Seller shall provide a receipt, for signature by the Buyer, disclosing the following information, or shall clearly and conspicuously state on the outside of the package of each food item sold in package form, the following information:

(i) The name and address of either the manufacturer, package, or distributor, as required by applicable law;

(ii) The identity of the item, and the net quantity of the contents in terms of either weight, measure, or count, as required by applicable law. The weight of each food item delivered shall be within the tolerance specified in Section 1.XX.2b(i)(2); and

(iii) The item price and total sales price of the food item. The item price shall be the same as that specified on the item price list given to the Buyer at the time of sale.

## Appendix B

### 1.XX.3. Prohibited Trade Practices

This recommendation accompanies Appendix A and is intended either to be added to proposed Section 1.XX. on Home Food Service Plan Sales or to be transmitted to the State's Consumer Protection Agency or Attorney General's Office.

No person advertising, offering for sale or selling a home food service plan shall engage in any unfair, deceptive or fraudulent methods of competition or trade practices, including, but not limited to:

#### Bait Selling

(i) Disparaging or degrading any item advertised or offered for sale by the Seller, or displaying any item or depiction thereof to any Buyer in such a manner as would be likely to discourage the sale of the advertised or offered item in order to induce the purchase of another item, or representing that an item is for sale when such representation is used primarily to sell another item;

(ii) Substituting any item for that ordered by the Buyer without the Buyer's consent; or

(iii) Failing to have available a sufficient quantity of any item represented as being for sale to meet reasonably anticipated demands, unless the available amount is clearly and conspicuously disclosed.

#### Price Concessions and Special Offers

(i) Misrepresenting to the Buyer that he is being given an introductory, confidential, close-out, going out of business, factory, packer, special or wholesale price or discount, grand opening or any similar price concession;

(ii) Offering any gift or prize, without clearly and conspicuously disclosing all terms and conditions of the offer, including the expiration date of the offer;

(iii) Failing to provide a qualified recipient with a gift or prize as set forth in the offer, as soon as practicable after such recipient is identified;

(iv) Misrepresenting the terms, conditions, limitations or availability of insurance or other forms of protection;

(v) Misrepresenting the terms, conditions, benefits and/or privileges available to a buyer in exchange for payment of a membership fee or similar charge.

#### Savings Representations

(i) Misrepresenting that the Seller is offering any savings to a Buyer by using or referring to any item price list related to the Seller's home food service plan which contains prices other than the Seller's current prices;

(ii) Misrepresenting that a Buyer will realize certain savings with the purchase of a home food service plan. Nothing contained herein shall prevent a Seller from accurately representing any opportunity for savings a Buyer may have by taking advantage of the features of a home food service plan, provided that the Seller has available written materials documenting any such representation;

(iii) Misrepresenting the Seller's prices by comparing its prices with items which are not of the same or higher grade or quality; or

(iv) Misrepresenting to the Buyer that a specified amount of food items or the cost thereof is sufficient to meet the food requirements of the Buyer. Any computation as to amount of food required shall be determined solely by the Buyer. Nothing contained herein shall preclude the Seller from furnishing current official government data on average food consumption and costs, and/or from conveying to the Buyer a suggested serving size or factor (the amount of food commonly consumed per eating occasion) with respect to the food items sold, provided the serving size or factor represented is not less than any established by the federal government.

#### Guarantees

(i) Making any promise either to exchange unsatisfactory food items or to give a refund therefor, which expires in less than 60 days from the date of delivery of such products, or failing to honor such promise, where through no fault of the Buyer, said food does not meet minimum standards of quality expected by the ordinary customer;

(ii) Providing a Buyer with a guaranty or warranty with respect to any item or durable consumer good with regard to a Home Food Service Plan which is not clear and specific or with which the Seller is unable to comply, or misrepresenting that someone else is the guarantor or warrantor of any product or service;



(iii) Failing to provide a Buyer with a copy of any written guaranty or warranty; or

(iv) Misrepresenting the date of performance of any contract.

**e. Identity of Seller**

(i) Misrepresenting that a person is, or that the Seller will provide the service of, a nutritionist or home economist; or

(ii) Misrepresenting that the Seller, his products or service have been approved by any Better Business Bureau, Chamber of Commerce, service club, financial institution, government agency or any other commercial or civil organization, or any official or employee thereof, or that the Seller is a member of such organization.

**f. Price and Financing**

(i) Misrepresenting or failing to clearly and conspicuously disclose at the time of the sale, if known, the name of the financing institution or contract assignee, if any;

(ii) Misrepresenting the assignability of any contract or failing to advise the Buyer before signing any contract that the contract may be transferred or assigned to a financial institution or other third party and payment enforced by them;

(iii) Misrepresenting the total amount that the Buyer will be obligated to pay;

(iv) Misrepresenting that the offer of sale or any part thereof is made on a trial basis without obligation;

(v) Failing to orally inform a Buyer who places an order by telephone subsequent to the signing of a contract, the current price of each item ordered and to mail to such Buyer a current item price list within 2 business days of the placement of the order;

(vi) Charging a Buyer for items at any price other than those contained in the price list provided pursuant to paragraph 1.3.3.(b)(iv) or the price orally disclosed pursuant to paragraph (c)(ii);

(vii) Misrepresenting or failing to disclose the existence or amount of any service charge and/or failing to clearly and conspicuously disclose the fact that a Buyer must pay a membership fee or similar charge and the amount thereof in conjunction with the purchase of any item. In the event a membership is sold for a period of greater than 2 years, and the home food service plan is canceled or terminated by the Buyer within 2 years of the date the membership was sold, the Seller shall refund to the Buyer

a prorated share of the price of the membership paid based upon the total period of membership; or

(viii) Misrepresenting that the Seller will pay or reimburse the Buyer for the expenses of delivering or moving a freezer or any other product for the Buyer.

**g. Product Representation**

(i) Misrepresenting the cut, grade, brand or trade name, or weight or measure of any food item or the brand or trade name or weight or measure of any non-food item;

(ii) Misrepresenting that items are "USDA or State inspected." Nothing contained herein shall prohibit Seller from describing an item as "U.S. or State Inspected" when such foods are inspected at the point of processing or fabrication as well as slaughter;

(iii) Misrepresenting a food item through the use of a term similar to government grade or failing to clearly and conspicuously disclose the correct government grade for any food item if such item has been graded;

(iv) Advertising or offering free, bonus, or an extra food product or service combined with or conditioned on the purchase of any other food product or service unless such additional product or service is accurately described including, whenever applicable, grade, net weight, measure, type and brand or trade name. The words "free," "bonus," or other words of similar import, shall not be used in any advertisement unless the advertisement clearly and conspicuously sets forth the total price amount which must entitle the Buyer to the additional food item or service and the stated price of the primary product does not exceed the price at which the Seller offered the item within the previous 90-day period;

(v) Misrepresenting the breed, origin, diet, yield, or hormonal or chemical content of slaughtered animals or parts for sale. Sellers making such claims shall have written records available to substantiate such fact;

(vi) Misrepresenting the breed, origin, diet, yield, or hormonal or chemical content of a food item or items used of any misleading trade name or brand name that does not in all respects accurately reflect the item or items, unless a written disclaimer is provided at the time of sale; or

(vii) Misrepresenting the price or quality of any durable consumer goods or failing to clearly and conspicuously disclose the brand or trade name, model number, year, and size of such goods. In the case of a refrigerator or freezer, the disclosure shall include the capacity thereof expressed in cubic feet.



## Appendix C

Section 3.18. of Handbook 133 is reprinted in its entirety below for ease of study. Material recommended to be added is shown underlined. Material to be deleted is shown crossed through.

### 3.18. Meat and Poultry from Federally-inspected Plants

#### 3.18.1. Background for Administrator and Inspector

These test procedures are for meat and poultry coming from Federally-inspected plants. If inspectors check these packages at wholesale or retail, and use Category A sampling plans from H-133 and either unused or dried used tare (see Section 3.18.3.5. for definition), the tested packages are either in or out of compliance: there is no gray area. If a jurisdiction uses wet tare (see Section 2.11. Tare, for definition), there is a "gray" or "no-decision" area. The gray area is not a tolerance. If packages are found in the gray or no-decision area, they neither automatically pass nor fail the test. If lots are tested and found inside the gray area, they are not necessarily in compliance. The jurisdiction will have to do more work to find out the final status of the lot.

Jurisdictions wishing to perform wet tare tests upon products for which no gray area has yet been determined will need to permit "reasonable variations" until a gray area has been determined for that product. New gray area determinations will be printed in this handbook and in the Federal Register. Contact the USDA Regional Office for a listing of the products that have gray areas, as well as the size of their gray area percentages.

The size of the gray area is defined as a percentage of the labeled weight that extends downward from the labeled weight.

**Enforcement action inside and outside the gray area.** - The overall objective is to test packages as closely as possible to a routine test. However, one difference will immediately be apparent.

**Category A (Table 2-2) sampling procedures** must be employed at retail or wholesale locations when testing packages put up in a Federally-inspected plant. (This is because a test similar to a Category B test has already been run on the packages at the plant level.)

**Category B (Table 2-5) sampling procedures** may be used when testing at the packaging plant.

**"Dry Tare" Jurisdictions.** - For jurisdictions that normally utilize unused tare to test meat and poultry

packaged at a retail store, it will be necessary to simulate unused tare for packages from Federally-inspected plants by drying out absorbent materials (if any) comprising the used tare and to determine a "dried used tare".

No additional information will be needed other than the results of a Category A test using "dried used tare" before taking enforcement action on lots.

**c. "Wet Tare" Jurisdictions.** - For jurisdictions that normally use wet tare, if the package lots are found short weight with wet tare tests, but fall in the "gray area", it is necessary to collect additional information to determine whether or not the lot complies with net weight requirements.

If the package lots are found short weight using a Category A sampling plan and wet tare, it will first be necessary to determine whether the lot is inside or outside the gray area. If the lot falls in the gray area, additional information will have to be collected before reaching a final determination whether the lot is in or out of compliance. Of course, nothing additional will be needed for lots that fall outside the gray area. Appropriate enforcement should be taken on packages found short weight and outside the gray area.

A "hold" or a "stop sale" order should be put on packages found short weight, but inside the gray area, until their status can be determined. If this is not possible, the strongest legal remedy should be sought if the product cannot be held and subsequent tests or information indicates that the lot is out of compliance.

**d. Which packages to consider as part of the lot being tested.** - Ordinarily, an inspector taking a sample from retail will record lot codes, but will not select the lot for test by sorting the packages by lot code. He or she will simply select a sample from all packages of the same brand and style and size on the shelf or in the stock room. If short weight is found and the results are in the gray area (wet tare only), follow-up investigation requires sorting the lot codes at this point.

**e. Category A sampling plans must be used for all tests.** - See Section 3.18.3. for details. The discussion below is based on using these procedures and on recording the "package errors"--how much and in what direction the actual package weight differs from the labeled weight. Thus, if a package labeled 2 lb actually

weighs 2.010 lb, its package error is +0.010 lb. Similarly, the "average package error" is the difference between the average weight of the sampled packages and the labelled package weight. If the average of 10 package weights is 1.994 lb, the average package error is  $(1.994 - 2.000 \text{ lb}) = -0.006 \text{ lb}$ .

**f. Package lots must meet the average requirement and the individual requirement.** - When checking packages not subject to possible moisture loss and using Category A sampling plans, two requirements must be met:

(1) The average net weight of the sample must equal or exceed the labeled net weight minus an adjustment factor called  $T^1$ , which represents the possible deviation between the sample average and the actual lot average.

If a jurisdiction applies either unused or used dried tare to meat and poultry packages, this is sufficient to determine whether the average requirement has been met. See Figure 3-15.

If a jurisdiction uses wet tare, an amount defined by the gray area must be considered before determining non-compliance of the lot under test without further information or data collection. See Figure 3-16.

The size of the gray area has been set at 3% of the average labeled weight for raw, fresh poultry, and 2-1/2% of the labeled weight for franks and hot dogs (whether made from meat or poultry).

(2) The number of packages that may fall below the MAV is specified in Category A sampling plans according to the sample size. Ordinarily, the inspector uses Table 2-8 to look up the MAV for packages labeled by weight.

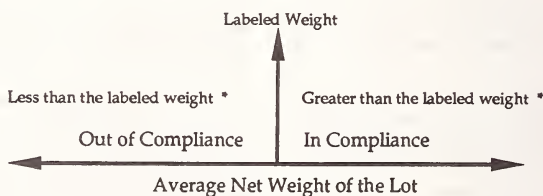
USDA Meat and Poultry Inspection uses a set of MAV's for products under its supervision. These are given in Table 2-12. Use Table 2-12 for all products coming from a Federally-inspected plant.

The size of the gray area must be added to the individual package limits specified in Table 2-12 when the jurisdiction uses wet tare.

**g. What to do when the lot is in the gray area ("Wet Tare" Jurisdictions Only).** - Contact the USDA Regional Director or the Inspector-in-charge at the packaging plant (see Section 3.18.3.h.) to determine what information (either USDA's or the plant's) is available at the plant to clarify the status of the lot in question. General guidelines are given in Section 3.18.3.h.

According to the location of the plant, either visit the plant, or call and ask the weights and measure authorities where the plant is located to visit and test.

**No Gray Area for Meat or Poultry  
from a Federally Inspected Plant  
If Category A Sampling Plan (or 100% Test)  
and Used Dry Tare Are Employed**



\* When following a Category A Sampling Plan, the sampling factor  $T$  must be computed and applied to the average error of the sample.

**Figure 3-15.**

<sup>1</sup>See the general discussion of  $T$  in Chapter 2 and in NCWM Training Module 10.

## Gray Area for Poultry or Hot Dogs from a Federally Inspected Plant Using Wet Tare

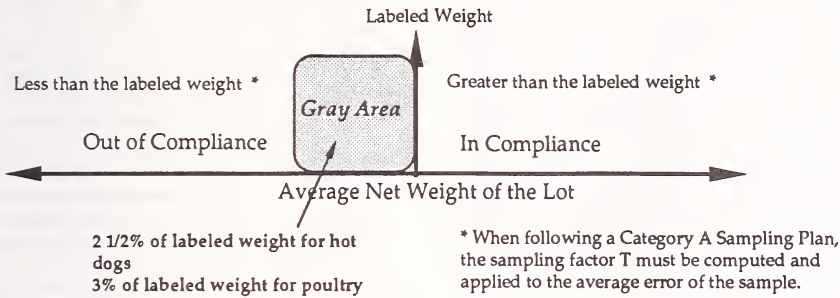


Figure 3-16.

### 3.18.2. Types of Products and Size of Gray Areas

**Bacon.** - The gray area is zero for bacon if there is no free-flowing liquid or absorbent materials in contact with the product, and the package is cleaned of clinging material prior to tare weight determination; when there is free-flowing liquid or absorbent materials in packaged bacon, wet tare and dried used tare are equivalent.

Whether you are following wet tare or dry tare procedures, wipe all packaging materials dry clean of fat and clinging moisture before weighing tare. There is no gray area for bacon.

**Fresh Sausage and Luncheon Meats.** - Luncheon meats comprise any cooked sausage product, loaves, sliced products, cured products, and any sliced meat packaged for placing on bread or similar products. This category of product does not include whole hams, briskets, roasts, turkeys, or chickens requiring further preparation to be made into ready-to-eat sliced product.

When there is no free-flowing liquid and no absorbent materials used in the package, there is no zero gray area for fresh sausage or luncheon meats (for example,ologna). Whether you are following wet tare or dry tare procedures, carefully clean and wipe all tare materials of fat and clinging moisture. Only when there is no free flowing liquid inside the package and there are no absorbent materials in contact with the product, wet tare and dried used tare are equivalent.

c. **Franks/Hot Dogs.** - A gray area of 2-1/2% of the labeled weight is to be applied when wet tare tests are conducted.

d. **Fresh Poultry.** - For net weight determinations only, fresh poultry is defined as poultry above 26 °F. This is product that yields or gives when pushed with a person's thumb. A gray area of 3% of the average labeled weight of the sample is to be applied to raw, fresh poultry in retail packages when wet tare tests are conducted.

### 3.18.3. Procedure

a. **Field Equipment.** - Use Scales and Weights recommended in Section 3.1.

b. **Report Forms.** - Use either the Standard Pack-Weight Only-Report Form (page A-2) or the Random Pack Report Form (pages A-3 and A-4). Record the official establishment number from the USDA logo in the space provided underneath name and address.

c. **Selection of Lots.** - Refer to Section 2.3, for defining and selecting the inspection lot. The lot codes are the packer's own identifying marks, not the universal product code (UPC). In many instances, the lot code may be represented by a "pull" or "sell by" date. Record the lot code on the report form.

d. **Sample Size.** - Select the sample according to the size of the inspection lot following a Category A sampling plan (Table 2-2, page B-3). Do not sort random-pack packages from lightest to heaviest as recommended in Section 3.8.1., step 2.



e. Tare. Select the tare sample as given in Table 2-2.

(1) **Unused or Dried Used Tare.** - Unused tare material is rarely available at retail or wholesale locations for package lots packaged at Federally inspected plants. The tare weights printed on the shipping containers may not be accurate. Therefore, it is necessary for the inspector to reconstruct an unused tare weight by drying the used tare and weighing it. If the tare is composed of nonabsorbent materials, it can be cleaned and wiped in order to obtain a "dried used tare." The following technique should be followed to get "dried used tare" when absorbent materials are involved. Absorbed fats as well as absorbed water-based fluids must be dried out of these materials:

A fresh poultry package will be used as the example.

**Shrink Wrap.** - Open package shrink wrap, remove wrinkles from heat-seal area as much as possible, and wipe or pat dry with paper toweling or other suitable material. These procedures can be considered the model for how to clean any nonabsorbent tare materials.

**Tray.** - If tray is foam or plastic, rinse tray and wipe or pat dry. If tray is paper or cardboard, pat dry between sheets of toweling and lay tray on heating element of prepack scale or heat in microwave oven to dry.

Depending on the power of the oven, total times between 2 and 5 minutes may be necessary. Frequent short bursts of power (30-sec intervals), checking after each cycle, are better than a single 5-minute run. (The trays can burn if too long a cycle is used to dry.) Let the tray cool and become dry to the touch before final weighing.

**Soaker Pad.** - Many soaker pads are composed of plastic sheets laminated with fibrous paper tissue. Peel the plastic sheeting away from the tissue (if possible), press the tissue between sheets of paper toweling, and dry the tissue on the heating element of the scale or in a microwave as described above for a paper tray. Wipe or pat the plastic sheeting dry and weigh it with the cooled tissue pad, tray, shrink wrap, and label. Do not attempt to rinse soaker pads--they will often disintegrate if loaded with water.

Depending on the surface area of the microwave oven tray and the size of the soaker pads, do not load more than two to five tare pads in a microwave at one time and do not stack them. Stacking or loading too many pads at one time will take more oven time and power, increasing the possibility of burning or charring the pads.

(a) **What a package should weigh using unused or dried used tare.** - Add the average "dried" tare weight to the labeled net weight to determine what the package is supposed to weigh--the "nominal gross weight".

$$\text{average tare weight} + \text{labeled weight} = \text{nominal gross weight}$$

(b) **Package errors using unused or dried used tare.** - Use the package checking scale to compare the packages in the sample with the nominal gross weight. A package that weighs more than the nominal gross weight is overweight and has a "plus package error"; a package that weighs less than this is underweight and has a "minus package error".

$$\text{package error} = \text{package gross weight} - \text{nominal gross weight}$$

Go to Section 3.18.3.f. on the average requirement.

(c) Packages opened for tare determination may be rewrapped by the supermarket provided that the USDA logo does not appear on the package. The supermarket should contact the original packager if it intends to leave the brand name on the product when repackaging.

(2) **Wet Tare.**

(a) When there is no free-flowing liquid or absorbent materials in contact with the product, clean the tare materials of all clinging product and wipe dry. Weigh the wiped tare materials for the number of packages indicated in the sampling plan. Average the tare weights. Add the average tare weight to the labeled net weight to obtain the nominal gross weight.

$$\text{average tare wt} + \text{labeled wt} = \text{nominal gross wt}$$

Use the nominal gross weight to compare with the gross weights of all the packages in the sample to determine their package errors.

$$\text{package gross wt} - \text{nominal gross wt} = \text{package error}$$

(b) **Determining the Net Weight when there is free flowing liquid or absorbent packaging materials in contact with the product.** - All free liquid is part of the wet tare. To avoid destroying too many packages

- (i) gross weigh two packages opened for tare,
- (ii) weigh solids inside,
- (iii) get wet tare by subtracting solids weight from gross weight,
- (iv)  $\text{average wet tare wt} + \text{labeled wt} = \text{nominal gross}$



Use the alternative tare procedure (Section 2.11.4.) to determine whether to open more packages (i.e., whether the tare is too variable).

(Packages opened for a wet tare test may be rewrapped by the supermarket as long as the USDA logo does not go on the package. The supermarket may wish to contact the original packager if it intends to leave the brand name on the product ~~on it~~ when repackaging.)

(c) **Determining Package Errors.** - If individual package net weights were measured:

Package error = package net weight - labeled net weight

A package that weighs more than the labeled weight is overweight and has a "plus package error". A package that weighs less than the labeled weight is underweight and has a "minus package error".

If an average tare weight and nominal gross weight were determined:

Package error = package gross weight - nominal gross weight

f. **The Average Requirement.** - Compute the average error for the sample. Sum all individual package errors and divide by the number of packages in the sample. Record the average package error in box 18 on the standard pack report form or box 20 on page 2 of the random pack report form.

If the average error is zero or plus, the lot complies with the average requirement.

If the average error is minus, first compute  $T^1$  (see Section 2.7. in this handbook and Chapter 6 of the Inspector's Manual in Module 10 for further instructions if this procedure is unfamiliar to you). Record T on the report form, and continue with subsections (1), (2), or (3) below as appropriate.

(1) Unused or Dried Used Tare or Bacon, Sausage, Luncheon Meats with No Free-Flowing Liquid or Absorbent Materials. - With dried used tare, if the average minus error is larger than T, the lot does not comply with the average requirement; enforcement action should be taken. Also, follow the process outlined in Section 3.18.3.g.

(2) **Wet Tare - Fresh Poultry.**

a) Compute 3% of the average labeled weight.

average labeled weight  $\times$  0.03 = gray area

There is space below column 8 of the Random Pack Report Form to compute the average labeled weight of the sample.

(b) Record this in the comments section as "gray area."

(c) If T was computed, add the gray area to T, calculated and recorded on page 2 of the random pack report form. Record in remarks section as "gray area + T".

(d) Compare value in box 20 with "gray area + T".

(e) If the value in box 20 is larger than the "gray area + T", the lot fails to comply. (Since box 20 will always have a minus value--or else you would not have calculated T--disregard the sign when comparing with gray area + T.) If the value in box 20 is between T and the gray area + T, go to Section 3.18.3.h. If the value in box 20 is less than T, the lot complies.

(3) **Wet Tare - Hot Dogs or Franks.**

(a) Compute 2-1/2% of the labeled net weight recorded in box 1 of the standard pack report form.

(value in box 1)  $\times$  0.025 = gray area (lb or oz)

(b) Convert to dimensionless units by dividing by the unit of measure in box 2.

gray area (lb or oz)  $\div$  box 2 = gray area (dimensionless units)

Record this in comments section as "gray area".

(c) Continue with (c), (d), and (e) as for Subsection (2), Wet Tare - Fresh Poultry.

g. **The Individual Package Requirement.** - Table 2-12 gives the limits for individual package errors for packages produced at Federally-inspected plants. Use this table instead of Table 2-8 for looking up the MAV. The number of individual minus package error permitted to be larger than the "lower limit for individual weights" (see the righthand column of this table) is given in Table 2-2 (page B-3). Convert this value (or values if a random pack lot falls between groups) to dimensionless units and record on the report form.

<sup>1</sup>Unless the lot is so small that the inspector is testing all packages in the lot (100% test). If this is the case, and the average error is minus, the lot fails if it is a dried used tare test; the lot may be in the gray area if it is a wet tare test.

**(1) Dried Used Tare or No Free-Flowing Liquid.**

When conducting a dried used tare test or testing bacon, sausage, or luncheon meats with no free-flowing liquid or absorbent tare materials, compare the value(s) from Table 2-12 (converted to dimensionless units) with the minus package errors. If the number of minus package errors that exceed the limits of Table 2-12 is more than allowed by the Category A plan being followed, the lot does not comply.

**(2) Wet Tare.** - When conducting a wet tare test on hot dogs or fresh poultry, the size of the gray area must be added to Table 2-12 value(s) before counting the number of packages that exceed the MAV. In Section 3.18.3.f. the size of the gray area (in dimensionless units) was recorded in the comments area of the report form. The values from Table 2-12 are recorded in boxes 10 and 11 on the random pack report form and box 4 on the standard pack report form. Add the size of the gray area to the value(s) from Table 2-12 (converted to

dimensionless units) before comparing with the minus package errors.

If the number of minus package errors that are greater than (Table 2-12 + the gray area) exceeds the number permitted in Category A plans, the lot does not comply. If minus package errors fall between the Table 2-12 value and (Table 2-12 + the gray area), they place the lot in the gray area if the number of these types of minus package errors exceeds the number permitted in Category A plans.

**h. What to Do When the Lot Is in the Gray Area.**

Although the following discussion is intended primarily for those jurisdictions using wet tare for meat and poultry, any jurisdiction is encouraged to follow these procedures when product from Federally-inspected plants fails to comply with net weight tests.

The "Meat and Poultry Inspection Directory" is available from the USDA Regional Offices listed below.

USDA Regional Offices	States or Territories
Western Regional Office 620 Central Avenue, Bldg. 2C Alameda, CA 94501 415/273-7402	Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, Oregon, Utah, Washington, Wyoming, North Dakota, South Dakota, Samoa, and Guam
Southwestern Regional Office 1100 Commerce Street Dallas, TX 75242 214/767-9116	Arkansas, Kansas, Louisiana, Missouri, New Mexico, Texas, and Oklahoma
North Central Regional Office 607 E. Second Street Des Moines, IA 50309 515/284-4042	Illinois, Indiana, Iowa, Michigan, Minnesota, Nebraska, Wisconsin, and Ohio
Southeastern Regional Office 1718 Peachtree Street, NW Atlanta, GA 30309 404/881-3911	Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, West Virginia, Puerto Rico, and the Virgin Islands
Northeastern Regional Office 1421 Cherry St., 7th Floor Philadelphia, PA 19102	Connecticut, Maine, Maryland, Massachusetts, Delaware, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, and the District of Columbia

Meat and poultry packaging plants are listed by "establishment number". Use the establishment number on the package to look up the location and telephone number of the plant. A separate number is sometimes provided for the USDA Inspector-in-charge. If the establishment number is not listed in this directory (since new businesses, established after the directory was published, may not be listed in the directory), call the Regional Office to get the telephone number(s) of the

plant and the appropriate USDA official for the plant question.

Contact the appropriate USDA official to determine what information is available on the lot in question (see subsection (1) below). If a lot of hot dogs or fresh poultry has been tested using wet tare, any average package error that is minus and larger than T may place the lot in the gray area.

(1) **Further Information.** - Ask the USDA official:

- (a) Whether the plant is operating under a "Total or Partial Quality Control Program" (TQC or PQC).

Some plants operate under a Federally approved "Total or Partial Quality Control Program". If such a program is in place, records on the lot in question will be maintained by the establishment, not by USDA. If the establishment is not operating under a TQC or PQC Program, USDA may or may not have tested the lot in question. The USDA official will be able to tell you what information he has, as compared with information that may be available from the plant personnel.

- (b) What information is available from USDA concerning the particular lot in question.

- How many packages are tested at what time intervals?
- How many packages are produced in that time interval?
- What criteria are employed to decide when adjustments to the net weight are required?
- What were the net weight checks on the lot in question?
- What adjustments were made to the target weight?

If USDA has data on the specific lot in question or if there is an approved TQC or PQC program producing data on the lot, this data may serve to substantiate that the lot complied with net weight requirements when it left the plant. If data on the specific lot in question were not collected by USDA or under an approved QC program, the weights and measures test results are the only regulatory agency data on the lot. In this instance, the weights and measures authority should take whatever action is deemed appropriate; USDA has no data to dispute the weights and measures findings.

- (c) What scale maintenance and testing program is in place in the plant.

- (d) What tare verification system is in place in the plant, including how the tare is determined, how often it is monitored, how it is verified when new tare materials are delivered.

- (e) What kind of net weight verification or testing (and how often) the USDA official conducts.

- (f) Who are the establishment personnel to contact to review establishment-maintained records on the lot in question.

(2) **Test Packages and Scales at the Packaging Plant.**

-Optionally, make arrangements to visit the plant or call the weights and measures jurisdiction where the plant is located. Discuss the net weight control program with plant quality control personnel, check their scales (if possible), and test packages. Even though it is not possible to test the lot in question at the plant, it may be possible to establish confidence in plant process and weight control procedures.

Note the type of scales used to monitor the fill weights of the packages. Ask to test the scales. (This may be disruptive during a production run.)

Test a sample of packages from the line or storage area using H-133 Category B sampling procedures plus the Table 2-12 values for individual packages. Since you are at the packaging plant and no distribution has occurred, there is no gray area to consider at this point. Due to the large number of packages in the lot when testing at the plant, the sample size will usually be 30 packages. Ask the USDA inspector if he will conduct a test using his procedures and equipment on the same lot.

(3) **Other Optional Information That May Be Available from the Packer.** - When testing at the packaging plant, this is the appropriate time (or it may be necessary to explore the issue by telephone) to get some optional information. The information below may be proprietary and not available to the inspector.

- How many packages are produced in a single production run? How much of the plant's production does each lot code represent (a single line's run, 8 hours/24 hours production, etc.)?
- What is the target weight for each label? How is this value set? (This will be considered confidential information.)
- What scales or other measuring equipment and procedures are used to measure or control the package net weights (checkweighers; line supervisor weighs a package every hour, etc.)?
- How quickly can adjustments be made to package fill targets that are found out of bounds?
- How often are the scales tested; who does the testing (yearly service call; quality control supervisor on a daily basis, etc.)?

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- How does the plant determine the tare weight, how often does the plant change the tare weight, what does the plant do with tare information?
- (For example: actual tare unit used and changed whenever new shipment of tares sent; average weight to closest 0.01 lb is added to target weight; etc.)
- Does the packager report different tare weights to different areas of his market? (For example: wet tare values, unused tare values, something in between.) How are these determined?
- What variation in package weights from the labeled declaration does the line or plant normally encounter? (Ask them to show you or send copies of their records. These records are proprietary and may be available only for viewing.)
- What are the details of the PQC or TQC program if they are operating one? (Again, this may be proprietary information.)



# Report of the Specifications and Tolerances Committee

James C. Truex, Chairman  
Weights and Measures Inspection Manager  
Ohio

Reference  
Key Number

## 00 Introduction

This is the Final Report of the Specifications and Tolerances Committee for the 76th National Conference on Weights and Measures. 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. Items marked with an "I" after the reference key number are information items. The items marked with "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. Any new items were assigned the next number in sequence to maintain a correlation between the Interim Meeting Agenda and this Report.

The attached Report contains many recommendations to revise or amend National Institute of Standards and Technology (NIST) Handbook 44, 1991 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**.

Table A  
Index to Reference Key Items

Reference Key No.	Title of Item		Page
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0-1	V	G-S.1. Identification; Marking All Equipment and Visibility	244
0-2	V	G-S.8. Provision for Sealing; Features to be Sealed	246
0-3	I	G-S.8. Provision for Sealing; Audit Trails	248
0-4	W	G-S.8. Provision for Sealing and Scales Code S.1.11. Provision for Sealing; Nonretroactive Dates	250
0-5	I	G-T.1. Acceptance Tolerances	250
0-6	VC	G-UR.2.3. Accessibility for Testing and Inspection	250
0-7A	V	G-UR.4.1. Maintenance of Equipment	251
0-7B	I	G-UR.4.1. Maintenance of Equipment; Guidelines	252

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Scales Code			
320-1	I	S.1.12. Manual Weight Entries	252
320-2	VC	S.2.4. Level-Indicating Means; Wheel-Load Weighers and Portable Axle-Load Scales	253
320-3	I	S.6.3. Marking Requirements; Temperature Range	254
320-4	V	S.6.4. NTEP Logo or Certificate of Conformance Number	255
320-5	VC	N.1.3.4. Shift Test; Livestock Scales	256
320-6	VC	N.4. Coupled-in-Motion Railway Track Scales; Use of the Term "Test Cars"	257
320-7	I	Guidelines to Determine When Coupled-in-Motion Scales Should be Tested "As Used"	258
320-8	I	Railroad Coupled-in-Motion Weighing of Individual Cars in Mixed-Merchandise Trains for Custody Transfer	258
320-9	I	Railroad Coupled-in-Motion Weighing of Liquids in Individual Tank Cars for Custody Transfer	259
320-10	I	Notes; Establish Procedures for Testing Uncoupled-in-Motion Railway Track Scales	259
320-11	W	Reweighing a Unit Train	260
320-12	I	T.1.2. Postal and Parcel Post Scales	260
320-13	W	T.N.3.1. Tolerances for Class III L Scales	260
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320-14B	I	UR.1.X. Selection Requirements; Suitability of Equipment	263
320-15	W	UR.1.2. Selection Requirements; Postal and Parcel Post Scales	264
320-16	W	UR.2.9. Accessibility for Sealing	265
320-17	W	UR.10. Records	265
320-18	VC	Definition of Concentrated Load Capacity	265
320-19	I	Specific Criteria for Unattended Vehicle Scales	266
320-20	I	Unattended Recycling Devices	266
320-21	I	Substitution and Strain-Load Test Procedures	267
320-22	I	Separate Code for Scales Used in Law Enforcement	267
320-23	I	Weigh-in-Motion Scales for Law Enforcement	268
320-24	I	On-Board Weighing Systems; Solid Waste Management and Recycling	268
320-25	V	S.1.11. Provision for Sealing; Nonretroactive Dates	268
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321-1	W	N.3.2. Material Tests; Test at Two Flow Rates	269
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Automatic Bulk-Weighing Systems			
322	VC	UR.4. System Modification	270

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330-1	VC	S.1.6.5.1. Money Value Divisions, Analog .....	270
330-2	VC	S.1.6.5.4. Selection of Unit Price .....	271
330-3	VC	S.2.2. Provision for Sealing Measuring Elements .....	271
330-4	VC	S.3.4. Discharge Lines and Valves; Exceptions .....	272
330-5	V	S.4.5. NTEP Certificate of Conformance Number .....	272
330-6	VC	N.4.1. Normal Tests; Tolerance Application .....	274
330-7	I	T.2.4. Tolerances for Lubricating Oil Meters .....	274
330-8A	I	UR.1.X. Selection Requirements; Suitability of Equipment .....	276
330-8B	I	UR.1.X. Selection Requirements; Suitability of Equipment .....	277
330-9	VC	UR.2.4. Diversion of Liquid Flow .....	280
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<b>LPG and Anhydrous Ammonia Liquid-Measuring Devices Code</b>			
332-1	VC	T.3. Automatic Temperature Compensating Systems .....	282
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34-1	VC	S.2.4. Automatic Temperature or Density Compensation .....	285
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356	I	Establish a Type Evaluation Program for Grain Measurement Equipment . . . . .	285
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360-1	V	Draft Mass Flow Meters Code . . . . .	285
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Table B  
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Appendix	Title	Reference Key No.	Page
A	Substitution and Strain-Load Test Procedures	320-21	29
B	Tentative Code for Mass Flow Meters	360-1	30



**Table C**  
**Voting Results**

Reference Key No.	House of State Representatives		House of Delegates		Results
	Yes	No	Yes	No	
00 - Consent	41	0	49	0	Passed
0-1	39	3	46	3	Passed
0-2	41	0	50	0	Passed
0-7A	27	12	38	12	Passed
0-4	22	13	22	17	Passed
Motion to consider amendment to change the effective date to January 1, 1993.					
0-4	36	3	33	7	Passed
Motion to amend the effective date to January 1, 1993.					
0-4	13	26	22	24	Failed
Motion to adopt item as amended to change the effective date to January 1, 1993.					
0-25	37	2	42	7	Passed
0-5	3	32	0	41	Failed
0-1	39	0	48	0	Passed
0 (in entirety)	40	0	52	0	Passed

## Details of All Items

### General Code

#### 310-1 V G-S.1. Identification; Marking All Equipment and Visibility

(This item was adopted.)

**Recommendation:** The Committee recommends that, as described below, the marking requirements of G-S.1. provide an exception for individual parts of a system that do not have any metrological effect. The Committee recommends amending the beginning of G-S.1. to read:

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

**Discussion:** This issue is discussed at great length in an effort to provide a thorough understanding of the position of the Specifications and Tolerances (S&T) Committee and because the marking requirements have been the subject of extensive debate. The objective is to provide device manufacturers with some relief (within the scope of other Handbook 44 requirements and definitions) from the marking requirements of G-S.1. for those devices that have no metrological effect in a weighing or measuring system. A device in a system is considered to have a metrological effect if it is capable of affecting the validity or accuracy of a measurement, compliance with Handbook 44, or the suitability of equipment for a given application (See Item 310-2, 320-14A, 320-14B, 330-8A, and 330-8B).

Changing technology and different designs of equipment result in reduction of size of many devices. Moreover, many parts of a weighing or measuring system are placed in separate modules or enclosures that are cable-connected to the other parts of the system. These separate parts are normally necessary to the system, but some have a metrological effect on the measurement process (i.e., they do not affect the accuracy or the integrity of the transaction). Some parts are made so small that the information required by G-S.1. cannot be readily marked to be visible after installation.

Several device manufacturers have stated that meeting all Handbook 44 marking requirements for some lesser part of a measuring system has become a significant cost consideration. The cost arises from the actual marking process, the time and documentation to monitor the production for marking considerations, and incorporating changes in marking purposes into production when the same module is used in different systems. For example, one type of cash register keyboard may be used in several different cash register systems and may carry different model numbers that correspond to the specific system with which it is to be used. Device manufacturers have requested that marking requirements be revised as they apply to equipment not having a significant effect on the measuring process, even though the equipment may be essential to the system. For example, separate keyboards for computer input, separate simple printers, remote scale indicators other than the primary display, and separate card readers necessary to activate unattended measuring systems could be exempted from some of the marking requirements of Handbook 44 without affecting the regulatory control and metrological integrity of the complete system.

The S&T Committee agrees that equipment needed for a system to function, but not having any metrological effect, does not have to be marked with all the requirements of G-S.1. However, although small weight or volume displays may not have any significant electronics or "intelligence," they must still be marked with all the information required by G-S.1. and the marking requirements contained in the specific codes of Handbook 44. The primary indicating element of a system that serves as the only indicating element for a weighing or measuring system must meet all applicable marking requirements. The indicating element is a main element of a system; it is considered to be the metrologically significant part of the system in terms of complying with numerous Handbook 44 requirements; specific requirements apply to the marking of indicating elements (e.g., Scales Code Tables S.6.3.a. and S.6.3.b.) and definitions of indicating element and primary indicating element specifically relate to the quantity display.

The Committee is sympathetic to the scale industry difficulties in marking indicating elements, but did not find a satisfactory alternative to the current marking requirements. The problem is to distinguish which indicating elements need markings and how the enforcement official can tell when a marking requirement should be applied to one indicating element and not to another. The weights and measures official cannot know whether or not a weight display (or other quantity display) has metrologically significant components based upon its external appearance. Consequently, the Committee has no alternative but to continue to apply all applicable marking requirements to quantity displays when they are the only indicating element for a system.

The National Type Evaluation Program has been clarifying the scope of devices that must be submitted for type evaluation. It can be concluded that if a device falls within the scope of type evaluation, then it must meet all of the marking requirements of Handbook 44. The scope of type evaluations is defined as follows:

Type evaluations will be conducted on all equipment to the point of the first indicated or recorded representation of the final quantity on which the transaction is based.

Device manufacturers are reminded that, although a device may be exempted from the marking requirements of G-S.1. if the proposed change is adopted, the components of a weighing or measuring system still fall under weights and measures regulatory control and must comply with the remaining applicable requirements of Handbook 44.

It is the position of the Committee that the following equipment does not have to be marked to meet the requirements of G-S.1.: computer keyboards, remote keypads, receipt printers and journal printers intended for use in point-of-sale systems, and other printers that do not have "intelligence."

It is the position of the Committee that the following equipment must be marked to meet all applicable marking requirements of Handbook 44: separate weighing elements, indicating elements (including simple weight displays and video displays that provide the first representation of the final quantity of the transaction), data processing systems that fall within the scope of type evaluation, and indicator electronics boxes. Indicator electronics boxes are generally separate enclosed cases that contain the electronics, microprocessor(s), and "intelligence" that receive the signals from the measurement transducers, process the information, and send the information to quantity displays for either operator or customer indications. Scale manufacturers are reminded that note 16 in Table S.6.3.b. of the Scales Code exempts only secondary weight displays (not weight displays that are the only indicating element) from the marking of the serial number and its associated prefix.

The following points reflect some of the devices that must be marked according to G-S.1.:

Remote weight displays for point-of-sale scales which are the only weight displays for the system are required to have the marking information, including  $n_{max}$ , although the weight display does not have any "intelligence". As specified in note 16 of the Scales Code Table S.6.3.b., the serial number is not required on secondary displays.

Digital indicating elements without analog-to-digital converters (i.e., they are connected to load cells or weighing elements with digital output) must be marked with all of the applicable marking information required by Handbook 44. From external appearance, it is not possible to tell whether or not an indicating element has the analog-to-digital converter or if the indicator electronics is located in the housing of the weight display. Consequently, the marking requirements of G-S.1. must be applied to the weight display.

Simple but separate quantity displays which are primary indicators for a device but separated from the indicator electronics must be marked with the information listed in G-S.1.; however, the marking requirements in Tables S.6.3.a. and S.6.3.b. of the Scales Code apply to weight displays.

The following guidelines are listed to identify specific types of equipment that must meet the marking requirements of G-S.1.:

**Separate Devices:** Devices capable of operating as weighing or measuring devices without being interfaced with or connected to other equipment must be marked according to G-S.1.

2. **Separate Main Elements:** Any remote quantity display that is the only primary indicating element must be marked according to G-S.1. If a device is a major element in a weighing or measuring system (that is, it is metrologically significant to the operation and/or performance of the system and interfaces with different compatible main elements), then it must be marked with the information specified in G-S.1. Examples: Indicating elements, weighing elements, meter registers, meter measuring elements (vehicle tank meters and loading rack meters).
3. **Components:** If a device is a component in a system, may be used in different models of devices, and is sufficiently complex to warrant a separate evaluation and a separate Certificate of Conformance (e.g., load cell and vapor recovery nozzles), then it must be marked with the information specified in G-S.1. Such a device may or may not be placed in an enclosure with other components of the system. When installed in an enclosure, the complete device must be marked with a serial number and that serial number will suffice for the entire collection of components. If not placed in an enclosure with other components, a serial number must be marked on the component.

### 310-2                      V                      G-S.8. Provision for Sealing; Features to be Sealed

(This item was adopted.)

**Discussion:** The range of features to be sealed has been disputed since G-S.8 was amended in 1989 to permit the use of audit trails as a method of sealing and to expand the requirement of provision for sealing to include "a change that affects the metrological integrity of the device."

Discussions with the Legal Metrology Branch (LMB) of Consumer and Corporate Affairs-Canada and with the Weighing and the Measuring Sectors of the Technical Committee on National Type Evaluation have led to a guideline and examples of features to be sealed under G-S.8. The guideline to determine those features, parameters, and characteristics that affect metrological integrity is as follows:

Only metrological parameters that can affect the measurement features that have a significant potential for fraud, and features or parameters whose range extends beyond that appropriate for device compliance with Handbook 44 or the suitability of equipment, shall be sealed.

The judgment as to whether or not a method of access to an adjustment represents a "significant potential for fraud" and will normally require sealing for security will be made based upon the application of the following philosophies:

- I. The need to seal some features depends upon:
  - A. the ease with which the feature or the selection of the feature can be used to facilitate fraud; and
  - B. the likelihood that the use of the feature will result in fraud not being detected.
- II. Features or functions which are routinely used by the operator as part of device operation, such as setting unit prices on gasoline dispensers and maintaining unit prices in price look-up codes stored in memory, do not have to be sealed.
- III. If a parameter (or set of parameters) selection would result in performance that would be obviously in error, such as the selection of parameters for different countries, then it is not necessary to seal the selection of the features.
- IV. If **individual** device characteristics are selectable from a "menu" or a series of programming steps, then access to the "programming mode" must be sealable.
- V. If a device must undergo a physical act, such as cutting a wire and physically repairing the cut to reactivate a parameter, then this physical repair process would be considered an acceptable way to select parameters without requiring a physical seal or an audit trail.



Examples of adjustments, parameters, and features to be sealed were agreed upon by the Technical Committee Sectors as "typical" or "normal," recognizing that it may be possible for a manufacturer to demonstrate that in certain designs the parameter or feature may not fall within the above definition of features to be sealed.

The Weighing Sector identified the following parameters or features that typically require sealing:

- Coarse zero
- Span
- Linearity correction values
- Motion detection (on/off)
- Motion detection (number of divisions and speed of operation)
- Number of samples averaged for weight readings
- Averaging time for weight indications
- Selection of measurement units (if internally switched and not automatically displayed on the indicator)
- Division value, d
- Number of scale divisions, n
- Range of over capacity indications (if it can be set to extend beyond regulatory limits)
- Automatic zero-setting mechanism (on/off) for bulk-weighers and hopper scales
- Automatic zero-setting mechanism (range of a single step)
- ¼- and ½-lb pricing capability or multiplier keys

The following are examples of scale features and parameters that typically do not have to be sealed:

- Automatic zero-setting mechanism (Selection of total range, e.g., 4 percent or 100 percent of capacity)
- Display update rate
- Weigh-in/weigh-out operation (on/off)
- Stored tare weight capability (e.g., computing scales and vehicle weight by information number)
- Selection of tare feature operation, e.g., keyboard or push-button tare (on/off)
- Product codes
- Commodity unit prices
- Discounts
- Baud rate for electronic data transfer

The S&T Committee made only one change to the list developed by the Measuring Sector. The S&T Committee believes that adjustments or parameters that control the octane blend setting for gasoline dispensers must be sealed since the blend settings could affect the quality of the product. If manipulation of the settings does not have sufficient safeguards, tampering with this setting could facilitate fraud. The Committee does not intend that the octane blend settings at the wholesale level must be sealed since the quality of the blended product at the wholesale level can be routinely checked through other enforcement programs. With this one change, the list prepared by the Measuring Industry Sector has identified the following features and parameters of liquid-measuring devices that typically require sealing:

- Measuring element adjustment (both mechanical and electronic)
- Linearity correction values
- Measurement units (e.g., gallons to liters)
- Octane blend setting for retail motor-fuel dispensers
- Any tables or settings accessed by the software or manually entered to establish the quantity (e.g., specific gravity, pressure, etc.)
- Density ranges
- Pulsers
- Signal pick-up (magnetic or reluctance)
- Temperature probes and temperature offsets in software
- Pressure and density sensors and transducers
- Flow control settings, e.g., flow rates for slow-flow start, quantity for slow-flow start and stop
- Temperature compensating systems (on/off)

## Specifications and Tolerances Committee

### Differential pressure valves

As a point of clarification, the flow control settings referenced above are those controls typically incorporated into the installations of large-capacity meters (wholesale meters). The reference does not include the point at which retail motor-fuel dispensers slow product flow during a prepaid transaction to enable the dispenser to stop at the preset amount.

The following are examples of liquid-measuring device features and parameters that typically do not have to be sealed:

- Analog-to-digital converters
- Quantity division value (display resolution)
- Double pulse counting
- Communications

**Recommendation:** The philosophies used to determine if certain features shall be sealed and the list of features that would normally be sealed will not appear in Handbook 44, but will appear in NCWM Publication 14, "National Type Evaluation Program: Administrative Procedures, Technical Policy, Checklists, and Test Procedures" and in NCWM Publication 3, "NCWM Policies, Interpretations, and Guidelines." It is recommended that the philosophy used to determine which features are to be sealed be included in the EPOs. To aid the enforcement official, the Committee recommends that the specific features to be sealed on a device be listed on the NTEP Certificate of Conformance. It is expected that the device manufacturer will provide the list of features that are sealable as part of the NTEP application for type evaluation.

The S&T Committee recommends that the NCWM endorse the philosophy and the lists of typical features to be sealed to serve as guidelines for the National Type Evaluation Program.

## 310-3 I G-S.8. Provision for Sealing; Audit Trails

**Discussion:** Paragraph G-S.8. was amended in 1989 to recognize the use of an audit trail as an alternative to the use of a physical security seal. Device manufacturers and National Type Evaluation Program (NTEP) laboratories need guidelines to determine what constitutes an adequate audit trail. In an effort to harmonize weights and measure requirements, the Office of Weights and Measures (OWM) has been working with the Legal Metrology Branch (LMB) to develop acceptable criteria for audit trails. If acceptable criteria can be developed, then the LMB will consider recognizing audit trails as an acceptable method of sealing electronic devices in Canada.

The LMB and OWM have discussed criteria for audit trails. The criteria have been reviewed by the Weighing Sector and the Measuring Sector of the NTEP Technical Committee, and the S&T Committee. The LMB has prepared a number of discussion papers on audit trails to facilitate the development of this issue. The latest paper is available from OWM upon request. The discussion paper is a joint OWM/LMB product. The S&T Committee has not taken a final position on the audit trail format.

Two main forms of audit trails have been discussed: an event counter and an event logger. The event logger retains significantly more information on the changes that occurred when parameters were changed, whereas an event counter simply counts the number of times the "calibration mode" is entered and changes made. It appears that the concepts and details related to the event counter have general acceptance; however, considerable differences of opinion exist regarding the event logger.

Some of the main aspects of the audit trail contained in the most recent discussion paper are reported below. This information is presented for further study and development before the Committee takes a final position on the points.

1. The objectives are to permit the use of an audit trail while providing adequate safeguards to weights and measure officials to control the easy access to the configuration parameters and accuracy adjustments. Different forms of the audit trail are considered necessary depending upon the design and sophistication of the device.

The criteria that identify the acceptable form of the audit trail are summarized below.

- a. No Remote Communication. The device accuracy and adjustment parameters must be input through the device itself, i.e., the device does not have the capability of remote configuration or adjustment of metrological parameters.
  - b. Remote Communication with a Sealable Switch. The device has the capability of accepting changes to accuracy or configuration parameters, but the device has a switch that can be physically sealed in a position to inhibit the capability to accept parameter changes from remote devices.
  - c. Remote Communication without a Sealable Switch. Devices are capable of accepting changes from a remote device with only a password to limit access to the calibration/configuration mode (i.e., no sealable switch to inhibit remote adjustment or configuration of the device).
2. The minimum form of the audit trail for each category of device listed above is summarized below.
- a. No Remote Communication. A physical security seal may be used or two event counters; one on the accuracy adjustments and the other on the sealable configuration parameters.
  - b. Remote Communication with a Sealable Switch. The minimum audit trail is a physical security seal on the switch and two event counters; one on the accuracy adjustments and the other on the sealable configuration parameters.
  - c. Remote Communication without a Sealable Switch. The audit trail must be in the form of an event logger. The event logger must include an event counter (at least 000 to 999), the identification of the parameter that was changed, the new value of the parameter, and the time and date of the change, all in an appropriate readable format.

Whenever a device has a sealable switch that provides access to the calibration/configuration mode, the device shall provide a clear indication if it is in this mode. This indication may be accomplished by either:

- a. inhibiting transactions when in this mode; or
- b. providing a readily visible indicator on or near the display to indicate this condition and recording a message to this effect on any recorded ticket.

The different levels of security in an audit trail are considered necessary to address the increased flexibility permitted through remote communication. If a device is not sealed or if the physical seal is broken, the weights and measures official needs the event counters to indicate how frequently the device parameters have been changed. Since the use of audit trails and remote calibration/configuration are new to commercial devices, these additional safeguards are considered appropriate and necessary.

For any devices without a sealable switch (to limit access to the calibration/configuration mode) that are capable of receiving metrological parameter values entered from an external means, such as floppy disks, cassettes, through a modem, etc., the event logger is the only acceptable form of an audit trail. An event logger is an electronic record that includes an event counter, but also documents the parameters that have been changed and the new values that have been entered. Any device is permitted to have an event logger. Consideration will be given to determine if additional devices should be required to have an event logger. Examples of devices falling into the different categories have been developed and are available from the Office of Weights and Measures.

As the minimum level of security, access to the calibration mode shall require the use of a password.

Information contained in the audit trail shall be readily available to the weights and measures official without entering the calibration mode. It shall be in a "read only" form so that operating parameters are not inadvertently



changed. The cooperation and assistance of industry to promote standardized means to access audit trail information for particular types of devices are requested.

6. The event logger information shall be downloadable (or available in hard-copy form) for extensive review without the official being exposed to the elements or taking a device out of service for long periods of time.

**310-4                      W                      G-S.8. Provision for Sealing and Scales Code S.1.11. Provision for Sealing; Nonretroactive Dates**

(This item was withdrawn.)

The proposal was to reinstate the 1979 requirements of both G-S.8. and S.1.11. This item has been withdrawn because the cited problem appears to be limited to scales. Consequently, a change to the General Code was not considered necessary. See Item 320-25 for the scale portion of this issue.

**310-5                      I                      G-T.1. Acceptance Tolerances**

Discussion: There have been instances where NTEP and state type evaluations have extended significantly beyond the 20- to 30-day permanence test period specified in the type evaluation procedures. Because some devices have received very heavy use during this period, the manufacturer believes that maintenance tolerances should have been applied.

Several proposals were submitted in an effort to respond to this problem, including deletion of part (e) of G-T.1 limiting the application of acceptance tolerances to 30 days in the type evaluation process, limiting the Handbook 44 language to type evaluations conducted by the National Type Evaluation Program, and establishing minimum use values for the "normal use" of a device during type evaluation.

The S&T Committee decided not to change Handbook 44 due to an occasional need to extend the application of acceptance tolerances beyond 30 days when a device does not receive adequate use. The Committee is aware that the Measuring Sector of the Technical Committee on National Type Evaluation has established minimum use levels for liquid-measuring devices, and that acceptance tolerances apply until that level of use has been achieved. The S&T Committee recommends that the Weighing Sector of the Technical Committee on National Type Evaluation develop similar minimum use criteria for scales. It is the position of the S&T Committee that acceptance tolerances should apply to a device undergoing type evaluation until the minimum use value is reached, even if the time extends beyond 30 days. Acceptance tolerances must apply to any device for 30 days even if the minimum use value was exceeded before the 30-day period ended. However, if the minimum use values are significantly exceeded and the time period exceeds 30 days, then maintenance tolerances should be applied to the device.

**310-6                      VC                      G-UR.2.3. Accessibility for Testing and Inspection**

(This item was adopted as part of the consent calendar.)

Discussion: Some devices are so designed that the part with the provision for sealing is not readily accessed either to seal the device or to inspect for the presence of an intact security seal. For example, one scanner/scale used at a checkout stand in supermarkets cannot usually be sealed unless the scanner/scale is lifted out of the checkout stand or access is provided through a door panel. Weights and measures officials do not want to lift a device from the checkout stand due to the potential for damage to the device and the associated liability to the enforcement jurisdiction.

In addition, G-UR.2.3. could be narrowly interpreted to require assistance by the device owner only for movement of test equipment to the device to be tested. Fortunately, device owners have taken the common sense approach to this requirement and have provided all needed assistance to test the device.



**Recommendation:** The Committee believes that the accessibility issue goes beyond just moving test equipment to the device and providing access for sealing, but must also include accessibility for inspecting (i.e., performing the inspection activities listed in the Examination Procedure Outlines) and testing the device. The testing of hopper scales is one example where assistance in the test of the scale is needed in addition to moving the test equipment to the scale. The Committee believes that these considerations apply to all types of devices (e.g., taximeters and timing devices), hence a change to the General Code is appropriate.

The Committee recommends amending G-UR.2.3. to read:

**G-UR.2.3. Accessibility for Inspection, Testing, and Sealing Purposes.** - A device shall be located, or such facilities for normal access thereto shall be provided, to permit:

(a) inspecting and testing the device;

(b) inspecting and applying security seals to the device; and

(c) so that readily bringing the testing equipment of the weights and measures official to the device by customary means and in the amount and size deemed necessary by such official for the proper conduct of the test, ~~may readily be brought to the device by customary means.~~

Otherwise, it shall be the responsibility of the device owner or operator to supply such special facilities, including such labor as may be needed to inspect, test, and seal the device, and to transport the testing equipment to and from the device, as required by the weights and measures official.

## 10-7A V G-UR.4.1. Maintenance of Equipment

(This item was adopted.)

**Discussion:** The basic concept and design of many businesses have changed over the years. For example, the local grocery store has evolved into an extended supermarket with as many as 30 or more checkout lanes. Similarly, some local gas stations have expanded from only a few dispensers to as many as 200 dispensers. The manner in which the accuracy of many devices in one location can be manipulated to the benefit of the device user exceeds the simple adjustment of all devices to near the tolerance limit.

Some jurisdictions are encountering difficulty in the enforcement of the provisions of this paragraph due to the qualifying phrase for errors found "near the tolerance limit." One method used on occasion to take advantage of the tolerance is to adjust the high volume gasoline dispensers to deliver within tolerance, but near the tolerance limit in favor of the user, while low volume dispensers may be adjusted to underregister within tolerance. The enforcement official needs more flexibility in applying G-UR.4.1. without being constrained by the phrase "near the tolerance limit."

Paragraph G-UR.4.1. is intended to apply to devices that are not maintained properly and to those devices adjusted to take advantage of the tolerance limits. The enforcement official must be aware that some devices tend to wear in one direction over time. This wear does not necessarily imply that the device user is taking advantage of the tolerance; however, the device user must also be aware of this bias and regularly maintain the equipment to keep devices performing within acceptable limits. The weights and measures official must use judgement when applying G-UR.4.1. in those cases where the official weights and measures seals are on devices that have worn in the direction favorable to the device user.

**Recommendation:** The Committee recommends that G-UR.4.1. be amended to read:

**G-UR.4.1. Maintenance of Equipment.** - All equipment in service and all mechanisms and devices attached thereto or used in connection therewith shall be continuously maintained in proper operating condition throughout the period of such service. Equipment in service at a single place of business found to be in error predominantly in a direction favorable to the device user ~~and near the tolerance limits~~ shall not be considered "maintained in a proper operating condition."

**310-7B I G-UR.4.1. Maintenance of Equipment; Guidelines**

**Discussion:** Some jurisdictions are encountering difficulty in the enforcement of the provisions of this paragraph. Guidelines have been requested to aid in enforcement and to promote a more uniform approach to defining specific requirements for "Equipment in service at a single place of business found to be in error predominantly in a direction favorable to the device user and near the tolerance limits..." is not easy due to the many variables and circumstances that may be found.

The Committee has reviewed the policy guidelines used by the few states that submitted information. Achieving agreement on guidelines for applying G-UR.4.1. appears to be a difficult task. The Committee would like to provide guidance to jurisdictions having difficulty enforcing G-UR.4.1. and offers the following policy guidelines for metering devices for study and comment over the next year in an effort to develop this issue.

**Maintenance of Equipment Policy for Metering Devices**

- I. Multiple devices (five or more) in service at a single place of business shall not be considered maintained in proper operating condition under any of the following circumstances:
  - A. All devices are found to be in error in a direction favorable to the device user.
  - B. The calculated average error of all devices is in the favor of the device owner/user by more than 1/3 of the acceptance tolerance.
  - C. Sixty percent or more of the devices are found to be in error in favor of the device owner/user by more than 1/3 of the acceptance tolerance.
- II. If it is determined that the highest volume devices or islands or the highest priced product meters are operating in error in favor of the device owner/user, they shall not be considered maintained in proper operating condition even if the circumstances in (I) do not exist in the installation.

**Note:** Weights and measures officials should take test method uncertainties into consideration when implementing this policy.

**Scales Code**

**320-1 I S.1.12. Manual Weight Entries**

**Discussion:** The use of manual gross weight entries is increasing in various applications; however, the potential for fraudulent use of this feature is great unless proper safeguards are incorporated into the weighing system. Manual weight entries are permitted on point-of-sale systems when credit is given for a weighed item and on postal and parcel post scales to generate manifests when the package is to be picked up at a later time. In both cases the manual weight entry must be identified as a manual weight entry and the scale must be at zero when the manual weight entry is made; a manual gross weight entry shall not override a non-zero weight indication on the scale. Manual gross weight entries are permitted on weighing systems, such as livestock scales, that generate weight tickets to correct erroneous tickets provided that the following conditions are met:

- a. The erroneous ticket must be printed.
- b. The erroneous ticket must be voided and so marked on the ticket. The erroneous weight information must be removed from the memory or, if retained in memory, the weight information must be identified as being voided.

A conspicuous message indicating that the weight has been corrected must be printed on the ticket in clear terms. "Manual Wt" or "Manual Weight" are recommended. Abbreviations such as "M", "keyed" or "MW" are not acceptable.

Requirements limiting the use of manual weight entries are needed to safeguard against fraud and abuse. Based upon the comments received, the Committee does not believe that this issue has been adequately developed to present it for a vote. Consequently, the issue is being returned to the regional weights and measures associations for review. Some of the questions that should be addressed are listed below:

Which applications are appropriate for the use of manual gross weights?

Will manual net weight entries also be permitted?

Keyboard tare entries have for years been accepted by weights and measures officials without requiring an identification of these values as manual weight entries. As the item was originally proposed (that is, all manual weight entries must be identified), how are predetermined tare weights distinguished from tare weights stored in memory for repeated use over time?

This issue requires thorough study before manual gross weight entries are accepted in many applications. The National Type Evaluation Program will continue to address devices with manual gross weight entry capability on a case-by-case basis.

## 20-2 VC S.2.4. Level-Indicating Means; Wheel-Load Weighers and Portable Axle-Load Scales

(This item was adopted as part of the consent calendar.)

**Discussion:** Paragraph S.2.4. states that a portable scale shall either be accurate when out of level by 5 percent or shall be equipped with a level-indicating means. The use of a level-indicating means is not realistic for wheel-load weighers or portable axle-load scales because the scales cannot be leveled once they are set in position. Consequently, the scales must be accurate when out of level up to and including 5 percent.

Since NTEP was initiated, wheel-load weighers and portable axle-load scales submitted for type evaluation have been required to be accurate when placed out of level up to 5 percent. Consequently, requiring scale accuracy in the out-of-level condition will not change how Handbook 44 has been applied to these scales in recent years. It is not necessary to conduct the out-of-level test every time the scale is tested. The out-of-level test is usually conducted only during the type evaluation of a particular model; however, the test may be conducted whenever it is deemed necessary and is appropriate on a periodic basis.

**Recommendation:** The Committee recommends amending S.2.4. to require wheel-load weighers and portable axle-load scales to be accurate when out of level up to and including 5 percent (approximately three degrees). The Committee recommends amending S.2.4. to read:

**S.2.4. Level-Indicating Means.** - Except for portable wheel-load weighers and portable axle-load scales, a portable scale shall be equipped with level-indicating means if its weighing performance is changed by an amount greater than the appropriate acceptance tolerance when it is moved from a level position and rebalanced in a position that is out of level in any upright direction by 5 percent (approximately 3 degrees). The level-indicating means shall be readable without removing any scale parts requiring a tool.

*[This requirement is nonretroactive and enforceable as of January 1, 1986, for prescription, jewelers', and dairy-product-test scales and scales marked I and II.]*

[Note: Portable wheel-load weighers and portable axle-load scales shall be accurate when placed out of level up to and including 5 percent (approximately three degrees).]



320-3

I

S.6.3. Marking Requirements; Temperature Range

**Discussion:** Paragraph S.6.3. requires class III and III L devices not marked with a temperature range to be accurate over a temperature range of 14 to 104 °F (-10 to 40 °C). The selection of 14 to 104 °F was based upon industry standards and normal practices. The temperature range is typical of many outside environments.

Many people interpret the language of S.6.3. to mean that if a scale has no temperature markings, then it is suitable for use only in environments where the temperature range is between 14 and 104 °F.

Devices without a temperature range marking are expected to perform within tolerance over the temperature range of 14 to 104 °F. Although these limits are specified in Handbook 44 and used for type evaluation, devices must still be accurate in the environment in which they are used, even if the temperatures of the environment exceed the temperature range of 14 to 104 °F (T.N.3.2.). Some devices may be accurate over a wider temperature range, but the device has not been tested over a wider range during type evaluation. If a device is marked with a temperature range greater than 14 to 104 °F, then the device is tested over the wider range during type evaluation.

If a device does not have a wider temperature range marked on the device, there is no assurance that a device will be accurate over a temperature range greater than 14 to 104 °F. It may be necessary to adjust a scale for accuracy when used at temperatures outside the marked or implied limits.

When a scale is adjusted near one of the temperature limits, it is logical to expect the scale to perform accurately within a sufficient range about that point. The expected accuracy is a result of the broad compensation range (14 to 104 °F) and because the compensation is generally a continuous functional relationship with temperature. Hence, adjustment shifts the compensation range to a more optimum position relative to the temperature limit.

A device marked with a temperature range smaller than 14 to 104 °F, but used in an environment in which the temperature exceeds the marked temperature range, is not suitable for use in that environment. A device with an operating temperature range of at least 14 to 104 °F must be used in an application in which the temperature of the environment varies at least from 14 to 104 °F, since other scales are readily available for such an application. Scales marked with a temperature range less than 14 to 104 °F are designed to be accurate only within the range marked on the scale.

**Recommendation:** The Committee is not recommending any change to Handbook 44, but is providing explanation of the proper interpretation of temperature ranges whether or not they are marked on scales. The discussion addresses class III and III L scales, but the concept is applicable to scales of other classes.

It is the intent of the requirement that any operating temperature range designated by the manufacturer that is different from 14 to 104 °F (-10 to 40 °C), either larger or smaller, be marked on the device. The different cases of marking and not marking temperature ranges are addressed. The following interpretations of the temperature range for scales should be added to the appropriate training modules, such as Module 5 on vehicle scales.

**Case 1: Temperature range of 14 to 104 °F**

This case has two parts. The conclusion is the same whether or not the temperature range is marked on the device.

- A. If temperature range is not marked on a scale, the device must be accurate over the range of 14 to 104 °F. If a temperature range is not marked on a device with an NTEP Certificate of Conformance, it was tested over a temperature range of 14 to 104 °F. The device may be used outside the specified temperature range, but the device must be accurate in the environment in which it is used, since T.N.2.3. applies.
- B. If a device is marked with a temperature range of 14 to 104 °F, the marking is not considered to be a limitation on its application. The device may be used outside the specified temperature range, but the device



must be accurate in the environment in which it is used, since T.N.2.3. applies. The marking of the temperature range of 14 to 104 °F is optional.

**Case 2: Marked temperature range is less than 14 to 104 °F**

If a device is marked with a temperature range less than 14 to 104 °F, then the environment in which the device is used must be evaluated to determine if the device is suitable for use in that application. The device cannot be used in an environment in which the temperatures exceed the temperature limits marked on the device.

**Case 3: Marked temperature range is greater than 14 to 104 °F**

If a device is marked with a temperature range greater than 14 to 104 °F this indicates higher quality than a scale without a temperature marking for devices within the same accuracy class and of the same scale division value. This fact may be used as a marketing tool in the same manner as the maximum number of scale divisions,  $n_{max}$ . A scale marked with a wider temperature range is tested during type evaluation over the marked temperature range.

**20-4 V S.6.4. NTEP Logo or Certificate of Conformance Number**

(The item was amended to make the effective date January 1, 1993. This voting item failed.)

**Discussion:** An increasing number of states require that devices have NTEP Certificates of Conformance before they are placed into commercial service. It has been proposed that devices be marked with the number of the NTEP Certificate of Conformance issued to them. This would assist the field inspector to determine the NTEP status of a device and would readily identify to potential purchasers those devices that have received an NTEP certificate. Fairness in competition would be promoted among device manufacturers since the marking requirement would tend to force manufacturers to undergo NTEP evaluation, particularly in those jurisdictions that require an NTEP certificate before devices may be used commercially.

A number of manufacturers have opposed placing the NTEP Certificate of Conformance number on devices on the bases that:

- It will create an administrative problem for the industry in the production process.
- The marking will have limited benefit, since each device must be checked for consistency with the Certificate of Conformance and for suitability of equipment.
- The Certificate of Conformance marking by itself does not assure that a device meets all the requirements of Handbook 44 or that it is suitable for the application for which it has been installed.
- The delays in obtaining a type evaluation can interfere with the marketing of a device.

The S&T Committee agrees with the device manufacturers and has concluded that the primary interest of weights and measures officials is that devices designed to comply with Handbook 44 be marked in a manner that identifies them as "Legal for Trade." Consequently, the S&T Committee recommends that models of specific types of scales and liquid-measuring devices that have received NTEP Certificates of Conformance be marked with the NTEP logo. The marking of the Certificate of Conformance number is not required, but the clearly identified Certificate number is an acceptable alternative to the marking of the NTEP logo. If a manufacturer chooses to mark the NTEP certificate number on devices, to simplify the marking and reduce the administrative burden of maintaining the correct Certificate number on a device, the Certificate number may be marked without the suffixes that identify that the Certificate is either an addendum, a Provisional Certificate, or a Pre-NTEP Certificate. The statement of the requirement indicated that the NTEP logo must be placed only on those devices that have received an NTEP certificate, but does not mandate an NTEP evaluation for all devices. The marking of the NTEP logo will assist the procurement official in determining whether or not a device has received an NTEP certificate. Furthermore, the logo will constitute a positive statement by the manufacturer that the device has been evaluated and found to comply with Handbook 44.

The marking of the NTEP logo or certificate number will not eliminate the need for the weights and measures official to inspect a device thoroughly. In addition to checking the performance, the weights and measures official will still have to determine if the devices installed in the field are consistent with the device identified in the Certificate of Conformance. The device must be inspected to determine that it is the correct model as listed on the Certificate of Conformance and that its features were evaluated in the type evaluation. The inspector must also still determine the device features, division value, accuracy, and other characteristics are suitable for the application. Even if a device has a Certificate of Conformance, new production devices must comply with any new or amended requirements of Handbook 44 when the date of manufacture is after the effective date of the new requirement. The inspector must also verify that the device has not been modified from the original design.

In the case of software packages that receive an NTEP Certificate of Conformance for use in devices for those applications proposed to be marked with the NTEP logo, the software must state either "NTEP Evaluated" or display the NTEP logo on the same screen that displays the software name. The software name must be displayable at some time for weights and measures officials to verify the package of software being run. The display of this information may be part of the boot-up operation or shown on a menu screen that can be called up on the display.

**Recommendation:** The Committee recommends that a new paragraph be added to the Scales Code to require certain types of devices that have received an NTEP Certificate of Conformance to be marked with the NTEP logo and Certificate of Conformance number. (See item 330-5 for the equivalent requirement as it would apply to liquid measuring devices.) The Committee recommends adding a new paragraph S.6.4. to read:

*S.6.4. NTEP Marking. - If a load cell, scale in a single enclosure, separate indicating element, or scale without indicating element has received an NTEP Certificate of Conformance, the NTEP logo or the NTEP Certificate number shall be marked on the device.*

*[Nonretroactive and effective as of January 1, 1993]*

### 320-5 VC N.1.3.4. Shift Test; Livestock Scales

(This item was adopted as part of the consent calendar.)

**Discussion:** Prior to the 1989 amendment of N.1.3.4., corner tests were required to be conducted on two-section livestock scales. Reinstatement of the corner test for two-section livestock scales has been requested. The rationale for the reinstatement is that livestock have a natural tendency upon entering a scale to go to and stand in a corner. At that time the load and weight indications stabilize and the printed weight is obtained.

More than 4000 livestock scales are subject to Packers and Stockyards Administration (P&SA). One of the most common scales is 10,000 x 5 lb with two sections and a deck size of 8' x 14'. These scales are frequently used to weigh one to several head of cattle. The P&SA studies shows load concentrations on livestock scales typically reach 110 lb/ft<sup>2</sup>. A 4' x 6' area of the deck (corner) can be used to weigh 2640 lb of cattle. The change to N.1.3.4. would permit a corner test at one-quarter of scale capacity, which is 2500 lb. This test would more closely duplicate conditions of actual use.

The Committee has concluded that it is appropriate to conduct corner tests on two-section livestock scales. The recommendation is to change the heading of N.1.3.4. so that it applies to livestock scales with more than two sections. After the change, N.1.3.4. will not apply to two-section livestock scales; consequently, the two-section livestock scales will fall under the test described in N.1.3.7. Because two-section livestock scales will be exempt from N.1.3.4. (assuming that the recommendation is adopted), the corner loading limitation of N.1.3.4.(b) will not apply. Therefore, a corner load of one-quarter of the scale capacity will be specified for two-section livestock scales.

This exemption is not extended to livestock scales with more than two sections since the platform will then be larger. If the scale may have a greater capacity, the scale is designed to distribute the load over more sections, and no animal will be weighed at one time, thus distributing the load over a larger area. Consequently, the test described in N.1.3.4. is considered acceptable for livestock scales with more than two sections.

**Recommendation:** Change the heading of N.1.3.4. and amend the beginning of N.1.3.4. to read:

**N.1.3.4. Vehicle Scales, Axle-Load Scales, and Livestock Scales With More Than Two Sections.** - A shift test shall be conducted with at least two different test loads and may be performed anywhere on the load-receiving element using the prescribed test patterns and maximum test loads specified below. (Two-section livestock scales shall be tested consistent with N.1.3.7.)

**320-6 VC N.4. Coupled-in-Motion Railway Track Scales; Use of the Term "Test Cars"**

(This item was adopted as part of the consent calendar.)

**Discussion:** Handbook 44 contains the following definitions.

test car. A railroad car weighed on a reference scale for use in a test train.

test train. A train consisting of cars weighed on a reference scale and used to test coupled-in-motion railway track scales. The test cars may be placed consecutively or distributed in different places within a train.

Railroad test cars typically have specific designs, such as a self-contained composite car, a self-propelled car, or a standard rail car. They are designed to be stable masses and are used as mass standards. The only reference to "test cars" in the Scales Code is in paragraph N.4.3.1.3.(b), but the reference to test train is frequent. The cars used in the testing of coupled-in-motion railway track scales are usually the types of railroad cars designed to carry the products or commodities normally weighed on the scale. They are usually weighed on a railway track scale that has been tested a short time before use to establish the weights for the cars used in the coupled-in-motion (CIM) scale test. The cars used in the CIM scale test are "temporary" or "transfer" standards, that is, they are used as reference standards for a short period of time and used only while the value assigned to the car is believed to remain constant; the car is not designed or intended to maintain stability as a mass standard for an extended period of time.

The definition of the term "test car" must be changed to properly reflect the rail cars used in these tests. The Committee is recommending definitions to correct this inconsistency with the industry term of "test car." The Committee requests that the railroad industry, industry associations, the Railroad Advisory Committee, and the American Railway Engineering Association Committee 34 review the proposed definitions to determine if they are appropriate and correct. If better definitions can be developed, the industry is requested to advise the S&T Committee of the definitions so they may be considered before a vote is taken on this item in July.

**Recommendation:** To recognize that test weight cars may be used in place of reference weight cars, the Committee recommends adding the following as a footnote to the heading of N.4.:

A test weight car that is representative of one of the types of cars typically weighed on the scale under test may be used wherever reference weight cars are specified.

The Committee recommends that the term "test cars" contained in N.4.3.1.3.(b) be replaced with "reference weight cars." The Committee recommends that the current definition of test car be deleted and the following two definitions added.

test weight car. A railroad car designed to be a stable mass standard to test railway track scales. The test car may be one of the following types: a self-contained composite car, a self-propelled car, or a standard rail car.

reference weight car. A railroad car weighed on a scale for temporary use as a mass standard over a short period of time (typically, the time required to test one scale) as part of a test train.

The Committee recommends that the definition of test train be amended to read as follows:



test train. A train consisting of ~~cars weighed on a reference scale~~ or including reference weight cars and used to test coupled-in-motion railway track scales. The test reference weight cars may be placed consecutively or distributed in different places within a train.

### 320-7 I Guidelines to Determine When Coupled-in-Motion Scales Should be Tested "As Used"

**Discussion:** The cost of conducting "as used" tests on coupled-in-motion (CIM) scales is very high and the decision to conduct "as used" tests cannot be taken lightly. On the other hand, the use of the minimum 10-car/5-times test does not always indicate the accuracy of the scale when weighing longer trains. Guidance is needed to aid in determining when to test a scale with the "as used" test procedures.

The Committee wants to develop guidelines to assist weights and measures officials to determine when the "as used" test procedures are appropriate for testing a specific scale installation. The recommendations of the American Railway Engineering Association for the site selection of a CIM scale and recommendations for the proper installation of CIM scales are the starting point for the development of the guidelines.

It is important to know the characteristics of an ideal scale site, installation, and approach and exit track to gain some understanding of the effects on the weighing accuracy caused by deviations from the ideal installation. The dynamics of the weighing process are complex and the potential for car interaction must be controlled. It is critically important to strive to minimize coupler interference as the cars being weighed pass over the scale. The objective is to avoid changes in coupler forces from tension to compression as the cars are weighed. Due to the interaction of forces throughout the length of the train, it is necessary to examine the profile of the track for a distance at least equal to the length of the train on both the approach and exit of the scale. Although the Committee will try to develop guidelines to aid in the decision for the method of test that is most appropriate for a CIM scale, the Committee is convinced that guidelines cannot replace experience, a thorough understanding of the weighing process and the dynamics of train interaction, and good judgement.

Installation characteristics have been extracted from the AREA Committee 34 report of Sub-Committee D-1-8 "Criteria for Location of Coupled-In-Motion Weighing Systems". Included with this list are general principles that apply to CIM weighing. The list, available from the Office of Weights and Measures, is merely an initial list of discussion items that can be reviewed by all interested parties. Comments, additions, and revisions are requested to assemble a more extensive list of guidelines that can ultimately serve to aid in the process of determining the procedure to be used to test a CIM scale. It is emphasized that this list does not provide the criteria for judging when "as used" test procedures should be applied to a scale: it is only intended to generate discussion and development of the issue. The Committee believes that the experience in the industry can lead to the development of suitable guidelines.

The Committee requests the assistance from the railroad industry, users of CIM scales, and associations to develop these guidelines.

### 320-8 I Railroad Coupled-in-Motion Weighing of Individual Cars in Mixed Merchandise Trains for Custody Transfer

**Discussion:** A number of companies would like to use (and some are using) individual car weights obtained from CIM scales for custody transfer. The NCWM has not taken a formal position on this issue, but the S&T Committee believes that it is not appropriate to use the weights of individual cars in mixed merchandise trains for custody transfer when the weights are collected from CIM scales. See the S&T reports in the Report of the 74<sup>th</sup> NCWM 1989 and the 75<sup>th</sup> NCWM 1990 for additional information on this issue.

The Committee would like data on other scales before it makes a recommendation to the Conference on this issue. The Committee plans to coordinate a study with railroads, scale owners, users of CIM scales, and weights and measures officials to collect more data on this issue. The Committee will distribute a plan to industry and industry associations to obtain advice and assistance in conducting this study.



The Committee again extends its appreciation to the members of the railroad industry, industry associations, and users of CIM scales for their assistance and advice regarding this complex issue. Weights and measures officials are encouraged to contact the railroads and users of CIM scales in their area to witness the test of CIM scales to gain a better understanding of the test processes and the constraints on the process to test these scales.

### 320-9 I Railroad Coupled-in-Motion Weighing of Liquids in Individual Tank Cars for Custody Transfer

**Discussion:** A number of companies would like to use (and some are using) individual car weights for liquids in tank cars obtained from CIM scales for custody transfer. The S&T Committee has reviewed data that show sufficient accuracy can be achieved when the CIM scale is tested as used and the weighing process is continually monitored. See the S&T reports in the Report of the 74<sup>th</sup> NCWM 1989 and the 75<sup>th</sup> NCWM 1990 for additional information on this issue.

The Committee observed the testing of one CIM scale used to weigh liquids in tank cars. Although the site for the scale installation was not ideal, after proper installation of the scale and maintenance of the railroad track on both ends, the scale passed the test when the distribution of errors applicable to individual cars as stated in T.N.3.6.2. was applied. This test and the detailed test data submitted last year indicate that it is possible to meet the current performance requirements when weighing liquids in tank cars.

The Committee would like additional data on other scales before it makes a recommendation to the Conference. The Committee plans to coordinate a study with railroads, scale owners, users of CIM scales, and weights and measures officials to collect more data on this issue for the custody transfer of liquids in tank cars. The Committee will distribute a plan to industry and industry associations to obtain advice and assistance in conducting this study.

The Committee again extends its appreciation to the members of the railroad industry, industry associations, and users of CIM scales for their assistance and advice regarding this complex issue. Weights and measures officials are encouraged to contact the railroads and users of CIM scales in their area to witness the test of CIM scales to gain a better understanding of the test processes and the constraints on the process to test these scales.

### 20-10 I Notes; Establish Procedures for Testing Uncoupled-in-Motion Railway Track Scales

**Discussion:** It has been suggested that specific procedures to test uncoupled-in-motion railway track scales be added to Handbook 44. Many uncoupled-in-motion railway track scales are in use, but Handbook 44 has no test notes explaining the minimum test for these scales. The test procedures already established by the Association of American Railroads (AAR) and the American Railway Engineering Association (AREA) were reviewed and appear to be a good foundation for Handbook 44 procedures.

Uncoupled-in-motion (UCIM) railway scales are of two types: scales weighing in a single draft and those weighing in two drafts. The industry practice has been to use three reference weight cars to test both single-draft scales and two-draft scales. The UCIM scale is to be tested statically and then the railway cars are weighed statically on the UCIM scale to establish the reference weight of the cars. If empty and loaded cars are weighed, three cars are selected for the test with one near the low end, one of intermediate weight, and one near the maximum load weighed on the scale. The cars used for the test shall be assigned a reference weight value and meet the following criteria taken from the AAR Scale Handbook):

The cars should have a range of gross weights similar to the weight of cars used in the normal operation of the scale.

The cars should be free of defects. The test shall not be conducted or continued if rain, snow or other unusual conditions alter or affect the weights of the cars before the motion test is completed.

When loaded cars are used, the contents of the loading should be stable.

4. The reference weight value shall be obtained by weighing the car, preferably on a single draft static scale.
5. The static scale shall be tested as specified in AAR Scales Handbook 1.8, Definition of a Standard Test of a Static Railway Track Scale, using appropriate test equipment.
6. In addition to the usual test, the scale shall be strain tested, if possible.

The Committee recommends that the procedure below be studied for another year before adding it to Handbook 44. The Committee suggests the following language for a Note to be added to the Scales Code:

N.X. Uncoupled-in-Motion Railway Track Scales. - The uncoupled-in-motion scale shall be tested statically before being tested by passing railroad reference weight cars over the scale for the in-motion test. When an uncoupled-in-motion railway track scale is tested, the car speed and in the direction of travel shall be the same as when the scale is in normal use. The minimum in-motion test shall be five reference weight cars passed over the scale five times.

### 320-11      W      Reweighing a Unit Train

(This item was withdrawn.)

A proposal was submitted to prohibit the reweighing of a unit train on another CIM scale for the purpose of identifying overloads or establishing freight charges. The rationale for the proposal is that the error distribution for individual cars specified in T.N.3.6.2. is not applicable to a unit-train-only CIM scale. Consequently, the errors for individual cars are not controlled and should not be subjected to reweighing for individual car weights.

It is the position of the S&T Committee that this is not a Handbook 44 issue. The reweighing of a train may be necessary to ensure consideration of safety in transporting railcars. No requirement in Handbook 44 prohibits the reweighing of a train (or any vehicle) on another scale, nor should there be such a requirement. This issue should be resolved by the parties involved in the transactions.

### 320-12      I      T.1.2. Postal and Parcel Post Scales

**Discussion:** The Committee has reviewed a proposal to delete the unique tolerances applicable to postal and parcel post scales on the basis that they are confusing and difficult to use. It is claimed that there are relatively few unmarked postal and parcel post scales in use; consequently, changing the tolerance would affect a relatively small number of devices.

The Committee has been advised that there is still a need for the postal scale tolerances for postal scales designed to weigh loads less than 12 oz. The Committee has also been advised that two or three states perform tests on unmarked U.S. Postal Service scales using the Handbook 44 tolerances. The S&T Committee is opposed to completely removing the postal scale tolerances from Handbook 44; the Committee does not have sufficient justification to implement a partial change to these tolerances.

### 320-13      W      T.N.3.1. Tolerances for Class III L Scales

(This item was withdrawn.)

**Discussion:** The performance requirements at the low end of class III L scales with more than 5000 divisions are extremely tight relative to the tolerance at the upper end. The proposal was to change the acceptance and maintenance tolerance of 0.5d and 1d for loads from 0 to 500d to 1d and 2d, respectively. This would have made the acceptance and maintenance tolerances from 0 to 1000d to be 1d and 2d.

The Committee did not support this proposal because these tolerances are considered to be too large for small loads placed on class III L scales. Furthermore, class III L scales (and, subsequently, class III L load cells) with less than 5000 divisions do not need such a large tolerance.

## 320-14A I UR.1.X. Selection Requirements; Suitability of Equipment

**Recommendation:** The Committee recommends establishing a suitability of equipment table based upon the commodity being weighed, the range of loads being weighed, the maximum division values, and the accuracy required for the commodity and transaction. Based upon the comments received, the Committee decided to make this an information item. The Committee recommends the continued development of the following amendments to UR.1.1. for consideration next year.

## UR.1.1. General.

(a) For devices marked with a class designation, the typical class or type of device for particular weighing applications is shown in Table 7a.

(b) Devices marked with a class designation and used in the applications listed in Table 7b shall comply with the parameters listed in Table 7b to be suitable for the application.  
[Nonretroactive as of January 1, 1992.]

(b) (c) For devices not marked with a class designation, Table ~~7b~~ 7c applies.

The following table should be reviewed as part of the change to UR.1.1.

**Discussion:** The suitability of equipment is critical for device manufacturers, device users, and the enforcement official. There appears to be considerable support among weights and measures officials to establish more definitive criteria on the suitability of equipment for various applications in order to minimize user and enforcement problems. Although objections have been expressed about putting the table in Handbook 44, it appears that most weights and measures officials want a suitability of equipment table in Handbook 44.

The Committee recommends the addition of a new table to the User Requirements of the Scales Code containing only those applications which the Committee believes are non-controversial or already specified in Handbook 44. The Committee expects that this table will be expanded in the future and eventually may replace tables 7a and 7b and some of the user requirements described in text.

This table is proposed as a nonretroactive user requirement. If a weights and measures jurisdiction has accepted currently installed devices with scale divisions larger than those in the table and considers them acceptable, this table will not change their acceptability. This table is a further definition of the suitability of equipment categories listed in Table 7a. Exceptions for specific installations with special circumstances would be at the discretion of the jurisdiction with regulatory authority over the device.

This table establishes the suitability of scales for specific applications based upon the loads that are weighed in the application and the accuracy that has customarily been required for these applications. The categories of devices for the table and the values defining the suitability of the scale are, in many cases, based on existing requirements in the Scales Code. The major aspect of this table is to state the maximum value for a scale division that is acceptable in an application. The accuracy required for the scale is based upon the categories listed in Table 7a. The values for the minimum load are based upon existing user requirements and Table 8.

Examples

The maximum value of a scale division for a given application depends upon the range of loads weighed on the scale. For example, if a livestock scale is used in applications where the minimum load is greater than or equal to 10,000 lb, the scale cannot have a scale division larger than 20 lb or weigh loads less than 500d. Similarly, if the scale is to weigh some loads less than 10,000 lb, but the minimum load is at least 5,000 lb, then a scale division of 10 lb or smaller may be used; the minimum load in this case is still 500d. These values are based upon and consistent with UR.3.8. The other entries for livestock scales are consistent with the entries in Tables 7a and 8 for livestock scales.



**Table 7b. Suitability of Equipment Criteria for Scales Marked with an Accuracy Class**

Application, Device, or Commodity		Loads Weighed	Maximum Division Value ( $d_{max}$ )	Minimum Net Load	Accuracy Required (Equivalent to)
Digital computing scale or POS scale		$\leq 50$ lb	0.01 lb	20d	Class III
Animal scale		$\leq 2,500$ lb	1 lb	20d	Class III
Livestock Scales (Smallest load weighed)		$\geq 10,000$ lb $\geq 5,000$ lb $\geq 250$ lb $\geq 100$ lb	20 lb 10 lb 5 lb 2 lb	500d 500d 50d 50d	Class III L
Grain hopper scales (Largest load) (Smallest load)		$\leq 50,000$ lb $> 20,000$ lb	10 lb 20 lb	20d 20d	Class III
Hopper scales (other than grain hopper) (Largest load weighed)		$\leq 1000$ lb $\leq 2,000$ lb $\leq 5,000$ lb $\leq 10,000$ lb $\leq 20,000$ lb $> 20,000$ lb	1 lb 2 lb 5 lb 10 lb 20 lb 50 lb	50d 50d 50d 50d 50d 50d	Class III L
Grain-test scale (Largest load) (Smallest load)		$\leq 500$ g $> 500$ g	0.2 g 0.5 g	20d 20d	Class III
Railway track scales		$\geq 50,000$ lb	200 lb	50d	Class III L
Vehicle scales	Grain (Largest load) (Smallest load)	$\leq 100,000$ lb $> 100,000$ lb	20 lb 50 lb	50d 50,000 lb	Class III L
	Sand and gravel	$\geq 1000$ lb	100 lb	50d	Class III L
	Solid waste	$\geq 1000$ lb	100 lb	50d	Class III L

[Nonretroactive as of January 1, 1992.]

In the case of hopper scales (other than grain hopper), the order of the "loads weighed" is from the smallest to the largest in order to correspond to the entry in Table 7b that states the maximum value for scales not otherwise specified shall not exceed 0.1 percent of the scale capacity. Therefore, if a scale is used to weigh loads less than 1000 lb, the maximum value of the scale division for these applications is 1 lb. If the scale weighs loads up to 2000 lb but the loads are always greater than the minimum load of 50d, the scale may have a scale division as large as 2 lb. This process continues through the values of loads weighed until a scale weighing loads greater than 20,000 lb must have a 50-lb scale division or smaller.

#### Cost of Commodity Argument

Some people have objected to establishing suitability of equipment on the basis of commodities, claiming that this changes Handbook 44 from a technology-based handbook to one that relies more heavily on classification based upon commodity. It has been claimed that the cost of a commodity should not be a basis for determining the suitability of the equipment used to measure the commodity.



Handbook 44 currently has requirements that result from cost considerations. For example, grain hopper scales are required to be class III devices, whereas other hopper scales may be class III L. The grain industry is required to have 20-lb scale divisions on vehicle scales, but larger scale divisions are permitted on vehicle scales used exclusively to weigh sand and gravel.

### 320-14B I UR.1.X. Selection Requirements; Suitability of Equipment

**Discussion:** The factors to consider when determining the suitability of equipment are complex. The objectives of establishing suitability of equipment criteria are to:

1. assure that purchasers obtain the proper equipment for the application;
2. encourage fair competition among companies by having the applicable criteria understood by all parties so they compete under the same conditions;
3. promote uniformity in the application of suitability of equipment criteria;
4. reduce enforcement problems caused by placing inappropriate equipment into service where it is not suitable for the application; and
5. facilitate different types of equipment to be used in different applications where the equipment accuracy and performance meets the needs of the application.

Obviously, many devices may comply with the requirements of Handbook 44, but not all equipment that complies with Handbook 44 is suitable for use in all applications. The suitability of scales for various applications depends on many factors, including device design, capacity, number of scale divisions, accuracy required for the application, range of loads weighed - which is associated with the minimum load limitation of the scale (accuracy class and scale division), the features available on the device, as compared with the features needed for the application.

In many cases, device design indicates the appropriate application of a device, such as a computing scale used in delicatessens and the typical retail motor-fuel dispenser used in retail service stations. A trend has developed over the years where devices have crossed technology lines to be used in applications which had been the exclusive domain of a specific device-based technology. For example, scales or mass flow meters may now be used to measure liquids; in-board weighing systems are recognized as acceptable for measuring cryogenic liquids; and bulk milk may be measured using scales, positive-displacement meters, or mass flow meters. Additionally, as manufacturers seek new markets for their products and changing times dictate control over materials that were not measured to a significant extent in the past (e.g., recyclable material and billing according to the amount of solid wastes sent to landfills), this trend is likely to increase. The Committee believes it necessary to establish more definitive criteria for the suitability of equipment and to have a mechanism to permit device technology to cross traditional technology lines and be used in other applications.

The following concepts should be considered to develop this issue:

The codes in Handbook 44 establish performance requirements (tolerances) for the device technology.

The "suitability of equipment" tables will establish the accuracy required for a particular commodity and the (minimum) quantity. Any device, regardless of technology, may be used to measure the commodity and quantity, provided that the device can meet the applicable accuracy requirement and resolution for the transaction.

A device should not be constrained in its application by the tolerance established in the code. If a device manufacturer has developed a device model of higher accuracy than required by the code, then it should be permitted for use in applications where tighter tolerances apply and which can be met by that device.

To be suitable for an application, a device must meet both the requirements of its technology (Handbook 44 device code requirements) and satisfy the accuracy and division requirements for the commodity and quantities being weighed (suitability of equipment).

Certain questions must be addressed, particularly as they relate to liquid-measuring devices. (See Item 330-8A). How can a manufacturer demonstrate that a device meets a tolerance tighter than that stated in Handbook 44? Is the type

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evaluation of one or two devices sufficient to demonstrate that a particular family of devices can meet the tolerance. Should uniform categories of accuracy be established within each code and devices be marked with the accuracy category that they can meet? If marked with an accuracy designation (class or category), then all devices marked with a given accuracy must meet the tolerance, regardless of the product being measured. How can weights and measure officials assure that production devices meet the specified accuracy if they cannot test the device in the field over the range of parameters that affect device performance, e.g., temperature?

The Committee believes that this area should be developed. At the Interim Meeting the Committee heard presentations regarding the practical limitations of weighing bulk recyclable on vehicle scales with the minimum net load requirement of 50d. The NCWM must provide leadership to those municipalities and companies interested in weighing solid waste sent to landfills in an effort to promote the recycling of aluminum, glass, plastics, paper, and ferrous and nonferrous materials. The Committee provides the following table of suitability of equipment criteria to generate comments and discussion of issues that have been brought to the attention of the Committee. Additional categories of devices have been submitted to the Committee, but were not be adequately reviewed at the Interim Meeting. The information will be sent to the regional weights and measures associations for review. As progress is made to establishing appropriate criteria, the Committee plans to present new additions to the table presented in Item 320-14A for inclusion in Handbook 44.

**Suitability of Equipment Criteria for Scales Marked with an Accuracy Class**

Application, Device, or Commodity		Loads Weighed	Maximum Division Value ( $d_{max}$ )	Minimum Net Load	Accuracy Required (Equivalent to)
Scrap and Recyclable material	Ferrous material			?	Class III L
	Nonferrous material				
	Aluminum cans			20d	Class III
	Bulk aluminum			?	Class III L
	Copper			20d	Class III
	Brass			20d	Class III
	Paper			?	?
	Glass			?	?
	Other nonferrous			?	Class III L
	White goods (Discarded appliances)			?	Class III L

### 320-15 W UR.1.2. Selection Requirements; Postal and Parcel Post Scales

(This item was withdrawn.)

A proposal was made to require that all scales used for postal and parcel post applications be weight classifiers. The weight classifier is ideal for postal and parcel post applications because it rounds up weight values, following the rates by which postal rates are defined. If all companies or mailing services used weight classifiers, the number of conflicts with the scales used by the U.S. Postal Service would be reduced.

The S&T Committee does not believe it appropriate at this time to mandate that only weight classifiers be used to weigh letters and packages to be submitted to the U.S. Postal Service for delivery. It is a fact that a "round-off" scale introduces a source of conflict with the results indicated by the weight classifiers used by the U.S. Postal Service. However, even if all scales used to weigh letters and parcels were weight classifiers, the problem of conflict with the indications would still exist due to the tolerances applied to scales. Bulk mail shippers are alerted to the fact that an accurate "round-off" scale may indicate that a letter or package may be shipped at one rate, while an accurate weight classifier may show the next higher rate for the letter or package. Bulk mail companies should consider this fact when purchasing a scale to weigh letters prior to taking them to the U.S. Postal Service for delivery.

**20-16 W UR.2.9. Accessibility for Sealing**

(This item was withdrawn.)

This item was withdrawn since it is covered as part of Item 310-6.

**20-17 W UR.10. Records**

(This item was withdrawn.)

This item proposed certain information and documentation on scale damage, maintenance, and repair to be available at the scale site to assist the weights and measures official in the evaluation of the device and the service technician in its maintenance. Although the Committee believes that this would be useful information to the service technician and the enforcement official, there was a lack of support by the Committee to make this a Handbook 44 requirement.

**20-18 VC Definition of Concentrated Load Capacity**

(This item was adopted as part of the consent calendar.)

**Discussion:** The term "concentrated load capacity" (CLC) is not being used consistent with the intent of the NCWM. In the case of vehicle scales, the term represents the maximum axle-load concentration for which a scale is to be used and tested. A scale must weigh accurately when loads equal to the CLC are placed on the scale in a single test pattern as specified in N.1.3.4. or in multiple loading patterns that reflect the axle positions of the types of vehicles weighed on the scale.

A number of manufacturers claim a large CLC for testing purposes, but state that device use is limited to weighing specified axle loads. From an engineering point of view, if the CLC is interpreted to represent only an occasional test load, then the CLC rating may be significantly larger than the axle loads to be applied to the scale in normal use. It appears that several companies rate their scales to reflect only occasional loads up to the CLC. In these cases, if the scale were routinely used for loads with this high CLC, the life of the scale would be greatly shortened. It was the intent of the S&T Committee that the CLC represent the normal loads for which the scale can be used.

Additionally, the vehicle configuration, including the number of axles in tandem (two or more axles), must be considered when a weighbridge is designed. A scale may be loaded to the CLC and weights placed in the prescribed loading pattern wherever the axles of the vehicles being weighed may be located. Any vehicle scale can be expected to accurately weigh any legally configured highway vehicle up to the CLC and capacity of the scale (consistent with R.3.3.). When vehicles of different axle configurations are weighed, the scale may be tested for the "worst case" of the axle configurations.

The current definition of CLC specifies that its value is for both testing and use; however, it is believed that a change in the definition would eliminate the practice of declaring a large CLC but stating another value as the maximum axle-load rating for the scale. The proposal is consistent with the original intent of the declaration of the CLC.

As a related matter, the formula to verify the relationship of the CLC to the nominal capacity of the scale is also being discussed. A scale manufacturer must first establish the CLC needed for the intended application of the scale, then use the formula to arrive at the maximum value that is appropriate for the nominal capacity of the scale. Apparently, some companies are using the formula backwards: they establish the nominal capacity and divide to establish the CLC. Consequently, some scales have CLC ratings that are below the axle-loads of the vehicles weighed on the scale. Scales with CLCs lower than the axle-loads of the weighed vehicles are not suitable for their application.

The Committee recommends that the definition of the concentrated load capacity be revised as stated below to accommodate livestock scales, where an axle-load rating is not applicable.

**Recommendation:** The Committee recommends the definition of concentrated load capacity (CLC) be amended to read:



concentrated load capacity (CLC). A capacity rating of a vehicle, axle-load, or livestock scale, specified by the manufacturer, defining the maximum load concentration for which the weighbridge is designed. In the case of vehicle and axle-load scales, it is the maximum axle-load concentration for which the weighbridge is designed as specified by the manufacturer. This capacity rating is for both test and use.

### 320-19 I Specific Criteria for Unattended Vehicle Scales

**Discussion:** There are an increasing number of unattended vehicle scales used for commercial transactions and to determine the axle loads of highway vehicles. Many jurisdictions are faced with applying current Handbook 44 requirements to these devices and apply different requirements. A uniform set of criteria to be applied nationally is desirable.

Several criteria have been applied to existing installations, but the criteria should be reviewed and developed further. The following criteria have been suggested by the regional weights and measures associations.

1. There must be a continuous indication of zero (S.1.1.). The concern with unattended, money-operated scales is to permit a scale to indicate zero, but not allow a vehicle to be weighed. A scale may indicate weight values to a low weight value, say to only 200 lb, to permit the balance condition of the scale to be determined, but not so far as to allow the scale to be used to weigh vehicles. Once payment has been made, the weight display should allow the full range of indication to display the actual weight of the vehicle.
2. The range of AZSM must be less than or equal to 3d (S.2.1.3.).
3. In a card-operated system, there must be a means for the card holder to set zero (S.2.1.1.) or the scale should be equipped with a mechanism that disables scale operation if the scale is not at zero at the start of the operation. For example, there may be a zero push button in front of the scale so the truck driver can set zero or the scale may automatically set zero if a card reader is located ahead of the scale before the driver moves the truck onto the scale.
4. When an unattended scale is used for custody transfer in Canada, the scale is required to have gates or other means to assure that vehicles are properly located on the scale platform. Canada does not require these locating devices on scales used only to determine axle-load weights, which may be of interest only to the driver of the vehicle.
5. A printer is recommended, or perhaps should be required. If a printer is provided, it should be located so that the driver can take the ticket before leaving the scale. The ticket should be available to the truck driver, perhaps by pushing a button to obtain it, i.e., the printed ticket is not automatically generated. If the ticket printer is not at the scale, then instructions at the scale must inform the driver where the ticket can be obtained. Instructions must also be on the printer as to how to obtain the ticket. It has been suggested that the printed ticket state "Weight determined on an unattended scale", and that the tickets be numbered consecutively.

Since the Scale Manufacturers Association has appointed a task force to develop criteria for these devices, this information is provided for further review and development. The assistance of the Scale Manufacturers Association to develop this issue is appreciated.

The Committee recognizes the need to change the reference to a continuous indication of zero in point 1 above to a reference to no-load condition. Additionally, a regional weights and measures association has recommended that the time and date be required on the printed ticket. The Canadian requirements will be sent to the Scale Manufacturers Association and the regional weights and measures associations for further development of the issue.

### 320-20 I Unattended Recycling Devices

**Discussion:** The application of existing Handbook 44 requirements is nonuniform. Some manufacturers are redesigning their recycling devices to meet all the requirements that some weights and measures officials believe must be met. A clear statement of the requirements and the features a device must have are needed.



The S&T Committee believes that more study and review of the requirements applicable to these devices are needed. Two issues are (1) whether or not these devices must have a continuous weight display and (2) specification of what a machine must do with the rejected cans.

The Committee believes that if these devices were required by weights and measures officials to have NTEP evaluations, significant improvement in the design of some devices would result. Strong weights and measures enforcement would also provide good control of these devices.

To assist in the review of this issue and promote enforcement, the Handbook 44 requirements applicable to these devices as identified in Item 301-9 in the 1984 Report of the NCWM are repeated below for reference. The references were (Scales Code numbers have been updated):

**General Code**

- G-S.1. Identification
- G-S.6. Marking Operational Controls, Indications, and Features
- G-S.7. Lettering
- G-UR.1.2. Environment
- G-UR.2.1. Installation
- G-UR.2.3. Accessibility for Testing Purposes
- G-UR.3.1. Method of Operation
- G-UR.3.4. Responsibility, Money-Operated Devices
- G-UR.4.4. Assistance in Testing Operations

**Scales Code**

- N.1.8. Material Test
- T.N.3.9. Material Test on Customer-Operated Bulk Weighing Systems for Recycled Materials

Note that paragraph G-S.5.1. Indicating Elements - General was not included in the list. Whether or not G-S.5.1. should be applied or if the money payment or money indication is sufficient has been argued over the years.

**320-21 I Substitution and Strain-Load Test Procedures**

**Discussion:** The proper conduct of these tests and the proper application of the tolerances to the test loads is not universally understood. The State metrologists have prepared a paper describing the test procedures and the proper tolerance application. The paper is contained in Appendix A of this report.

The Committee recommends that the paper be used as a training and a reference document for these tests. The Committee is sending this document to the Education Committee to be incorporated as appropriate in the training modules.

**320-22 I Separate Code for Scales Used in Law Enforcement**

**Discussion:** Many court cases result from actions taken by State and local police enforcing highway weight laws. The court arguments are often jeopardized because lawyers confuse the requirements for commercial weighing with those for law enforcement scales, particularly UR.3.3. and UR.3.4.

It is believed that a separate code would be of considerable help to weight enforcement agencies and to the transportation industry. A separate code or a separate report should contain a full discussion of acceptable weighing procedures, reasonably attainable scale accuracies, sources of potential weighing errors and instructions to minimize these effects, and allowable tolerances for these scales. This information should address permanently installed scales, portable axle-load weighers, wheel-load weighers, and weigh-in-motion equipment. The discussions should cover determining wheel, axle, and gross weights, and single-draft and split-draft weighing.

The Committee will review the requirements that would apply specifically to law enforcement scales to determine if the best approach is to create a separate code or a separate section in the Scales Code to contain the unique requirements applicable to law enforcement scales. This issue will be studied over the next year.

### 320-23 I Weigh-in-Motion Scales for Law Enforcement

**Discussion:** Over the years the reliability, durability, and accuracy of weigh-in-motion (WIM) equipment has improved. This equipment is already being used in many states, Canada, and the United Kingdom. The American Society for Testing and Materials has published ASTM standard E 1318-90, "Standard Specification for Highway Weigh-in-Motion (WIM) Systems with User Requirements and Test Methods."

The S&T Committee has been asked to establish appropriate requirements in Handbook 44 for WIM scales for the purposes of screening overweight trucks and for writing citations based upon the use of WIM scales. The Committee believes that more information is needed on these systems and their performance potential before Handbook 44 requirements can be developed. The Committee encourages the Federal Highway Administration to contact the highway law enforcement agencies in various States to determine their estimates of tolerances needed to enforce the highway weight laws. The State weights and measures agencies are encouraged to cooperate with their highway law enforcement agencies in the conduct of tests to collect information for the Committee to review.

### 320-24 I On-Board Weighing Systems; Solid Waste Management and Recycling

**Discussion:** The trends toward recycling and for charging businesses and residents for solid waste disposal appear to be increasing. It is important that appropriate specifications, performance requirements, and test procedures be developed so that equipment developed for on-board weighing systems complies with weights and measures requirements. If businesses and municipalities are not aware of the specific criteria applicable to commercial scales then inappropriate equipment will become entrenched in these applications and make enforcement much more difficult.

It has been, and still is, the position of the NCWM and the S&T Committee that on-board weighing systems must be class III scales. The Committee is willing to consider various approaches to address industry needs, including the possibility of using class III scales, but is not receptive to creating a separate category of tolerances for waste management systems. Weights and measures officials are encouraged to work with their municipalities and companies involved in solid waste management and recycling to determine industry needs and to develop possible criteria for these scales.

### 320-25 V S.1.11. Provision for Sealing; Nonretroactive Dates

(This item was adopted.)

This item was added as a consequence of withdrawing Item 310-4.

**Discussion:** The original S.1.11. required the sealing of electronic adjustment mechanisms affecting the performance of a scale on a nonretroactive basis effective January 1, 1979. The definition of performance requirements limited the scope of sealing to those adjustments that affected requirements specified in the Tolerance Sections of the code. When G-S.8. and S.1.11. were amended to recognize audit trails and expanded the scope of the sealing requirement to include any change that might affect the metrological integrity of the device, the nonretroactive requirements that were in effect since 1979 were dropped from the paragraphs. The reasons the previous requirements were dropped were: (1) it was thought that stating both requirements would be too confusing, and (2) it was thought that any device in the field would already comply with the 1979 requirements.

It has been discovered that scales that were used in noncommercial applications are now being placed into service in commercial applications, specifically for use as shipping scales for parcels. Some of these scales do not comply with the 1979 requirement. Consequently, it appears to be necessary to restore the 1979 language in S.1.11. so that access to the adjustment for accuracy on these scales can be required to have provision for sealing. In the specific case presented to the Committee, the scale has keyboard calibration capability without any provision for sealing.

**Recommendation:** The Committee recommends reinstating the original 1979 requirement with its original nonretroactive date into S.1.11. The Committee recommends that S.1.11. be amended to read:

*S.1.11. Provision for Sealing.*

*(a) Except on Class I scales, 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 affecting the performance of an electronic device.*

*[Nonretroactive as of January 1, 1979.]*

*(b) Except on Class I scales, 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 affects the metrological integrity of the device can be made to any electronic mechanism.*

*[Nonretroactive as of January 1, 1990.]*

## Belt-Conveyor Scale Systems

### 321-1 W N.3.2. Material Tests; Test at Two Flow Rates

(This item was withdrawn.)

A situation was reported in which a scale was tested and adjusted to be accurate at the maximum flow rate over the scale, but due to a mistake in the installation of a load cell, the scale had extreme nonlinearity and was inaccurate at any flow rate other than where the scale was adjusted. The simulated load test recommended by the scale manufacturer did not detect the problem.

The proposal was to require conduct of material tests at two rates of flow for a belt-conveyor scale. There was considerable concern whether or not the cost of this testing could be justified by the number of problems that might be found. The Committee did not receive any information on scale performance at different rates. This item was withdrawn since there was insufficient justification for the proposal and it lacked support by the Committee.

### 321-2 W UR.5. Records

(This item was withdrawn.)

This item proposed certain information and documentation on scale damage, maintenance, and repair to be available at the scale site to assist the weights and measures official in the evaluation of the device and the service technician in its maintenance. Although the Committee believes that this would be useful information, there was a lack of support by the Committee to make this a Handbook 44 requirement.

### 321-3 VC Official with Statutory Authority

(This item was adopted as part of the consent calendar.)

**Discussion:** Last year the Committee made several changes to the requirements for testing coupled-in-motion railway rack scales, in particular, changing the reference of "certifying authority" to "official with statutory authority" to indicate clearly that the enforcement official has the authority specified in the requirements. This proposal is to make the same changes to the Belt-Conveyor Scales Systems Code to be consistent with weights and measures law and with the changes to the Scales Code adopted last year.

**Recommendation:** The Committee recommends editorially changing the references from "certifying authority" to "official with statutory authority" in N.1.2., N.3.2.1., N.3.3., UR.1.2., UR.3.2., UR.4. and the definition of certifying authority.



## Automatic Bulk-Weighing Systems

### 322 VC UR.4. System Modification

(This item was adopted as part of the consent calendar.)

**Discussion:** Last year the Committee modified the requirements for testing coupled-in-motion railway track scales, changing the reference from "certifying authority" to "official with statutory authority" to indicate clearly that the enforcement official has the authority specified in the requirements. This change will clarify the reference to "authority" in UR.4. of the Automatic Bulk-Weighing Systems Code, to be consistent with weights and measures law and will make the language consistent with the changes made to the changes adopted last year to the Scales Code.

**Recommendation:** The Committee recommends editorially changing the reference to "authority having jurisdiction over the scale" to "official with statutory authority having jurisdiction over the scale." Amend UR.4. to read:

**UR.4. System Modification.** - The weighing system shall not be modified 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 the official with statutory authority having jurisdiction over the scale.

## Liquid-Measuring Devices Code

### 330-1 VC S.1.6.5.1. Money Value Divisions, Analog

(This item was adopted as part of the consent calendar.)

**Discussion:** The original language of S.1.6.5.1. (formerly S.1.4.4.1.) stated that the money values now listed in Table 1 were maximum values. At that time, the maximum allowable variation in the money computation was limited to one-half the money-value division. The maximum allowable variation was later changed to be no greater than the specific money values stated in Table 1. As part of the editorial rewrite of the Liquid-Measuring Devices Code in 1990, the language was unintentionally changed to specify that the money values had to be the values stated in Table 1. It is proposed to return the language to its original statement that the money values shall not be greater than the values stated in Table 1.

The original language of the 1988 paragraph S.1.4.4.1. is given below for reference:

**S.1.4.4.1. Money-Value Divisions, Analog.** - The value of the graduated intervals representing money values on a computing type device with analog indications shall be as follows:

- (a) not more than 1 cent at all unit prices up to and including \$1.00 per gallon or \$0.25 per liter;
- (b) not more than 2 cents at unit prices greater than \$1.00 per gallon or \$0.25 per liter up to and including \$3.00 per gallon or \$0.75 per liter;
- (c) not more than 5 cents at all unit prices greater than \$3.00 per gallon or \$0.75 per liter.

**Recommendation:** The Committee recommends editorially amending S.1.6.5.1. to indicate that the money values listed in Table 1 are maximum values for the stated unit prices, rather than specific values. It is recommended that paragraph S.1.6.5.1. read:



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

330-2 VC **S.1.6.5.4. Selection of Unit Price**

(This item was adopted as part of the consent calendar.)

**Discussion:** Some truck stops offer diesel fuel at as many as 18 different unit prices. The dispensers currently available for these installations permit the user to select one of two unit prices; primarily for either cash or credit. Paragraph S.1.6.5.4. was added in 1989 to require customer-activated controls on the dispenser to ensure that the customer or device user is aware of the unit price at which the dispenser will compute. The variety of unit prices at truck stops was not specifically considered when this issue was reviewed. Currently available dispensers are unable to offer a choice of more than two unit prices from one dispenser.

Although the effective date of S.1.6.5.4. was delayed to January 1, 1991, to allow time for pump manufacturers to incorporate the necessary changes into production, device manufacturers did not realize the need for user-activated controls to select from more than two unit prices. Since there does not appear to be a strong demand for user-activated controls on dispensers installed at truck stops and since equipment does not have the capability to provide this feature, it seems practical to exempt truck stops from the requirements of S.1.6.5.4.

This exemption is intended to apply only to those dispensers used exclusively for truck refueling. If dispensers at truck stops are used to refuel both cars and trucks, then user-operated controls to select the unit price are needed on the dispensers.

**Recommendation:** The Committee recommends that S.1.6.5.4. be amended as shown below to exempt dispensers used exclusively for truck refueling from the requirement for customer-activated controls to select the unit price:

*S.1.6.5.4. Selection of Unit Price.- Except for dispensers used exclusively for 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 using controls on the device or other user-activated controls.*

*(Effective and nonretroactive as of January 1, 1991)*

330-3 VC **S.2.2. Provision for Sealing Measuring Elements**

(This item was adopted as part of the consent calendar.)

**Discussion:** The General Code paragraph G-S.8. allows a data audit trail to be used as a security seal. However, the specifications of a specific code supersede those of the General Code. Since paragraph S.2.2. of the Liquid-Measuring Devices (LMD) Code requires measuring elements to have provision for sealing with a security seal, it could be interpreted that a physical security seal on the adjustment mechanism is the only method of sealing liquid-measuring devices. However, electronic audit trails are also considered appropriate for liquid-measuring devices.

The capability for electronic adjustment of vehicle-tank meters and loading-rack meters has existed for a number of years and may be extended to measuring devices covered by the LMD Code. This electronic capability is likely to be located apart from the measuring element of the device. Manufacturers may wish to utilize an electronic audit trail as a method of sealing this electronic adjustment, rather than using a physical security seal. The Committee recommends that S.2.2. be amended to explicitly recognize the possible use of audit trails.

Paragraph S.2.2. falls under the subsection for measuring elements. The Committee emphasizes that the amendment to S.2.2. does not exclude the use of audit trails for other types of electronic adjustments covered by G-S.8. of the General Code. Paragraph G-S.8. still applies to all other electronic adjustments on devices covered by the LMD Code. The change to S.2.2. assures that an electronic audit trail is available for use for adjustments to the measuring elements of devices covered by the LMD Code.

**Recommendation:** The Committee recommends S.2.2. be amended to read:

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

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

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

330-4            VC            **S.3.4. Discharge Lines and Valves; Exceptions**

(This item was adopted as part of the consent calendar.)

**Discussion:** The size of meters and discharge outlets used in dispensers at truck stops has been increasing over the years. Dispensers with discharge outlets of 1-1/2 inches are not unusual. As currently worded, dispensers at truck stops that have a discharge outlet of 1-1/2 inches are exempt from S.3.2. Multiple Delivery Outlets and S.3.3. Fueling of Trucks. These dispensers should be subject to the requirements of S.3.2. and S.3.3.

**Recommendation:** To clarify the language in S.3.1., S.3.2., S.3.3. and S.3.4. without changing the intent of the requirements, the Committee recommends rewording as follows:

**S.3.1. Diversion Prohibited.** - It shall not be possible to divert any measured liquid from the measuring chamber of the meter or its discharge line.

Two or more delivery outlets may be installed only if automatic means are provided to ensure that:

- (a) liquid can flow from only one outlet at a time, and
- (b) the direction of flow for which the mechanism may be set at any time is clearly and conspicuously indicated.

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

- (a) truck refueling devices when diversion of flow to other than the receiving vehicle cannot readily be accomplished and is readily apparent. Allowable deterrents include, but are not limited to, physical barriers to adjacent driveways, visible valves, or lighting systems that indicate which outlets are in operation, and explanatory signs;
- (b) other devices when all discharge outlets designed to operate simultaneously are 1-1/2 inches in diameter or larger.

The present paragraphs S.3.5. through S.3.9. will be renumbered as S.3.3. through S.3.7.

330-5            V            **S.4.5. NTEP Certificate of Conformance Number**

(This voting item failed.)

**Discussion:** An increasing number of States require that devices have NTEP Certificates of Conformance before they are placed into commercial service. It has been proposed that devices be marked with the number of the NTEP Certificate of Conformance issued to them. This would assist the field inspector to determine the NTEP status

a device and would readily identify to potential purchasers those devices that have received an NTEP certificate. Fairness in competition would be promoted among device manufacturers since the marking requirement would tend to force manufacturers to undergo NTEP evaluation, particularly in those jurisdictions that require an NTEP certificate before devices may be used commercially.

A number of manufacturers have opposed placing the NTEP Certificate of Conformance number on devices on the bases that:

1. It will create an administrative problem for the industry in the production process.
2. The marking will have limited benefit since each device must be checked for consistency with the Certificate of Conformance and for suitability of equipment.
3. The Certificate of Conformance marking by itself does not assure that a device meets all the requirements of Handbook 44 or that it is suitable for the application for which it has been installed.
4. The delays in obtaining a type evaluation can interfere with the marketing of a device.

The S&T Committee agrees with the device manufacturers and has concluded that the primary interest of weights and measures officials is that devices designed to comply with Handbook 44 be marked in a manner that identifies them as "Legal for Trade." Consequently, the S&T Committee recommends that models of specific types of scales and liquid-measuring devices that have received NTEP Certificates of Conformance be marked with the NTEP logo. The marking of the Certificate of Conformance number is not required, but the clearly identified Certificate number is an acceptable alternative to the marking of the NTEP logo. If a manufacturer chooses to mark the NTEP Certificate number on devices, to simplify the marking and reduce the administrative burden of maintaining the correct Certificate number on a device, the Certificate number may be marked without the suffixes that identify that the Certificate is either an addendum, a Provisional Certificate, or a Pre-NTEP Certificate. The statement of the requirement indicates that the NTEP logo must be placed only on those devices that have received an NTEP certificate, but the NTEP marking does not mandate an NTEP evaluation on all devices. The marking of the NTEP logo will assist the enforcement official in the determination of whether or not a device has received an NTEP certificate. Furthermore, the logo will constitute a positive statement by the manufacturer that the device has been evaluated and found to comply with Handbook 44.

The marking of the NTEP certificate number will not eliminate the need for the weights and measures official to inspect a device thoroughly. In addition to checking the performance, the weights and measures official will still have to determine if the devices installed in the field are consistent with the device identified in the Certificate of Conformance. The device must be inspected to determine that it is the correct model as listed on the Certificate of Conformance, and that its features were evaluated in the type evaluation. The inspector must still determine if the device features, division value, accuracy, and other characteristics are suitable for the application. Even if a device has a Certificate of Conformance, new production devices must comply with any new or amended requirements of Handbook 44 when the date of manufacture is after the effective date of the new requirement. The inspector must also verify that the device has not been modified from the original design.

In the case of software packages that receive an NTEP Certificate of Conformance for use in devices for those applications proposed to be marked with the NTEP logo, the software must state either "NTEP Evaluated" or display the NTEP logo on the same screen that displays the software name. The software name must be displayable at some time for weights and measures officials to verify the package of software being run. The display of this information may be part of the boot-up operation or shown on a menu screen that can be called up on the display.

**Recommendation:** The Committee recommends that a new paragraph be added to the LMD Code to require certain types of devices that have received an NTEP Certificate of Conformance to be marked with the NTEP logo or the NTEP Certificate of Conformance number. (See Item 320-4 for the equivalent requirement as it applies to scales.)

The Committee recommends adding a new paragraph S.4.5. to read:

*S.4.5. NTEP Marking. - If a retail motor fuel dispenser, loading rack meter, measuring element, or service station console has received an NTEP Certificate of Conformance, the NTEP logo or the NTEP Certificate number shall be marked on the device.*



[Nonretroactive as of January 1, 1992]

330-6 VC N.4.1. Normal Tests; Tolerance Application

(This item was adopted as part of the consent calendar.)

**Discussion:** The rated maximum flow rate for a meter is the maximum flow rate for which the manufacturer designed the device. This rate is marked on wholesale meters and retail devices with maximum discharge rates of 25 gallons per minute or more, but may not be marked on other retail devices. The maximum discharge rate is the maximum flow rate that can be generated under the conditions of a specific installation. The maximum discharge rate is normally less than the rated maximum flow rate and shall not exceed the rated maximum flow rate. The rated minimum flow rate is the minimum flow rate marked on wholesale meters and retail devices with maximum discharge rates of 25 gallons per minute or more. On other retail devices, the rated minimum flow rate is the minimum flow rate marked on the device or the minimum discharge rate at which the device will deliver when equipped with an automatic discharge nozzle set at its lowest setting (N.4.2.2.)

The maximum discharge flow rate achieved by a meter in an actual installation is often less than the rated maximum flow rate established by the manufacturer. For example, a meter marked with a maximum flow rate of 100 gallons per minute (gpm) may achieve a maximum flow rate of only 60 gpm in an actual installation. Paragraph N.4.1. specifies that a test at the maximum discharge flow rate achieved at an installation is considered the "normal" operating condition, hence the tolerance for the normal test is applied. Paragraph N.4.2. and its subparagraphs specify the flow rates at which "special" tests are conducted. For tests conducted at other flow rates, the tolerance to be applied is not clear. This is particularly true in type evaluation testing.

The Measuring Sector of the Technical Committee on National Type Evaluation discussed this issue. They concluded that it is appropriate to apply the normal test tolerance from the maximum discharge flow rate for an installation to a flow rate equal to one-half of the sum of the maximum discharge flow rate plus the minimum flow rate for the meter. The Measuring Sector also concluded that a meter used in an installation that has a maximum flow rate less than 60 percent of the rated maximum flow rate of the meter is not suitable for the installation.

An example to compute the flow rates to which the normal test tolerance applies is given below.

Rated maximum flow rate = 100 gpm  
Rated minimum flow rate = 20 gpm  
Maximum discharge flow rate for the installation = 80 gpm

$$\begin{aligned}\text{Lowest normal test flow rate} &= \frac{\text{Maximum discharge rate} + \text{Minimum rated flow rate}}{2} \\ \text{Lowest normal test flow rate} &= \frac{80 + 20}{2} = 50 \text{ gpm}\end{aligned}$$

**Recommendation:** To clarify the flow rates at which the tolerances for the normal test apply, the Committee recommends amending N.4.1. to read:

**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.

330-7 I T.2.4. Tolerances for Lubricating Oil Meters

**Discussion:** Meters are being used to measure lubricating oil and other automotive liquids in quantities ranging from a few fluid ounces to several quarts. The LMD Code tolerances for retail devices are too large when quantities less



than 1 gallon are delivered. It is necessary to establish appropriate tolerances for lubricating oil meters over the range of measurements for which these devices are used.

The types of fluids to which these tolerances apply may include such products as transmission fluid, power brake fluid, antifreeze fluid, and any other automotive fluids that may be delivered directly into an automobile. Because the measured quantities may be relatively small, the uncertainties associated with the test of the meter are a relatively large percentage of the measured quantity. The test procedures used to check these meters will consist of deliveries into a metal volume standard, a glass flask, a graduated cylinder, or a gravimetric procedure. The tolerance applied to the device must be large enough so the uncertainty of the standards and the test procedures do not become a significant part of the tolerance.

The Committee reviewed the tolerances contained in the OIML Second Preliminary Draft, "Measuring Assemblies for Liquids Other than Water" and the LMB tolerances for lubricating oil meters. The OIML equivalent of an acceptance tolerance is 0.3 percent for one liquid at one flow rate for test drafts greater than 2 liters. A table comparing the values is below.

Test Draft Quantity, Q, in Liters	Acceptance Tolerance				Maintenance Tolerance			
	OIML		LMB		OIML		LMB	
	ml	%*	ml	%*	ml	%*	ml	%*
$Q \leq 0.1$	1.2	1.2	2.0	2.0	2	2	4	4.0
$0.1 < Q \leq 0.2$	2.4	1.2	2.5	1.25	4	2	5	2.5
$0.2 < Q \leq 0.4$ (0.5 for LMB)	2.4	0.6	6	1.2	4	1.0	12	2.4
$0.4 (0.5) < Q \leq 1$	6	0.6	10	1.0	10	1.0	20	2.0
$1 < Q \leq 2$	6	0.3	15	0.75	10	0.5	30	1.5
$2 < Q \leq 5$	0.3%Q	0.3	30	0.6	25	0.5	60	1.2
$5 < Q \leq 10$	0.3%Q	0.3	40	0.4	50	0.5	80	0.8
$Q > 10$	0.3%Q	0.3	0.25%Q	0.25	0.5%Q	0.5	0.5%Q	0.5

Percent is based upon the largest test draft in the range.

The Committee recommends establishing separate tolerances for lubricating oil meters. Because of the relatively large tolerances associated with the test procedure for lubricating oil meters and the difficulty in handling the product, the committee decided to recommend the LMB tolerances for test drafts through 10 liters. The OIML acceptance tolerance is used for test drafts greater than 10 liters. The OIML and LMB maintenance tolerances are the same. Test drafts and tolerances for the inch-pound measurement units were selected to be round numbers with general correlation to the metric values. The tolerances are to be applied to any meters measuring automotive fluids.

Based upon the recommended table, any test drafts smaller than 100 ml or 0.2 pint would have a very large tolerance. Consequently, it is advisable to set the smallest test draft equal to 100 ml or 0.2 pint.

**Recommendation:** To facilitate discussion of this item over the next year, the Committee is considering proposing adoption in 1992 the following new paragraph T.2.4. and a new Table T.2.4. with tolerances for lubricating oil and automotive fluid meters.

**T.2.4. Meters for Measuring Lubricating Oil and Automotive Fluids.** - The tolerances for meters used to measure lubricating oil and other automotive fluids shall be those given in Table T.2.4.

Table T.2.4. Tolerances for Lubricating Oil and Automotive Fluid Meters

Test Draft Quantity, Q	Acceptance Tolerance (fl dr)	Maintenance Tolerance (fl dr)	Test Draft Quantity, Q, (Liters)	Acceptance Tolerance (ml)	Maintenance Tolerance (ml)
$Q \leq 0.2 \text{ pt}$	0.5	1.0	$Q \leq 0.1$	2	3
$0.2 \text{ pt} < Q \leq 0.4 \text{ pt}$	0.6	1.0	$0.1 < Q \leq 0.2$	2.5	5
$0.4 < Q \leq 1 \text{ pt}$	1.5	3	$0.2 < Q \leq 0.5$	6	30
$1 \text{ pt} < Q \leq 1 \text{ qt}$	0.5	5	$0.5 < Q \leq 1$	10	20
$1 \text{ qt} < Q \leq 2 \text{ qt}$	6	8	$1 < Q \leq 2$	15	30
$2 \text{ qt} < Q \leq 1 \text{ gal}$	6	12	$2 < Q \leq 5$	30	30
$1 \text{ gal} < Q \leq 2 \text{ gal}$	8	16	$5 < Q \leq 10$	40	80
$Q > 2 \text{ gal}$	0.3% of the test draft	0.5% of the test draft	$Q > 10$	0.3% of the test draft	0.5% of the test draft

330-8A

I

#### UR.1.X. Selection Requirements; Suitability of Equipment

**Discussion:** The suitability of equipment is critical for device manufacturers, device users, and the enforcement official. There appears to be considerable support among weights and measures officials to establish more definite criteria on the suitability of equipment for various applications in order to minimize user and enforcement problems. Although objections have been expressed about putting a suitability of equipment table in Handbook 44, it appears that most weights and measures officials want it.

This issue developed out of the request to clarify the definitions of retail and wholesale devices, because meters that had been used in one application were beginning to appear in the other. Larger capacity meters are used in retail motor-fuel dispensers, and the same meter may be used as a vehicle-tank meter and in some loading-rack meter applications. Generally, any device may be used in a specific application provided that it satisfies the accuracy and the value of the quantity division requirements.

The Committee recommends the addition of a new table to the User Requirements of the LMD Code containing those applications which the Committee believes are non-controversial or already specified in Handbook 44. The Committee expects that this table will be expanded in the future.

This table is proposed as a nonretroactive user requirement. If a weights and measures jurisdiction has accepted currently installed devices with quantity divisions larger than those in the table and consider them acceptable, this table will not change their acceptability. Exceptions to this table for specific installations with special circumstances is at the discretion of the jurisdiction with regulatory authority over the device.

This table establishes the suitability of liquid-measuring devices for specific applications based upon the quantity delivered, the value of the quantity division, and the accuracy customarily required for these applications. The categories of devices for the table and the values defining the suitability of the device are, in many cases, based on existing requirements in the LMD Code.

**Recommendation:** Based upon the comments received, the Committee decided to make this an informational table. The Committee recommends the continued development of the following for consideration next year.

UR.1.2. *Suitability of Equipment.* - In addition to G-UR.1.1., equipment installed in the applications or used to measure the commodities listed in Table UR.1.2. shall comply with the parameters listed in Table UR.1.2. to be suitable for the application.

[Nonretroactive as of January 1, 1992]

Table UR.1.2. *Suitability of Equipment Criteria for Liquid-Measuring Devices*

Application or Commodity		Deliveries	Maximum Division Value ( $d_{max}$ )	Minimum Delivery	Accuracy Required
Motor fuel	Analog	$\leq 100$ gallon	0.1 gallon	10d	0.5%
	Digital	$\leq 100$ gallon	0.01 gallon	100d	
	Analog or digital	$> 100$ gallon	0.1 gallon	500d	
Loading rack		$\leq 1000$ gallon $> 1000$ gallon	0.1 gallon 1 gallon	500d 500d	0.3%
Milk		$\leq 1000$ gallon $> 1000$ gallon	0.1 gallon 1 gallon	500d 1000d	0.2%

[Nonretroactive as of January 1, 1992]

### 30-8B I UR.1.X. Selection Requirements; Suitability of Equipment

**Discussion:** The factors to consider when determining the suitability of equipment are complex. The objectives of establishing suitability of equipment criteria are to:

- assure that purchasers obtain the proper equipment for the application;
- encourage fair competition among companies by having the applicable criteria understood by all parties so they compete under the same conditions;
- promote uniformity in the application of suitability of equipment criteria;
- reduce enforcement problems caused by placing inappropriate equipment into service where it is not suitable for the application; and
- facilitate different types of equipment to be used in different applications where the equipment accuracy and performance meets the needs of the application.

Obviously, many devices may comply with the requirements of Handbook 44, but not all such complying devices are suitable for all applications. The suitability of liquid-measuring devices for various applications depends on many factors, including device design, capacity, value of the quantity divisions, accuracy required for the application, range of deliveries measured through the meter, and the features available on the device as compared with the features needed for the application.

In many cases, device design indicates the appropriate application of a device, such as a computing scale used in delicatessens and the typical computing retail motor-fuel dispenser used in retail service stations. A trend has developed over the years where devices have crossed technology lines to be used in applications which had been the exclusive domain of a specific device-based technology. For example, scales or mass flow meters may be used to measure liquids; on-board weighing systems are recognized as acceptable for measuring cryogenic liquids; and bulk milk may be measured using scales, positive-displacement meters, or mass flow meters. As manufacturers seek new markets for their products and changing events dictate control over materials that were not measured to a significant extent in the past (e.g., recyclable material and billing according to the amount of solid wastes sent to landfills), this trend is likely to increase. The Committee believes it necessary to establish more definitive criteria for the suitability



of equipment and to have a mechanism to permit device technology to cross traditional technology lines and be used in other applications.

The following concepts should be considered to develop this issue:

1. The codes in Handbook 44 establish performance requirements (tolerances) for the device technology.
2. The "suitability of equipment" tables will establish the accuracy required for a particular commodity and (minimum) quantity. Any device, regardless of technology, may be used to measure the commodity and quantity provided that the device can meet the applicable accuracy requirement and resolution for the transaction.
3. A device should not be constrained in its application by the tolerance established in the code. If a device manufacturer has developed a device model of higher accuracy than required by the code, then it should be permitted for use in applications where tighter tolerances apply and which can be met by that device.
4. To be suitable for an application, a device must meet both the requirements of its technology (Handbook 44 code) and satisfy the accuracy and division requirements for the commodity and quantities being measured (suitability of equipment).

Certain questions must be addressed. How can a manufacturer demonstrate that a device meets a tolerance tighter than that stated in Handbook 44? Is the type evaluation of one or two devices sufficient to demonstrate that a particular family of devices can meet the tolerance? Should uniform categories of accuracy be established within each code and devices be marked with the accuracy category that they can meet? If marked with an accuracy designation (class or category), then all devices marked with a given accuracy must meet the tolerance, regardless of the product being measured. How can weights and measures officials ensure that production devices meet the specified accuracy if they cannot test the device in the field over the range of parameters that affect device performance, e.g., temperature in the case of the proposed code for mass flow meters? Mass flow meters are frequently used to measure liquids.

The similarities of scales and metering devices allow similar concepts to be applied for suitability of equipment; however, they must be modified for the unique characteristics of each type of device.

1. The capacity of a scale is limited by the measuring range of the transducer. In the case of metering devices, capacity is usually limited by the flow rate of the meter and the pressure drop across the meter for specific installations.
2. The minimum load for a scale is based primarily upon the resolution of the weight display or graduation value. The accuracy of scales marked with an accuracy class is related to the value and number of scale divisions. Consequently the value of the scale division and the minimum load are related to the scale capacity and the accuracy of the scale.

The value of the quantity division for a liquid-measuring device is usually very small relative to the total quantity measured in the transaction. The meter measures relatively small volumes on a continuous basis and sums incremental measurements. Consequently, the minimum delivery for a liquid-measuring device is often many more divisions than the minimum load established for a scale. However, the value of the quantity division remains a consideration, for if the value of the quantity division is large relative to the normal delivery for the meter, the measuring device may not have adequate resolution for the transaction. The number of divisions a measuring device is not controlled, so a device may have a small value for its volume indication, but can be used to measure very large quantities.

3. Liquid-measuring devices are considered to have a fixed error associated with the start and stop of the measurement cycle with a constant relative error associated with the steady state flow of product through the meter. The error associated with the steady state operation will vary with the rate of flow of the product and the viscosity of the product. There is usually a lower limit on the flow rate below which a meter of a particular



size will not measure within Handbook 44 requirements. The nonlinearity of a scale with respect to the load is analogous to the nonlinearity of a meter with respect to the flow rate.

### Minimum Measured Quantity (MMQ)

These points are mentioned to introduce the concept of a "minimum measured quantity" for meters. Although the minimum measured quantity may be new to weights and measures officials in the United States, it is fairly common in OIML countries. Under OIML recommendations, liquid-measuring devices must be marked with the minimum measured quantity.

The minimum measured quantity (MMQ) is declared by the device manufacturer as smallest quantity that can be measured within the accuracy specified by weights and measures requirements. The MMQ is one method for determining if a device is suitable for use in a given application. The device may not be used to measure quantities smaller than the MMQ: this is comparable to the minimum load that may be weighed on a scale. The S&T Committee is considering the MMQ concept to aid in determining the suitability of equipment for different applications. Weights and measures officials are reminded that MMQ requirements are contained in the draft code for mass flow meters.

### Tolerance for the MMQ

Handbook 44 has always specified the minimum test draft for a device. In theory, this could be considered the minimum quantity that should be measured by the device for a transaction. The minimum test draft is not used that way because retail motor-fuel dispensers are often used for transactions smaller than the typical 5-gallon test draft.

If an MMQ is defined and required in the U.S., a device must meet the accuracy requirement for that quantity. In OIML, the tolerance for the minimum measured quantity is usually twice the tolerance normally applied to the meter. The normal tolerance is usually applied to all quantities equal to and larger than twice the MMQ.

If an MMQ is declared, a tolerance must be applied to this quantity. The MMQ may be a relatively small number, so the uncertainty associated with the test process must be considered when establishing the tolerance. For purposes of discussion, a table showing some values of the MMQ and the tolerance for the MMQ is provided on the next page. The normal tolerance is applied to all deliveries for quantities equal to or greater than twice the MMQ.

### Special Accuracy Category

The performance requirements for a particular type of device are established in the particular Handbook 44 code that applies to the device. However, a device should not be constrained in its application by the tolerance established in the code. If a particular manufacturer designs a device that performs at a significantly higher level of accuracy than required by the applicable device code, the device should be permitted for measuring commodities for which the device can meet the required accuracy. In these cases, the device must meet both the requirements of its code and the suitability of equipment criteria and applicable requirements to measure the commodity.

To allow the application of this concept, a mechanism must be established whereby it can be demonstrated that a device has a level of accuracy above that required by the device code and the series of devices or the devices within the series that meet the required accuracy can be identified. The enforcement official needs assurance that devices claimed to have a higher accuracy level are indeed capable of meeting the higher accuracy when installed in field applications, instead of the device requiring extensive maintenance and adjustment to perform within the required accuracy to measure the commodity.

To allow a liquid-measuring device to be used at different levels of accuracy, one approach under consideration is to require devices to be marked with a special symbol corresponding to an accuracy level. All devices designed by the manufacturer to meet an accuracy higher than that specified in the device code would have to be marked with the accuracy category. This is similar to marking the accuracy class on scales. Consideration should be given to establishing a relatively small number of fixed categories of accuracy for the wide range of commodities that may be measured.

Table for the Suitability of Equipment for Liquid-Measuring Devices

The Committee has developed a format for a table (see page 281) that would expand on the table in Item 330-8A illustrating the concept of the MMQ and the special accuracy category. The table is presented for study and discussion to aid in the development of this issue. The table includes devices and applications from other codes to provide a better overview of the concept, but considerably more work must be done. Some of the suggested tolerances are tighter than those currently in Handbook 44: the smaller tolerances are listed for discussion purposes. Also, the values in metric units must be developed beyond those presented in the table.

The Committee has received comments for several years that the tolerances for agri-chemical meters are too large considering the cost of the commodities. This issue should be addressed in this review to determine if the tolerance for agri-chemical meters should be changed.

**330-9 VC UR.2.4. Diversion of Liquid Flow**

(This item was adopted as part of the consent calendar.)

**Discussion:** The use of physical barriers, valves, and lighting systems are installation requirements as well as restrictions placed on the device itself. To better assure that all responsible parties are aware of this, it should also be a user requirement.

**Recommendation:** The Committee recommends adding the last sentence of S.3.3. to the end of UR.2.4. to read:

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

**330-10 I UR.3.2. Unit Price and Product Identity**

**Discussion:** Some stations post various unit prices for the same product under different methods of payment or level of service as adjustments to the posted price, rather than stating the actual unit price in dollars per gallon. A proposal was made to change UR.3.2. to clearly require that all unit prices be displayed to prohibit the practice of declaring unit prices for different methods of payment or levels of service in terms of discounts from the posted price. The proposal is repeated below for reference.

Amend UR.3.2.(a)(1) to read:

UR.3.2. Unit Price and Product Identity.

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

- (1) all of the unit prices (excluding fleet sales and other price contract sales) at which the product is offered for sale; and ...

The Committee's review of this issue raised several questions about the language in UR.3.2., the proposed language and the enforcement practices of weights and measures jurisdictions. The Committee concluded that this proposal must be studied further before recommending changes. The issues the Committee would like the industry and the weights and measures associations to review are listed below.

Suitability of Equipment Criteria for Liquid-Measuring Devices

Application or Commodity	Deliveries	Maximum Division Value ( $d_{max}$ )	Minimum Delivery	Accuracy Required	Largest Value Allowed for the Minimum Measured Quantity (MMQ)	Tolerance for the MMQ %	Special Accuracy Category
Motor fuel	≤ 100 gallon	0.1 gallon or 0.01 L	10d	0.5%	0.2 gal or 1 L	1.0	0.5
	≤ 100 gallon	0.01 gallon or 0.01 L	100d	0.5%	0.2 gal or 1 L	1.0	0.5
	> 100 gallon	0.1 gallon or 0.1 L	500d	0.25%	10 gal or 50 L	0.25	0.25
	All	0.01 gallon or 0.01 L	1 gal or 5 L	1.0%	1 gal or 5 L	1.5	1.0
Loading rack	≤ 1000 gallon > 1000 gallon	0.1 gallon 1 gallon	500d 500d	0.3%	50 gal or 100 L 500 gal or 500 L	0.5	1.0
Milk	≤ 1000 gallon > 1000 gallon	0.1 gal or 0.1 L 1 gal or 1 L	500d 1000d	0.2%	50 gal or 100 L 1000 g or 4000 L	0.2	0.2
Home heating oil	All	0.1 gal or 0.1 L	500d	0.25%	50 gal or 50 L	0.25	0.25
Inexpensive non-food liquids	> 5 gal or 50 L	0.1 gal or 1 L	50d	0.75%	5 gal or 50 L	0.5	1.0
Agri-chemicals	≤ 100 gal	0.01 gallon	500d	1%	5 gallon	1%	1.0
	100 gal ≤ Q ≤ 1000 gal	0.1 gallon	500d	1%	50 gallon	1%	
LPG and NH <sub>3</sub>	> 1000 gal	1 gallon	500d	1%	500 gallon	1%	1.0
	≤ 1000 gal > 1000 gal	0.1 gallon 1 gallon	500d 500d	1.0% 1.0%	50 gallon 500 gallon	1% 1%	



## Specifications and Tolerances Committee

1. What are the enforcement practices of the various jurisdictions? Must all unit prices be posted (displayed) on the face of the dispenser? (See Handbook 44 for the definition of the face of a dispenser.) Is there enough room on the face of a dispenser to post all unit prices?
2. Are "pump-toppers" allowed for posting the unit prices? Technically, pump-toppers do not satisfy the requirements of UR.3.2. although many jurisdictions permit their use.
3. Are pump-toppers required to state the actual unit prices for the products, or may the unit prices be stated in the form of discounts from the highest unit price at which the product is offered for sale, e.g., 4¢/gal discount for cash?
4. Are the requirements for posting the unit prices applied to truck stops which are not exempt from the pricing posting requirements? Should truck stops be exempt? Does the posting of unit prices at truck stops depend upon whether or not the sales are based upon a contract price?
5. How should this requirement be applied to unattended card-activated dispensers? In some card-activated systems, the unit price is not known at the time of product delivery.

## LPG and Anhydrous Ammonia Liquid-Measuring Devices Code

### 332-1 VC T.3. Automatic Temperature Compensating Systems

(This item was adopted as part of the consent calendar.)

**Discussion:** A performance requirement for the accuracy of automatic temperature compensating systems was added to the LMD Code in 1987 as requirement T.2.3.3. (See the S&T report, Item 330-14B, in the Report of the 7th NCWM 1987.) A similar requirement is needed for LP gas and anhydrous ammonia meters. The proposed tolerance is adjusted proportionally relative to the meter tolerances for the two types of applications. The objective is to limit the error in the automatic temperature-compensating system without conducting a separate test on the temperature probe.

The Committee recommends a tolerance of 0.5 percent for the difference between the meter error for tests with and without the automatic temperature compensating system activated. The Committee agrees with the comment from California that the originally proposed tolerance of 1.2 percent is unnecessarily large. The tolerance established in the Liquid-Measuring Devices Code is equivalent to the acceptance tolerance for normal tests; further, it is equivalent to a probe error of approximately 3 °F for gasoline and a 4 °F error for fuel oil. The original proposal of 1.2 percent for LPG is almost twice the acceptance tolerance and is equivalent to a probe error of approximately 7 °F. Setting the tolerance to 0.5 percent is equivalent to a probe error of approximately 3 °F.

The Committee received a comment that a new requirement would mandate that both temperature-compensated and uncompensated tests be conducted on the meter. It is not always necessary to conduct both tests on a meter, and the process of disconnecting and reconnecting the temperature compensator can change the meter performance of the temperature-compensated device. This last characteristic has been reported for mechanical temperature compensators. The possible change in the meter performance as a result of disconnecting the automatic temperature compensator requires that another temperature-compensated test be conducted on the meter, consuming much more time than conducting a meter test in the "as found" condition.

The Committee considered the comment, but concluded that it has no direct bearing on setting the tolerance. Paragraph N.4.1.1. specifies the test procedure for systems with automatic temperature compensators and requires both tests. Since the addition of the tolerance does not change the test procedure for these meters, the Committee recommends that the tolerance for automatic temperature-compensating systems be adopted.

**Recommendation:** The Committee recommends adding a new paragraph T.3. to read:



**T.3. 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 0.5 percent of the test draft. The results of each test shall be within the applicable acceptance or maintenance tolerance.

**32-2 VC UR.1.2. Length of Discharge Hose**

(This item was adopted as part of the consent calendar.)

**Discussion:** To establish a uniform requirement applicable to both retail motor-fuel dispensers and stationary LPG retail motor-fuel dispensers, it is recommended that the maximum length of the discharge hose be increased to 18 feet. The change will make the hose length requirement consistent with the LMD Code requirement UR.1.1.1. The addition of the word "stationary" will make the language consistent with similar changes that have been made over the past two years.

**Recommendation:** The Committee recommends amending UR.1.2. to read:

**UR.1.2. Length of Discharge Hose.** - The length of the discharge hose on a stationary motor-fuel device shall not exceed ~~15~~ **18** feet, measured from the outside of the housing of the device to the inlet end of the discharge nozzle, unless it can be demonstrated that a longer hose is essential to permit deliveries to be made to receiving vehicles or vessels. Unnecessarily remote location of a device shall not be accepted as justification for an abnormally long hose.

**Hydrocarbon Gas Vapor-Measuring Devices Code**

**33-1 VC Recognize Mass Flow Meters**

(This item was adopted as part of the consent calendar.)

**Discussion:** Several states have reported installations for and increasing use of compressed natural gas as a motor fuel, with mass flow meters used to measure this commodity. To establish requirements for these devices and to recognize the use of mass flow meters for this application, it is recommended that the Hydrocarbon Gas Vapor-Measuring Devices Code be amended to permit mass units when mass flow meters measure the vapor and to establish tolerance for these devices.

The Committee emphasizes that mass units are not to be used on vapor meters that measure on a volumetric basis. Vapor meters measuring volumetrically must still indicate the quantity in volume units.

When mass flow meters measure compressed natural gas for use as a motor fuel, the system display must have adequate resolution for the transaction. The Committee has been advised that the tank capacities for compressed natural gas range from approximately 20 to 50 lb. In principle, the resolution of the quantity division must be sufficiently small that the round-off error not represent a significant portion of the tolerance applied to the device. The proposed acceptance and maintenance tolerances for mass flow meters when measuring vapors is 1.5 percent and 3 percent, respectively. Assuming that small deliveries of compressed natural gas may be on the order of 10 lb, if the display had a resolution of 1 part in 500 parts for this delivery, the resolution would be approximately 0.1 percent (0.5d/500d is 0.01 percent). Since a manufacturer of mass flow meters reported that providing this level of resolution is not a problem, the Committee recommends that the maximum value of the quantity division for measuring hydrocarbon vapors as a retail motor fuel be set at 0.01 lb. Quantity-value divisions shall be in decimal multiples or submultiples of 1, 2, or 5.

## Specifications and Tolerances Committee

Compressed natural gas is measured at a high pressure when being transferred to the fuel tank on a vehicle. Consequently, it is necessary to exclude the measurement of hydrocarbon vapors from the pressure regulation limit of S.2.1.

**Recommendation:** The Committee recommends amending this code to recognize the use of mass flow meters to measure compressed natural gas sold outside the regulatory control of Public Service Commissions. The requirements for mass flow meters are written as separate parts of each paragraph to make it clear that mass units are to be used only with mass flow meters.

The Committee recommends the following changes to the code.

A.1. - This code applies to devices used for the measurement of hydrocarbon gas in the vapor state, such as propane, propylene, butanes, butylenes, ethane, methane, natural gas and any other hydrocarbon gas/air mix.

### S.1.1.2. Units.

- (a) A volume-measuring device shall indicate, and record if equipped to record, its deliveries in terms of cubic feet or cubic meters, or multiple or decimal subdivisions of ~~these units~~ cubic feet or cubic meters.
- (b) Deliveries through mass flow meters shall be indicated and recorded in grams, kilograms, metric tons, pounds, or tons and decimal subdivisions thereof.

### S.1.1.3. Value of Smallest Unit.

**Volume-Measuring Devices:** The value of the smallest unit of indicated delivery, and recorded delivery if the device is equipped to record, shall not exceed:

- (a) 100 cubic feet or 1 cubic meter (1,000 cubic decimeters) when the maximum rated gas capacity is less than 10,000 cubic feet per hour;
- (b) 1,000 cubic feet or 10 cubic meters when the maximum rated gas capacity is 10,000 cubic feet per hour up to but not including 60,000 cubic feet per hour;
- (c) 10,000 cubic feet or 100 cubic meters when the maximum rated gas capacity is 60,000 cubic feet per hour or more.

**Mass Flow Meters:** The maximum value of the quantity-value division shall not exceed 0.01 lb (0.01 kg) when measuring product as a retail motor fuel.

S.2.1. Pressure Regulation. - Except when measured as a retail motor fuel, the vapor should be measured at a normal gauge pressure of: ...

S.2.5. Mass Flow Meters; Density Correction. - An automatic means to determine and correct for changes in product density shall be incorporated in any mass flow metering system that is affected by changes in the density of the product being measured.

S.4.2. Discharge Rates. - A volume-measuring device shall be marked to show its rated gas capacity in cubic feet or cubic meters per hour. A mass flow meter shall be marked with its maximum and minimum flow rates in pounds or kilograms per unit of time.

N.1. Test Medium. - The device shall be tested with air or the product to be measured.

**T.2. Tolerance Values for Mass Flow Meters. - Maintenance and acceptance tolerances for mass flow meters shall be 2.0 percent and 1.5 percent, respectively.**

to exempt sales of compressed natural gas used as a motor fuel from the requirement to provide an invoice, amend R.2.2. to read:

**UR.2.2. Invoices. - A customer purchasing hydrocarbon gas measured by a vapor meter for other than motor fuel shall receive from the seller an invoice for each billing period ...**

**33-2 VC N.4.2.2. Low-Flame Test and T.1.1. Low-Flame Test**

(This item was adopted as part of the consent calendar.)

**Discussion:** When the low-flame test is conducted, a defective meter will fail to register at some point during the test. Consequently, the results of the low-flame test are either pass or fail: the meter will either continue to operate throughout the test or will stop operating and, therefore, fail. The inclusion of a tolerance value appears to be unnecessary. The Committee has been advised that replacing the tolerance with a requirement for continuous registration of the meter throughout the test will adequately identify defective meters relative to the low-flame test.

**Recommendation:** The Committee recommends deleting paragraph T.1.1. and amending N.4.2.2. to read:

**N.4.2.2. Low-Flame Test. - The device shall be tested at an extremely low-flow rate as given in Table 1. The test shall consist of passing air at a pressure of 1.5 inches water column through the meter for not less than 60 minutes. ~~The quantity of air registered by the meter shall be determined at a minimum of three approximately equal time intervals. (See T.1.1. for the performance requirement for this test.)~~ The meter shall continue to advance at the conclusion of the test period.**

**Cryogenic Liquid-Measuring Devices Code**

**4-1 VC S.2.4. Automatic Temperature or Density Compensation**

(This item was adopted as part of the consent calendar.)

**Discussion:** The Cryogenic Liquid-Measuring Devices Code provides an option for using temperature-compensated uncompensated meters. Several uncompensated meters have been found to overregister due to liquid temperatures above the temperatures intended for the delivery.

Meters rely on pressure relief valves to maintain stable and proper temperatures of liquid in storage tanks. It appears that the pressure relief valves are often set too high or fail to function, resulting in higher liquid temperatures and meter overregistration. Customers and users usually fail to detect this problem. It is therefore necessary for all cryogenic meters to be equipped with automatic temperature or density compensation systems. This requirement should apply on a retroactive basis effective January 1, 1992.

**Recommendation:** The Committee recommends amending S.2.4. on a retroactive basis to read:

**S.2.4. Automatic Temperature or Density Compensation. - ~~If a~~ A device is shall be equipped with an automatic means for adjusting the indication and/or recorded representation of the measured quantity of the product, ~~it shall to~~ indicate and/or record in terms of: kilograms or pounds; liters or gallons of liquid at the normal boiling point of the specific cryogenic product; or the equivalent cubic feet of gas at a normal temperature of 70 °F and an absolute pressure of 14.696 psia.**



334-2

VC

#### S.2.4. Automatic Temperature or Density Compensation

(This item was adopted as part of the consent calendar.)

**Background:** In the event of a failure to the temperature-compensating system, this proposal would permit temperature-compensated meters to revert automatically to indicate uncompensated volume values provided that clear indication of this condition exists. This operation will be an alternative to taking the meter out of service until repaired or until approval is obtained from the weights and measures authority to operate the meter in the uncompensated mode. However, paragraph UR.2.6.1. applies and authorization to operate in the uncompensated mode must be obtained from the weights and measures official having statutory authority.

Paragraph S.2.4. now requires that indications of volume on compensated devices be in terms of compensated volume only. Some devices revert to uncompensated indications when there is a failure in the compensator system and so clearly disclose that the indication is in uncompensated volume. This is preferable to devices which revert to displaying uncompensated volumes without disclosing that the system has failed. Both methods of operation appear to violate the current specification.

It seems reasonable to permit cryogenic liquid meters to display the uncompensated volume when due to system failure, provided that the meter display clearly indicates that the displayed and recorded quantity is the uncompensated volume and failure of the system is clearly indicated. The meter should not be permitted to display or record uncompensated volume without disclosure. Such operation would violate G-S.6. Marking Operational Control Indications, and Features.

**Recommendation:** Add a nonretroactive sentence to S.2.4. to read:

**S.2.4. Automatic Temperature or Density Compensation.** - If a device is equipped with an automatic means for adjusting the indication and/or recorded representation of the measured quantity of the product, it shall indicate and/or record in terms of: kilograms or pounds; liters or gallons of liquid at the normal boiling point of the specific cryogenic product; or the equivalent cubic feet of gas at a normal temperature of 70 °F and an absolute pressure of 14.696 psia. When a compensator system malfunctions, the indicating and recording elements may indicate and record in uncompensated volume if the mode of operation is clearly indicated, e.g., by a marked annunciator, recorded statement, or other obvious means.\*  
**[\*Nonretroactive as of January 1, 1992]**

334-3

I

#### Cryogenic Liquid-Measuring Devices

**Discussion:** A proposal to add a separate code to Handbook 44 for liquid carbon dioxide meters has been before the Committee for several years. Due to lack of resources, very little work has been done on this code.

The Committee has questioned the need for a separate code since many of the requirements for cryogenic measuring and liquid carbon dioxide meters are the same. The Committee has been advised that businesses and offices concerned with specifications and tolerances for liquid carbon dioxide (CO<sub>2</sub>) and cryogenic liquid-measuring devices are not interested in the large number of requirements that apply to devices other than those with which they are working. Separate codes would be more easily understood. Moreover, deliveries of liquid CO<sub>2</sub> require substantially different equipment than for cryogenic liquids. Companies that produce and consume these products have special facilities and personnel to work with CO<sub>2</sub> or cryogenic liquids; the same equipment and personnel do not handle both products.

In response to these comments, the Committee will review the special requirements applicable to each type of meter and ultimately offer a single code that separates within the same code the requirements for the two types of meters or else a separate code for carbon dioxide liquid-measuring devices.



## Milk Meters Code

## 35-1 VC S.3.2. Intake Hose

(This item was adopted as part of the consent calendar.)

**Discussion:** The dairy industry is very concerned that hoses withstand operating pressures; maintain the vacuum developed during use; maintain proper connections and structure during cleaning; and permit cleaning the equipment without disassembly. Optically clear hoses often fail after a few months, either due to pin holes and/or connection ends that are not suitable for cleaning in place.

It was originally proposed to amend this paragraph to require that all intake hoses comply with the requirements of the Food and Drug Administration and the U.S. Department of Agriculture regarding pressure and vacuum. The Committee does not find it necessary to restate these requirements in Handbook 44 since they are already met. Additionally, the federal requirements supersede those in Handbook 44. Instead, the Committee is concerned that the code requirement specifying the use of "clear hoses" is not appropriate and does not reflect the types of hoses used in the industry. Since no one in the industry or from the regulatory community appears to have any objection to using other than clear hoses on milk meters, the Committee believes that the obsolete requirement should be removed from the code.

**Recommendation:** The Committee recommends deleting point (d) under S.3.2. and renumbering point (e) to be point (d). The paragraph will then read:

S.3.2. Intake Hose. - The intake hose shall be:

- (a) of the dry-hose type,
- (b) adequately reinforced,
- (c) not more than 20 feet in length unless it can be demonstrated that a longer hose is essential to permit transfer from a supply tank; and
- ~~(d) sufficiently clear so product in the hose is visible, and~~
- ~~(e)~~ (d) connected to the pump at horizontal or above to permit complete drainage of the hose.

## 5-2 I UR.2.3. Ticket in Printing Device

**Discussion:** It is contended that there is a potential for fraud or error if a milk hauler must manually record the quantity of milk picked up or delivered through a milk meter. A proposal was made to require a printed receipt from every meter to ensure that there is a printed ticket for every transaction.

This proposal would have a significant impact on existing equipment and actually represents a design specification for a meter. To be consistent, a specification would have to be added to have the same effect as this user requirement. Due to the potential impact of this proposal, more information is needed to assess the ramifications. Comments are requested on the need and impact of a requirement for a printed ticket for every transaction.

## Taximeters Code

### 354-1 VC T.1.2.2. Tolerance on Average Time Interval Computed After Excluding the Initial Time Interval

(This item was adopted as part of the consent calendar.)

**Discussion:** There is a tolerance on overregistration for the initial time interval and a separate tolerance for other individual intervals, but not for the average of four successive time intervals. A non-zero tolerance for overregistration would recognize variations in production even though timing devices are targeted to have zero error. Although the electronic timing devices used in taximeters are quite accurate, errors of either overregistration or underregistration may occur. The electronic timing devices usually do not have any adjustment mechanism for accuracy, consequently the zero tolerance on overregistration is not practical. All devices, no matter how accurate, will have some overregistration or underregistration error. Moreover, the tolerance for a device must recognize the uncertainty in the test process used to test the time feature on taximeters.

See Item 354-3 in the S&T report in the Report of the 75<sup>th</sup> NCWM 1990 for background information.

**Recommendation:** The Committee recommends establishing a 0.2 second per minute tolerance for overregistration for the average time interval for the timing device on taximeters. The Committee recommends amending T.1.2.2. to read:

**T.1.2.2. On Average Time Interval Computed After Excluding the Initial Interval. - Maintenance and acceptance tolerances on the average time interval excluding the initial interval shall be as follows:**

- (a) On Overregistration: ~~0 seconds~~ 0.2 second per minute (0.33 percent)
- (b) On Underregistration: 3 seconds per minute (5 percent).

### 354-2 VC UR.4. Reinspection

(This item was adopted as part of the consent calendar.)

**Discussion:** Paragraph UR.4. requires testing by a weights and measures official of all taximeters that have been damaged or repaired in any way that might affect accuracy before they are returned to service. Taximeters are only devices that a registered service person cannot place back into service after installing, repairing, and adjusting until an official examination can be made. Although weights and measures officials may still want to be notified when any taximeters are placed back into service, the need for a mandatory reinspection is not justified.

The Committee proposes that UR.4. be deleted. This will eliminate the mandatory testing of a taximeter by weights and measures officials before being placed back into service. If a jurisdiction has a regulation permitting registered service agencies to return a device to service (such as the Uniform Regulation for the Voluntary Registration of Servicepersons and Service Agencies for Commercial Weighing and Measuring Devices), the deletion of UR.4. will have no effect on the regulation. The weights and measures official has the discretion to test taximeters after return to service either for a new installation or after repair.

**Recommendation:** The Committee recommends deleting paragraph UR.4. Reinspection.

## Grain Moisture Meters

## 56 I Establish a Type Evaluation Program for Grain Measurement Equipment

**Discussion:** Congress has passed a new U.S. Farm Bill promoting greater uniformity in commercial grain inspection. (See the Executive Committee Item 102-4.) A cooperative effort to develop standards would be beneficial to the grain industry and all parties involved. The FGIS has provided extensive information to OWM regarding its current and proposed requirements, and a proposed plan for type evaluation of this equipment.

Discussions are in progress to explore establishment of a cooperative program among the USDA Federal Grain Inspection Service (FGIS), the National Conference on Weights and Measures, and the NIST Office of Weights and Measures to develop device specifications and a type evaluation program for grain-measuring equipment. Equipment includes grain moisture meters, dockage testers, near infrared spectroscopy equipment to measure grain constituents including moisture, protein and oil), aflatoxin screening test kits, and test weight per bushel apparatus. This could result in additional codes or requirements for Handbook 44. Interested parties are encouraged to monitor the activities in this area and provide input to the Executive Committee.

## Other Items

## 60-1 V Draft Mass Flow Meters Code

(This item was adopted.)

**Discussion:** Several codes have been amended over the years to recognize that mass flow meters are acceptable devices for measuring the products covered by the separate codes. Item 333-1 proposes to amend another code to recognize these devices for measuring compressed natural gas. Adding mass flow meters to each separate code has resulted in different tolerances for mass flow meters based on the tolerances that already exist in the amended codes. A separate code for mass flow meters would consolidate the requirements for these unique devices into one reference document and standardize the applicable tolerances.

The LMB and OWM have reviewed the pre-draft international recommendation developed for the International Organization of Legal Metrology (OIML). The LMB and OWM agreed upon a tolerance for measuring liquids and general specifications for mass flow meters. The specifications and tolerances were distributed to the regional weights and measures associations as information and for review. A meeting of the OIML International Working Group held in August 1990 resulted in changes to the OIML pre-draft. These changes were reviewed by the LMB and OWM. A number of changes to the draft mass flow meter code were distributed in December 1990 to the regional weights and measures associations and have been agreed upon. The proposed Tentative Mass Flow Meters Code is contained in Appendix B to this report.

The major changes from the December draft and issues for discussion are listed below:

It was reported that the zero setting of mass flow meters is significantly affected by temperature. The effect can be as large as 0.4 percent over a temperature range of -10 to 50 °C. The change in zero has the same effect as an adjustment to the accuracy of the device. Consequently, the December draft included a "window" concept for the zero adjustment mechanism. This concept was subsequently rejected by the OIML International Working Group. A mass flow meter must be accurate over the range specified for the device without adjustment of the zero due to the effects of temperature. Hence, the temperature "window" concept has been deleted from the proposed tentative code.

The tolerance for measuring liquids is 0.3 percent acceptance and 0.5 percent maintenance.

3. The specifications and tolerances for measuring gases (vapors) as proposed in Item 333-1 have been included in the tentative code.
4. The OIML International Working Group agreed that mass flow meters should indicate in "true mass" rather than in "apparent mass." The LMB and OWM agreed to accept the OIML position as the appropriate indication of mass units. The issue is whether mass flow meter indications should essentially agree with volume indications of liquid meters when converted to true mass, or should agree with indications from a scale (apparent mass) if a product is weighed. The quantitative difference between these two indications is approximately 0.1 percent for liquids with a density near water. If true mass indications are accepted, a table with correction factors based on the density of the liquid must be used to convert scale indications into true mass values. The process of correcting the indications is not a major issue.

Air buoyancy is not a factor when measuring gases or liquids under pressure since they are delivered into a closed container: the air buoyancy effect is canceled out.

The Committee is concerned about the practicality of adopting the requirement for accuracy over a temperature range when compliance with this requirement cannot be determined through field enforcement, but only in the laboratory. The Committee will continue to study this point. The Committee may delete this requirement from the draft before presenting the code for adoption in its final form.

**Recommendation:** The Committee recommends the adoption of the Mass Flow Meters Code as a Tentative Code in Handbook 44.

The recommended Tentative Code for Mass Flow Meters is contained in Appendix B to this report. The comments and notes that appeared in the previous draft have been retained to aid in the review of the recommended code; however, the notes will be omitted when the Tentative Code appears in Handbook 44.

Manufacturers of mass flow meters, device users, and weights and measures officials are encouraged to apply the code over the next year to learn if the requirements are practical and appropriate. Based upon comments received, the following changes were made to the proposed tentative code and are reflected in Appendix B.

Paragraph S.3.5. was amended to read:

**S.3.5. Provision for Sealing.** Adequate provision shall be made for an approved means of security (e.g., data change audit trail) or physically applying security seals in such a manner that an adjustment cannot be made on any device that affects the measurement result without breaking the security seal.

The text in part (b) of S.1.2.4. was deleted and the following text added:

- (b) The maximum value of the quantity-value division for vapor-measuring devices shall not exceed (0.01 kg) 0.01 lb when measuring product as a retail motor fuel.

Paragraph N.6. was amended to read:

**N.6. Air Buoyancy Correction.** - Air buoyancy corrections are applied when measuring products into an open vessel; air buoyancy corrections are not applied when measuring product into a closed vessel. When measuring product into an open vessel, weight values from a scale shall be converted to mass values by using Table N.6.

The formula under Table N.6. was corrected to be:

$$M = \frac{0.99985 \times \rho_p}{\rho_p - 0.0012 \text{ g/cm}^3}$$



## 60-2 I Appendices B and C of Handbook 44

**Discussion:** In November 1989, the Committee received a detailed proposal from Mr. Louis Sokol to update Appendices B and C of Handbook 44 with respect to terminology and language related to the International System of measurement units. The NIST review of Appendix B, "Units and Systems of Weights and Measures: Their Origin, Development, and Present Status," revealed that much more extensive revision is needed to update the appendix regarding the International System of Units. Since a new NIST publication on the International System is in process, an update of Appendix B is not justified; hence, Appendix B will be omitted from the 1992 edition of Handbook 44.

The changes to Appendix C, "General Tables of Weights and Measures," are primarily changes to the many headings or sections and tables. The updated Appendix C is available from OWM upon request. The revised Appendix C will be included in the 1992 edition of Handbook 44 and renumbered as Appendix B.

*Editor's Note: Subsequent to the Annual Meeting, strong interest was expressed to retain Appendix B. Consequently, Appendix B has undergone revision for the International System of Measurement and will be included in the 1992 edition of Handbook 44.]*

## 60-3 I OIML Report

The following information was provided by Mr. O. K. Warnlof, Standards Management, NIST, to report on OIML activities that are of significant importance to the National Conference on Weights and Measures.

**Discussion:** The OIML schedule of activities for 1990/1991 has been extremely heavy and is expected to continue for the next several years, primarily because of "EC'92". The cooperation and interest of members of the NCWM is appreciated and your continued participation is encouraged. The following is an outline of activities since the 1990 CWM and scheduled for the calendar year 1991.

### OIML WORK PROGRAM - 1990/1991

## S5D "Dynamic Measurement of Liquids"

### RS1 "Meters With Measuring Chambers or Turbines"

2nd Pre-Draft "Combined Document" received & circulated to National Working Group (NWG) - 7/7/90  
 Meeting of NWG - 8/13-15/90, NIST, Gaithersburg, MD  
 Comments on 2nd Pre-Draft due Reporting Secretariat (RS) - 8/90  
 Meeting of International Working Group (IWG) - 10/24-26/90, NIST Gaithersburg, MD  
 Comments on Self-Service Equipment to Co-Reporting Secretariats - 12/31/90  
 Meeting of Self-Service Ad-hoc group - 3/91, Italy  
 3rd Pre-Draft Combined Document to be circulated - 6-7/91  
 Meeting of IWG - 10/91, Paris  
 Meeting of self-service Ad-hoc group held (5/13/91) Florence, Italy

### RS3 "Water Meters"

Meeting of IWG on 2nd Pre-Draft Revision International Recommendation (R) 49 scheduled for late 1991.

### RS6 "Electronic Devices"

Draft IR accepted by RS & PS (U.S. voted "no") - 1/1/90  
 Draft will not be published because of "EC'92."

**RS7 "Methods & Devices for Verification" & RS9 "Vortex Meters"**

Meeting of IWG held on 11/6-10/89, Japan on:

- (a) 2nd Pre-Draft "Test Procedures, Gas Pumps"
- (b) 2nd Pre-Draft "Pipe Provers"
- (c) 1st Pre-Draft "Vortex Meters"

Comments received from - (a), API, Gilbarco; (b) & (c), NIST

Comments sent to RS - 11/14/89

Note: The results of this meeting have not been distributed.

Reporting Secretariat provided the 3rd Pre-Draft IR Test Procedures, Gas Pumps and 3rd Pre-Draft IR Pipe Provers and circulated to NWG for comment (8/30/91)

IWG Meeting (3rd Pre-Draft referenced above), Tokyo, Japan, 11/25-27/91

**RS10 "Direct Mass Flow Meters"**

2nd Pre-Draft circulated to IWG 3/22/90 for comment by 8/1/90

Meeting of NWG - 8/15-16/90 NIST, Gaithersburg, MD to review comments received.

Meeting of IWG - 10/22-23/90 NIST, Gaithersburg MD

Meeting of NWG - 1/17-18/91, Hyatt Hotel, Washington, D.C., to finalize the 3rd Pre-Draft 3rd Pre-Draft to be circulated to IWG - 2/91

Meeting of IWG - 5/13-15/91, NWML, U.K.

Results of IWG Meeting 1st Draft IR

Ballot on 1st Draft IR to PS IWG 6/12/91

Response due 9/27/91

**PS5S "Static Measurement of Liquids"**

**RS12 "Static Direct Mass Measurement of Quantities of Liquids"**

Meeting of IWG on 2nd Pre-Draft IR - 5/16-17/91, NWML, Teddington U.K.

**PS6 "Measurement of Gas"**

**RS4 "Measurement of Hydrocarbon Gases Distributed by Pipe-Line"**

2nd Pre-Draft IR circulated to NWG - 8/8/89.

Comments due to RS - 9/15/89; delay requested.

Comments received from AGA & API, 10/3/89; sent to RS on 10/10/89.

**PS7 "Measurement of Mass"**

**RS2 "General Problems. Electronic Devices"**

IWG Meeting - 7/16-18/90, NIST, Gaithersburg, MD, to discuss revision of R74

R74 Revision - Circulated to PS IWG for vote - 9/7/90

R74 Revision Vote Results: yes - 4, no - 3, abstain - 1.

Vote on 3 V/m versus 1 V/m from 500-1000 MHz: 3 V/m - 6, 1 V/m - 1, abstain - 1.

Reporting Secretariat's response to comments and re-vote request to the International Working Group (5/8/91). Response due 8/16/91.

**RS4 "Non-Automatic Weighing Instruments"**

IWG Special Meeting on 3rd Pre-Draft Rev. - 8/27-29/90, Cologne.

NWG Meeting - 12/5-7/90, NIST, Gaithersburg, to develop comments on 3rd Pre-Draft Rev. R76.

IWG Meeting - 1/28-2/1/91, PTB, Braunschweig, to discuss 3rd Pre-Draft Revision R76.

PS7 IWG Meeting - 2/1/91, PTB, to act on any decisions made during RS meeting.

R76 Revision will be provided to the National Working Group (NWG) for vote by 5/17/91.

U.S. "YES" vote on R76 revision along with comments on humidity test sent 6/7/91.

The NCWM was represented by J. Truex, Chairman of the S & T Committee, and five other representatives of scale manufacturers at the meetings in Braunschweig.

#### **RS5 "Automatic Weighing Instruments"**

1st Draft IR "Hopper Scales" & Draft IR "Railroad Track Scales" being editorially revised to reflect the revision of R74.

3rd Pre-Draft Revision R61 "Gravimetric Filling Instruments" - circulated to NWG 11/21/90.

4th Pre-Draft Revision R50 "Belt Weighers"- circulated to NWG 1/7/91.

NWG Meeting - 3/20-21/91, NIST, Gaithersburg MD to review succeeding Draft Documents on Belt Weighers, Catchweighers, etc.

IWG Meeting - 5/20-24/91. NWML, U.K. - to discuss succeeding Draft Documents.

Results of the International Working Group (IWG) meeting:

1st Draft Revision R50 Belt Weighers accepted.

4th Pre-Draft Revision R61, Gravimetric Filling Instruments (to be circulated by fall 1991)

2nd Pre-Draft Revision R51, Catchweighers (to be circulated by fall 1991)

IWG Meeting, February, 1992, NWML, U.K. - to discuss draft document revisions R51 and R61.

#### **RS8 "Load Cells"**

Revised R60 voted on by CIML at meeting in Paris, 10/90.

Revision accepted with 1 dissenting vote (Germany).

Test procedures and report forms needed for Certificate System.

#### **PS8 "Weights"**

Revised Combined Document received from Belgium 6/20/90, circulated to NWG for comment 6/22/90.

IWG Meeting - Combined Document on Weights - NIST, 7/19/90

4th Pre-Draft & meeting minutes circulated to NWG for comment - 11/6/90

One comment received and sent - 1/8/91

1st Draft IR received 4/17/91 and circulated to NWG for comment by 6/28/91

1st Draft IR U.S. vote by 7/1/91

Truex, Ohio, Chairman

. Carroll, Massachusetts

. Helmick, Arizona

. Jeffries, Florida

. Suiter, Nebraska

. Marceau, Legal Metrology Branch Canada, Technical Advisor

. Oppermann, NIST, Technical Advisor

#### **Specifications and Tolerances Committee**

## Appendix A

### Testing Large Capacity Platform Scales Reflecting 1989 and 1990 Changes to NIST Handbook 44

by

Ross J. Andersen, Metrologist  
New York State Bureau of Weights and Measures

Several changes to NIST Handbook 44[1] in the 1989 and 1990 editions significantly affect the testing of large capacity platform scales. These changes were the product of a study of how vehicle scales are used, how they are rated, and how they should be tested[2][3]. This paper is intended as a aid to understanding the changes and the practical application of the prescribed tests.

The first change redefined the capacity ratings of vehicle scales to link the nominal capacity and the concentrated load capacity (CLC) (see Scale Code par. S.6.1.) The concentrated load capacity is a new term that is somewhat similar to the section capacity in older versions of the handbook. This change is intended to correct a problem with misrepresenting the weighing capabilities of Class III L scales. In the second change, the shift test (formerly section test) was redefined in paragraph N.1.3.4. to reflect the change from section capacity to CLC. The objective is to clearly require a scale to be accurate whenever loads up to the CLC are placed on the weighbridge in a configuration typical of the vehicles to be weighed. The change clarifies the proper application of the test loads applied in a shift test to produce a better test and prevent inappropriate loading of the scale.

The third change specified the minimum increasing-load test of a Class III L scale (see Scale Code par. N.3. and Table 4). This change called for two tests over two different ranges equal to 25 percent of the scale capacity. This was a significant addition to Handbook 44 in regard to testing these scales since the standard reference was NIST Handbook 94, which is now out of print[4]. Furthermore, the changes go beyond the procedures in Handbook 94 to define how the scale should be loaded during the tests.

### Load Application

When a tractor-trailer is on a vehicle scale, it may appear that the load is distributed across the scale. The scale, however, senses only the load concentrations at the treads of the tires. A typical tractor-trailer has 18 tires on five axles, usually in groups of one, two, or three axles spaced 4 to 5 feet apart on center. Thus a two-axle group applies load to the scale over an area formed by approximately four feet in length by the width of the scale. A truck places no load directly on the center 2 feet of the deck along the longitudinal axis since the tires do not touch that area.

The Federal and State departments of transportation (DOT) have defined maximums that each axle may legally carry on the highway in a formula called the "Bridge Formula" [5]. This formula relates the permissible gross and axle load to the number and spacing of the axle groups. The DOT regulations attempt to limit highway loads to prevent overloading the roadbeds and bridges. Although this does not directly affect weights and measures, the bridge formula parallels the design and use of the vehicle scale, and the official test must duplicate the use of the device of the device as closely as possible.

To reflect the method of use, Handbook 44 has defined a test pattern consisting of an area, at least 4 feet long extending across the scale deck (N.1.3.4.). This test pattern is used to load the scale during the official tests and must not be loaded above the rated CLC. If a very large load is to be carried on a vehicle, the common solution is to add an axle to spread out the load. When applying loads greater than the CLC, Handbook 44 specifies that the additional load be concentrated on other test pattern areas consistent with the method of use. To test the scale to its full capacity, it will be necessary to load several different test patterns to avoid overloading any one pattern. Multiple patterns may be loaded to the CLC consistent with the axle configurations of the trucks intended to be weighed. The test will parallel the way the scale is used.

Figure 1. Test patterns for a 60' x 10' scale with three (3) sections.



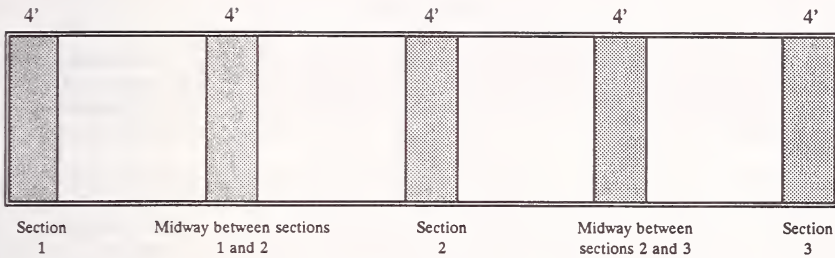
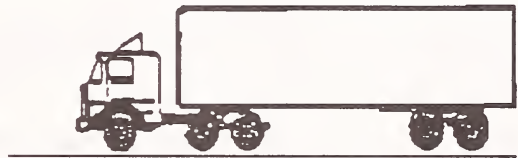


Figure 2. Typical loading of a vehicle scale.



30-foot truck with three axles



60-foot truck with 5 axles

When conducting the shift test (N.1.3.4.), the two required test loads may be loaded in a test pattern anywhere on the deck. Generally this means applying the shift test loads at the sections and at the mid-span between sections. Loading at the sections tests for proper adjustment of the levers or load cells in each section. Loading at mid-span tests for performance changes due to deflection in the deck supports, since the mid-span is the weakest point in the deck.

The tolerances on the shift test are applied in two ways. First, when using known test loads, every reading must be within the applicable acceptance or maintenance tolerance. Second, as required in T.N.4.4., the readings obtained during the shift test must agree within the absolute value of the maintenance tolerance. Stated another way, the difference between the highest and the lowest reading must not be more than the maintenance tolerance for that load.

When loading the test pattern with weights (without a weight cart), the test pattern can readily accept 54 1,000-pound weights. These may be placed on the deck in two stacks, each three high by three deep by three across. It is permissible to load the center 2 feet of the deck with weights since the load concentrations (in pounds per square inch) are not very high. In routine enforcement tests, it is very unusual to have such a large amount of test weight available.

When using weight carts, the official must be aware of the load concentrations on the solid rubber wheels. The more recent designs of weight carts use wide wheel spacings and soft rubber to reduce the concentrations on the deck, since more closely resemble the loads generated by highway vehicles. Four-wheel carts with loads up to 30,000 lb and six-wheel carts with loads up to 40,000 lb are in use in many States. Due to the design of many weighbridges, the wheels of the cart should in no case be placed in the center 2 feet of the deck. If two carts are used, one on each side of center, then care must be exercised to prevent unbalanced loading. Load the first cart to no more than 1/4 CLC, load the second cart, then finish loading the first cart.

Large load concentrations are also an issue when using test trucks with special hydraulic jacks to perform shift tests. The jacks, located between the front and back axles, lift the front wheels off the ground and concentrate the load in a small area between the rear wheels and the jacks. The loading surfaces of the jacks must be large enough to minimize the load concentrations (usually less than 100 lb/in<sup>2</sup>). If the load supported by the two jacks is 20,000 lb then the area of the load surfaces should be at least 200 in<sup>2</sup> (e.g., each jack has a base plate of 10 x 10 in). Supporting the same load on jacks with 4-inch-round base plates would result in load concentrations in excess of 800 lb/in<sup>2</sup>.

## Standards

Suitable standards are the key to a meaningful test, Table 4 of the Scales Code provides the weights and measures official with a very good guide as to the suitability of a given capacity scale. With large capacity scales, it is highly unusual to have test weights equivalent to the scale capacity. Handbook 44 therefore differentiates between test weights and test loads.

The term "test weights" refers to calibrated standards which meet specified accuracy criteria. The test weights should have valid calibration reports from a certified State laboratory attesting to their accuracy and their traceability to the national standards. For scales with capacities over 1,000 lb and up to 40,000 lb, test weights equivalent to 25 percent of scale capacity should be available, and for larger scales, equivalent to 12.5 percent of capacity. Test weights are usually cast iron blocks that conform to Class F specifications and tolerances [6]. The tolerances for Class F weight over 2 pounds are 0.01 percent, or 1 part in 10,000. This is at least 10 times better than the acceptance tolerance for Class III L scales.

Weight carts generally do not meet the specifications for Class F weights, but can be maintained to be accurate within 1 or 2 pounds. This is within 1/3 of the smallest tolerance applied to most Class III L scales and, therefore, make the carts suitable for use as test weights for these scales. Periodic recalibration and proper maintenance will assure that the weight cart remains sufficiently accurate.

The term "test load" used in Table 4 refers to other material, such as trucks, skidloaders, etc, which is placed on the platform during the test. These test loads allow the official to test the scale to capacities beyond the available test weights. The test loads are used either as strain loads, as substitution loads, or as a combination of both. The official must be aware of the differences and the proper application of tolerances in each case.

### The Increasing Load Test

The increasing load test measures the performance of the scale when loads of increasing size are placed on the weighing platform. Table 4 specifies the minimum test loads that should be applied during this test. A note in Table 4 specifies that a minimum test of a Class III L scale should consist of one test from zero to at least 25 percent of the scale capacity, then one strain load test up to the used capacity of the scale. The used capacity is based on the largest loads commercially weighed on the device.

The test weights available to perform these tests often dictates the use of substitution and/or strain load testing, test procedures have been used for many years, often incorrectly. The test procedures at the end of this document attempt to describe the tests as they apply to current technology and test equipment.

The substitution test method extends the test beyond the available test weights. In a substitution test, the substitution load replaces test weights in a range of the scale that has been already tested so that the error is known.<sup>1</sup> A correction is made for any error in the scale at that point based on a previous test using the test weights. Thus the substitution load has a known value and is included with the test weights in the application of tolerances. The substitution procedure may be used as part of a test that starts at zero and as part of a strain-load test.

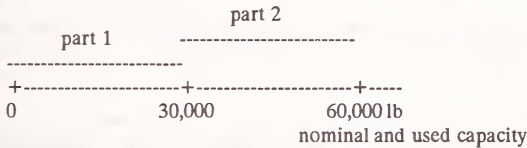
The strain-load test uses an unknown load to establish a new reference point upscale from zero and beyond the calibrated range of the scale. This is one method of extending the test beyond the available test weights. The error in the scale at the strain-load reference point is unknown, hence must be thought of as the starting point for the test. When test weights are applied, the only comparison can be the change from the strain-load reference point; this is the basis for tolerance application. Tolerances are applied only to the change from the strain-load reference base on the known test loads applied.

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<sup>1</sup>To be accurate, the scale error should be determined at the precise load at which the substitution of weight will occur. This is more critical when testing dial and beam scales, where the geometry of graduations, notches, and rack and pinion gears may affect the scale error. The precise substitution of weight on a digital, load-cell scale is not as critical since the output is a smooth continuous function.

The major difference between the strain-load and substitution tests is the untested range of the scale in the former. The following examples provide a schematic of the proper application of the two types of tests. Test weights smaller than one scale division, typically to 1/4 or 1/10 d, should be used to determine scale errors and reference points within scale divisions whenever substitution and strain load tests are conducted.

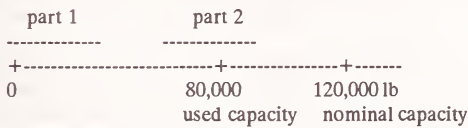
**Example 1.** Test of a 30-foot scale (60,000 x 20 lb) using Procedure 1 and using the substitution option and 30,000 lb of test weights (50 percent of scale capacity). The test truck (approximately 28,000 lb) will be used as the substitution load.



part 1 - The test weights are applied beginning at zero.

part 2 - The test truck is substituted for the test weights and then the weights are reapplied to reach both used and nominal capacity.

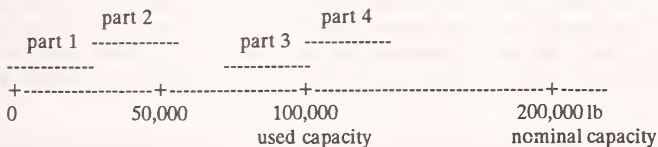
**Example 2.** Test of a 60-foot scale (120,000 x 20 lb) using Procedure 1 and using the strain-load option and 30,000 lb of test weights (25 percent of scale capacity). A dump truck with sand (approximately 60,000 lb) is used as the strain load. (As a practical matter, the weight of the truck will not be equally distributed over the steering and drive axles; the bulk of the load will be on the rear axles. Care must be taken not to add test weights near the rear axles to the extent that the combined loads of the truck axles and test weights exceed the CLC.)



part 1 - The test weights are applied beginning at zero.

part 2 - The dump truck is applied as a strain load, balanced out, and then the weights are reapplied to reach used capacity.

**Example 3.** Test of an 80-foot scale (200,000 x 20 lb) using Procedure 2 with 30,000 lb of test weights (15 percent of scale capacity) and a substitution test near 30,000 lb. A large dump truck with sand (approximately 70,000 lb) is used as the strain load and a skiploader (approximately 28,000 lb) is used as a substitution load.





Part 1 - The test weights are applied beginning at zero.

Part 2 - The skiploader is substituted for the test weights and then the weights are reapplied to reach 25 percent of scale capacity.

Part 3 - The dump truck is applied as a strain load and then the weights are reapplied.

Part 4 - The strain load is left on the scale, the weights are removed, and the skiploader is substituted for the test weights. The weights are then reapplied to reach used capacity.

Note that additional substitutions could have been performed as a part 1A in Example 2 and as a part 2A in Example 3. These would have been beyond the minimum test recommended in Table 4 but may be within a jurisdiction's testing policy.

Care should be exercised in multiple substitutions since there are uncertainties even with the use of error weights. Factors such as creep, zero drift, hysteresis, repeatability, and shift in the test load distribution may limit the suitability of repeated substitutions. The Office of Weights and Measures recommends that no more than three substitutions be performed before treating the remaining tests as strain-load tests[7].

### Reading the Scale Errors

During the tests, it is important to read the errors in the scale correctly since they do not always equal whole scale divisions. It may be necessary to read between the lines (i.e., interpolate between graduations or use error weight to measure to values smaller than digital scale divisions) to avoid misapplication or improperly applying tolerance and penalizing the scale for round-off errors when reading the weight value.

The problem stems from the round-off of weight values to the nearest scale division. Normally, the observer mentally rounds off the indications of such analog indications as beams and dials to the nearest scale division, while round-off occurs automatically on digital devices. Each time the observer reads an indication (other than zero) there is potential for an error of  $\pm 0.5$  division (e.g., a reading of 20,140 lb on a scale with  $d = 20$  lb may be anywhere between 20,130 and 20,150 lb). This potential error can have significant impact on the outcome of the test.

First, consider the application of the tolerance when the tolerance is a whole number of scale divisions. This occurs when applying maintenance tolerances and some acceptance tolerances. When a digital-indicating scale reads  $+1$  for a known test load, the scale is rounding its indication and the actual load measured by the scale may be anywhere between  $+0.5$  and  $+1.5$  divisions in error. If the tolerance is  $1.0d$  then the range between  $+1.1$  and  $+1.5d$  is actually out of tolerance, and failure to read this error increases the tolerance by up to 50 percent. When only small amount of test weights are available, e.g., 500 or 1000d, this can be very significant.

The solution to this problem is to read the scale in increments less than a scale division. On analog scales, this can be done by carefully reading between the graduations on dial scales or by reading the position of the beam on beam scales. On digital scales, a tolerance weight of  $0.5d$  can be used to make a pass/fail determination of scale error relative to the tolerance. If the tolerance is  $\pm 1d$  and the reading is  $+1d$ , then the addition of the tolerance weight must not result in a stable reading of  $+2d$ . This indicates that the scale was between  $+0.5d$  and  $+1.0d$  and not between  $+1.1$  and  $+1.5d$ . If the error is  $-1d$ , the addition of a weight equal to  $0.5d$  must take the reading to the next higher division, indicating that the reading was between  $-0.5d$  and  $-1.0d$ .

Another problem occurs when substitution or strain load tests are applied. There is a potential error of  $\pm 0.5d$  in the reading of the reference point for the strain or substitution load and a potential error of  $\pm 0.5d$  in the reading after the test weights are applied. This means a potential  $\pm 1d$  error exists in the indicated values for every strain load or substitution test, when the tolerance may be as small as  $\pm 0.5d$ ! The use of error weights in these tests is very important.

Under windy conditions, both the official and the scale user must be ready to accept these potential errors as they may help or hurt the scale. It is not practical, considering the inspector's time and expense of operating a test truck



to reschedule a test simply because the wind is gusting. However, if the wind and gusts are so strong that a reasonably accurate test cannot be performed, the test must be postponed.

Under good environmental conditions, the use of error weights can significantly reduce the potential round-off error. The use of error weights has been documented [8] and employs the break point between divisions to measure the errors to 1/10 or 1/4 scale division. Use the formulas in the Appendix to compute the scale errors. It is necessary to get outside the operating range of the automatic zero-setting mechanism (AZSM window) when measuring the amount of weight needed to reach the break point near zero load. Note that the use of error weights is necessary only when the scale is on the border of being out of tolerance or when applying a strain or substitution load. The remainder of the scale errors may be calculated directly from the scale readings.

It is recommended that the inspector weigh the substitution loads before the test begins. Then the use of error weights may be limited to the substitution point, which is the closest test load to the amount of the substitution load. For example, consider the case of a test similar to Example 3 above. The inspector weighs the skiploader before the test, and it weighs 27,720 lb. If the weights are applied in 3000-lb increments, the inspector need only use the error weights at 27,000 lb to determine the scale error to be carried with the substitution. This of course assumes that the scale performance remains fairly linear between 27,000 and 30,000 lb.

Weighing the substitution loads before the test also may reduce the movement of weights in and out of the test truck. For example, if the substitution load were only 22,000 lb in the above example, then it would only be necessary to apply 24,000 lb of the test weights before applying the substitution load. The error weights would be used at 21,000 lb and the range between 24,000 lb and 30,000 lb would be covered when the weights are reapplied.

#### References

1. Oppermann, H. V., editor, Specifications and Tolerances, and Other Technical Requirements for Weighing and Measuring Devices, NIST Handbook 44 (published annually).
2. Tholen, A. D., et. al. editor, Report of the National Conference on Weights and Measures 1988, NIST Special Publication 750, Specifications and Tolerances Committee Items 320-5A and 320-5B, p 242-245.
3. Tholen, A. D., et. al. editor, Report of the National Conference on Weights and Measures 1989, NIST Special Publication 771, Specifications and Tolerances Committee Items 320-7, p 151.
4. Jensen, M.W., The Examination of Weighing Equipment, NBS Handbook 94, (1965).
5. Bridge Gross Weight Formula, US Dept. of Transportation, Federal Highway Administration, (1984).
6. Specifications and Tolerances for Reference Standards and Field Standard Weights and Measures, NIST Handbook 105-1, Specifications and Tolerances for Field Standard Weights (NIST Class F), (1990).
7. Oppermann, H.V., The Testing of Hopper Scales, available through the NIST Office of Weights and Measures.

### **Increasing Load Test: Procedure #1**

Available test weights equal to at least 25 percent of scale capacity.

1. Begin the test with the scale at zero load.
2. Apply the test weights in one or more test patterns; be sure not to exceed the rated CLC. Apply the weights in convenient increments while striving to take readings at the maximum test loads near the loads at which the tolerance changes; record the scale errors.
3. A decreasing load test may be run where appropriate by removing half of the applied weights.
4. Remove all test weights and check for proper return to zero.

#### **Option 1. Strain Load Test - to reach used capacity (see Example 2)**

5. Start with the scale at zero load.
6. Apply a strain load to the scale leaving room to apply the test weights. Record the scale reading at the starting point of the strain load test: this is the strain-load reference point.
7. Apply the test weights in one or more test patterns; be sure not to exceed the rated CLC. Apply the weights in convenient increments while striving to take readings at the maximum test loads near the loads at which the tolerance changes; record the scale errors.

$$\text{error} = (\text{scale reading} - \text{strain load reading}) - \text{test weights}$$

Calculate the scale errors and apply tolerances to the change from the strain-load reference point based on the known test load applied.

8. A decreasing load test may be performed where appropriate by removing the strain load, calculating the errors, and applying the tolerance to the known test weights left on the scale.
9. Remove all test weights and check for proper return to zero.
10. This test may be performed on both ends of the scale or in test patterns on other areas of the scale platform

#### **Option 2. Substitution Test - to reach used capacity (see Example 1)**

5. Start with the scale at zero load.
6. Apply a substitution load to the scale leaving room to apply the test weights. The substitution load must not exceed the previously calibrated range of the scale based on steps 1-4, nor a previous substitution. Calculate the actual weight of the substitution load based on the scale errors previously recorded.
7. Apply the test weights in one or more test patterns; be sure not to exceed the rated CLC. Apply the weight in convenient increments while striving to take readings at the maximum test loads near the loads at which the tolerance changes; record the scale errors. Calculate the scale errors and apply the tolerances to the entire load on the scale since the full load on the scale is known test load. Follow steps 5 through 7 may be repeated, but there should not be more than three substitutions.
8. A decreasing load test may be performed where appropriate by removing the test weights or the substitution load. Calculate errors and apply the tolerance to the known test load left on the scale.

9. Remove the entire test load and check for proper return to zero.
10. This test may be performed on both ends of the scale or in test patterns on other areas of the scale platform.

### **Increasing Load Test: Procedure #2**

Available test weights are less than 25 percent of scale capacity.

1. Begin the test with the scale at zero load.
2. Apply the test weights in one or more test patterns. Apply the weights in convenient increments while striving to take readings at the maximum test loads near the loads at which the tolerance changes; record the scale errors.
3. Remove all test weights and check for proper return to zero.
4. Starting at zero, apply a substitution load to the scale leaving room to apply the test weights. The substitution load must not exceed the previously calibrated range of the scale based on steps 1-3, or a previous substitution. Calculate the actual weight of the substitution load based on the scale errors previously recorded.
5. Apply the test weights in one or more test patterns; be sure not to exceed the rated CLC. Apply the weights in convenient increments while striving to take readings at the maximum test loads near the loads at which the tolerance changes; record the scale errors. Calculate the scale errors and apply the tolerance to the entire load on the scale since all the load on the scale is known test load. Follow steps 4-6 to reach 25 percent of scale capacity. There should be no more than three substitutions performed as part of this portion of the test.
6. A decreasing load test may be performed where appropriate by removing the test weights or the substitution load. Calculate the errors and apply the tolerance to the known test load left on the scale.
7. Remove the entire test load and check for proper return to zero.

#### **Strain Load Test - to reach used capacity (see Example 3)**

8. Start with the scale at zero load.
9. Apply a strain load to the scale leaving room to apply the test weights. Record the scale reading as the starting point of the strain load test: this is the strain-load reference point.
10. Apply the test weights in one or more test patterns; be sure not to exceed the rated CLC. Apply the weights in convenient increments while striving to take readings at the maximum test loads near the loads at which the tolerance changes; record the scale errors.

$$\text{error} = (\text{scale reading} - \text{strain load reading}) - \text{test weights}$$

Calculate the scale errors and apply tolerances to the change from the strain-load reference point based on the known test load applied.

11. Remove all test weights and check that the scale returns to the strain load reference point.
12. Starting at the strain load reading, apply a substitution load to the scale leaving room to apply the test weights. The substitution load must not exceed the previously tested range of the scale based on step 10 or a previous substitution. The range between zero and the strain load is not included since the error at the strain load reading is unknown. Calculate the actual weight of the substitution load based on the scale errors previously recorded.

13. Apply the test weights in one or more test patterns; be careful not to exceed the rated CLC. Apply the weights in convenient increments while striving to take readings at the maximum test loads near the loads at which the tolerance changes; record the scale errors. Calculate the scale error and apply the tolerance to the combination of substitution load and test weights since all this load is known test load. Steps 12 and 13 may be repeated to reach the used capacity of the scale, but no more than three substitutions are to be performed as part of this portion of the test. To calculate the error from direct reading, use the following formula.

$$\text{error} = \frac{\text{scale}}{\text{reading}} - \frac{\text{strain}}{\text{load reading}} - \frac{\text{substitution}}{\text{load}} - \text{test weights}$$

14. A decreasing load test may be performed where appropriate by removing the strain load and applying the tolerance to the combination of substitution load and test weights left on the scale.
15. Remove the substitution load and all test weights and check for proper return to the strain load reading.
16. After removing all material and test weights from the scale, check for proper return to zero. Do not penalize the scale for possible drift or creep that may occur if the testing procedure takes a long time.

If the scale does not return to zero after removing all material and test weights, a separate return to zero test should be conducted. Zero the scale and drive a vehicle onto the scale platform. Allow the vehicle to remain on the scale for a time equal to the normal weighing operation. Drive the vehicle off the scale and check the return to zero. This test may be repeated as many times as necessary to determine whether or not the scale has a problem returning to zero.



## Formulas for Calculating Scale Errors When Using Error Weights

### Increasing Load Test - start at zero

$$\text{error} = R_{\text{load}} - S_{\text{wts}} + E_{\text{zero}} - E_{\text{load}}$$

Tolerances are applied to only the test weights ( $S_{\text{wts}}$ )

### Strain Load Test

$$\text{error} = R_{\text{load}} - R_{\text{strain}} - S_{\text{wts}} + E_{\text{strain}} - E_{\text{load}}$$

Tolerances are applied to only the test weights ( $S_{\text{wts}}$ )

### Increasing Load or Strain Load Test with Substitution

$$\text{error} = E_{\text{prev}} + R_{\text{load}} - R_{\text{sub}} - S_{\text{wts}} + E_{\text{sub}} - E_{\text{load}}$$

Tolerances are applied to the sum of the substitution load and the test weights ( $S_{\text{wts}}$ ).

\*The scale error in substitution is assumed to be the same as the error at the nearest test point recorded in the previous tests.

When starting at zero the substitution load is equal to the scale reading of the substitution load ( $R_{\text{sub}}$ )

When starting at a strain load the substitution load is the difference between the scale reading at the substitution load and the scale reading at the strain load ( $R_{\text{sub}} - R_{\text{strain}}$ ).

Where:

$R_{\text{load}}$	=	Scale reading at load
$R_{\text{strain}}$	=	Scale reading at strain load
$R_{\text{sub}}$	=	Scale reading at substitution load
$S_{\text{wts}}$	=	Test weights
$E_{\text{zero}}$	=	Error weights to break point at zero
$E_{\text{strain}}$	=	Error weights to break point at strain load
$E_{\text{sub}}$	=	Error weights to break point at substitution load
$E_{\text{load}}$	=	Error weights to break point at load
$E_{\text{prev}}$	=	Scale error at substitution load*

The scale error in substitution is assumed to be the same as the error at the nearest test point recorded in the previous tests.

## Appendix B

### Tentative Mass Flow Meters Code

Handbook 44 has been amended over the years to recognize the use of mass flow meters in various specific code. The Specifications and Tolerances Committee believes that a separate code should be developed to recognize mass flow meters. Initial discussions with the Legal Metrology Branch (LMB), Canada have resulted in specifications and tolerances that are believed to be appropriate for these meters. The OIML draft document for mass flow meters was used as the reference document to determine the requirements.

The draft contains the proposed changes to the Hydrocarbon Vapor-Measuring Devices (HVMD) Code that are on the agenda of the Specifications and Tolerances Committee for the Interim Meeting in January. The appropriateness of the proposed requirements must still be determined; however, the proposed changes are included in this draft to aid in the review process. Specific requirements for vapor-measuring mass flow meters are shown in SMALL CAPITAL LETTERS.

Explanatory notes are indicated by *[brackets and italics]* to provide information regarding the requirement. This information is intended to aid in the review, but will not appear in the final code. All requirements are proposed to be retroactive.

All changes made since the December 1990 draft of this code will be reviewed by the S&T Committee in detail at the Annual Meeting. Of particular importance is that section S.2.4. Operation Over a Temperature Range, which addressed the temperature effect on zero, has been deleted since the concept was rejected by the OIML International Working Group. One OIML performance requirement has not been included at this time, namely specifying that the tolerance for quantities from the minimum measured quantity to twice the minimum measured quantity be twice the tolerances specified in T.2. This point will be considered by the S&T Committee in July.

Some requirements for mass flow meters are unique to these devices. An index of related paragraphs is given below to assist in the review of the unique requirements that are new for mass flow meters.

#### Index of Related Paragraphs

Mass or (true) mass .....	S.1.2.2., N.6.
Minimum measured quantity (MMQ) .....	S.1.2.4., S.5., N.1., N.4., UR.1.
Temperature range (operating temperature range) .....	S.5., T.1.
Vapor measurement .....	A.2., S.1.2.1., S.1.2.4., N.2.2., T.2.

## Tentative Mass Flow Meters Code

### A. Application

**A.1. Liquids.** - This code applies to devices that are designed to dynamically measure the mass of liquids. It also specifies the relevant examination and tests that are to be conducted.

**A.2. - VAPOR (GASES).** - THIS CODE APPLIES TO DEVICES THAT ARE DESIGNED TO DYNAMICALLY MEASURE THE MASS OF HYDROCARBON GAS IN THE VAPOR STATE. EXAMPLES OF THESE PRODUCTS ARE PROPANE, PROPYLENE, BUTANES, BUTYLENES, ETHANE, METHANE, NATURAL GAS AND ANY OTHER HYDROCARBON GAS/AIR MIX.

**A.3. Exclusions.** - This code does not apply to measuring assemblies for cryogenic liquids.

### S. Specifications

#### S.1. Indicating and Recording Elements.

**S.1.1. Indicating Elements.** A measuring assembly shall include an indicating element. Indications shall be clear, definite, accurate, and easily read under normal conditions of operation of the instrument.

#### S.1.2. Units. -

**S.1.2.1. Units of Measurement.** - Deliveries shall be indicated and recorded in grams, kilograms, metric tons, pounds, or tons and decimal subdivisions thereof. *[Modified from H-44 LMD Code S.1.2.2.]*

**S.1.2.2. Mass Measurement.** - The indication of a delivery shall be on the basis of (true) mass (as opposed to apparent mass versus a density of  $8.0 \text{ g/cm}^3$ ). The quantity indication and any recorded representations shall be identified as follows, "Product quantity is based upon (true) mass" or some similar suitable statement.

*This is a change from H-44 LMD Code S.1.2. The OIML International Working Group has established the basis of "true mass" for indications from mass flow meters instead of the "apparent mass" basis that has been accepted in the U.S. The Canada LMB has agreed with the Office of Weights and Measures to accept "mass" as the basis of mass flow meter measurement.*

*The significance of this issue is whether mass flow meters should be required to agree with scale indications as if the product were weighed on a vehicle scale, or to require quantity agreement as if the product were measured through a liquid meter. The difference in the indication is approximately 0.1 percent for liquids with a density of  $1.0 \text{ g/cm}^3$ . If a liquid is measured through a liquid meter and weighed on a vehicle scale, the buoyant effect of air would cause the scale indication to indicate approximately 0.1 percent less than the mass computed from the volume and the density of the liquid. However, in the case of products in vapor form (which will be measured using a closed tank, e.g., compressed natural gas) and pressurized liquids such as LP gas, the scale and liquid meter readings will agree: the buoyant effect of air cancels since the receiving tank is a closed system.*

*The use of mass means that a correction value must be used to convert scale indications to true mass when the meter is tested. The correction factor depends upon the density of the liquid being measured. A table is provided in the code for this purpose.]*

**S.1.2.3. Numerical Value of Quantity-Value Divisions.** - The value of a scale interval shall be equal to:

- 1, 2, or 5, or

- a decimal multiple or sub-multiple of 1, 2, or 5.

**S.1.2.4. Maximum Value of Quantity-Value Divisions.**

- (a) The maximum value of the quantity-value division for liquids shall be not greater than 0.2 percent of the minimum measured quantity.
- (b) The maximum value of the quantity-value division for vapor-measuring devices shall not exceed 0.01 lb (0.01 kg) when measuring product as a retail motor fuel.

*[Note: The flow rates in pounds per hour are obtained by converting the cubic feet per hour in the HVMD Code to pounds using the conversion factor used in the proposal to change the HVMD Code.]*

**S.1.2.5. Values Defined.** Indicated values shall be adequately defined by a sufficient number of figures, words, symbols, or combinations thereof. A display of "zero" shall be a zero digit for all displayed digits to the right of the decimal mark and at least one to the left.

**S.2. Operating Requirements.**

**S.2.1. Return to Zero.** Except for measuring assemblies in a pipeline, one indicator shall be provided with a means for returning the indication to zero either automatically or manually.

**S.2.2. Indicator Reset Mechanism.** The reset mechanism for the indicating element shall not be operable during a delivery. Once the zeroing operation has begun, it shall not be possible to indicate a value other than the latest measurement, or "zeros" when the zeroing operation has been completed.

**S.2.3. Nonresettable Indicator.** An instrument may also be equipped with a nonresettable indicator if the indicated values cannot be construed to be the indicated values of the resettable indicator for a delivered quantity.

*[Note: The section S.2.4. Operation Over a Temperature Range, which appeared in the December 1990 draft, has been deleted since the concept was rejected by the OIML International Working Group.]*

**S.3. Measuring Elements and Measuring Systems.**

**S.3.1. Maximum and Minimum Flow-Rates.**

- (a) The ratio of the maximum to minimum flow-rates specified by the manufacturer for devices measuring liquified gases shall be 5:1 or greater.
- (b) The ratio of the maximum to minimum flow-rates specified by the manufacturer for devices measuring other than liquified gases shall be 10:1 or greater.

**S.3.2. Adjustment Means.** An assembly shall be provided with means to change the ratio between the quantity indicated and the quantity of liquid measured by the assembly. A by-pass on the measuring assembly shall not be used for these means.

**S.3.2.1. Discontinuous Adjusting Means.** When the adjusting means changes the ratio in a discontinuous manner, the consecutive values of the ratio shall not differ by more than 0.1 percent.

**S.3.3. Vapor Elimination.** A liquid-measuring instrument or measuring system shall be equipped with an effective gas extractor or other effective means, automatic in operation, to prevent the measurement of vapor and air that results in errors greater than the tolerance for the minimum measured quantity (See N.1.).

**S.3.4. Maintenance of Liquid State.** A liquid-measuring device shall be installed so that the measured product remains in a liquid state during passage through the instrument.



**S.3.5. Provision for Sealing.** Adequate provision shall be made for an approved means of applying security (e.g., data change audit trail) or physically applying security seals in such a manner that an adjustment cannot be made on any device that affects the measurement result without breaking the security seal.

**S.3.6. Mass Flow Meters.** - An automatic means to determine and correct for changes in product density shall be incorporated in any mass flow metering system that is affected by changes in the density of the product being measured. *[From H-44 LMD Code S.2.9.]*

#### 4. Discharge Lines and Valves.

**S.4.1. Diversion of Measured Product.** No means shall be provided by which any measured product can be diverted from the measuring instrument. However, two or more delivery outlets may be permanently installed and operated simultaneously, provided that any diversion of flow to other than the intended receiving receptacle cannot be readily accomplished or is readily apparent. Such means include physical barriers, visible valves or indications that make it clear which outlets are in operation, and explanatory signs if deemed necessary.

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 measuring system.

**S.4.2. Directional Flow Valves.** A valve or valves or other effective means, automatic in operation (and equipped with a pressure limiting device, if necessary) to prevent the reversal of flow shall be properly installed in the system if a reversal of flow could result in errors that exceed the tolerance for the minimum measured quantity. (See N.1.)

**S.4.3. Discharge Valves.** A discharge valve may be installed on a discharge line only if the system is a wet hose type. Any other shutoff valve on the discharge side of the instrument shall be of the automatic or semiautomatic predetermined-stop type or shall be operable only:

- by means of a tool (but not a pin) entirely separate from the device, or
- by means of a security seal with which the valve is sealed open.

**S.4.4. Anti-drain Means.** In a wet hose type device, effective means shall be provided to prevent the drainage of the hose between transactions.

**S.4.5. Other Valves.** Check valves and closing mechanisms that are not used to define the measured quantity shall have relief valves (if necessary) to dissipate any abnormally high pressure that may arise in the measuring assembly.

#### 5. Markings. A measuring system shall be legibly and indelibly marked with the following information:

- 1) pattern approval mark (i.e., type approval number);
- 2) name and address of the manufacturer, or his trademark and, if required by the weights and measures authority, the manufacturer's identification mark in addition to the trademark;
- 3) model designation or product name selected by the manufacturer;
- 4) nonrepetitive serial number;
- 5) maximum and minimum flow rates in pounds per unit of time;
- 6) maximum working pressure;

## Specifications and Tolerances Committee

- (g) applicable range of temperature if other than  $-10^{\circ}\text{C}$  to  $+50^{\circ}\text{C}$ ;

*[Note: A meter must operate within tolerance over the temperature range of  $-10$  to  $50^{\circ}\text{C}$  unless it is marked with another temperature range. (See T.1.) Determining compliance with this requirement can be done only during type evaluation. Unless a test facility exists, it may be premature to adopt this requirement since weights and measures does not have a way to determine device performance over a temperature range.]*

- (h) minimum measured quantity; and
- (i) product limitations, if applicable.

**S.6. Printer.** When an assembly is equipped with means for printing the measured quantity, the following conditions apply:

- (a) the scale interval shall be the same as that of the indicator;
- (b) the value of the printed quantity shall be the same value as the indicated quantity;
- (c) a quantity for a delivery (other than an initial reference value) cannot be recorded until the measurement of a delivery has been completed;
- (d) the printer is returned to zero when the resettable indicator is returned to zero; and
- (e) the printed values shall meet the requirements applicable to the indicated values.

**S.6.1. Printed Receipt.** Any delivered, printed quantity shall include an identification number, the time and date and the name of the seller. This information may be printed by the device or pre-printed on the ticket.

## N. Notes

**N.1. Minimum Measured Quantity.** The minimum measured quantity shall be specified by the manufacturer. *[From OIML draft document, point 5]*

### N.2. Test Medium.

**N.2.1. Liquid-Measuring Devices.** - The device shall be tested with the liquid that the device is intended to measure or another liquid with the same general physical characteristics.

**N.2.2. VAPOR-MEASURING DEVICES.** - THE DEVICE SHALL BE TESTED WITH AIR OR THE PRODUCT TO BE MEASURED.

**N.3. Test Drafts.** - The minimum test shall be one test draft at the maximum flow rate of the installation and one test draft at the minimum flow rate. More tests may be performed at these or other flow rates. (See T.4.)

*[Note: The length of time for the deliveries is specified in N.1. and may be less than one minute when the flow rate is more than twice the minimum flow rate.]*

**N.4. Minimum Measured Quantity.** - The device shall be tested for a delivery equal to the declared minimum measured quantity when the device is likely to be used to make deliveries on the order of the minimum measured quantity.

*[Note: This will require the device to be tested using a standard capable of measuring the minimum measured quantity (MMQ). For example, a gas pump may be required to have an MMQ of 0.2 gallons. This would require the device to be tested for accuracy for a 0.2 gallon delivery. Handbook 44 now requires a gas pump to be tested with a 5-gallon delivery draft.]*

**5. Motor Fuel Dispenser.** - When a device is intended for use as a liquid motor-fuel dispenser, the type evaluation test shall include a test for accuracy using 5 starts and stops during a delivery to simulate the operation of the automatic shut-off nozzle. This test may be conducted as part of the normal inspection and test of the meter.

**6. Air Buoyancy Correction.** - Air buoyancy corrections are applied when measuring products into an open vessel; air buoyancy corrections are not applied when measuring product into a closed vessel. When measuring product into an open vessel, weights values from a scale shall be converted to mass values by using Table N.6.

Multiplier for Liquids to Convert Scale Indication to Mass (Air Buoyancy Correction)

Product Density (g/cm <sup>3</sup> )	Multiplier	Product Density (g/cm <sup>3</sup> )	Multiplier
0.5011 to 0.5228	1.0022	0.8011 to 0.8582	1.0013
0.5229 to 0.5465	1.0021	0.8583 to 0.9241	1.0012
0.5466 to 0.5725	1.0020	0.9242 to 1.0010	1.0011
0.5726 to 0.6011	1.0019	1.0011 to 1.0919	1.0010
0.6012 to 0.6326	1.0018	1.0920 to 1.2010	1.0009
0.6327 to 0.6677	1.0017	1.2011 to 1.3343	1.0008
0.6678 to 0.7069	1.0016	1.3344 to 1.5009	1.0007
0.7070 to 0.7510	1.0015	1.5010 to 1.7152	1.0006
0.7511 to 0.8010	1.0014	1.7153 to 2.0009	1.0005

Note: Table N.6. is computed using the following equation.

$$M = \frac{0.99985 \times \rho_p}{\rho_p - 0.0012 \text{ g/cm}^3}$$

where  $\rho_p$  = density of the product

This equation is based on an assumed air density of 1.2 mg/cm<sup>3</sup>. Since the density of air can range from 0.96 mg/cm<sup>3</sup> to 1.2 mg/cm<sup>3</sup>, assuming a density of 1.2 mg/cm<sup>3</sup> results in a maximum potential error of only 0.02 percent; a difference of 0.02 in the last decimal place in Table N.6. This assumed value simplifies the process of making air buoyancy corrections when testing the meter.

The magnitude of the air buoyancy correction depends upon the density of the weighed product. The density must be known or given to make the correction. However, as mentioned in the note under S.1.2.2., an air buoyancy correction is not made when measuring products into a closed vessel, e.g., LP gas or compressed natural gas: because vapor products are always measured in a closed container, an air buoyancy correction is not needed.]

## T. Tolerances

### T.1. Tolerances, General

- (a) The tolerances apply equally to errors of underregistration and errors of overregistration.
- (b) The tolerances apply to all products at all temperatures between -10 to 50 °C, inclusive, measured at any flow rate within the rated measuring range of the meter.

**T.2. Tolerances for Liquid-Measuring Devices.** - The maintenance tolerance shall be 0.5 percent of the measured quantity. The acceptance tolerance shall be 0.3 percent of the measured quantity.

*[Note: The OIML draft doubles the tolerances for liquefied gases. The OWM and LMB have taken the position that the larger tolerance is not needed because these meters must be installed such that the measured liquid remains in the liquid state during measurement. Consequently, a larger tolerance is not needed. However, it was argued at the OIML meeting that liquefied gases are more difficult to handle and measure, hence the larger tolerance was retained in the OIML draft.]*

**T.3. TOLERANCES FOR VAPOR-MEASURING DEVICES.** - MAINTENANCE AND ACCEPTANCE TOLERANCES FOR MASS FLOW METERS SHALL BE 2.0 PERCENT AND 1.5 PERCENT, RESPECTIVELY.

*[Note: The proposed tolerances for vapor-measuring devices seem large. The proposed tolerances should be reviewed to assure that the tolerances realistically reflect the ability of the technology to measure vapors. The tolerances should not be based solely on the tolerances for other vapor-measuring equipment. This tolerance will be significant when the suitability of equipment issue is studied. One could argue that since compressed natural gas used as a motor fuel, the tolerance should be the same order as for measuring gasoline through retail motor-fuel dispensers.]*

**T.4. Tolerance for Multiple Tests.** - When multiple tests are conducted at approximately the same flow rate, the range of the test results for the flow rate shall not exceed 20 percent of the measured quantity.

*[Note: This tolerance was changed from 40 percent of the applicable tolerance to 20 percent of the measured quantity. This change makes the repeatability tolerance the same for both acceptance and maintenance tolerance tests. This revised tolerance is the same as that specified in the December 1990 draft for the maintenance tolerance tests.]*

## UR. User Requirements

### UR.1. Minimum Measured Quantity.

- (a) The minimum measured quantity shall be specified by the manufacturer. *[From OIML draft document, page 5]*
- (b) The minimum measured quantity appropriate for a transaction may be specified by the weights and measures authority. A device may have a minimum measured quantity smaller than that specified by the weights and measures authority; however, the device must perform within the performance requirements for the declared minimum measured quantity.



## Report of the Committee on Education, Administration, and Consumer Affairs

Steven A. Malone, Chairman  
Director, Weights and Measures Division  
Nebraska

Reference  
Key Number

### 400 Introduction

This is the Final Report of the Committee on Education, Administration, and Consumer Affairs for the 76th Annual Meeting of the National Conference on Weights and Measures. The Report consists of the Interim Report offered at the Conference "Program and Committee Reports" as amended by the Addendum Sheets issued during the Annual Meeting.

Table A identifies all of the items contained in the Report by Reference Key Number, Item Title, and Page Number. All items were informational (as indicated by the "I" after the Reference Key No.) and required no formal action by the membership. The membership adopted the report in its entirety as follows: House of State Representatives - 2 yeas, 0 nays; House of Delegates - 42 yeas, 0 nays.

**Table A  
Reference Key Items and Index**

Reference Key No.		Title of Item	Page
<b>401</b>	<b>I</b>	<b>Regional Weights and Measures Activities .....</b>	<b>312</b>
401-1	I	Deletion of H-44 Paragraphs from Modules .....	313
401-2	I	Minimum Training Requirements .....	313
401-3	I	NTP Certificates for Completion of Classroom Training .....	313
401-4	I	Special Recognition for NTP Achievements .....	314
401-5	I	Distribution of Module Revisions .....	314
<b>402</b>		<b>National Training Program (NTP) .....</b>	<b>314</b>
402-1	I	NTP Status Report .....	314
402-2	I	Certification Program Implementation .....	316
402-3	I	Registry Summary .....	316
402-4	I	Module Revisions .....	316
402-5	I	Training for Trainers .....	317
402-6	I	Module 5 Revision .....	318
402-7	I	Weights and Measures Administration Module .....	318
402-8	I	Joint Meeting with Executive Committee .....	318
402-9	I	New Regulatory Strategies in Canada .....	318
402-10	I	Certification of NTP Instructors .....	319
402-11	I	Revised EPOs and Tolerance Work Sheets for Scales .....	320

In addition, the Report contains four appendices that are related to specific Reference Key Numbers as follows:

**Table B**  
**Appendices**

Appendix	Title	Reference Key No.	Page
A.	Suggested Format for Certificate of Recognition	401-3	321
B.	NTP Certification Summary	402-2	322
C.	NTP Registry Summary of Activity	402-3	325
D.	Trainer Certification Criteria	402-10	332

**Details of All Items**  
(in order of Reference Key Number)

**401 I Regional Weights and Measures Activities**

The Committee reviewed and discussed the following:

1. The final report of the Education, Administration, and Consumer Affairs Committee to the 33rd Annual Technical Conference of the Western Weights and Measures Association (WVMA) (August 1990).
2. The final report of the Education Committee to the 45th Annual Conference of the Southern Weights and Measures Association (October 1990).
3. The final report of the Committee on Education, Administration, and Consumer Affairs to the 18th Annual Conference of the Northeastern Weights and Measures Association (NEWMA) (May 1990). (This is a carryover item from the 75th Annual Meeting of the NCWM.)
4. A proposal developed at NEWMA's Interim Meeting in October 1990.
5. A proposal concerning the establishment of minimum training requirements that was developed at the Central Weights and Measures Association's Interim Meeting in October 1990 and submitted to the NCWM Laws and Regulations Committee.
6. The final report of the Committee on Education, Administration, and Consumer Affairs to the 19th Annual Conference of the Northeastern Weights and Measures Association (May 1991).

The report of WVMA's Education and Consumer Affairs Committee includes a proposal that CEUs be granted individuals who attend NIST-sponsored metrologist training programs. The Committee would like to note that provision was made to include metrologist training in the NCWM's National Training Program (NTP) Registry when it was established in 1985. Information on all participants who successfully completed basic and intermediate metrology seminars held at NIST since 1985 was recently submitted to the Registry and CEUs were awarded to the participants. (See Appendix C for a summary of CEUs awarded.)

The Committee agrees with the Western Association about the importance of including safety considerations in the modules. Anyone with safety information related to one of the modules is encouraged to send it to the Committee.

Technical Advisor. The Committee is looking forward to receiving the recommendations of the NCWM Safety Task Force. In particular, it is interested in the Task Force's efforts to incorporate basic safety information in the Examination Procedure Outlines that appear in the modules and are published separately in NCWM Publication 12. As soon as these revised EPOs are available, the Committee will begin to incorporate them into the modules.

## 01-1 I Deletion of H-44 Paragraphs from Modules

The Southern and the Central Weights and Measures Associations both recommended that paragraphs from NIST handbooks not be included in the modules in order to facilitate updating; they felt that students could use the handbooks to look up paragraph references. The Technical Advisor reported that the task of revising handbook references is actually the easiest part of revising a module because this task can be automated; for example, a secretary with a computer floppy disk of the latest edition of Handbook 44 can block text from the handbook and copy directly into a module. The real problem in revising modules is rewriting explanatory text, redoing tolerance work sheets, making changes to module quizzes and exams, and revising module illustrations and visual aids. These tasks are far more difficult and time consuming and require substantial technical staff time. It was also pointed out that:

Due to the many references included in the modules (some EPOs have more than 70 references), the task of looking up each reference can be time consuming, distracting, and boring. In most cases, students are asked to read a module before they come to class; consequently, they may have to look up the paragraphs twice: once during self-study and again in class.

If the references were not included in the module, it might not be immediately clear that the text refers to an out-of-date requirement; therefore, it might make it harder for instructors to identify out-of-date material.

It is not an objective of the device modules to teach an inspector how to use Handbook 44. Each module states that familiarity with Handbook 44 is a prerequisite. Module 24, Introduction to NIST Handbook 44, was developed specifically to teach inspectors how to use the Handbook.

After considering the pros and cons associated with the proposal from the regional groups, the Committee decided to continue to include Handbook paragraphs in the modules.

## 01-2 I Minimum Training Requirements

The Committee reviewed and discussed a proposal made by the Central Weights and Measures Association to the NCWM's Laws and Regulations Committee to amend the Uniform Weights and Measures Law, Section 12, Powers and Duties of the Director, to include authority to adopt rules and regulations to establish minimum training requirements. The Committee strongly supports the concept behind this proposal. It was recognized, however, that the wording of the proposed change should perhaps be more permissive to make it clear that the Director has the authority to do so, but is not required to set minimum training requirements.

## 01-3 I NTP Certificates for Completion of Classroom Training

The Northeastern Weights and Measures Association (NEWMA) submitted a proposal requesting that NTP certificates be given to individuals who successfully complete the classroom training portion of a module for which certification is available. NTP certificates are currently awarded to: 1) any associate member who completes the classroom portion of any NTP module that is sponsored by a State participating in the NTP, 2) any weights and measures official who completes a module for which certification is not available, and 3) to weights and measures officials who have successfully completed the classroom and field training portions of a module and have been nominated for certification by their State weights and measures director.

It has been the position of the Education Committee that modules with a certification component were not considered completed until the field training or field evaluation phase of the training was successfully finished since these modules are intended to train an individual to perform an official evaluation in the field. The Committee believes that giving NTP certificates to individuals who complete only the classroom portion of a module would diminish the importance of NCWM certification and the recognition that is given for that achievement. Consequently, the Committee does

not plan to change its policy. The Committee has no objection to a State or a region recognizing individuals who successfully complete the classroom portion of a module and who may or may not be planning to complete field training and seek NCWM certification. A suggested format for a certificate that could provide such recognition is shown in Appendix A.

#### 401-4 I Special Recognition for NTP Achievements

In the 1990 report of NEWMA's education committee, it was suggested that individuals be given special recognition for completing a specific number of modules or earning a specific number of Continuing Education Units. The Committee felt that this would also be a more appropriate undertaking for a specific weights and measures jurisdiction or for the regional weights and measures groups. Some States already have performance or promotion programs based on completion of specific modules to attain a certain level of competence. The Committee does not want to create programs that compete or conflict with these State programs.

#### 401-5 I Distribution of Module Revisions

NEWMA's education committee also recommended that module revisions be sent to all local officials who have purchased the module or have attended a course on a module. The current practice is to send copies of the first revision of a module to each State weights and measures office and to all purchasers of the module. Future revisions are sent to the States and to all purchasers who notify the NCWM that they would like to continue receiving revisions. State's that participate in the NCWM's National Training Program have an obligation to keep their officials who have taken modules up to date on changes to the handbooks on which the modules are based.

#### 402 National Training Program (NTP)

##### 402-1 I NTP Status Report

The status of the National Institute of Standards and Technology (NIST) grants to the NCWM as of June 30, 1991, is as follows:

	Grant 1 <u>NB83NAHA4003</u>	Grant 2 <u>70NANB8H0869</u>
Net outlays to date:	\$489,444.12	\$ 31,868.13
Total unliquidated obligations: (money committed to contractors)	7,000.00	2,500.00
Total outlays & unliquidated obligations:	496,444.12	34,368.13
Total grant funds authorized:	515,189.00	180,000.00
Unobligated balance of funds: (money available for future module development)	18,744.88	145,631.87
Total funds available for future module development (grants 1 & 2):	\$164,376.75	

The status of all training modules under development as of June 30, 1991, is given in Table C.



**Table C**  
**Training Module Status Report**  
 (As of 6/30/91)

<u>Module No.</u>	<u>Subject</u>	<u>Status</u>
1	Mechanical Computing Scales	Project completed.
2	Electronic Computing Scales	Project completed.
4	Medium-Capacity Scales	Project completed.
5	Vehicle and Axle-Load Scales	The first draft of the revision of this module was reviewed by the Education Committee at the NCWM's 1991 Interim Meeting. The second draft will be reviewed at NCWM's 1991 Annual Meeting.
6	Monorail Scales	Project completed.
7	Livestock and Animal Scales	Project completed.
8	Retail Motor-Fuel Dispensers	Project completed.
10	Package Checking	Project completed.
13	Hopper Scales	The working group is developing the first draft of this module.
19	Loading-Rack Meters	Project completed.
20	Vehicle-Tank Meters	Project completed.
21	LPG Liquid Meters	Project completed.
22	Commodity Regulations	Project completed.
23	Weights and Measures Admin.	Chapters 1 and 2 of Part II of this module will be reviewed at the NCWM's 1991 Annual Meeting.
24	Introduction to Handbook 44	Project completed.
27	Electronic Weighing and Measuring Systems	Project completed.

#### **402-2 I Certification Program Implementation**

As of June 30, 1991, all 50 States, the District of Columbia, Puerto Rico, and the Virgin Islands had signed Letters of Agreement with the NCWM and had been accepted as participants in the NTP Certification Program. Although every State is now a participant in the Certification Program, there were (as of June 1991) 18 States that did not have any certified officials. (See Appendix B for a summary of participation in the NTP Certification Program.) The Education Committee plans to survey these 18 States to find out why they have not yet certified any officials in order to determine if there are actions the Conference might take to facilitate the certification process.

A review of the annual reports submitted by participants in the Certification Program indicated some confusion over what constitutes certification. An individual who receives Continuing Education Units for successfully completing the classroom portion of a module is not automatically certified by the NCWM. To be certified, an individual must participate in and successfully complete a period of field training as described in the module or, if the individual experienced in the area covered by the module, must be evaluated at least once in the field after the module class and demonstrate the ability to conduct an examination as described in the module. After field training or field evaluation, an individual must be nominated for certification by the State Weights and Measures Director on a form supplied by the NCWM. Certification is not available for all modules, only for those that require the demonstration of some technical procedure in the field.

#### **402-3 I Registry Summary**

The NTP Registry serves as a permanent record of NCWM courses successfully completed and Continuing Education Units (CEUs) earned under the NTP. A summary of information in the Registry as of June 30, 1991, is found in Appendix C. For the first time, this summary includes information on credits awarded to NCWM Associate Members and to State officials who participated in NIST Office of Weights and Measures (OWM) metrology seminars.

#### **402-4 I Module Revisions**

The revision status of all published NCWM training modules as of June 30, 1991, is shown in Table D. Because the scales modules were significantly affected by substantial changes made to the tolerances in the Scales Code NIST Handbook 44 in 1990, revisions of all of the Examination Procedure Outlines and the Tolerance Work Sheets are being developed and will be distributed to the States for their use in teaching the modules until comprehensive revisions of the modules can be completed. A revision of Module 5, Vehicle and Axle-Load Scales, is underway and a revision of Module 2, Retail Computing Scales - Electronic, is also scheduled for completion in 1991.

**Table D**  
**Module Revision Status**  
 (As of 6/30/91)

<u>Module</u>	<u>Date of Pub</u>	<u>Date of Last Rev</u>	<u>Rev Stat*</u>	<u>Comments</u>
	1/28/85	10/86	N	
	11/20/85	11/86	P	The Committee does not plan to revise this module in the future. The feasibility of combining this module with Module 2 is being studied. Revised EPOs and tolerance work sheets for this module have been distributed to the States.
	11/29/85	9/90	N	
	2/26/86	9/89	P,R	Revised EPOs and tolerance work sheets for this module have been distributed to the States.
	7/14/86	9/90	N	
	10/17/86		U	Revision of this module is scheduled to be completed in the fall of 1991.
	10/31/86		R	Module will be reviewed in 1991 to determine the extent of changes required to bring it up to date.
	4/3/87		P	
	5/27/87		P	
	8/5/87		R	Module will be reviewed in 1991 to determine the extent of changes required to bring it up to date.
	6/22/88		P	
	5/18/89	8/90	N	
	6/8/90		N	
	7/18/90		N	

\*Key to module revision status abbreviations: N = No revision planned in 1991, U = Revision is underway, R = Revision or review of the module is planned in 1991, P = Revision of EPOs and work sheets is planned for 1991.

## 2-5 I Training for Trainers

In the last few years, the Education Committee has focused on improving the quality of delivery of the NCWM training modules. A trainers list was published last year to help weights and measures offices identify experienced trainers who would be willing to assist in providing module training when the offices do not have their own trainers or do not have a trainer experienced in a particular module. This list now consists of 11 individuals capable of presenting some or all of the published modules; most of them ask only for reimbursement of their expenses in return for their services.

In addition, other programs were established to help technical weights and measures staff learn how to become effective trainers. The status of these programs is given below.

## Education Committee

### Videotape Training-the-Trainer Program

In 1989, the Committee purchased a comprehensive videotape/text program on Training the Trainer using \$10,000 that the Executive Committee had allocated specifically for training trainers. This program, consisting of 14 half-hour tapes and accompanying student work books, is available for loan to NCWM members for in-house training programs. In 1990, five groups used the tapes to train 21 individuals. As of January 1991, two more groups were scheduled to use the tapes to train a total of six individuals. Feedback from the participants in the program has been very positive. The Education Committee plans to follow up with the groups who presented the class to determine how many participants now serve as trainers.

### Regional Training-the-Trainer Programs

In 1990, the Education Committee recommended to the NCWM Executive Committee that Conference funds up to \$2,500 be made available to any regional weights and measures association planning to sponsor a train-the-trainer course. The Northeastern Weights and Measures Association used the funds in 1990 to sponsor two training sessions in which 15 individuals from eight States participated. The Western Weights and Measures Association used the funds in May of 1991 to sponsor a training session for seven individuals from five states. It was reported to the Committee that the other two regional weights and measures groups are planning to sponsor trainer training programs.

## **402-6 I Module 5 Revision**

At its Interim Meeting, the Committee reviewed the first draft of the revision of Module 5, Vehicle and Axle-Load Scales. This major revision, which has been contracted to Industrial Training Corporation, will make the module compatible with the 1991 edition of Handbook 44. The revised module will reflect the changes to the scale tolerance that were adopted by the NCWM last year and will include all of the marking requirements that were adopted after the publication of the module. The visual aids included in the Instructor's Manual also will be updated.

## **402-7 I Weights and Measures Administration Module**

Work has begun on some sections of this module. At the Interim Meeting, the Education Committee received the first draft of the Weights and Measures Administration Module chapter on metrology that was prepared by Roy Andersen, NY Bureau of Weights and Measures. The NCWM Task Force on Safety is working on a report that is scheduled to be issued in 1991; information from this report will be incorporated into the chapter on safety. The Committee contracted with Dr. Charles Greene of Verde Ventures to write Chapter 1, Functions of a Weights and Measures Program, and Chapter 2, Structure of a Weights and Measures Program, of the administration module. The first drafts of these chapters were reviewed by the Committee at the 1991 NCWM Annual Meeting.

## **402-8 I Joint Meeting with Executive Committee**

The Education Committee met with the Executive Committee and presented a status report on the administration of the grant funds provided by NIST for the development of training materials (see Item 402-1) and implementation of the National Training Program. The Committee did not request that any new funds be included in the Conference's 1991-1992 budget for implementation of the training program, but did ask that funding previously allocated to assist the regions in sponsoring training for trainers and to facilitate the development of module revisions be carried over into the next budget cycle.

## **402-9 I New Regulatory Strategies in Canada**

Renald Marceau, a representative of the Weights and Measures Division of Canada's Department of Consumer and Corporate Affairs, briefed the Committee on Canada's new strategies for organizing its regulatory weights and measures program to meet today's needs. This briefing was part of the Committee's efforts to gather information for the development of the weights and measures administration module. Mr. Marceau described how Canadian regulatory philosophy had changed considerably over the last 25 to 30 years. In the early 1960's the weights



Measures part of Canada's Department of Trade and Commerce was oriented more toward providing assistance to industry and less toward protecting consumers. The primary methodology used to accomplish the mission of the Weights and Measures Division was annual inspection of weighing and measuring devices, for which users paid a service fee; only a small percentage of resources was spent on commodity inspections. The performance indicators used to judge the success of the program were the amount of service fees collected by inspectors in a day and the number of territories covered every year.

In 1967, the Weights and Measures Division was placed under the new Department of Consumer and Corporate Affairs and became more oriented toward consumer protection. Emphasis was placed on listening to consumers and solving complaints. The role of the Division changed from "technical service agency" to "policing body." The Division continued to perform annual device inspections and to judge performance based on number of devices inspected. Industry continued to pay for initial inspections of devices or inspections by request, but annual service fees were dropped and consumers had to pay for Division services.

In the late 1970's and early 1980's, increased workloads and reduced resources resulted in the discontinuation of annual device inspections. The Division began to rethink its regulatory philosophy. A management information system (MIS) was created to help management decide where it could have the greatest impact. Inspection for its own sake was replaced by controlled inspections conducted on a selective basis to concentrate on problem areas, for example, areas with low compliance rates.

The focus in the late 1980's was on more controlled inspections and commodity inspections. Zone inspections -- those conducted on a non-selective basis planned by geographical areas to maintain a record of device accuracy and supply a policing presence -- were made only every 3 or 4 years if a device was not targeted for inspection due to a complaint or problem identified by the MIS. Performance was judged by the number of problems resolved and increased compliance rates.

Today cost/benefit is a key concern of the Division. A Dollar Inequity Program (DIP) was created to target areas with a potentially high level of dollars at risk due to device inaccuracy. DIP is a pilot inspection program designed to assess the implications of measuring program effectiveness in terms of inequity found and corrected rather than changes in compliance rates. By comparing data on dollars saved (by both the consumer and the device owner) as a result of correcting inequities found in a specific category of devices with data on the cost of inspecting that type of device, the Division can establish a cost/benefit ratio: for every dollar spent, x dollars were saved. Reductions in inequities are now the indicators of program success.

In the future, the Division plans to emphasize industry and consumer education, greater allocation of resources for commodity inspection programs, and greater access of each inspector to the MIS. They will also evaluate the possibility of increasing revenues by requiring traders to obtain licenses to operate weighing or measuring devices.

## 2-10 I Certification of NTP Instructors

In its report to the 75th NCWM (see item 402-10), the Education Committee announced that it was considering the establishment of a certification program for individuals who teach NCWM training modules and requested input on pros and cons of such a program. The comments received from the regional weights and measures associations were reviewed and the following questions and issues were identified:

- Are the benefits of a certification program worth the time, effort, and resources required to develop and operate the program?
- Should the program be mandatory? In other words, should NTP recognition (in the form of Continuing Education Units and certification) be given only to individuals who have participated in a module class taught by an NCWM certified instructor?
- Should the program be voluntary? Should participation in the certification program be a way for an instructor to gain recognition and credentials but not be mandatory in order for the officials taught by the instructor to receive NTP recognition?

## Education Committee

- Who should certify instructors--the States, the regional weights and measures associations or the NCWM?
- What criteria should be used to certify instructors?

The Committee plans to ask for additional input from the regional groups on the questions listed above. Sample certification criteria had been developed to aid the regional groups in their discussions of this item. These criteria, which were modified slightly by the Education Committee at the Interim Meeting, are included in this report Appendix D.

### **402-11 I Revised EPOs and Tolerance Work Sheets for Scales**

Revised Examination Procedure Outlines (EPOs) and tolerance work sheets for all of the Scales Modules were reviewed by the Committee at the Interim Meeting. These will be distributed to all State weights and measures offices as an interim measure until comprehensive revisions to the modules can be completed. Major changes to the scales modules were necessitated by changes to the tolerances in the Scales Code that were adopted by the NCWM in 1990.

S. Malone, Nebraska, Chairman

M. Gray, Florida

J. Harnett, Orange County, California (replacing C. Greene, New Mexico)

R. Kalentkowski, Connecticut

M. Coile, Georgia

J. Koenig, NIST, Technical Advisor

**Committee on Education, Administration, and  
Consumer Affairs**

Appendix A - Suggested Format for Certificate of Recognition

The State of \_\_\_\_\_

is pleased to recognize

*John Doe*

for successful completion of classroom training in

*Module 4, Medium-Capacity Scales*

*Administered in accordance with the requirements and procedures of the National Training Program  
of the National Conference on Weights and Measures*

*(State Seal)*

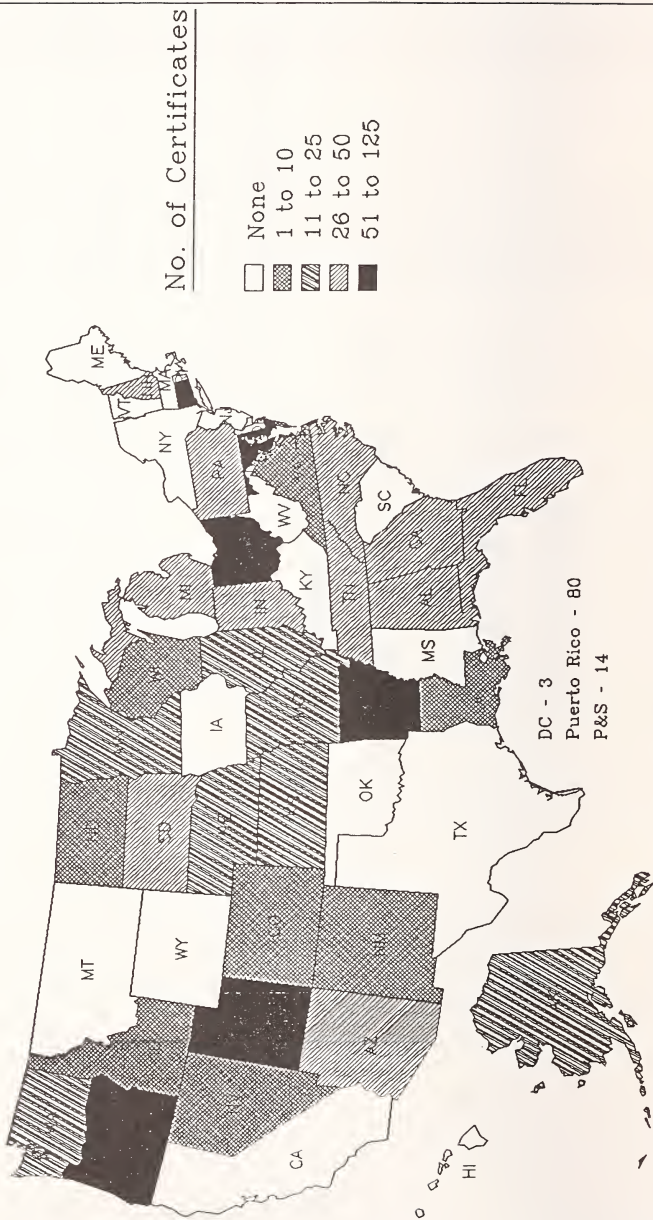
\_\_\_\_\_  
*Director, Weights and Measures*

\_\_\_\_\_  
*Instructor*

\_\_\_\_\_  
*Date*

Appendix B

National Training Program  
Number of Certificates Issued  
(As of 6/30/91)



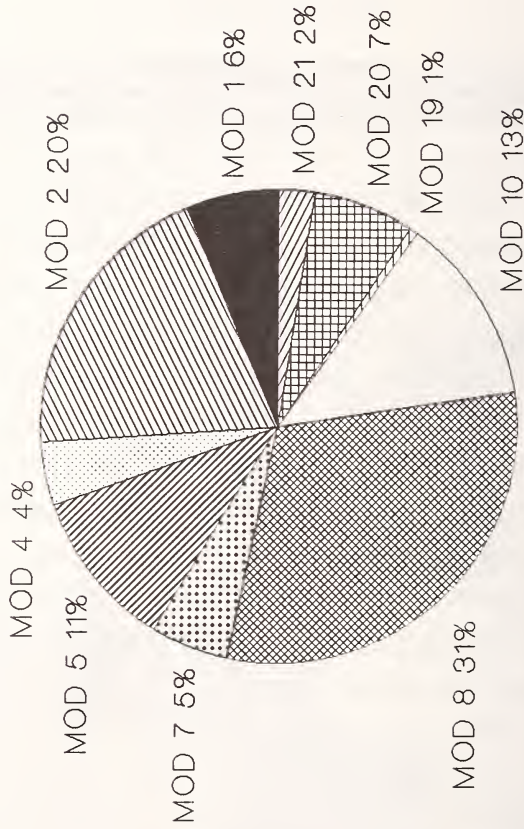


**Appendix B**  
**Certification Summary**  
 (As of June 30, 1991)

State	Total No. of Certif.	Total No. of People	Module Number									
			1	2	4	5	7	8	10	19	20	21
AL	44	22		15	12		4	13				
AK	11	10				1		10				
AZ	28	28		28								
AR	121	38	20	20		8	4	37	12		17	3
CO	7	7					7					
CT	64	22		15	19	2		2	15	6	3	2
DC	3	3						3				
FL	36	24	6	8	3	7			12			
GA	29	24				8	4	17				
ID	9	9						9				
IL	17	17		8		9						
IN	30	30				30						
KS	21	9	7	7		4		1	2			
LA	1	1							1			
MD	61	35						28			33	
MI	42	14				9	12				14	7
MN	15	15						15				
MO	24	23						5	19			
NE	24	12		2				12	10			
NV	2	2				1						1
NH	32	8	6	5	5	2		6			8	
NM	8	8		1				7				
NC	37	33						18	19			
ND	3	3						3				
OH	86	48		27		6	3	38	6			6
OR	54	16	16	15		6		10	6			1
PA	31	20		14				6	11			
PR	80	47		32				33	15			
SD	27	12			7	12		7	1			
TN	41	30				5	6	30				
UT	72	16	15	15	2	11	4	12	12			1
VA	2	2										2
WA	21	16		5				16				
WI	4	4										4
Other												
P&S	14	14					14					
<b>Totals</b>	<b>35</b>	<b>1,100</b>	<b>70</b>	<b>217</b>	<b>48</b>	<b>120</b>	<b>58</b>	<b>338</b>	<b>141</b>	<b>6</b>	<b>75</b>	<b>27</b>

## Appendix B

# Module Certification (Percentage of Total)



Data as of 6/30/91

**Appendix C**  
**NATIONAL TRAINING PROGRAM REGISTRY**  
**SUMMARY OF ACTIVITY**  
 (As of June 30, 1991)

**Courses Listed in Registry:**

Module 1, Retail Computing Scales - Mechanical  
 Module 2, Retail Computing Scales - Electronic  
 Module 4, Medium-Capacity Scales  
 Module 5, Vehicle and Axle-Load Scales  
 Module 6, Meat Beams and Monorail Scales  
 Module 7, Livestock and Animal Scales  
 Module 8, Retail Motor-Fuel Dispensers and Consoles  
 Module 10, Checking the Net Contents of Packaged Goods  
 Module 19, Loading-Rack Meters  
 Module 20, Vehicle-Tank Meters  
 Module 21, LPG Liquid-Measuring Devices  
 Module 22, Commodity Regulations  
 Module 24, Introduction to NIST Handbook 44  
 Module 27, Introduction to Electronic Weighing and Measuring Systems

**Individuals Trained - By Module**

Module Number																
State	1	2	4	5	6	7	8	10	19	20	21	22	24	27	Totals	
AL		15	12	4		4	20							26		81
AK				1			10	8								19
AZ		27				6		17			25	1				76
AR	20	20		8		8	37	12		17	3	13				138
CA						1										1
CO						9	1	1								11
CT		22	20	2			22	18	12	6	2	26				130
DE			1													1
DC	4	4					3		1							12
FL	13	24	15	13		10	27	25		8			40	41		216
GA			11	8		4	17							7		47
HI								14							4	18
ID		9		39			10				10	11		8		87
IL		8	1	9			7	2				1				28
IN		43	46	42			56						47	48		282
IA						3	4					2				9
KS	9	10	14	5		2	17	25		2			3	8		95
KY	8	8	1	5			19									41
LA						8		1								9
ME			3	9			14				2			4		32
MD							28		4	33		4	6			75
MA		23	4	5			16	3	2	31	1	1		12		98
MI		50		13		19	2	29		22	13		18	53		219
MN							12				2	1				15
MS			2	3		3										8

## Appendix C

**NATIONAL TRAINING PROGRAM REGISTRY  
SUMMARY OF ACTIVITY  
(As of June 30, 1991)**

Module Number															Totals
State	1	2	4	5	6	7	8	10	19	20	21	22	24	27	
MO			13				32	27					60	22	154
MT			5				6				1			8	20
NE		17	4	13	14		15	18			2	15	16	27	141
NV				1							1		1		3
NH	6	5	7	2			7			8				6	41
NJ		21	21				108			109				147	406
NM		12				13	15	25			2				67
NY		74						92			9				175
NC							18	19				16			53
ND							3				3			12	18
OH		40	13	44	4	8	42	14			9	11	38	58	281
OK			2				5	22					17	2	48
OR	18	17		8			12	16	1		16	12	17	16	133
PA	34	69	51				63	45			1	19	27	82	401
PR		32					33	24					29		118
RI		1		1						1					3
SC		25				2	28								55
SD			7	12			7	10			1	10		10	57
TN		27		6		6	32							5	76
TX		25				8	24				4		5		66
UT	16	15		11		4	12	13			1		13	16	101
VT	5		3	2			9	1	1			2		5	28
VA			24	16		2	17	38		25	4		5	43	174
WA	13	8		16			16				1	13	6	16	89
WV						3									3
WI	56	53		13			28	16		26	10			65	273
WY			11				16				10		11	3	51
Other															
Associate Members							6		2						8
FGIS														13	13
P&S				2	4	16								3	25
Totals	202	714	291	319	22	139	876	535	23	288	133	145	372	770	4,829



## Appendix C

**NATIONAL TRAINING PROGRAM REGISTRY  
SUMMARY OF METROLOGY SEMINAR ACTIVITY  
(As of June 30, 1991)**

## Courses Listed in the Registry:

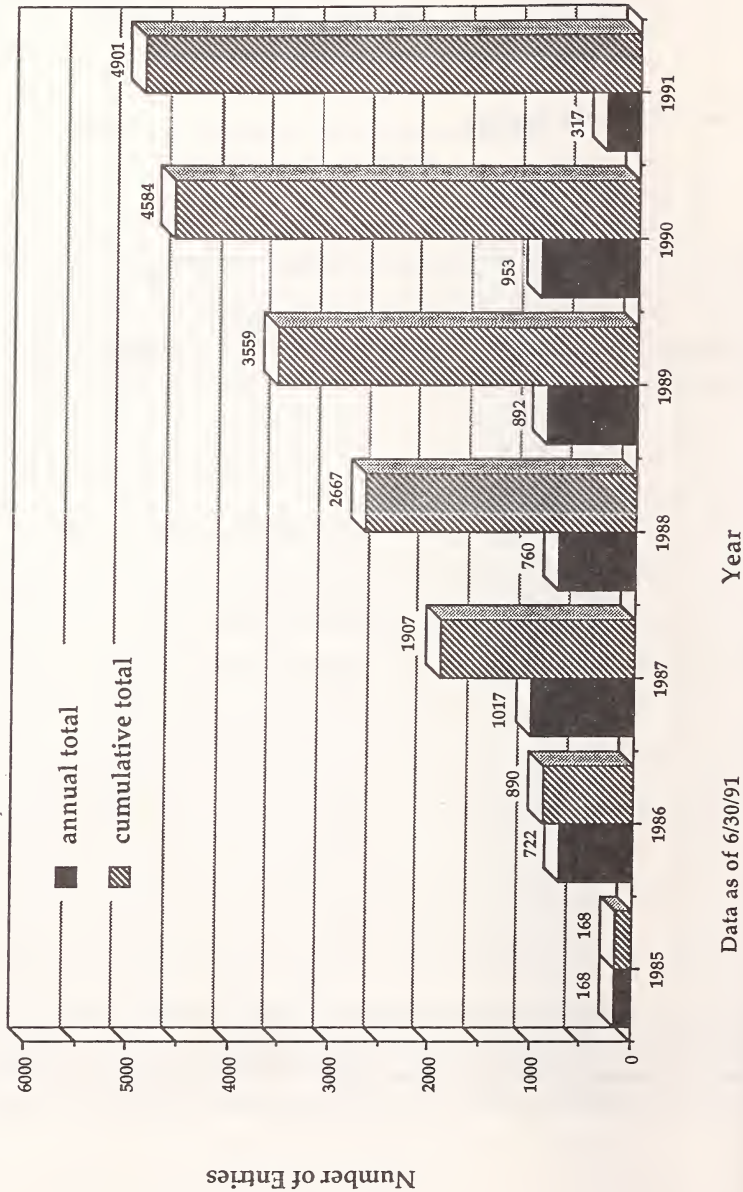
- No. 201, Basic Metrology I  
No. 202, Basic Metrology II  
No. 203, Intermediate Metrology

## Individuals Trained - By Course

State	Course Number			Totals
	201	202	203	
AK			1	1
AZ	1	1		2
CO	2	2		4
CT			1	1
DE			1	1
FL	3	3		6
GA	1	1		2
HI	1	1		2
ID	1	1		2
IL	3	3		6
KY	1	1		2
ME	1	1		2
MD	2	2	3	7
MA	1	1		2
MI			1	1
MS			1	1
NY	1	1		2
NC	2	2	2	6
ND	1	1		2
PA			1	1
PR			1	1
RI	1	3		4
TX	3	3	1	7
VA	1	1	1	3
WV	1	1		2
WI			1	1
Other				
Canada			1	1
<b>Totals</b>	<b>27</b>	<b>29</b>	<b>16</b>	<b>72</b>

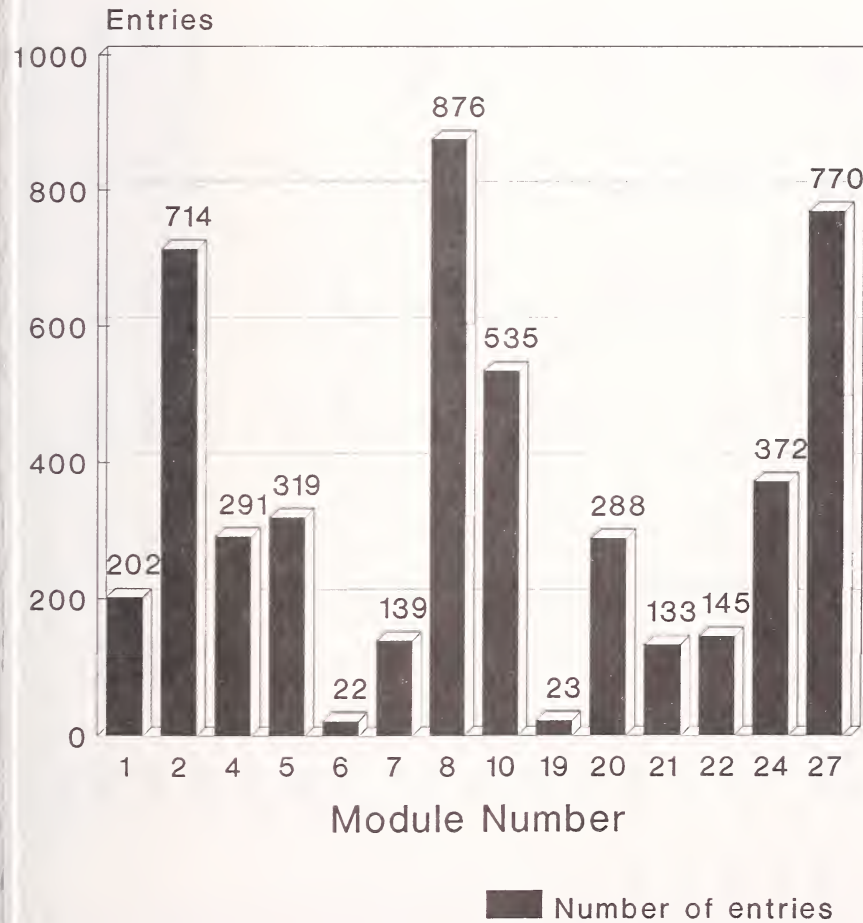
Appendix C

Growth of NTP Registry  
(Annual and Cumulative Data)



Appendix C

# Entries in NTP Registry By Module



# Appendix C

## Continuing Education Units (CEUs) Awarded By the National Conference on Weights and Measures (As of June 30, 1991)

Module Number	CEUS*	No. of Partic.	1985 Total	1986 Total	1987 Total	1988 Total	1989 Total	1990 Total	1991 Total	Grand Total
1	3.10	202	-	306.90	77.50	117.80	99.20	24.80	-	626.20
2	3.10**	714	-	65.10	857.90	759.50	173.60	244.90	31.00	2,132.00
4	3.10	291	-	-	-	492.90	198.40	170.50	40.30	902.10
5	3.10	319	-	-	96.10	133.30	381.30	217.00	159.60	987.30
6	3.10	22	-	-	12.40	-	-	55.80	-	68.20
7	3.10	139	-	-	12.40	-	248.00	117.80	52.70	430.90
8	2.80	876	-	288.40	856.80	260.40	739.20	299.60	8.40	2,452.80
10	2.80	535	75.60	372.40	302.40	128.80	417.20	120.40	81.20	1,498.00
19	3.50	23	-	-	-	-	-	59.50	21.00	80.50
20	2.80	288	-	-	156.80	109.20	109.20	338.80	92.40	806.40
21	3.50	133	-	-	105.00	129.50	147.00	52.50	31.50	465.50
22	2.45	145	-	-	-	-	-	230.30	124.95	355.25
24	1.50	372	-	-	-	-	15.00	402.00	141.00	558.00
27	1.10	770	155.10	402.60	165.00	66.00	36.30	22.00	-	847.00
Totals		4,829	230.70	1,435.40	2,642.30	2,197.40	2,564.40	2,355.90	784.05	12,210.15

\*\*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



## Appendix C

### Continuing Education Units (CEUs) Awarded By the National Conference on Weights and Measures For Attendance at OWM Metrology Seminars (As of June 30, 1991)

<u>Course No.*</u>	<u>CEUs**</u>	<u>No. of Partic.</u>	<u>1990 Total</u>	<u>Grand Totals</u>
201	3.60	27	97.2	97.2
202	3.50	29	101.6	101.6
203	3.10	16	49.6	49.6
	<b>Totals</b>	<b>72</b>	<b>248.4</b>	<b>248.4</b>

\* Course No. 201: Basic Metrology I  
 Course No. 202: Basic Metrology II  
 Course No. 203: Intermediate 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**

### **Trainer Certification Criteria**

#### **Technical Experience**

At least 3 years' experience in weights or measures activities such as:

- Device Regulation
- Package Quantity or Labeling Control
- Device Manufacture
- Device Sales or Servicing
- Federal Enforcement or Coordination

#### **Training Experience**

At least 10 hours of participation in a professional train-the-trainer course, or

Review of at least 10 Videotapes in the Training the Trainer series on loan from the NCWM, or

At least 3 years' experience as a full- or part-time teacher.

#### **Demonstration of Teaching Skills**

Submittal of a satisfactory lesson plan for one chapter of an NCWM module, and

Submittal of satisfactory class evaluations from one module class, and

Submittal of Supervisor recommendation.

**Final Report of the  
Committee on Liaison**

Kathleen A. Thuner, Chairman  
Agricultural Commissioner and Sealer of Weights and Measures  
San Diego County, California

Reference  
Key No.

**500            Introduction**

This is the final report of The Committee on Liaison for the 76th Annual Meeting of the National Conference on Weights and Measures. This report results from the Interim Report, the Addendum Sheets issued at the meeting, and the actions taken by the membership at the meeting.

Reference Key Numbers, Item Titles, and Page Numbers are identified in Table A. Voting items are identified in **boldface print**, as well as by the suffix "V." Information items are identified by the suffix "I." Withdrawn items are identified by the suffix "W."

(This report was informational and adopted in its entirety by a vote of the membership.)

**Table A  
Reference Key Items and Index**

Reference Key No.	Title of Item	Page
501	Federal Agency Activities . . . . .	334
501-1    I	Federal Grain Inspection Service (FGIS) . . . . .	334
501-2    I	Federal Role in Net Content Compliance: USDA . . . . .	335
501-3    I	Labeling of Turkey with Gravy . . . . .	335
501-4    I	Packers and Stockyards Administration . . . . .	335
501-5    I	United States Postal Service (USPS) . . . . .	336
501-6    I	Food and Drug Administration (FDA) . . . . .	337
502        I	OIML Activities . . . . .	337
503        I	OWM Status Report . . . . .	337

Table A (Continued)

Reference Key No.		Title of Item	Page
504	I	Liaison with Regional Associations . . . . .	337
504-1	I	Reports from Regional Weights and Measures Associations . . . . .	337
504-2	I	Improvement of Regional/NCWM Interaction . . . . .	338
505	I	Weights and Measures Week . . . . .	340
506	I	Liaison with Other NCWM Organizations and Committees . . . . .	340
507	I	Public Liaison . . . . .	341

Details of All Items

501 Federal Agency Activities

501-1 I Federal Grain Inspection Service (FGIS)

Railroad Track Scale Testing

Mr. Richard Pforr (FGIS) and Mr. Jim Decker (FGIS) reported the following activities for FGIS for 1990:

1. All of the thirteen Master Scales in service were tested during the year. The Burlington Northern Scale at Havelock, Nebraska, is now out of service until new parts are delivered and installed. The remaining twelve master scales were approved, and the results of the tests were submitted to the Association of American Railroads, state weights and measures jurisdictions, and appropriate railroads.
2. The Master Scale from Martinsburg, West Virginia was reinstalled at Barboursville, West Virginia and tested and approved the week of September 10, 1990.
3. One hundred and seven tests were conducted on scales used for the official weighing of grain. Thirteen railroad-owned track scales, one of them uncoupled-in-motion, and fourteen railroad track scales owned by other industries were tested by FGIS representatives while on approved itineraries. FGIS also performed the field calibration of twenty-one railroad-owned test cars at the FGIS Master Scale Depot in Clearing, Illinois.
4. FGIS continues the tolerance testing of standards owned by local scale companies and private industry. This testing is performed on a request basis, and reports of test are provided to the owner of the standards and the State of Illinois. Industry and local scale service companies requested FGIS to increase calibration services at the Master Scale Depot in Clearing by providing tolerance testing on 25- and 50-pound field standards. The State of Illinois concurs with providing this increase in service.



FGIS continues to operate the railroad track scale testing program at full capacity. FGIS is considering the addition of a third test car to increase track scale testing capability in the midwestern states.

## 01-2 I Federal Role in Net Content Compliance: USDA

Mr. Irv Dubinsky, USDA, provided a report on the activities of the Food Safety Inspection Service (FSIS) in the area of net weight labeling of meat and poultry products.

FSIS has published, in final form, rules dealing with the net weight labeling of meat and poultry products. These rules are designed to:

- (1) create standards that will assure that the net weight statement is as accurate as can be reasonably required for the consumer;
- (2) enable Federal, State and local regulatory officials to enforce uniform net weight standards at retail and other locations within their jurisdictions where meat and poultry products are sold; and
- (3) provide clear and uniform notice to packers, wholesalers, and retailers of net weight compliance procedures and requirements.

The new rules incorporate by reference appropriate sections of NIST Handbook 133, Third Edition, and the 1990 Edition of NIST Handbook 44.

FSIS has requested that Dr. Carroll Brickenkamp of NIST develop a manual, patterned after Handbook 133, for its inspectors; FSIS is also working on the development of a directive or other vehicle for implementing the institution of the program. Dr. Dubinsky is working with Dr. Carroll Brickenkamp, NIST, in this development and implementation. See also Items 240-1 and 240-2.

## 01-3 I Labeling of Turkey with Gravy

In conjunction with his presentation to the Committee on Item 501-2, Mr. Irv Dubinsky, USDA discussed the labeling requirements for turkey with gravy packets. At the July 1988 meeting of the NCWM, the Conference voted to petition USDA to require that poultry and meat products that are packaged with gravy or sauce packets be labeled with both the total net weight for the entire product and the net weight of the gravy or sauce packet. The NCWM petition was submitted to USDA and accepted as a comment on USDA's net weight proposal discussed in Item 501-2. USDA's response to the petition was to be included in the analysis of comments when USDA published its final action on the net weight proposal.

Mr. Dubinsky reported that his division at FSIS has gone about as far as it can in dealing with this issue, which actually falls within the responsibility of another division of FSIS, Standards and Labeling. He referred the Committee to the director of that division of FSIS, Mr. Ashland Clemons, for future contact. One of the problems in resolving this issue is that the Food and Drug Administration (FDA) also has jurisdiction over the labeling of this product. A joint USDA/FDA Committee has been appointed to study the problem. See items 231-5 and 232-4.

## 01-4 I Packers and Stockyards Administration

Mr. John T. Lacy, Chief, Scales and Weighing Branch, USDA Packers and Stockyards Administration (P&S) provided an update on P&S activities for 1990. In recent years, P&S has had to re-prioritize its scales and weighing activities as a result of decreased funding along with increased responsibilities. At present, two regional offices do not have scales and weighing specialist, and P&S is uncertain if these vacancies can be filled on a full time basis.

P&S is now giving greater priority to investigative activities than to participation in scale testing. In areas where weights and measures jurisdictions are active in the testing of devices, P&S is fairly confident that its reduced participation in the testing program does not create a problem; however, weights and measures jurisdictions now face the same budget problems as P&S and participate in the testing of devices less than in the past. In Federal fiscal year 1990, 24% of subject livestock scales, 56% of monorail scales used for purchasing livestock on a carcass weight basis, and 20% of subject vehicle scales used for purchasing live poultry were not tested by a weights and measures official. This causes P&S some concern because they believe that the absence of an official test for an extended period of time will result in decreased accuracy.

The agency continues to be active in providing training in scale testing to scale service personnel and to weights and measures officials. Under the auspices of the National Training Program, P&S has conducted seven training sessions on Module 7 and one training session on Module 6. A total of 132 officials from 20 states have participated in the Module 7 training and 20 officials from one State and four P&S offices participated in the Module 6 training. Current plans for Federal fiscal year 1991 include three training schools for Module 7 training in Louisiana, South Dakota, and Virginia.

A summary of the P&S activities for Federal fiscal year 1990 not including special scale testing is available from the OWM upon request.

## 501-5 I United States Postal Service (USPS)

Mr. Ted Yaffe, USPS, provided the Committee with a report of the activities of the USPS. Mr. Yaffe indicated that the three main areas of USPS activity may be of interest to the NCWM:

- 1) Deployment of the USPS Integrated Retail Terminal (IRT), a combination scale and point-of-sale device, is essentially complete. All post offices with two or more customer windows have received IRT's and should be using them now or installing them for use in the near future. Some State weights and measures personnel have already inspected and tested units in their jurisdictions with the aid of a special test program supplied by the USPS. Because the response to the test program has been very positive, the USPS is including the program in the software which accompanies the IRT's so that it will be available to weights and measures personnel at the scales at all times.
- 2) The USPS has developed and is now deploying a Weighing and Rating Unit (WRU) for installation in post office lobbies and self-service units. The WRU consists of a scale similar to that used in the IRT, a video display, a numeric keypad, and a printer. It is programmed to permit customer operation without assistance. The scale is an unbiased weight classifier (i.e., the tolerance is applied +/- to both sides of the break point), which assures that a mailed piece will never be rated with insufficient postage (as opposed to the Integrated Rate Terminal which incorporates a weight classifier biased in the customer's favor by the amount of the scale tolerance [i.e., the tolerance on the scale applies to the customer's advantage] which assures that a customer will never be overcharged). In following the simple operating instructions that appear on the video screen of the WRU, a customer will be able to weigh mail and determine the correct postage for the mail class plus additional services, such as insurance, that the customer specifies. On request, the customer will receive a printout showing the information he has just developed; the customer may then purchase postage from a nearby vending machine, thus eliminating the usual wait in line at the counter. Approximately 1500 WRU's are scheduled to be in operation by the time the pending rate increase goes into effect. Eventually, almost all mechanical scales now used by customers will be replaced with WRU's.
- 3) The USPS is now in the process of procuring precision test weights for every post office which has IRT's and WRU's. These weights will be used daily to verify the calibration accuracy of the scales in these systems.

as indicated by the activities described above, the USPS continues to be actively committed to a policy of accuracy in weighing mail pieces and to continued cooperation with the NCWM in this area.

## 101-6 I Food and Drug Administration (FDA)

Mr. Christine Lewis, nutritionist with the FDA reported on the status of the nutritional labeling requirements mandated by the "Nutritional Labeling and Education Act of 1990".

Mr. Lewis reported on the progress being made in the promulgation of regulations which must be published by November 8, 1991. She emphasized the importance of comments to the proposed regulations and solicited such comments by interested parties. She can be contacted at Food and Drug Administration, HFF-2651, 200 C Street SW, Washington, DC 20204. Her telephone number is (202) 485-0088.

## 102 I OIML Activities

Mr. Samuel E. Chappell (NIST) described to the Committee, in a joint session with the Executive Committee, the OIML activities of interest to the NCWM. See Item 101-19 for details of the presentation.

## 103 I OWM Status Report

Mr. Albert D. Tholen, Chief, OWM reported to the Committee, in a joint session with the Executive Committee, on the status of the OWM in terms of staffing and program changes. Mr. Tholen also provided an outline of OWM's five-year work plan and invited comments from the Committees concerning OWM/NCWM interaction as described in the work plan. See Item 101-20 for details of the presentation.

## 104 I Liaison with Regional Associations

### 104-1 I Reports from Regional Weights and Measures Associations

#### Central Weights and Measures Association(CWMA)

Mr. DeVern Phillips, Chairperson of the CWMA, presented the Committee with a report of the CWMA's activities. Mr. Phillips reported that the dates for the CWMA's Interim Meetings have been set for October 21-23, 1991 in St. Louis, Missouri. In addition to its standing committees, the CWMA has established a Public Relations Task Force, a Working Committee on Membership Recruitment, and a Working Committee on Training Resources. The Public Relations Task Force is responsible for providing resources and guidance to CWMA members interested in promoting public awareness in the area of weights and measures. The primary goals of the Working Committee on Membership are to increase attendance at and participation in the CWMA; this Committee has already increased CWMA membership by 158 members through a membership drive. The Working Committee on Training Resources is to work to obtain information on the training resources and materials available within the member states of CWMA. The next annual meeting of the CWMA is scheduled for May 3-7, 1992 in Topeka, Kansas.

#### Northeast Weights and Measures Association(NEWMA)

Mr. Bruce Martell, Chairperson, presented the report for NEWMA. Mr. Martell indicated topics for discussion during the recent annual meeting of NEWMA included alternative fuels, and other subjects relating to the 1990 Clean Air Act Amendments. The next interim meeting is scheduled for October 29 and 30 in Cromwell, Connecticut. The next annual meeting is scheduled for the week of May 10, 1992 in Montpelier, Vermont.



## Liaison Committee

### Southern Weights and Measures Association(SWMA)

Mr. Victor Page, President of the Southern Weights and Measures Association (SWMA), reported on the activities of the SWMA. The next meeting of the SWMA is scheduled for October 6-10, 1991 in Lexington, Kentucky.

### Western Weights and Measures Association(WWMA)

Mr. Aves Thompson, President, Western Weights and Measures Association (WWMA), reported to the Committee on the activities of the WWMA.

A "Train the Trainer" course sponsored by the WWMA and supported by the NCWM, Education, Administration and Consumer Affairs Committee, was held at the Utah Department of Agriculture, in Salt Lake City, Utah, on May 2, 3 and 4, 1991. Mr. Thomas M. Stabler conducted the training and seven participants successfully completed the training. The dates for the training were selected in order to economize on air travel by taking advantage of the reduction for staying over Saturday night.

The next annual meeting is scheduled for September 8-13, 1991, in Boise, Idaho, at the Red Lion Inn. Registration information has been sent. For further information, please contact Mr. Glen H. Jex at (208) 334-2345.

## 504-2 I Improvement of Regional/NCWM Interaction

The standing committees of each regional weights and measures association currently provide the standing Committee of the NCWM with a final report of the issues discussed and voted on at the regional meetings along with the result of each voting item. This provides the standing committees of the NCWM with information useful in deliberation at the national level; however, there is some concern on the part of the NCWM committees concerning the amount of background information that accompanies the reports provided by the regional associations.

When an NCWM committee deliberates on an issue in the process of developing a recommendation for the NCWM it should consider a number of parameters before establishing its position. For example, the committee must consider the technical validity of a position, the consensus of the regional weights and measures community, input received from the private sector, and the impact of the position on the business community and the consumer. Because the NCWM committee members often do not have the benefit of attending a particular regional association meeting, they miss the discussions that take place concerning a particular issue at the regional level, which often include crucial information about the surrounding problems in the field. Such information is often not evident from the information provided to the standing committee by the regional committee since the provided information usually focuses primarily on why an item was or was not supported by a region. While the report from the region may also include some of the background, the details concerning reasons for opposing viewpoints are often lacking. This type of information is often valuable to the NCWM committee members in developing their position.

During the discussion of this issue it was noted that the NCWM standing committees are composed of members from each of the four regional areas. The Committee acknowledged that each member of an NCWM committee has responsibility to carry to that committee detailed information concerning the discussions surrounding a particular issue at the regions. Although some NCWM committee members do this, it is evident from the concerns that have been raised that some do not. The Liaison Committee views the responsibility for communicating the needed information to the NCWM as shared by both the regional representative to each NCWM committee and the individual(s) writing the final regional committee report to be sent to the NCWM.

In order to be most effective, each regional weights and measures association committee should ensure that at least one person acknowledges responsibility for providing the detailed information to the NCWM committee. This might be incorporated into the final report of the regional committee or be a separate, more detailed, report accompanying the regional committee report.



The Liaison Committee believes that providing detailed background and discussion information to the NCWM committees would greatly improve the effectiveness of the interaction between the regionals and the NCWM. The committee acknowledges the importance of the opinions of regional members reaching the NCWM committees. The committee expressed these concerns to the Chairperson or President of each Regional Association during the NCWM interim Meetings. The Committee also plans to express these concerns in writing to the Chairperson or President of each regional association as well as to the members of the committees within each regional association. Each proposal to a Standing Committee should be submitted using NCWM Form 15 "Proposal to NCWM Standing Committee". The Form is reprinted below.

## PROPOSAL TO NCWM STANDING COMMITTEE

Committee: \_\_\_\_\_

Regional Association \_\_\_\_\_ Date \_\_\_\_\_

Priority Level: (High) 1 2 3 4 5 (Low)

Contact Person \_\_\_\_\_ Telephone \_\_\_\_\_

Proposal:

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Justification:

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Reasons For:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

Reasons Against:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

Additional Considerations:

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## 505 I Weights and Measures Week

Committee member Mr. Aves Thompson has agreed to assume the responsibilities of spokesperson for the Committee for Weights and Measures Week Activities. Since NCWM, Publication 7, Weights and Measures Week Guide, was recently updated, the Committee determined that no additional revision to that publication would be needed in the next year. The current edition of this publication is dated June, 1989.

The committee urges each member to contact the Chief Executive of their jurisdiction to request that the week of March 1-7 be proclaimed and recognized as "Weights and Measures Week". Sample copies of such proclamation are found in NCWM, Publication 7. The theme for 1992 is "Partners in Progress".

NCWM, Publication 7, is available from the OWM, NIST, at a cost of \$12.00 for members and \$20.00 for non members. The Committee urges each jurisdiction to obtain a copy of this useful publication.

## 506 I Liaison with Other NCWM Organizations and Committees

### Associate Membership Committee

Committee member Mr. Rich Davis provided the Committee with a report on the activities of the Associate Membership Committee (AMC). Mr. Davis reported that this year's chairperson is Dawn Brydon of the International Dairy Foods Association. The AMC this year appealed to the Executive Committee for an increase in the dues for Associate Members. The additional monies realized from the increase in the dues would be provided to the AMC treasurer to help support the dramatically increasing costs of the Associate Membership Reception which is held on Wednesday night during the annual meeting of the NCWM. The AMC believes this would help to provide more equitable and effective support for this function. It would also be the intent of the AMC to use any excess funds to help support NCWM educational programs, training, and publication efforts. This request and some possible solutions were discussed at great length with the NCWM Executive Committee. Refer to Executive Committee Item 101-9 for further comments and recommendations on this issue.

### Retiree's Group

Mr. Raymond Wells, spokesperson for the Retiree's Group reported to the Committee on the activities of that group. Mr. Wells indicated that retiree participation is active in both the Southern and the Western Weights and Measures Associations. There has been some discussion of holding meetings of the Retiree's Group outside of the regional and national weights and measures conferences. In California a statewide retiree's group is being formed. The retiree in the Central and the Northeastern regions are not active at the present time. The retiree's report that they are made to feel very welcome at the national and regional weights and measures conferences.

Mr. Wells discussed with the Committee various ways to involve and utilize the expertise of the retired members in NCWM activities. Possible areas in which this might be accomplished include the training, funding, administrative and equipment acquisition involved in a weights and measures program.

Richard Smith, retired NIST Regional Coordinator, will take over from Mr. Wells as spokesperson for the Retiree's Group sometime in early 1991. The Committee will pursue with Mr. Smith possible directions in which the retiree's expertise can be utilized by the Conference.

### Energy Allocation

When the NCWM Task Force on Energy Allocation Systems was disbanded, the report was assigned to the Liaison Committee to find groups who would be able to adopt or utilize our model guidelines.

Recently, The American Society for Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) has chosen this topic to propose technical specifications as well as consumer related information. Some members of the NCWM Task Force are on the ASHRAE Study Group. Members of the National Utilities Allocation Association and two NCWM Members, Patrick Nichols representing groups of general interest and Peggy Adams representing consumer interests, are members of the study group. At the first meeting of the Study Group, the Chair, Martha Hewitt, Executive Director of the Citizens Energy Center, Minneapolis, Minnesota, stated that the NCWM Task Force had done an outstanding job.

The project has a two year time table. The next meeting will be in Anaheim, California in late January.

## 507 I Public Liaison

### Consumer Information Pamphlet

In the 1970's NIST (then the National Bureau of Standards) developed a consumer pamphlet on weights and measures for distribution by the NCWM. The Committee received a request from the OWM to review and update this pamphlet to include additional and more up-to-date information concerning weights and measures activities and transactions involving weighed or measured commodities. The Committee reviewed an outline of a proposed revision to the original pamphlet and discussed possible means of printing and distributing the revised pamphlet.

The Committee met with Ms. Annette Duff, United States Consumer Information Center (CIC) to discuss how her office, a division of the General Services Administration, could assist the NCWM in establishing more consumer-awareness of the proposed consumer pamphlet and in weights and measures in general. The CIC is prepared to help the NCWM to develop, publish, promote, and distribute consumer information relating to weights and measures activities and services. Pamphlets and brochures distributed by the CIC are available to consumers at either no charge ("free"), or a cost of \$0.50, \$1.00, or higher for each publication. The cost for distribution and handling of a "free" pamphlet is \$0.48 per copy for Federal fiscal year 1991; this does not include the cost for printing the material. The CIC indicated that a rise in cost of approximately 30 percent is expected in the next year; however, the CIC will make a concerted effort to keep the costs for "free" pamphlet distribution and handling in the range of \$0.48. While it is possible to put the weights and measures information on the low fee schedule (i.e., \$0.50 is paid by the consumer to obtain the pamphlet), the Committee felt that a free publication would receive much broader distribution. The Committee will pursue this issue as a priority and invites comments and assistance from all interested parties.

The Committee has targeted Weights and Measures Week 1993 as the time at which the revised pamphlet would be made available. This effort will require input from every region on the content of the pamphlet and coordination with NIST and the NCWM for the development and printing of the pamphlet. The Committee plans to distribute an outline of the proposed pamphlet to members of the education committees of the regional weights and measures associations to obtain their comments and input on the pamphlet by July, 1992.

### Consumer Groups

#### National Coalition for Consumer Education

The Committee met with representatives from The National Association of Consumer Agency Administrators, and the National Coalition for Consumer Education. The Executive Director of the National Coalition for Consumer Education, Mrs. Carole Glade, gave a presentation to the Conference concerning their goals and objectives. She indicated that NCCE is willing to work with NCWM to facilitate the delivery of consumer education regarding weights and measures issues, and looks forward to creating a working relationship with the Committee.

The National Coalition for Consumer Education (NCCE) is a not-for-profit organization advocating consumer education in the nation's schools and communities. Founded in 1981, it operates through a national volunteer network of state coordinators representing business, government, educators and consumer groups. NCCE provides leadership



## Liaison Committee

in promoting consumer education; serves as a resource and catalyst for the expansion of consumer education; conducts surveys to identify issues and trends; and publishes a quarterly newsletter.

National Association of Consumer Agency Administrators (NACAA)

The National Association of Consumer Agency Administrators is a membership organization of approximately 150 administrators of governmental consumer protection programs at the federal, state and local levels. Members are involved in all aspects of protecting consumer rights; resolving individual consumer complaints, conducting informational and education programs, enforcing consumer protection laws, and supporting consumer legislation. NACAA members provide direct service to consumers, and receive in return first-hand information regarding consumer problems and concerns.

With encouragement from NCWM's Liaison Committee, NACAA has been considering how our two organizations might effectively combine efforts. NACAA recognizes that weights and measures concerns are a significant pocketbook issue for consumers. Just recently, NACAA identified for the Blue Sky Task Force some weights and measures issues that we believe require the continued attention of consumer protection agencies. Those issues included: odometer accuracy, octane level; claims, accuracy and reliability of scanning devices of retail establishments, slack fill, uniform unit pricing, downsizing, uniform portions for serving sizes and weight at time of sale. However, while NACAA and NCWM can see the implications of these matters for consumers, both of our groups have realized that consumers themselves are often completely uninformed. The common conclusion we have reached is that consumer education efforts are needed.

NACAA Executive Director Sara Cooper will explore with NCWM Liaison Committee Chair Aves Thompson what concrete steps each group should take in order to pursue a joint consumer education effort. By combining the outreach potential of members from both organizations, we should be successful in our endeavor. NACAA looks forward to a fruitful relationship among our members and members of NCWM in the future.

## Environmental Labeling

A group of 11 States Attorneys General working together over the last 15 months have published a document titled "Green Report II" containing their recommendations for responsible environmental advertising. A copy of this report is available from the participating Attorney General offices - California, Florida, Massachusetts, Minnesota, Missouri, New York, Tennessee, Texas, Utah, Washington, or Wisconsin. The "Green Report II" has been filed with the Federal Trade Commission with recommendations that a national regulatory scheme for environmental advertising be developed.

A group of trade associations has filed a petition with the FTC recommending that FTC provide national guidelines for environmental labeling. This petition has been referred to as the NFPA (National Food Processors Association) petition even though it represents some 11 different trade associations.

The FTC has scheduled public hearings on July 17th and 18th, 1991, to hear testimony regarding environmental labeling and advertising.

## Food Labeling Study

Dr. Mary Heslin contacted the Committee regarding the Institute of Medicine's (IOM) Food and Nutrition Board panel to conduct a study of State and local statutes (laws and regulations) dealing with certain misbranding sections of the Federal Food, Drug, and Cosmetic Act (FDCA), as amended. Section six of the Nutrition Labeling and Education Act (NLEA) of 1990 (P.L. 101-535, enacted November 8, 1990) mandates preemption of State and local statutes that deal with six sections on misbranding. In addition, the Act requires FDA to conduct a study to evaluate the adequacy of Federal regulations in addressing the six sections of FDCA that NLEA preempts.

Dr. Heslin is the Vice Chair of the Committee on State Food Labeling and is seeking to obtain comments on State and local statutes, their impact and rationale in relationship to the adequacy of Federal regulations on the six sections



## Liaison Committee

the law under study.

The Committee on State Food Labeling continues to seek input on the six sections of the FDCA that NLEA exempts. The Committee would appreciate your answers to any of the questions that are relevant to your State. If you have further questions, please call the Project Director, Donna Porter, at (202)707-7032, Institute of Medicine, National Academy of Sciences, 2101 Constitution Avenue, Washington, DC 20418.

Thuner, San Diego County, CA, Chairman

Davis, State of Maine

Davis, James River Corp.

Lacy, USDA, Packers and Stockyards

Thompson, State of Alaska

G. Butcher, NIST, Technical Advisor (Interim Meeting)

G. Newell, NIST, Technical Advisor (Annual Meeting)

Committee on Liaison

## **Metrology Report**

July 14 - 19, 1991  
Philadelphia, PA

Georgia Harris (NIST)

### **Training Program for Metrologists Cancelled**

The initial response to the Train-the-Trainer program for the metrologists to teach the BASIC laboratory metrology seminar was very limited. There was considerable verbal support and encouragement for the concept; however, budgets are extremely limited at this time and few States felt they could support the program.

### **Status of Handbook 143**

A significant amount of information has been collected during the past year for incorporation into Handbook 143. Material includes position descriptions, grain moisture laboratory requirements, petroleum laboratory requirements, and laboratory design and auditing requirements for MIL-STD-45662A, CFR Title 10 (Nuclear requirements), ASTM guidelines, NCSL guidelines, ISO guidelines, OIML guidelines. Many standards will be evaluated to develop a program for State laboratories to meet one set of requirements that will meet as many of the standards as possible.

### **Training, Regional Metrology Meetings, and Site Visits**

All five regional groups had meetings in the last year. There have been two Basic and two Intermediate Laboratory Metrology Seminars. The following laboratories had site visits:

Rice Lake Weighing Systems, Rhode Island, Louisiana, Maryland, Georgia, South Carolina, Savannah River Site, California, Nevada, Washington, Oregon, Virginia, North Carolina

### **Atlanta Mass Measurements Seminar**

Georgia Harris attended a mass measurements seminar, sponsored by the Institute of Nuclear Materials Management (INMM), that was held in Atlanta, Georgia, April 22 - 24, 1991. The workshop was attended by a number of State metrologists and industry metrologists (many who participate in the regional metrology groups) including: David Dikken (MN) who presented initial results of a Mass MAP round robin and spoke as a discussion panel member, Michael Kramer (VA), Martin Coile (GA) who arranged for a number of tours through the Georgia State laboratory, Brenda Whitener (GA), John Pugh (SC) who spoke as a discussion panel member and arranged tours through the South Carolina laboratory, Paul Hadyka (FGIS), Dick Weber (3M, MidMAP), James Reid (Duke Power, SEMAP), Don Brookover (Duke Power, SEMAP), Phil Gibbs (Savannah River Site, SEMAP), Walter Kupper (Mettler), Mark Kline (Troemner). A significant number of excellent papers were presented in measurement control areas as well as precision mass measurements. The INMM currently plans to have another such meeting.

### **NCSL Annual Meeting**

The annual meeting of the National Conference of Standards Laboratories will meet August 18 - 22, 1991 in Albuquerque, New Mexico. Information has been distributed to the State laboratories regarding NCSL and the annual meeting. Georgia Harris will attend the meeting in Albuquerque and encourages metrologists to attend.

## Platform Scale Use

Much discussion has taken place at the regional level in the last year regarding the use of platform scales in the weights and measures laboratories for tolerance testing weights. Some of the States have opted for the use of platform scales in addition to or in lieu of the Russell balance. There is concern regarding appropriate transfer ratios for tolerance testing work in the State laboratories. Most platform scales do not have precision capabilities comparable to the Russell balance. Two States have purchased the Mettler 600-kg platform scale; initial results indicate values approaching those obtainable with the Russell balance.

## ASTM E691 Software

The ASTM E691 data analysis software has been used in several of the regional meetings for demonstration and for analysis of round robin data. The software was developed at NIST and is sold through ASTM for a very modest price. The software also comes with a copy of E 691, Standard Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method. The package can reduce results very quickly, is readily available, can be used on any DOS system, and is a standardized package for data analysis.

## Upcoming Training and Meetings

BASIC Seminars, all held at NIST, Gaithersburg, MD

September 23-October 4, 1991

March 16-27, 1992

October 5-16, 1992

## INTERMEDIATE Seminars

December 2-6, 1991 Gaithersburg, MD

February 10-14, 1992 San Juan, PR (Intensive Basic/Intermediate)

December 7-11, 1992 Gaithersburg, MD

## Regional Metrology Meetings

	<u>1991</u>	<u>1992</u>	<u>Location</u>
SEMAP	held	April 6-10	Forest Park, GA
WRAP	held	May 4-8	Reno, NV
MIDMAP	July 29-Aug 2		Bismarck, ND
NEMAP	September 16-20		Hartford, CT
SWAP	October 21-25		San Antonio, TX

## Safety Report, Laboratory Concerns: L. F. Eason, (NC)

The NCWM Safety Task Force has concluded their work as a Task Force with the publication of the final report which is available from the NCWM. L. F. Eason (NC) has made recommendations to Georgia Harris (NIST) to incorporate suggestions into Handbook 143 and Handbook 145. Until Handbook 145 is revised, it is suggested that State laboratories use Attachment H of the Task Force Report as a guideline for good laboratory practices. Handbook 143 will have suggestions incorporated into the draft which is in process.

## **Education Report, Metrology Chapter of Module 23: Ross Andersen (NY)**

The outline and first draft of the Metrology section of the Administrative module were reviewed during the past year. A new format for this particular module has been developed and Ross Andersen (NY) is in the process of preparing a second draft using the new format.

## **Overview of Regional Reports**

All five of the regional measurement management program (RMMP) groups have met during the past year. Many topics on the agenda are the same at each group meeting. Each of the meetings usually has had a round table discussion of what is happening in each State or facility, which has been a useful format for discussing current issues and items of concern. Each meeting also includes discussion of the round robin measurements. Discussion includes measurement procedures, error analysis, and any systematic errors in individual results. The meetings also include a laboratory tour. During the past year items of discussion included safety, computer demonstrations, platform scale use, magnetized weights, auditing requirements, volume uncertainties, plus a variety of individual technical papers, presentations, and discussions.

### **1. MidMAP Report: Bob Wittenberger (MO)**

The meeting was held July 29 - August 2, 1990 in Rice Lake, Wisconsin. All States were represented.

### **2. NEMAP Report: Mike Dynia (CT)**

The meeting was held September 10 - 14, 1990 in Providence, Rhode Island. Several States were not represented. These included Indiana, Ohio, West Virginia, New York, New Hampshire.

### **3. SEMAP Report: L. F. Eason (NC)**

The meeting was held March 18 - 22, 1990 in Annapolis, Maryland. Several States were not represented. These included Tennessee, Mississippi, Puerto Rico, Virgin Islands.

### **4. SWAP Report: Herb Eskew (TX)**

The meeting was held October 22 - 26, 1990 in Lafayette, Louisiana. Colorado was the only State not represented.

### **5. WRAP Report: Joe Rothleder (CA)**

The meeting was held May 13 - 17, 1991 in Sacramento, California. All States were represented.

## **Philadelphia City Weights and Measures Tour**

Emmett Murphy and Jim Noone of the City of Philadelphia provided the opportunity for metrologists to ask questions about the city weights and measures program and to view the city test equipment. Also, they arranged for space for Mettler Instrument Corporation and Sartorius Corporation to set up demonstrations.

## **Demonstration of Analytical Balances, Sartorius and Mettler**

Balances, accessories, and literature were available. Technical and sales staff from both companies were available to answer the many questions typical of this group. Equipment demonstrated included the Sartorius RC 210 S and S 4 as well as a density kit installed on a Sartorius AC-series balance with an attached printer. The Mettler MT5 and PM 5003 interfaced with a computer were also demonstrated.



## Tour of Troemner, Inc. Facilities

The metrologists were provided with an informative tour of the Troemner manufacturing facility as well as their calibration laboratories.

## LPG SOP 21 Changes and Updates

The compressibility of water information will be added to SOP 21, Handbook 145, and has been discussed at several regional meetings and Intermediate Metrology seminars. An Appendix will be added to SOP 21 with information as follows:

The water compressibility factor is calculated based on an equation given in a paper by George S. Kell, "Density, Thermal Expansivity, and Compressibility of Liquid Water from 0 to 150 °C: Corrections and Tables for Atmospheric Pressure and Saturation Reviewed and Expressed on 1968 Temperature Scale", as published in the Journal of Chemical and Engineering Data, Vol. 20, No. 1, 1975. The calculated compressibility factor for the reference temperature 60 °F (15.555 °C) is  $46.6287 \times 10^{-6}$ /bar. LPG provers are calibrated at a nominal reference point at a specified temperature and pressure, typically 60 °F and 100 psig. A pressure of 100 psig correlates to 6.8 atmospheres. The following equation was used to calculate the compressibility factor:

$$\text{Compressibility in}^3 = (100 \text{ gal}) \left( \frac{231 \text{ in}^3}{\text{gal}} \right) \left( \frac{46.6287 \times 10^{-6}}{\text{bar}} \right) \left( \frac{1.01325 \text{ bar}}{\text{atm}} \right) (6.8 \text{ atm}) = 7.421 \text{ in}^3 \quad (1)$$

The 1990 Change in the Temperature Scale (IPTS 90) does not have a significant effect on the outcome of the equation. Thermometers used for testing are not accurate to the level affected by changes to the temperature scale.

Previously, the value used for adjusting the calculated volume for the compressibility of water was 7.8 in<sup>3</sup>.

## Z<sub>60</sub> Equations

Minor technical changes will be made to the equation used for large volume transfer. The change will not have a significant effect on results. If delta (the difference between the nominal value and that delivered) is not used, there is no difference. The change will incorporate the delta into the temperature correction of the prover. The current and revised equations are given below.

Calculate Z<sub>60</sub>, the calculated volume of the prover at the time of test, which when corrected to 60 °F will be the nominal volume, using the following equation:

$$Z_{60} = \frac{\rho_A \{U_{60}[1 + \alpha(t_A - 60)] + \Delta_A\}}{\rho_Q[1 + \beta(t_Q - 60)]} \quad (2) \text{ current equation}$$

$$Z_{60} = \frac{\rho_A \{(U_{60} + \Delta_A)[1 + \alpha(t_A - 60)]\}}{\rho_Q[1 + \beta(t_Q - 60)]} \quad (3) \text{ proposed revision}$$

## Drift Free Equations

Clarification was made regarding the equations and how they are used. The drift-free equations are also used in the 3-1 data sets that are being reviewed.

## Volume Uncertainties, Gravimetric Procedures, Certification Issues

Uncertainties associated with the following measurements were discussed: 1) laboratory volume transfer calibration; 2) laboratory gravimetric calibration; 3) field calibration (volume transfer); and 4) actual field use of the provers. Uncertainties associated with volume calibration has also been discussed at the regional level and lists of variables affecting the measurements have been made and will be included in a formal report.

The issue of the uncertainties affects several areas, some of which are the review of API requirements, Handbook 44 and Handbook 105-3 tolerances, the laboratory certification of field calibrations, and the primary calibration and traceability of volume measurements made in State laboratories.

## Computer Examples, Demonstrations & Discussion

The use of macros in wordprocessing and spreadsheet software (Wordperfect and Lotus 1, 2, 3 were demonstrated) were discussed as a tool that can be used to save time in using the computers in the laboratory. Macros in wordprocessing included those to open and close letters and memoranda, create calendars, and macros for technical characters that are used in laboratory work. Those include such things as:  $\rho$ ,  $\alpha$ ,  $^\circ$ ,  $\text{in}^3$ ,  $\mu$ , etc.. There was a demonstration of creating a macro for the character  $^\circ$ . There was a request to have this available on the bulletin board for downloading.

The process of creating a macro for adjusting the column width in Lotus 1, 2, 3 was demonstrated. It was stressed that documentation of macros is extremely important for future reference.

The 3-1 data set material that has been prepared by Ken Fraley was discussed. A request for people to "proof" the calculations was made so that the data sets can be distributed to all metrologists.

The ASTM software package E 691 was demonstrated. The package is being used for the analysis of interlaboratory round robin data.

## The Future of Laboratory Metrology: Professionalism, Training & Organizations

A round table discussion took place regarding the future of the laboratories. The information that follows is a summary of the main discussion items.

1. Participants were asked to state concerns and issues that they felt should or will be addressed in the future. A list was prepared.
2. Participants were asked to suggest visions of the future or ideas for change.
3. From the major topics of discussion, the following projects were discussed further.
  - a. The development of individualized training modules would include the development of video and workbook material.
  - b. The development of a mass map for state laboratories could possibly be coordinated through the Office of Weights and Measures using the Mass Code for data reduction.

### **Computers in the Laboratory: Hardware, Software & Testing**

A round table discussion took place regarding the use of computers in the laboratory. The information that follows is a summary of the main discussion items.

1. Participants were asked to state benefits, advantages, or progress that has been made in the use of computers in metrology laboratories. A list was prepared.
2. Participants were asked to suggest ideas for projects that can be addressed at individual levels to improve the use of computers in the laboratories. Another list was made.
3. From the major topics of discussion, the following projects were discussed further.
  1. **Update software programs and system recommendations.** Prepare an index of available programs which people are willing to share, update programs on the bulletin board, advise metrologists of changes and updates of programs and updates. This will be a joint effort between the regional metrology groups and OWM.
  2. **Obtain a speaker to discuss interfacing computers with laboratory equipment.** Rick Calkins agreed to discuss the possibility with Dave Ramos (Sartorius), who gave a presentation at the April 91 Precision Mass Measurements Seminar and Workshop, for giving a presentation at the next annual NCWM meeting.
  3. **Use of the Mass Code in the laboratories.** Several options exist with coordinated efforts. OWM will contact the Mass Group or Rich Davis regarding possible training options. Weighing designs can be performed in the State laboratories. Data files of the observations can be uploaded to the bulletin board, downloaded and reduced; reports can then be uploaded to the bulletin board. Use of the User-Operated Mass Package would provide many of the benefits of the Mass Code in State laboratories.

### **Ken Fraley (OK), Magnetism in the Laboratory**

During the past year Ken Fraley (OK) found 500-lb weights that were magnetized and affected the Mettler ECC 600 comparator in their laboratory. Ken reported how the problem was found and the effect the magnetism had on the comparator. A gaussmeter has been purchased by the State of Oklahoma and was available for examination along with a pair of magnetized forceps.

Several important questions were raised regarding magnetized weights.

1. How can magnetized weights be tested in the laboratory when errors due to magnetism can exceed tolerance limits?
2. Should Handbook 105-1 address the issue of magnetized cast weights?
3. Will the weights affect other types of balances or scales in other testing or weighing applications?

### **David Dikken (MN), Use of the Mass Code and Round Robin Data Analysis**

David Dikken (MN) demonstrated the preparation of data files for use with the NIST Mass Code program using wordprocessing software. Information about the system, standards, unknowns, and observations is arranged according to a set pattern that the Mass Code will reduce into a final report. David has received training from the NIST Mass Group to use this particular software.

David also discussed the report that is produced, the changes he makes in the report to provide a calibration report to clients, and some of the error codes associated with the program.

David also discussed results of a national level round robin that was done with other participants of the NIST Mass MAP program. The round robin was performed to validate the significantly lower uncertainties attainable using the advanced weighing designs and the NIST Mass Code data reduction software. The results of the round robin were compared to a round robin done by the Western Regional Assurance Program (WRAP) group using the same nominal values. The uncertainties reported and actualized among participants were significantly lower for the laboratories using the weighing designs and Mass Code data reduction.

### **Frank Jones (consultant), Air Density Equation and Water Density Equations**

Frank Jones (consultant), gave a presentation regarding use of the air density equation. He also gave the presentation at the Mass Measurements Seminar in Atlanta. The presentation and paper show the metrologists how to develop constants for use with the air density equation that are specific to each laboratory environment. The equation used in Handbook 145 should be used unless the laboratory is capable of developing the constants and incorporating their use with computer programs. The minor systematic differences that may be introduced as a result of using different equations will not be significant unless the laboratory is making very high precision measurements.

Frank also discussed water density equations that use updated information regarding water density, air-saturation, and pressure corrections. This information will be made available to facilitate the use of water density equations when using computer programs. Updated water density tables will also be available.

### **Thermal Effects in the Laboratory**

Apparently systematic differences have been noticed in some primary State standards that have had recent recalibrations. One of the possible causes may be due to thermal effects noticed when the weights are not at the same temperature as the surrounding air. This can be especially noticeable when a single weight is compared to a summation of weights due to differences in the surface to mass ratios. Randy Schoonover gave a presentation at the 1983 NCWM Annual Meeting and discussed the results of work done at NIST on this subject. Recent papers (1986 and 1990) have been prepared and two were distributed with information from Rick Calkins, Rice Lake Weighing Systems, about thermally controlled soaking plates. Soaking plates are used in the NIST mass calibration laboratory and are used for stabilizing the weights to the same temperature as the air in a balance as if a person is performing a calibration.



In dealing with possible systematic effects, a couple of approaches may be used. One is to increase the uncertainty to account for systematic differences; however, this effect is not easily estimated. The preferred approach is to reduce the effects. Several alternatives exist to reduce thermal effects. The proper design of shields to be used on the balances can limit operator effects. A controlled stable temperature in the laboratory will help. Thermally controlled soaking plates can be used. Weight designs that reduce surface dependent thermal effects may be possible. A different measurement control program, where a standard is compared to a check weight of similar design rather than to a summation, may be another alternative.

## **Auditing Requirements/Update of Handbook 143**

Of significant recent concern to laboratories in the United States is the issue of meeting a variety of auditing requirements. In the past these have included military and nuclear requirements. With changes in the international markets and EC92, the ISO 9000-series documents, and ISO Guide 25 will become increasingly important. This is particularly important to State laboratories providing services to industries that market internationally.

Handbook 143 is in the process of being revised and every effort will be made to address audit requirements for the State laboratories. Continued commitment of laboratory staff and management is required to maintain a quality laboratory environment in which to meet audit requirements.

## **Participants**

Joe Rothleder	California
Richard Weber	3M
Jim Akey	Wisconsin
Kelly Moody	Arizona
James Reid	Duke Power
Herb Eskew	Texas
Ken Fraley	Oklahoma
Lynda Maurer	Rhode Island
José Torres Ferrer	Puerto Rico
Bob Wittenberger	Missouri
Rick Calkins	Rice Lake Weighing Systems
L.F. Eason	North Carolina
Mike Dynia	Connecticut
Ross Andersen	New York
Curtis Roberts	North Dakota
Archie Corbitt	Virgin Islands
Vic Gerber	Wyoming
Jim Cammel	Washington
Paul Hadyka	FGIS
David Dikken	Minnesota
Holger Schulz	Sartorius
Alan Little	Sartorius
Jim Floyd	Sartorius
Walter Kupper	Mettler
Dave Baird	Delaware

# Summary Tables of Work Projects

Item #	Title, Description, Status	Contact People	Status	Start Date
1	105-1, Class F Field Standards —adopted by the NCWM at the 1991 Annual Meeting	Georgia Harris	final	1990
2	105-2, Glassware used as Field Standards —update to be drafted by Kelly Moody (AZ)	Kelly Moody (AZ)	initial	1991
3	105-3, Field Standard Test Measures and Provers —comments compiled —update to be drafted and circulated to metrologists for initial comments	Georgia Harris	draft	1990
4	105-4, Field Standard LPG Provers —drafts prepared by Jim Clifford (OR) —reformatting to be done to new 105 format —final editing and suggested changes	Georgia Harris	final edit and format	1989
5	105-5, Field Standard Thermometers —drafts prepared by Joe Rothleder (CA) —editing and formatting to be done —circulation to all metrologists for final comments	Georgia Harris	edit and review	1990
4	105-6, Field Standard Timing Devices —drafts prepared by Ross Andersen (NY) —editing and formatting to be done —circulation to all metrologists for final comments	Georgia Harris	edit and review	1990
7	Comment forms for publication drafts —standardized form developed by L.F. Eason (NC) for use in review of documents completed	Georgia Harris	final	1990
8	105-series Format Guidelines —new format for 105-series handbooks developed by Ross Andersen (NY) to follow OIML/ASTM patterns completed	Georgia Harris	final	1990
9	Large Capacity Platform Scales Test Procedure —procedure drafted by Ross Andersen (NY) —included in the NCWM report —to be included in the training modules	Georgia Harris	final	1989
10	Module 23, Chapter on the Metrology Laboratory —outline and initial draft prepared by Ross Andersen (NY) —reviewed and a new format for module suggested —second draft being prepared by Ross Andersen (NY)	Ross Andersen Georgia Harris	revised draft	1990
11	Laboratory Safety —L.F. Eason (NC) completed recommendations to Safety Task Force regarding laboratory issues —Recommend use of Appendix H of the final report —Issues to be incorporated into HB 143 and HB 145 as updated	Georgia Harris	final	1989
12	SOP's —SOP 21 for LPG provers to be circulated by Georgia Harris —SOP for tuning fork tests prepared by Bill Young (CO) —SOP for testing timing devices prepared by Ross Andersen (NY) —SOP for railroad test cars being prepared by Vic Gerber (WY) —SOP for density determination being prepared by James Reid (Duke Power) and David Dikken (MN)	Georgia Harris	final edit draft initial	1991

Item #	Title, Description, Status	Contact People	Status	Start Date
13	<b>Data Sets for Testing Computer Software</b> -Air density, circulated 1990 -3-1 weighing design (also double substitution), prepared by Ken Fraley (OK), Herb Eskew (TX), final evaluation prior to circulation -Z <sub>60</sub> and LPG data sets in process -Gravimetric data being collected -4-1 and 5-1 design data being collected	Georgia Harris	final edit  draft draft draft	1989
14	<b>Speaker for 77th Annual Meeting</b> -Metrologists would like a speaker to discuss interfacing computers with laboratory equipment, Rick Calkins (RLWS) agreed to make an initial contact	Georgia Harris	initial	1991
15	<b>Index of Available Computer Programs</b> -prepare an index of programs available on the bulletin board and in individual laboratories that people are willing to share	Regional Groups	initial	1991
16	<b>Index of Available Technical Papers and Reports</b> -prepare an index of papers and reports that people are willing to share	Regional Groups	initial	1991
17	<b>Update Computer Programs</b> -requests made to update computer programs available on the bulletin board -Volume.wk1 and Vollpg.wk1 are updated Lotus worksheets on the bulletin board -additional updates will be made as available, a memo will be sent to states regarding programs	Georgia Harris	in process	1991
18	<b>Collect Data to Evaluate Mass Flow Capabilities</b> -requests for information will be made by several metrologists, to their divisions or other organizations: Kelly Moody (AZ), Ross Andersen (NY), David Dikken (MN), Herb Eskew (TX), Bob Wittenberger (MO)	Kelly Moody	initial	1991
19	<b>Address Issues Associated with Air &amp; Water Contaminants</b> -A memo dealing with contaminant concerns will be shared if anyone is interested in developing the material further	Joe Rothleder	initial	1991
20	<b>Develop Individualized Training Modules for Laboratory Metrology</b> -draft of a request from the metrologists will be written by LF Eason (NC) -A recommendation to the Office of Weights and Measures at NIST will be made to include this topic in the Long Range Plan	L.F. Eason Georgia Harris	initial	1991
21	<b>Coordinate a Project to Provide Training and Use of the Mass MAP and Mass Code</b> -draft of a request from the metrologists will be written by LF Eason (NC) -A recommendation to the Office of Weights and Measures at NIST will be made to include this topic in the Long Range Plan	L.F. Eason Georgia Harris	initial	1991
22	<b>Handbook 143, Laboratory Program</b> -Information has been collected for position descriptions, grain moisture and petroleum quality programs -Additional information will be reviewed to incorporate accepted auditing requirements	Georgia Harris	initial	1991

## Report of the Resolutions Committee

Dean F. Ely, Chairman  
Pennsylvania Department of Agriculture

### REFERENCE KEY

700

#### GENERAL

The resolutions committee wishes to express the appreciation of the members of the National Conference on Weights and Measures to those who contributed their time and talents toward the arrangements for the conduct of, and the success of this 76th Annual Meeting. Special votes of thanks are extended:

- (1) to Leon Wigrizer, Commissioner, Philadelphia Department of Licenses and Inspection, for his introductory remarks delivered at the General Session of the Conference on Tuesday afternoon;
- (2) to the Honorable W. Wilson Goode, Mayor of the City of Philadelphia for his gracious welcome to the conference members and guests;
- (3) to Ray Kammer, Deputy Director of NIST, representing Dr. John Lyons, NIST Director, who conveyed to the Conference Dr. Lyons' spirit of vital support of the ongoing programs and activities of the Conference to Dr. Lyons for his direction to NIST and the NCWM toward future joint issues including: use of the Metric (SI) System; enhancement of international trade; implementing the philosophy of Total Quality Management and its application to State weights and measures programs and the operation of the NCWM;
- (4) to the staff of the Philadelphia Weights and Measures Bureau, particularly Emmett Murphy and Jim Noone for their kindness and assistance in ensuring the success of the 76th Annual Meeting of the Conference;
- (5) to Louis Sokol, U.S. Metric Association, and Theodore Wright, American National Metric Council, for their dedication and tireless efforts in keeping the issue of metrication before the many NCWM government and industry attendees of this Conference;
- (6) to officers and appointed officials of the National Conference on Weights and Measures for their assistance and service toward progress on national issues;
- (7) to committee members for their efforts throughout the past year preparing and presenting their reports; to the subcommittees and task forces for their discerning and appropriate recommendations;
- (8) to regulatory officials of State and local jurisdictions for the advice, interest, and support of weights and measures administration in the United States;
- (9) to representatives of business and industry for their cooperation and assistance in committee and Conference work; to the associate membership organization for the hospitality exhibited in sponsored social functions;
- (10) to the staff of the Four Seasons Hotel for their assistance and courtesies, all of which contributed to the enjoyment and comfort of the delegates within their fine facilities;
- (11) to Albert D. Tholen, former Executive Secretary of the Conference, now appointed Acting Chief of the NIST National Voluntary Laboratory Accreditation Program, for his untiring leadership and outstanding efforts on behalf of the NCWM;



- (12) to Carroll S. Brickenkamp for her many contributions to the work of the Laws and Regulations Committee, with congratulations on her appointment as Acting Chief of the Office of Weights and Measures and Executive Secretary of the Conference; and
- (13) to the National Institute of Standards and Technology and the Office of Weights and Measures for their outstanding assistance in planning and conducting the work and program of the National Conference on Weights and Measures, especially to Ann Heffernan-Turner, Terry Grimes, and Elizabeth Loveless for their professional and hospitable operation of the administrative operations of the meeting.

D. Ely, Pennsylvania, Chairman

G. Jex, Idaho

M. Phillips, Indiana

C. Pittman, Tennessee

E. Price, Texas

A. Thompson, Alaska

J. Mindte, NIST, Coordinator

#### **Resolutions Committee**

On motion of Mr. Jex, the Resolutions Committee Report, Reference Key Item 700, was adopted by the Conference.

## Report of the Nominating Committee

Fred A. Gerk, Chairman  
State of New Mexico

Reference  
Key No.

800

The Nominating Committee met during the Interim Meeting at the Hyatt Regency Bethesda, Bethesda, MD, and nominated the listed persons to be officers of the 77th Conference. In the selection of nominees from active membership, consideration was given to professional experience, qualifications of individuals, Conference attendance and participation, regional representation, and other factors considered to be important.

CHAIRMAN-ELECT:	Allan M. Nelson, Connecticut
VICE-CHAIRMEN:	Thomas Geiler, Barnstable, MA Cathryn Pittman, Tennessee Kathleen Thuner, San Diego County, CA James Truex, Ohio
EXECUTIVE COMMITTEE:	Darrell Guensler, California Steve Malone, Nebraska
TREASURER:	Charles Gardner, Jr., Suffolk County, NY

Fred A. Gerk, NM, Chairman

Carl Conrad, NJ  
L. F. Eason, NC  
Charles Gardner, NY  
Steve Malone, NE  
Allan Rogers, VA  
Donald Sobberg, WI

### Nominating Committee

On motion of Mr. Gerk, the Nominating Committee Report, Reference Key Item 800, was adopted by the Conference.

## **Report of the Auditing Committee**

Emmett Murphy, Chairman  
Chief  
Philadelphia, Pennsylvania Weights and Measures

Reference  
Key No.

900

The Auditing Committee met on Tuesday afternoon, July 16, 1991, for the purpose of reviewing the financial reports of the Conference Treasurer, Charles A. Gardner, Jr.

The Auditing Committee finds the financial reports of the Conference Treasurer to be in accordance with Conference procedure and correct.

E. Murphy, Chief, Philadelphia, Pennsylvania, Weights and Measures

S. Casto, West Virginia  
E. Hanish, Indiana

J. Mindte, NIST, Coordinator

### **Auditing Committee**

On motion of Mr. Murphy, the Report of the Auditing Committee, Reference Key Item 900, was adopted by the Conference.

**National Conference on Weights and Measures  
Treasurer's Report  
Fiscal Year 76 (1990-1991)**

July 1991

CASH ON HAND June 30, 1990

\$104,815.32

(BUDGET)

RECEIPTS:

(\$30,000)	1.1 Registrations	27,000.00
(92,500)	1.2 Memberships	126,339.00
(6,500)	1.3 Training Modules	9,985.75
(3,700)	1.4 Interest	5,499.81
(1,000)	1.5 Promotional	2,348.20
(8,000)	1.6 Special Events	4,846.16
(1,000)	1.7 NTEP Operations	0.00
(300)	1.8 Publications	1,981.00
(15,000)	1.9 Miscellaneous	680.00
(158,000)	TOTAL RECEIPTS	<u>178,679.92</u>
	TOTAL INCOME	<u>283,495.24</u>

DISBURSEMENTS:

(15,000)	2.0 Annual Meeting	22,737.79
(5,000)	3.0 Interim Meeting	13,057.79
(20,000)	4.0 Committee Operations	18,914.79
(43,000)	5.0 Special Programs	32,370.69
(12,500)	6.0 Chairman's Expense	6,859.15
(6,000)	7.0 Membership Expense	7,991.49
(12,000)	8.0 Printing & Publications	14,843.32
(10,500)	9.0 Administration	15,849.47
(8,000)	10.0 Special Events	23,319.76
(2,000)	11.0 Promotions	955.43
(24,000)	12.0 Training Modules	11,817.02
(158,000)	TOTAL DISBURSEMENTS	<u>168,716.70</u>

BALANCE: 114,778.54

BANKS

European American (New York)	77,355.72
Signet (Maryland)	314.24
Certificate of Deposit #1	25,226.74
Certificate of Deposit #2	11,881.84
Certificate of Deposit #3	0.00

BALANCE: 114,778.54

Grant Account	3,617.54
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Date Submitted: 7/16/91 Charles A. Gardner  
Charles A. Gardner, Treasurer

Date Audited: 7/16/91 James M. Hughes  
Auditing Committee Chairman

J. G. Givette  
Staff Advisor



July 17, 1991

**Treasurer's Report  
Fiscal Year 75 (1990-1991)  
National Conference on Weights and Measures**

**Grant Account**

Start		<u>6,780.00</u>
Deposits		
Grant #1 HA 4003	\$15,750.00	
Grant #2 8H 0869	-0-	
Total		<u>15,750.00</u>
Interest		314.97
Payments		
Grant #1 HA 4003	17,303.52	
Grant #2 8H 0869	1,523.91	
Total		<u>18,827.43</u>
Interest Transfer		400.00
Close		<u>3617.54</u>

Date Submitted: 7/16/91

Charles A. Gardner  
Charles A. Gardner, Treasurer

J. Spindler  
Staff Advisor

## **New Chairman's Address**

Sid Colbrook  
Weights and Measures Program Manager  
Illinois Department of Agriculture

### **PARTNERSHIPS FOR PROGRESS**

We are facing the challenges of the future. We have all heard this week some of the cutbacks being made in government. There has never been a time when we in weights and measures must work more closely together in order for our programs to grow and continue to prosper than now. The theme this year, partnerships for progress, I believe signifies the importance for us to work together and become more uniform in weights and measures. One method of achieving uniformity is the adoption of the National Conference on Weights and Measures publications established by regulatory weights and measures officials from throughout the United States. One of the objectives stated in the Constitution of the National Conference on Weights and Measures is to encourage and promote uniformity of requirements and methods among jurisdictions. Manufacturers, distributors and other representatives of industry attend and support the Conference in order to achieve uniformity in weights and measures.

I know if I were a member from industry and supported the National Conference with the understanding that by using this forum, uniform laws, regulations and testing procedures are established, I would be discouraged to find that some weights and measures jurisdictions are not following the documents adopted by the Conference.

The adoption of the conference standards benefits manufacturers, packagers, other members from industry, weights and measures officials, but most importantly, it benefits all consumers.

During the past several years, we have seen the regional associations playing a more active role at the National Conference. It was not that long ago that many issues of the various standing committees were thrashed out during the voting session. Now we see that the agenda items are being thoroughly discussed at the regional and interim meetings. Very seldom do we see amendments made upon amendments on voting items during the voting session. I recall voting one time for the opposite of what I thought I was voting for. Conference attendees of today are better informed to make the right decision.

A significant accomplishment was reached last year by having all states agree to participate in the National Training Program. This program has developed quite rapidly and has had a positive impact on uniform testing procedures not only for weights and measures officials but also members from industry. It is imperative in order to keep this program functional, the training modules must be kept up-to-date.

Chairman Smith appointed the "Blue Sky Task Force" last year to study weights and measures issues of today and the future. Darrell Guensler this week gave a detailed report on the progress of this task force. Some of the items they are considering include determining the need to have a session on motor fuel quality at the Conference; consider the impact of biodegradable, recyclable, and safety packaging on existing requirements; make recommendations for new areas which need to be considered by the Conference; and look at new ways of financing weights and measures programs. These issues are important for the National Conference. Therefore, I have asked the task force and Darrell as Chairman, to continue their work. One addition, David Smith has agreed to serve on this Task Force.

We have seen in recent years the interaction of other countries to the National Conference on Weights and Measures. Canada is continuing to work with the Conference to reduce differences between our two countries. Also the Board of Governors have been working with the Specifications and Tolerances Committee about making the National Type Evaluation procedures more compatible with OIML. We need to consider international standards when establishing national standards to insure that there exists a basis for equity in trade.

I have been very pleased with the support of the Scale Manufacturer's involvement with the National Type Evaluation Program. The presentations which have been made by SMA supporting the adoption of NTEP have not only answered many questions about the program but have moved some jurisdictions to begin the process of adopting NTEP. These are all examples of Partnerships formed by the National Conference for Progress. We have found that NTEP has prevented many devices which were never designed for commercial use from being used commercially. Judging by the number of times I have contacted either Henry, Tina, Terry or Karl regarding a question I may have about a Certificate of Conformance, I know they must spend a considerable amount of their time on the telephone.

As I mentioned earlier, it seems that many of our programs may be reduced due to budgetary cutbacks being made. If you need assistance in supporting your program during these critical times, contact the Office of Weights and Measures. We have a great resource in Carroll Brickenkamp and her staff.

A new endeavor being established is the expansion of the National Type Evaluation Program to include performance criteria for grain moisture measuring devices and protein analyzers. The need to standardize commercially used grain moisture measuring devices has existed for years and we are finding that the protein content of some grains is a primary grading factor. The United States Grain Standards Act authorizes the Federal Grain Inspection Service to work with the National Institute of Standards and Technology and the National Conference on Weights and Measures to establish performance criteria for commercial grain inspection instruments and develop a national program to approve grain inspection equipment. We look forward to working with the Federal Grain Inspection Service, another example of partnerships for progress.

There has been much discussion this week about a formal organizational structure for Metrologists with the National Conference on Weights and Measures. The Metrology laboratories are the basis for all of our weights and measures programs. I know in our State that the training of our Metrologist and Metrologist Associates is the number one priority. Georgia Harris has filled the void by providing the support to the metrology laboratories and maintaining the state's certification program.

On behalf of the National Conference on Weights and Measures, I would like to extend my appreciation to the task force on safety. To Chairman Charlie Gardner, L.F. Eason, Jim Harnett, Hap Thompson and Don Soberg, the work you have accomplished will be extremely beneficial to all of us in weights and measures. We should all become familiar with your glossary of safety key phrases. As addressed in your final report, the end result of establishing a safety program will reduce workplace injury, disability and property damage.

One area I would like to see developed is to set time aside at the National Conference for jurisdictions involved with motor fuel quality testing to discuss issues of interest. This is an item being considered by the "Blue Sky Task Force". Perhaps a model regulatory program for petroleum testing could be developed which would be beneficial to all regulatory agencies responsible for the quality of motor fuel and petroleum products. I have been questioned about the standards we have established for motor fuel and have heard that we have more stringent standards than other states performing motor fuel testing. After making contact with other states, I have found that our standards are sometimes more lenient than their standards. This is why I believe there is a need for model petroleum regulation.

Another special thank you goes to Peter Perino, Chairman, and the task force on Belt Conveyor Scales. I know that in Illinois the testing criteria and procedures for use in the evaluation of belt conveyor scales have been needed. Pete and his work group has dedicated a lot of their time in putting these standards together. Thank you.

#### NOW FOR THE COMMITTEE APPOINTMENTS.

To the Auditing Committee, Bob Gunja from Kansas City will serve.

Dean Ely from Pennsylvania will serve on the Credentials Committee.

To the Resolutions Committee, Bruce Martell from Vermont will serve.

The Nominating Committee will be David Smith, Chairman; Les Barrows from Missouri, Darrell Guensler from California, Carl Conrad from New Jersey, Ray Elliott from Oklahoma, Fred Gerk from New Mexico, and

Jim Truex from Ohio.

The Budget Review Committee shall be myself, David Smith, Fred Gerck, Harvey Lodge, Charles Gardner and Carroll Brickenkamp.

To the Specifications and Tolerances Committee, George Shefcheck from Oregon will serve.

Lou Straub from Maryland will serve on the Laws and Regulations Committee and Tom Geiler will serve the remainder of Allan Nelson's term to the Committee.

Michelle Phillips from Indianapolis, Indiana will serve on the Committee on Education, Administration and Consumer Affairs.

Jim Melgaard from South Dakota will serve on the Liaison Committee.

The Chaplain will be Martin Coile from Georgia.

Gerry Hanson from California has agreed to be Assistant Treasurer.

The Parliamentarian will be Clayton Davis from Maine.

The Associate Membership Committee will be:

Chip Kloos of Beatrice/Hunt-Wesson Foods, Chairman

Jim Schnitzler, Accurate Metering Systems, Inc., Vice-Chairman

Dave Quinn, Fairbanks Scales, Secretary

Tom Stabler, Toledo Scale Corp., Treasurer

Associate Committee Members:

Hap Thompson, American Petroleum Institute

Ray Wells, Sensitive Measurement, Inc.

Richard Davis, James River Corporation

Irving Bell, Coca-Cola Company

Terry James, Cardinal/Detecto

Doug Walker, Marathon Petroleum Company

Well, we are at the wind down part of the program. I have really enjoyed visiting each regional association and making new friends and renewing old acquaintances. I look forward to working with Allan Nelson, a person I have known for years and a good friend. Allan and I were both metrologists, both members of the Northeastern Weights and Measures Association for several years and most recently members on the Laws and Regulations Committee. Allan and I will be available to you. Please let us know of any ideas or suggestions which you may have to benefit the Conference. It takes all of us to work together, as partners to continue the progress of the Conference. I would again like to personally thank David Smith for the support he has given me. Allan and I will look to you for your guidance and assistance to provide continuity to the conference.

The 77th National Conference will be held July 19 through July 24, 1992 at the Stouffer Hotel in downtown Nashville, Tennessee. There are many side attractions to see while in Nashville, such as the Grand Ole Opry, Riverboat cruises, a theme park and Printer's Alley. We plan to combine next year the Industry and Conference outing together. We hope to take a riverboat ride on Wednesday evening which will include dinner and a show.



Also Ann Turner who has been in contact with me almost daily, has advised me that there will be tickets available to go to the 9:00 p.m. show on Saturday night at the Grand Ole Opry for those conference attendees who arrive early. Bob Williams mentioned to me that if you have not been to Nashville before, you may want to spend a few days before or after the Conference to take in all of the sights.

The interim meeting will be held again at in Bethesda, Maryland at the Hyatt Regency Hotel January 13 through 17, 1992. The room rate is \$69 for a single or a double.

David, do you have anything else to say before we close or is there anyone else who wishes to address the Conference? -- if not, I would like to call upon our Conference Chaplain, Dean Ely for the benediction.

I now would entertain a motion to adjourn...

Then I declare the 76th National Conference on Weights and Measures adjourned. Have a safe trip home and I hope to see each of you next year in Nashville, Tennessee.

# Registration List for Annual Meeting July 14 - 19, 1991

Deidre Adams Staff Product Planner IBM 2020 Yonkers Road Raleigh, NC 27604 Telephone: 919-664-5106 FAX: 919-664-5004	700	Tom Balmer International Dairy Foods Asso 888 16th St NW Washington, D.C., 20006 Telephone: 202-296-4250	16260	James R. Bird Deputy State Supt NJ Retired 57 Bella Road Medford, NJ 08055 Telephone: 609-267-5520	82
Michael F. Adams Manager of Technical Support Fairbanks Scales 711 E St Johnsbury Rd St Johnsbury, VT 05819 Telephone: 802-748-5111 x326 FAX: 802-748-5216	11447	Jerry L. Bane Chief, Wgts. & Measures Bureau Iowa Department of Agriculture Henry A Wallace Bldg, E 9th Des Moines, IA 50319 Telephone: 515-281-5716 FAX: 515-281-6800	10636	Michael Blacik Director of Wts & Meas. State Of Minnesota 2277 Highway 36 St Paul, MN 55113 Telephone: 612-341-7200 FAX: 612-639-8537	8924
Peggy H. Adams Retired Consultant Box E Bedminster, PA 18910 Telephone: 215-795-2149 FAX: 215-795-2694	2735	Salvatore A. Barbera President Digi Matex Inc 80 Oak St Norwood, NJ 07648 Telephone: 201-784-3400 FAX: 201-784-3770	287	Barbara J. Bloch Special Assistant CA Div of Measurement Standard 8500 Fruitridge Rd Sacramento, CA 95826 Telephone: 916-366-5119 FAX: 916-366-5179	7004
James H. Akey State Metrologist WI Department of Agriculture PO Box 7883 4702 University Ave(05) Madison, WI 53707-7883 Telephone: 608-267-3510 FAX: 608-266-1506	2414	Lester H. Barrows Director Bureau of Weights & Measures PO Box 630 Jefferson City, MO 65102 Telephone: 314-751-4316 FAX: 314-751-8307	3926	David J. Bott Manager, Technical Services ARCO Chemical Company 3801 West Chester Pike Newtown Square, PA 19073-2387 Telephone: 215-359-5730 FAX: 215-359-5753	3265
Frederick T. Allen, Jr. Manager, Reg Affairs (LC)27-00 Pitney Bowes, Inc. Walter Wheeler Dr Stamford, CT 06926 Telephone: 203-925-5044 FAX: 203-925-5080	12094	Irving Bell Senior Executive Staff Rep Coca-Cola Company PO Drawer 1734/One Coca-Cola Plaza Atlanta, GA 30313 Telephone: 404-676-2623 FAX: 404-676-8265	4473	Frank J. Bowden, Jr. Consultant %Sun Refining & Marketing Ten Penn Center 1801 Market St. Philadelphia, PA 19103 Telephone: (215) 977-3731 FAX: (215) 977-34	22188
Norman A., Alston Manager, P.D. Meter Sales Daniel Flow Products Inc. 9720 Old Katy Rd., PO Box 19097 Houston, TX 77224 Telephone: 713-827-3857 FAX: 713-827-3880	2590	Francis X Bellotti Attorney Mintz & Levin One Financial Centr Boston,, MA 02170 Telephone: (617) 542-6000	22180	Harold D. Bradshaw Inspector Weights & Measures Dept of Weights & Measures City County Bldg, Room 314 Jeffersonville, IN 47130 Telephone: 812-283-6289	2738
Ross J. Andersen Metrologist NY State Bureau of Wts & Meas State Campus Bldg, 7A Albany, NY 12235 Telephone: 518-457-4781 FAX: 518-457-4780	2994	Anthony F. Belmont Sealer of Weights & Measures Town of Greenwich Con Aff 101 Field Point Road Greenwich, CT 06830 Telephone: 203-622-7713 FAX: 203-622-3767	2547	William D. Brasher Senior Quality Control Analyst Southern Co Services Inc PO Box 2625 Bin B852 Birmingham, AL 35202 Telephone: 205-877-7653 FAX: 205-877-7288	4417
Sydney D. Andrews Consultant 1133 Myers Park Dr Tallahassee, FL 32301-4525 Telephone: 904-878-3928	41	F. Michael Belue President Belue Associates PO Box 701, 2004 Liberty St Bonham, TX 75418 Telephone: 903-583-9082	691	William H. Braun American Paper Institute 5743 Jeffrey Place Fairfield, OH 45014 Telephone: 513-829-2106	2983
David L. Baird Metrologist Weights & Measures Section 2320 S Dupont Hwy Dover, DE 19901 Telephone: 302-739-4811 x32 FAX: 302-697-6287	4129	Melvin Bighumb Weights & Measures Inspector The Navajo Nation PO Box 663 Window Rock, AZ 86515 Telephone: 602-871-6714 FAX: 602-871-7381	4248	Carroll S. Brickenkamp Program Manager Nat'l Inst of Sids & Tech A617 Admin Gaithersburg, MD 20899 Telephone: 301-975-4005 FAX: 301-926-0647	239

Robert T. Brumbaugh President Systems Associates Inc 1932 Industrial Dr Libertyville, IL 60048 Telephone: 708-367-6650 FAX: 708-367-6960	297	Jeffrey D. Canfield President Acme Scale & Supply Co 5401 Butler St Pittsburgh, PA 15201 Telephone: 412-782-1808 x1 FAX: 412-782-2658	273	Camil Collard Grain Weighing Systems Inc. CDN. Grain Commission Montreal Quebec CANADA K1A 0C9, H2Y2P5 Telephone: 514-283-8355	22132
Mike Bryan C.G.O. National Corn Growers Assn 1000 Executive Parkway-Stc 105 St Louis, MO 63141 Telephone: 314-275-9915 FAX: 314-275-7061	10790	Charles H. Carroll Assistant Director MA Division of Standards One Ashburton Place Boston, MA 02108 Telephone: 617-727-3480 FAX: 617-227-6094	4393	Carl P. Conrad, Jr. Chief Supervisor Office of Weights & Measures 1261 U.S. Rte 1 & 9 South Avenel, NJ 07001 Telephone: 908-815-4840 FAX: 908-382-5298	2487
Dawn M. Brydon Director of Marketing Internatl Dairy Foods Assn 888 16th St, NW Washington, DC 20006 Telephone: 202-296-4250 FAX: 202-331-7820	9099	Charles D. Carter Program Administrator W & M Agricultural Products Division 2800 N Lincoln Blvd Oklahoma City, OK 73105-4298 Telephone: 405-521-3864 x294 FAX: 405-521-4912	9838	Archie Corbitt Chief Inspector Weights and Measures Goldern Rock Shopping Center Christiansted-St. Cro, VI 00820 Telephone:	22153
Mark Buccelli Weights & Measures Div State Of Minnesota 15580 Hallmark Court Apple Valley, MN 55124 Telephone: 612-341-7200	8926	Max C. Casanova Manager Technical Service Ramsey Technology, Inc. 501 - 90th Avenue N.W. Minneapolis, MN 55433 Telephone: 612-783-2659 FAX: 612-780-1537	362	William Corey American Frozen Foods 355 Benton St Stratford, CT 06497 Telephone: 203-386-8605	16318
Charles A. Burns, Jr. Chief Inspector City of Birmingham W & M Rm 207, City Hall 710 N.20th St. Birmingham, AL 35203 Telephone: 205-254-2246 FAX: 205-254-2925	7575	Stephen L. Casto Director Weights & Measures Division 1800 Washington St E Charleston, WV 25305 Telephone: 304-348-7890 FAX: 304-348-3797	11187	William J. Corey, Jr. Secretary American Frozen Foods, Inc. 355 Benton Street Stratford, CT 06497 Telephone: 203-378-7900 FAX: 203-386-8676	16337
Philip S. Bush Specialist, Corp. Studies Amoco Oil Company 200 E. Randolph Drive Chicago, IL 60601 Telephone: 312-856-7890	3152	H. Penny Causgrove Retired Sealer of Wts & Meas City of New Haven 18 Davis St New Haven, CT 06515 Telephone: 203-387-4913	3847	Constantine V. Cotsoradis Program Manager W&M Sect MD Dept of Agric 50 Harry S Truman Parkway Annapolis, MD 21401 Telephone: 301-841-5790 FAX: 301-841-2765	8232
Kenneth S. Butcher Weights & Measures Coordinator Natl Inst of Stds and Tech A623 Admin, NIST Gaithersburg, MD 20899 Telephone: 301-975-3991 FAX: 301-926-0647	2512	Michael J. Cavanaugh Retired District Supervisor PA Bureau of Wts & Meas 36 Spicebush Rd Levittown, PA 19056 Telephone: 215-945-9288	8878	Richard D. Cunningham Inspector Weights & Measures Huron County 2 East Main Norwalk, OH 44857 Telephone: 419-668-8643	150
Tina Gaver Butcher Weights & Measures Coordinator Natl Inst of Stds & Tech A617 Administration Building Gaithersburg, MD 20899 Telephone: 301-975-2196 FAX: 301-926-0647	8236	Samuel E. Chappell Standards Management Natl Inst of Stds & Tech Bldg 101, Room 625 Gaithersburg, MD 20899 Telephone: 301-975-4024 FAX: 301-963-2871	10610	A.R. Daniels Director Industry Stds & Rel NCR Corp 1700 S Patterson Blvd WHQ-5 Dayton, OH 45479 Telephone: 513-445-1310 FAX: 513-445-1418	343
Richard Calkins Senior Metrologist & Manager Rice Lake Weighing Systems 230 West Coleman St Rice Lake, WI 54868 Telephone: 715-234-9171 x11 FAX: 715-234-6967	9100	Fred P. Clem Weights & Measures Inspector City of Columbus 50 W Gay St Columbus, OH 43215-2821 Telephone: 614-645-7397 FAX: 614-645-6675	169	Jeffrey B. Davies Product Manager-Weighing Sys. Saratec Traffic Group 820 Lafayette Rd Hampton, NH 03842 Telephone: 603-926-1986 FAX: 603-926-7415	7046
James H. Cammel Acting Director Dept of Agric/Wts & Measures 406 General Admin Bldg Olympia, WA 98504 Telephone: 206-753-5042 FAX: 206-586-7029	8385	Sidney A. Colbrook W&M Program Manager Illinois Dept of Agriculture PO 19281, 801 E Sangamon Ave Springfield, IL 62794-9281 Telephone: 217-782-3817 FAX: 217-524-4882	47	Gerald E. Davis System Supvr Scale Insp Conrail 6 Penn Center Plaza Room 1634 Philadelphia, PA 19103-2959 Telephone: 215-977-1617	968

Richard L. Davis 3806 Manager Product Compliance James River Corporation 1915 Marathon Ave. P.O. Box 899 Neenah, WI 54956-0899 Telephone: 414-729-8174 FAX: 414-729-8089	L.F. Eason 3886 Metrologist NC Dept of Agric Standards Division PO Box 27647, Dept. SD Raleigh, NC 27611 Telephone: 919-733-4411 FAX: 919-733-0999	James Floyd 12946 Director Tech Services Sartorius Corporation 140 Wilbur Place Bohemia, NY 11716 Telephone: 800-645-3108 FAX: 800-344-2068
Lacy H. DeGrange 27 Retired Chief, W&M Section MD Dept of Agriculture 7123 E. Bradshaw Court Frederick, MD 21701 Telephone: 301-841-5790 FAX: 301-841-5999	Steve K. Eckhardt 10643 Product/Market Manager Micro Motion Inc 196 South Brown Road Long Lake, MN 55356-9407 Telephone: 612-475-0067 FAX: 612-832-5316	Robert L. Fonger 3919 Senior Field Representative Bennett Pump Co PO Box 597 Muskegon, MI 49445 Telephone: 616-733-1302 FAX: 616-739-8832
Mike Deisley 4428 Agric Program Supervisor Nebraska Weights & Measures PO Box 94757 Lincoln, NE 68509 Telephone: 402-471-4292 FAX: 402-471-3252	David E. Edgerly 2999 Acting Deputy Dir/Tech Serv Nat'l Inst of Sids & Tech Bldg 221 Room A363 Gaithersburg, MD 20899 Telephone: 301-975-4500 FAX: 301-975-2183	Cleveland C. Forde 9841 Director Monroe Dept Weights & Measures 1157 Scottsville Rd Rochester, NY 14624 Telephone: 716-436-1330
G.W. (Wes) Diggs 9034 Superv, VA Weights & Measures VA Weights & Measures PO Box 1163 Room 402 Richmond, VA 23209 Telephone: 804-786-2476 FAX: 804-786-1571	John J. Elengo, Jr. 440 VP Engr, Wallinford Operations Revere Transducers Inc PO Box 5041 Wallingford, CT 06492 Telephone: 203-284-5102 FAX: 203-284-5142	Ken L. Fraley 4148 Metrologist Lab Div Bur of Standards 2800 N Lincoln Blvd Oklahoma City, OK 73105 Telephone: 405-521-3864 x370 FAX: 405-521-4912
David Dikken 13899 Metrologist MN Weights & Measures 2277 Hwy 36 Roseville, MN 55113 Telephone: 612-341-7200	Dean F. Ely 9648 District Supervisor PA Dept of Agriculture 332 Washington Ave. Jersey Shore, PA 17740 Telephone: 717-327-3560	George S. Franks 144 Retired County Superintendent Dept Wts & Meas & Cons Prot 1142 E. Landis Avenue Vineland, NJ 08360 Telephone: 609-453-2203 FAX: 609-453-2206
Loren Dobyns 12941 Manager Plant & Electrical Thunder Basin Coal Co PO Box 406 Wright, WY 82732 Telephone: 307-939-1300 FAX: 307-939-1300	Joycelyn Encarnacion 12545 Division of Weights & Measures Dept of Licensing & Con Aff Golden Rock Shopping Center Christiansted-St.Croix, VI 00820 Telephone: 809-773-2226	Bob Fuehne 10443 Quality Assurance Specialist Ralston Purina Co Checkerboard Square - 4RN St Louis, MO 63164 Telephone: 314-982-2916 FAX: 314-982-4072
Louis D. Draghetti 2673 Inspector of Wts & Meas Town of Agawam 36 Main St Town Hall Agawam, MA 01001 Telephone: 413-786-0400 x232 FAX: 413-786-9927	Larry J. Enfield 15874 Director Quality Control General Mills Inc. Number One General Mills Blvd Minneapolis, MN 55440 Telephone: 612-540-2729 FAX: 612-540-7611	Carol P. Fulmer 4463 Assistant Commissioner SC Dept of Agriculture PO Box 11280 Columbia, SC 29211 Telephone: 803-737-2080 FAX: 803-737-2068
Dennis Druzba 14361 Assistant Superintendent Middlesex County Wts & Meas 149 Kearny Avenue Perth Amboy, NJ 08861 Telephone: 201-324-4610 FAX: 201-324-4608	David C. English 2153 President Measurement Systems Intl 14240 Interurban Ave, S Seattle, WA 98168-4660 Telephone: 206-433-0199 FAX: 206-244-8470	Frank R. Gamba 6067 Actin Super./Wgts. & Meas. Cumberland County 788 E Commerce St Bridgeton, NJ 08302 Telephone: 609-453-2203 FAX: 609-453-2206
Andrew Dudiak 22159 Manager Product Marketing 7070 Winchester Circle Boulder, CO 80302 Telephone: 303-530-8545 FAX: 303-530-8418	James H. Eskew 3435 Chief Metrologist TX Dept of Agriculture 119 Cumberland Rd Austin, TX 78704 Telephone: 512-462-1441	Charles A. Gardner 3438 Director Wts & Measures Suffolk County Consumer Affair County Ctr/N Bldg 340 Hauppauge, NY 11788 Telephone: 516-853-4621 FAX: 516-360-7470
Michael Dynia 7196 Metrologist Weights & Measures Rm G-17 St Off Bl, 165 Capitol Hartford, CT 06106 Telephone: 203-566-5230 FAX: 203-566-7630	Sy Feinland 7048 SMTS Pitney Bowes, Inc. Parrot Dr Shelton, CT 06484 Telephone: 203-925-5211 FAX: 203-925-5333	



Charles H. Gardner President Seraphin Test Measure 30 Indel Ave Rancocas, NJ 08073 Telephone: 609-267-0922 FAX: 609-261-2546	9660	Maxwell H. Gray Chief Bureau of W&M FL Dept of Agric/Consumer Serv 3125 Conner Blvd Tallahassee, FL 32399-1650 Telephone: 904-488-9140 FAX: 904-922-6655	7991	Melvin C. Hankel Manager of Mechanical Engr Liquid Controls Corporation Wacker Park North Chicago, IL 60064-3599 Telephone: 708-689-7302 FAX: 708-689-0330	9094
Thomas F. Geiler Director, Consumer Affairs Town of Barnstable 230 South St., P.O. Box 2430 Hyannis, MA 02601 Telephone: 508-790-6251 FAX: 508-790-6454	219	Richard D. Greek Agri Commissioner/Sealer San Luis Obispo County 2156 Sierra Way Suite D San Luis Obispo, CA 93401 Telephone: 805-549-5910 FAX: 805-549-5911	2875	Gerald W. Hanson Director San Bernardino County Wts/Meas 777 E Rialto Ave San Bernardino, CA 92415-0790 Telephone: 714-387-2136 FAX: 714-387-2143	116
William G. GeMeiner Manager-Weights and Measures Chicago & North Western RR 165 N Canal Street Chicago, IL 60606 Telephone: 312-559-6133 FAX: 312-559-7185	562	Charles H. Greene, Ph.D. Retired Division Director NM Dept of Agriculture 840 Camino Del Rex Las Cruces, NM 88001 Telephone: 505-523-0730	64	James D. Harnett Agricultural Commissioner Dept of Weights & Measures 1010 S Harbor Blvd Anaheim, CA 92805-5597 Telephone: 714-447-7100 FAX: 714-774-2741	7774
Victor L. Gerber Metrologist Wyoming Dept of Agriculture 2219 Carey Avenue Cheyenne, WY 82002-0100 Telephone: 307-777-7324	2455	Terry L. Grimes Secretary Nat'l Inst of Stds & Tech A617 Admin Bldg Gaithersburg, MD 20899 Telephone: 301-975-4027 FAX: 301-926-0647	6275	Georgia Harris Metrologist, Office Wts & Meas Nat'l Inst Stds & Tech A617 Admin Bldg Gaithersburg, MD 20899 Telephone: 301-975-4004 FAX: 301-926-0647	9324
Fred A. Gerk Dir Div Stds & Consumer Svcs NM Dept of Agriculture PO Box 30005, Dept. 3170 Las Cruces, NM 88003-0005 Telephone: 505-646-1616 FAX: 505-646-3303	63	Christopher B. Guay Regulatory Affairs Procter & Gamble 11511 Reed Hartman Highway Cincinnati, OH 45240 Telephone: 513-626-2222 FAX: 513-626-2407	13666	Ivan E. Headley Chief Inspector Monroe Cnty Weights & Measures 119 W 7th St, c/o County Health Bld Bloomington, IN 47404 Telephone: 812-333-3566	147
Joseph A. Giannina Manager Bulk Terminal Port of Corpus Christi Auth PO Box 1541 Corpus Christi, TX 78403 Telephone: 512-883-1162 FAX: 512-883-1652	3905	Darrell A. Guensler Assistant Director CA Measurement Standards 8500 Fruitridge Rd Sacramento, CA 95826 Telephone: 916-366-5119 FAX: 916-366-5179	38	Thomas J. Healy Servie Manager Thayer Scale-Div. Hyer Ind Inc P.O. Box 669 Pembroke, MA 02359 Telephone: 617-826-8101 x320 FAX: 617-826-7944	16522
Dennis B. Giovacco Colorado Prime Inc. One Michael Ave. Farmingdale, NY 11735 Telephone: (516) 694-1111	22184	Robert Gunja Standards Administrator Kansas City, KS Wgts & Measure 701 North 7th St Kansas City, KS 66101 Telephone: 913-573-5080 FAX: 913-573-5005	9956	David K. Heck Coordinator-Policy Developemen Chevron Corporation 575 Market St, Room 966 San Francisco, CA 94105-2856 Telephone: 415-894-0910 FAX: 415-894-8468	11242
Carole Glade Nat. Coalition for Cons.Ed. 434 Main Street, Suite 201 Chatham, NJ 07928 Telephone: 619-694-2778 FAX: 619-565-7046	22176	Paul Hadyka Industrial Specialist USDA/FGIS Room 0623-S PO Box 96454 1400 Ind. Ave Washington, DC 20250-6454 Telephone: 202-382-0262 FAX: 202-447-4628	9402	Edward C. Heffron, D.V.M. Director, Food Division MI Dept of Agriculture P.O. Box 30017 Lansing, MI 48909 Telephone: 517-373-1060 FAX: 517-373-9146	2452
William V. Goodpaster Vice President Cardinal/ Detecto 1610 North C St Sacramento, CA 95814 Telephone: 916-441-0178 FAX: 916-441-5606	1607	Edwin M. Hanish Inspector Laporte County Indiana Weights & Measures 2700 Franklin St Michigan City, IN 46360 Telephone: 219-874-7197	109	Bruce W. Heine Ethanol Sales Manager New Energy P.O. Box 2289 South Bend, IN 46680 Telephone: 219-233-3116 FAX: 219-232-1876	3162
John Gould American Meat Institute 1700 N Moore St Room 1600 Arlington, VA 22209 Telephone: 703-841-2400 FAX: 703-527-0938	15317				

Sid Hejzlar Vice President Engineering John Chatillon & Sons Inc 83-30 Kew Gardens Rd Kew Gardens, NY 11415 Telephone: 718-847-5000 FAX: 718-441-4365	4201	Frances P. Holland Authorities & Stan. Administra Schlumberger Technologies 3601 Koppens Way Chesapeake, VA 23323 Telephone: 804-366-4400 FAX: 804-487-7350	15654	Ted F. Johnson Director of Marketing Sensortronics Inc 677 Arrow Grand Circle Covina, CA 91722 Telephone: 818-331-0502 FAX: 818-332-3418	9899
Raymond H. Helmick Director State of AZ Dept of W&M 1951 W North Lane Phoenix, AZ 85021 Telephone: 602-255-5211 FAX: 602-255-1950	10130	Monty H. Hopper Director Dept. Of Weights & Measures 1116 E. California Avenue Bakersfield, CA 93307 Telephone: 805-861-2418 FAX: 805-324-0668	11132	Debbie A. Joines Sr. Design Engineer Wayne Div-Dresser Industries 124 W. College Ave., P.O. Box 1859 Salisbury, MD 21802 Telephone: 301-546-6699 FAX: 301-548-6913	11709
Michael G. Hendricks Superintendent Middlesex County Wts & Meas 149 Kearny Avenue Perth Amboy, NJ 08861 Telephone: 201-324-4610 FAX: 201-324-4608	14360	Richard M. Huff Vice President Electronics Universal Epsco Inc 1494 Ellsworth Ind Dr/Bx 93544 Atlanta, GA 30318 Telephone: 404-351-2740 FAX: 404-351-2899	10608	Walter Junkins Supervisor 1309 Strafford Road Camp Hill, PA 17011 Telephone: 717-761-0342 FAX: 717-795-8842	12589
Marilyn J. Herman President Herman & Associates 2300 M St, NW, Suite 800 Washington, DC 20037 Telephone: 202-775-1630 FAX: 202-293-3083	9091	Terry Jaffoni Sales & Marketing Rep. Cargill 2330 Buoy Street Memphis, TN 38113 Telephone: (901) 775-5800	22185	Raymond Kalentkowski Supervisor Weights & Measures Division State Office Bldg/Cons Prot Hartford, CT 06106 Telephone: 203-566-4778 FAX: 203-566-7630	7243
Mary M. Heslin Commissioner CT Dept. Consumer Protection St Office Bldg 165 Capitol Ave Hartford, CT 06106 Telephone: 203-566-4999 FAX: 203-566-7630	9110	W. Terry James Vice Pres Engineering Services Cardinal/Detecto 203 E Daugherty PO Box 151 Webb City, MO 64870 Telephone: 417-673-4631 FAX: 417-673-5001	3099	Ray Kammer Deputy Director Natl Inst of Stds and Tech 11th Floor, Admin Bldg Gaithersburg, MD 20899 Telephone: 301-975-2300	22178
Sam F. Hindsman Director Arkansas Bureau of Standards 4608 W 61st St Little Rock, AR 72209 Telephone: 501-562-7605 FAX: 501-562-7605	45	Jack Y. Jeffries Supervisor Division of Standards 7810 Alafia Dr Riverview, FL 33569 Telephone: 904-487-2634 FAX: 813-272-2287	2199	Gene I. Katz Vice President Weigh-Tronix, Inc. Po Box 1501 2320 Airport Blvd Santa Rosa, CA 95402 Telephone: 707-527-5555 x303 FAX: 707-579-0180	1069
Donald J. Hine (Retired) AEM Corp 452 W Tenth St Elyria, OH 44035 Telephone: 216-323-2041	3448	Glen H. Jex Chief Bureau of Weights & Measures 2216 Kellogg Lane Boise, ID 83712 Telephone: 208-334-2345 FAX: 208-334-2170	7260	Joseph T. Keenen E.C. Operations Manager E. W. Saybolt, Inc. 400 Swenson Drive Kenilworth, NJ 07033 Telephone: 908-245-3100	2968
Herman R. Hochstetler Inspector Elkhart County Weights & Meas 117 N 2nd Room 107 Goshen, IN 46526-3231 Telephone: 219-534-3541 x319 FAX: 219-533-4431	5855	Mark R. Joelson General Counsel Morgan Lewis & Bockius 1800 M St, NW Washington, DC 20036 Telephone: 202-467-7240 FAX: 202-467-7176	4238	Michael J. Keilty Product Mgr-Custody Transfer Micro Motion Inc 9170 Washington Blvd. Beaumont, TX 77707 Telephone: 409-727-0776 FAX: 303-530-8418	11672
Lee Hock Manager Field Services BP Oil Co 4850 E 49th St Cleveland, OH 44125 Telephone: 216-271-8211 FAX: 216-271-8717	6238	Gordon W. Johnson Regulatory Engineer Gilbarco, Inc 7300 W. Friendly Avenue Greensboro, NC 27420 Telephone: 919-547-5375 FAX: 919-292-8871	3351	Richard Kelley Mobil Chemical Co Plastics Pkg 729 Pittsford-Palmyra Road Macedon, NY 14502-0798 Telephone: 315-986-5350 FAX: 315-986-5033	13790
				Thomas W. Kelly Director (Retired) NJ Food Council 737 Evergreen Parkway Union, NJ 07083 Telephone: 609-392-8899	5892

Thomas Kiley Counsel American Frozen Foods Suite 820, 1 International Place Boston, MA 02110 Telephone: 617-439-7775 FAX: 617-330-8774	3159	William Lagemann Administrator Wgts. & Measures State Of Delaware 2320 S Dupont Hwy Dover, DE 19901 Telephone: 302-739-4811 x37 FAX: 302-697-6287	7976	Clement Magras Commissioner Lic. & Cons Aff Prop & Proc BI #1 Subbase Room 205 St. Thomas, VI 00820 Telephone: 809-774-3130	19419
Thomas R. Kiley Attorney Regulatory Counsel American Frozen Foods Suite 820 One International Place Boston, MA 02169 Telephone: (617) 439-7775	22181	Robert L. Land Inspector of City Anderson Dept of Weights & Measures PO Box 2100, 120 E 8th St Anderson, IN 46011 Telephone: 317-646-9839 FAX: 317-646-5668	187	James E. Maka Administrator Div Of Measurement Standards 725 Ilalo St Honolulu, HI 96813-5524 Telephone: 808-548-7152 FAX: 808-548-7269	8069
Mark Kline Troemner Inc 6825 Greenway Ave Philadelphia, PA 19142 Telephone: 215-724-0800 FAX: 215-724-9663	9219	Edward G. Levers Retired Superintendent Union County 629 Norwood Terrace Elizabeth, NJ 07202 Telephone: 908-352-8331	12598	Steven A. Malone Director Weights & Measures Division Box 94757/301 Centennial Mall South Lincoln, NE 68509 Telephone: 402-471-4292 FAX: 402-471-3252	554
Chip Kloos Lab Manager-R & D Beatrice/Hunt-Wesson Foods 1645 W Valencia Dr Fullerton, CA 92633-3899 Telephone: 714-680-1098 x1098 FAX: 714-449-5166	3453	Raymond J. Lloyd Executive Director Scale Manufacturers Assn 932 Hungerford Dr #36 Rockville, MD 20850 Telephone: 301-738-2448 FAX: 301-738-0076	7	Renald Marceau Program Officer Consumer & Corporate Affairs 207 Queen St, Ottawa CANADA K1A 0C9, 026 Telephone: 613-952-2629 FAX: 613-952-1736	10211
Kenneth J. Knapp Product Engineering Manager Milltronics Inc 709 Stadium Drive, East Arlington, TX 76006 Telephone: 817-277-3543 x191 FAX: 817-277-3894	11120	Harvey M. Lodge Dunbar Manufacturing Inc 307 Broadway Swanton, OH 43558 Telephone: 419-825-2331 FAX: 419-826-8439	355	Patrick Marino Technical Service Manager New Brunswick Internatl Inc 76 Veronica Ave Somerset, NJ 08873 Telephone: 201-828-3633 FAX: 201-828-4884	9366
Joan A. Koenig Weights & Measures Coordinator Natl Inst of Sids & Tech Admin 101, Rm A617 Gaithersburg, MD 20899 Telephone: 301-975-4007 FAX: 301-926-0647	9036	Elizabeth Loveless Secretary Natl Inst of Sids & Tech A617 Admin Gaithersburg, MD 20899 Telephone: 301-975-4004 FAX: 301-926-0647	11655	Glen R. Marshall Staff Engineer Shell Oil Co 777 Walker - TSP1130 Houston, TX 77002 Telephone: 713-241-1452 FAX: 713-241-7166	10444
Curtiss R. Kunkel Senior Engineer Emark Corp 6255 Ferris Square San Diego, CA 92121 Telephone: 619-457-1180 x312	12862	Forrest Joe Loyd, Jr. Engineer-Scales & Weighing CSX Transportation Inc 500 Water St, Room 907 Jacksonville, FL 32202 Telephone: 904-359-1024 FAX: 904-359-7476	9086	Bruce Martell Supervisor, Cons. Assur. Div. Vermont Dept of Agriculture 116 State Street SOB Montpelier, VT 05602 Telephone: 802-828-2436 FAX: 802-828-2361	10126
Walter E. Kupper Director Tech & Reg Affairs Mettler Instrument Corp Princeton-Hightstown Rd.-PO Box 71 Hightstown, NJ 08520-0071 Telephone: 800-638-8537 x8861 FAX: 609-443-5972	3930	David Luncford Northeast Regional Mgr SGS Control Services, Inc. 20 Lafayette St Carteret, NJ 07008 Telephone: 201-541-7200 FAX: 201-541-1336	94	Keith E. Masser President PA Cooperative Potato Growers Box 210 Harrisburg, PA 17968 Telephone: (717) 682-3709	22183
Dan Kushnir Sales Manager Seraphin Test Measure 30 Indel Ave Rancocas, NJ 08073 Telephone: 609-267-0922 FAX: 609-261-2546	9902	Melvin L. Lyons Asst Director LA Wts & Measure LA Dept of Agri and Forestry 5825 Florida Blvd. Baton Rouge, LA 70806 Telephone: 504-925-3780 FAX: 504-922-1289	8632	Vernon Lee Massey Sealer Shelby County Government 157 Poplar Suite 402 Memphis, TN 38103 Telephone: 901-576-3920 FAX: 901-576-3796	3634
John T. Lacy Chief Scales & Weighing Branch USDA Packers & Stockyards Adm 3414 S 14th & Independence Ave Washington, DC 20250 Telephone: 202-447-3140	246	Lynda Agresti Maurer Supervising Metrologist Dept of Labor/Mercantile Div 220 Elmwood Road Providence, RI 02907 Telephone: 401-457-1867 FAX: 401-457-1830	32		



Robert McCarty Systems Engineer-Industry Stds NCR Corp PO Box 728, 800 Cochran Ave Cambridge, OH 43725-0728 Telephone: 614-439-0579 FAX: 614-439-0226	11686	Charles W. Moore County Inspector Madison County Wgths. & Meas. Govt. Center, 16 E 9th St. Box 15 Anderson, IN 460161 Telephone: 317-641-9662 FAX: 317-641-9486	2739	Oral "Pete" R. O'Bryan Q.A. Supervisor Foster Farms PO Box 457 Livingston, CA 95334-9900 Telephone: 209-394-7901 x4119 FAX: 209-394-6902	2595
Thomas B. McDonald Manager Resale Facilities Eng. Mobil Oil Corp 3225 Gallows Road Fairfax, VA 22037 Telephone: 703-849-5320 FAX: 703-849-5074	12456	Louis G. Moreno Director Cumberland Co. W & M Cons Prot 788 East Commerce St. Bridgeton, NJ 08302 Telephone: (609) 453-2204 FAX: (609) 453-22	22182	Henry V. Oppermann General Physical Scientist Nat'l Inst of Stds & Tech Admin 101, Rm A617 Gaithersburg, MD 20899 Telephone: 301-975-4008 FAX: 301-926-0647	3389
William J. McHale Vice President Kanawha Scales & Systems PO Box 569 Poca, WV 25159 Telephone: 304-755-8321 FAX: 304-755-3327	645	Paul W. Mueller, Jr. Manager, Qual. Engr. & Sys.Dev H.J. Heinz Company 1062 Progress Street Pittsburgh, PA 15022 Telephone: 412-237-5474	21806	Anthony Padilla Scale Equipment Specialist ADOT Equipment Services 2225 S 22nd Ave Phoenix, AZ 85009 Telephone: 602-255-8399 FAX: 602-258-5193	16344
John R. McPherson Senior Staff Engineer Exxon Co USA PO Box 4415, 1200 Smith St Houston, TX 77210 Telephone: 713-656-7757 FAX: 713-656-6272	9392	Ronald D. Murdock Program Manager, Measure.Sect. NC Dept. of Agri.-Stds. Div. PO Box 27647, Dept. SD Raleigh, NC 27611 Telephone: 919-733-3313	8366	Victor L. Page Supervisor, Weights & Measures KY Dept of Agric Wts & Meas 106 West 2nd St Frankfort, KY 40601 Telephone: 502-564-4870 FAX: 502-564-5669	3904
James Melgaard Director Div Commercial Insp & Reg 118 West Capitol Pierre, SD 57501-2080 Telephone: 605-773-3697 FAX: 605-773-4117	39	Emmett Murphy Chief Philadelphia Wts & Meas 1600 Arch St., Cigna Bldg. 9th Fl. Philadelphia, PA 19103 Telephone: 215-686-5159 FAX: 215-561-0374	6208	James E. Peebles Director Legislative Affairs Information Resources Inc 499 S. Capitol St Suite 400 Washington, DC 20003 Telephone: 202-554-0614	7505
Joan Mindte Training Coordinator Nat'l Inst of Stds & Tech A609 Admin Gaithersburg, MD 20899 Telephone: 301-975-4003 FAX: 301-926-0647	12500	Larry Murray Chief Engineer Wayne Div-Dresser Industries 124 W College Ave PO Box 1859 Salisbury, MD 21802 Telephone: 301-546-6690 FAX: 301-548-6913	5879	Peter Perino Consultant Revere Transducers Inc 681 Nacimiento Lake Dr. Paso Robles, CA 93446 Telephone: 805-239-8024	3894
Daniel H. Moenter Manager, Government Affairs Marathon Oil Company 539 South Main Street Findlay, OH 45840 Telephone: 419-421-3756 FAX: 419-421-4255	11212	Allan M. Nelson Director Weights & Measures Dept of Consumer Protection 165 Capitol Ave, Room G17 Hartford, CT 06106 Telephone: 203-566-4778 FAX: 203-566-7630	2515	DeVern H. Phillips State Sealer Kansas Weights & Measures 2016 SW 37th St Topeka, KS 66611-2570 Telephone: 913-267-4641 FAX: 913-296-2247	10619
Marvin D. Moist President Revere Transducers, Inc. 14030 Bolsa Lane Cerritos, CA 90701 Telephone: 714-739-1991 FAX: 714-522-0931	16512	Karl Newell Office of Weights & Measures Nat'l Inst of Stds & Tech Admin 101, Rm A617 Gaithersburg, MD 20899 Telephone: 301-975-4013 FAX: 301-926-0647	9879	Gordon Phillips President Seedburo Equip Co 1022 W Jackson Blvd Chicago, IL 60607-2990 Telephone: 312-738-3700 FAX: 312-738-5329	11155
Kelleen K. Moody Lab Equip. Technician AZ Dept of Weights & Measures 1951 W North Lane Phoenix, AZ 85021 Telephone: 602-255-5211 FAX: 602-255-1950	10960	Patrick E. Nichols Director Weights & Measures Dept of Weights & Measures 333 Fifth Street Oakland, CA 94607-4107 Telephone: 415-268-7287 FAX: 415-444-3879	110	Michelle I. Phillips Assistant Administrator Dept of Weights & Measures 200 E Washington St. Ste 1760 Indianapolis, IN 46204-3325 Telephone: 317-236-4272	9076
		James Noone Enforcement Supervisor Bureau Of Weights & Measures 1600 Arch St., Cigna Bldg. 9th Fl. Philadelphia, PA 19103 Telephone: 215-686-5156 FAX: 215-561-0374	9303	Richard Pierce Ag Engr, Type Approval Group USDA FGIS Box 20285 Kansas City, MO 64195 Telephone: 816-891-8553	13794



Cathryn F. Pittman Technologist TN Department of Agriculture PO Box 40627 Melrose Station Nashville, TN 37204 Telephone: 615-360-0159	2403	Lyn A. Rhodes Manager of Quality Control Foster Farms 843 Davis Street, PO Box 457 Livingston, CA 95334 Telephone: 209-394-7901 x4348 FAX: 209-394-7901	2598	Albert E. Salerno President Syracuse Scale Co Inc 158 Solar St Syracuse, NY 13204 Telephone: 315-476-9696 FAX: 315-476-3743	12232
Alan Porter Technical Unit Supervisor Wisconsin Dept of Agriculture 801 W Badger Rd, Box 8911 Madison, WI 53708 Telephone: 608-266-7244 FAX: 608-266-1300	8752	Marsha L. Richardson Inspector Gibson County Wts & Meas Courthouse Annex, 800 S Prince St Princeton, IN 47670 Telephone: 812-385-2426	11136	James Schnitzler Gen Mgr Milk Receiving Sym Accurate Metering Systems Inc 1651 Wilkening Court Schaumburg, IL 60173 Telephone: 708-882-0690 FAX: 708-882-2695	10871
Edwin J. Price Enforcement Coordinator Dept of Agriculture PO Box 12847 Austin, TX 78711 Telephone: 512-463-7607 FAX: 512-475-1618	2434	Richard L. Rightmyer Senior Staff Engineer VA Power PO Box 26666 Richmond, VA 23261 Telephone: 804-771-3862 FAX: 804-771-3166	11075	Holger Schulz Southern Regional Service Mgr Sartorius Corporation 140 Wilbur Place Bohemia, NY 11716 Telephone: 800-645-3108 FAX: 800-344-2068	22128
David W. Quinn Product Manager Fairbanks Scales 69th Ave Industrial Park Meridian, MS 39307 Telephone: 601-483-4311 FAX: 601-483-4311	11509	Curtis Roberts Director Weights & Measures Division State Capitol Bismarck, ND 58505 Telephone: 701-224-2400 FAX: 701-224-2410	11117	Richard L. Seitz Manager Mech Petro Engr Veeder-Root Co 125 Powder Forest Dr, POB 2003 Simsbury, CT 06070-2003 Telephone: 203-651-2722 FAX: 203-651-2719	1032
Robert R. Rall Manager of Operations Texaco Refining and Marketing 1111 Bagby St. Houston, TX 77002 Telephone: 713-752-6769 FAX: 713-752-6894	3144	John J. Robinson Sr. Assistant Vice President Assn of American Railroads 50 F St NW Washington, DC 20001 Telephone: 202-639-2204 FAX: 202-639-2930	743	Jack H. Senter Truckstop Relations Director CAT Scale Company P.O. Box 630 Walcott, IA 52773 Telephone: 319-284-6263	21729
James Reid Production Specialist Duke Power Co 13339 Hagers Ferry Road Huntersville, NC 28078 Telephone: 704-875-5798 FAX: 704-875-5509	13763	Dennis E. Rogers Supv. - Elect. Systems Arco Products Company 8601 S. Garfield Ave. South Gate, CA 90280 Telephone: 213-806-4172 FAX: 213-928-8691	3151	George S. Shefcheck Asst Admin Measmt Stds Div Oregon Dept of Agriculture 635 Capitol St NE Salem, OR 97310-0010 Telephone: 503-378-3792 FAX: 503-378-6525	6241
Robert A. Reinfried Technical Assistant Scale Manufacturers Assn 932 Hungerford Dr, #36 Rockville, MD 20850 Telephone: 301-738-2448 FAX: 301-738-0076	9388	Ronald R. Roof Assistant Director Pa Bureau Of Weights & Measure 777 Blanchard Avenue Chambersburg, PA 17201 Telephone: 717-787-9089 FAX: 717-772-2780	6200	Joseph Silvestro Superintendent Gloucester Co Wts & Meas Dept 49 Wood St County Bldg Woodbury, NJ 08096 Telephone: 609-853-3358 FAX: 609-853-2770	2809
Robert E. Reynolds President Downstream Alternatives Inc 2982 Dogwood Court Bremen, IN 46506 Telephone: 219-546-4204 FAX: 219-546-5845	10653	Terry Rosfelder Manager of Engineering Project Sun Refining & Marketing Co 1801 Market Street 21st Floor Philadelphia, PA 19103-1699 Telephone: 215-977-6502 FAX: 215-246-8098	9078	Kendrick J. Simila Administrator Measmt Stds Div Oregon Dept of Agriculture 635 Capitol St, NE Salem, OR 97310-0110 Telephone: 503-378-3792 FAX: 503-378-6525	2510
Sharon Rhoades Administrator Division of Weights & Measures 1330 W Michigan St, Rm 136N Indianapolis, IN 46202 Telephone: 317-633-0350 FAX: 317-633-0776	8157	Joseph Rothleder Principal State Metrologist CA Div of Measurement Standard 8500 Fruitridge Rd Sacramento, CA 95826 Telephone: 916-366-5119 FAX: 916-366-5179	3495	John C. Skuce Manager Mechanical Engineering Smith Meter Inc 1602 Wagner Ave-PO Box 10428 Erie, PA 16514 Telephone: 814-898-5405 FAX: 814-899-8927	10442
		Joseph E. Ryan 115 Roslyn Avenue North North Cape May, NJ 08204 Telephone: 609-889-0179	12609	David Smith Hi-Tech Scale Company 3014 N. 50th Drive Phoenix, AZ 85031-3502 Telephone: 602-867-3834	17187

Douglas C. Smith Technical Services Rep William M Wilsons Sons Inc 8th St & Valley Forge Rd Lansdale, PA 19446-0309 Telephone: 215-361-5236 FAX: 215-855-0341	262	Chuck Strawn Petroleum Market Manager Micro Motion, Inc. 7070 Winchester Circle Boulder, CO 80005 Telephone: 303-530-8506 FAX: 303-530-8118	22148	Daryl E. Tonini Technical Director Scale Manufacturers Assn 932 Hungerford Dr, #36 Rockville, MD 20850 Telephone: 301-738-2448 FAX: 301-738-0076	1336
N. David Smith Director Standards Division NC Dept of Agriculture PO Box 27647, Dept SD Raleigh, NC 27611 Telephone: 919-733-3313 FAX: 919-733-0999	2391	Richard C. Suiter Agric. Inspec. Supervisor Nebraska Weights & Measures PO Box 94757 Lincoln, NE 68509 Telephone: 402-471-4292 FAX: 402-471-3252	2368	Jose A. Torres-Ferrer Metrologist/W&M Supervisor Department of Consumer Affairs PO Box 41059 Minillas Station Sanurce, PR 00940-1059 Telephone: 809-721-1930 FAX: 809-726-6570	11193
Richard N. Smith Retired Tech Coordinator Nat'l Institute of Std & Tech 1003 Windemere Rd Inwood, WV 25428 Telephone: 304-229-5964	237	Chester Szyndrowski Inspector Weights & Measures City of East Chicago 1102 W 151 Street East Chicago, IN 46312 Telephone: 219-397-3409	10302	Jonas E. Townsend, Jr. Assistant Superintendent Cumberland County 788 E Commerce St Bridgeton, NJ 08302 Telephone: 609-453-2203 FAX: 609-453-2206	6068
Robert A. Smoot Dir. Weights & Measures Utah Dept of Agriculture 350 North Redwood Rd Salt Lake City, UT 84116 Telephone: 801-538-7158 FAX: 801-538-7126	10657	Albert D. Tholen Chief Off of Weights & Measure Nat'l Inst of Stds & Tech Admin 101, Rm A617 Gaithersburg, MD 20899 Telephone: 301-975-4009 FAX: 301-926-0647	232	James C. Truex Weights & Measures Insp Mgr Ohio Dept of Agriculture 8995 E Main St Reynoldsburg, OH 43068-3399 Telephone: 614-866-6361 FAX: 614-866-4174	2178
Louis F. Sokol President Emeritus and Editor US Metric Association 255 Mountain Meadows Rd Boulder, CO 80302-9256 Telephone: 303-443-9728	1021	Aves D. Thompson Chief Div of Measurement Standards 12050 Industry Way Anchorage, AK 99515 Telephone: 907-345-7750 FAX: 907-345-2641	10201	Richard Tucker Manager Customer Service Tokheim Corporation 1602 Wabash Ave Ft Wayne, IN 46801 Telephone: 219-423-2552 FAX: 219-484-4887	9070
Edward C. Squire Sales & Business Develop. Mgr. E. I. DuPont De Nemours & Co. C&P Dept B16226 Wilmington, DE 19898 Telephone: 302-774-1946 ex1946 FAX: 302-774-5205	15310	E.A. Hap Thompson Marketing Dept. Senior Assoc. American Petroleum Institute 1220 L Street NW Washington, DC 20005 Telephone: 202-682-8230 FAX: 202-682-8222	715	Ann H. Turner Conference Coordinator Nat'l Conf on Wts & Meas PO Box 4025 Gaithersburg, MD 20885 Telephone: 301-975-4012 FAX: 301-926-0647	236
Thomas M. Stabler Manager-Weights & Measures Toledo Scale Corporation PO Box 1705 Columbus, OH 43216 Telephone: 614-438-4548 FAX: 614-438-4646	3119	Merrill S. Thompson Arnold & Porter P.O. Box 8500 Bridgeton, IN 47836 Telephone: 317-548-2211 FAX: 317-548-2214	590	Eric Vaughn President Renewable Fuels Assn. 1 Massachusetts Avenue N.W. Washington, DC 20001-1431 Telephone: 202-543-3802 FAX: 202-543-6925	3178
Don E. Stagg Director Weights & Measures Division PO Box 3336 Montgomery, AL 36109-0336 Telephone: 205-242-2613 or 2614 FAX: 205-240-3135	3317	Kathleen A. Thuner Agric Comm Sealer Wts & Meas Dept of Agric Wts & Meas 5555 Overland Ave, Bldg 3 San Diego, CA 92123-1292 Telephone: 619-694-2741 FAX: 619-565-7046	5869	Gilles Vinet Program Officer Weights & Meas CANADA Legal Met Branch 207 Queen St, 2nd Fl, Ottawa CANADA K1A 0C9, Telephone: 613-952-2628 FAX: 613-952-1736	11941
Ernest J. Stebbins Executive Manager Nat'l Hardwood Lumber Assn 6830 Raleigh-Lagrange Rd Memphis, TN 38184-0518 Telephone: 901-377-1818 FAX: 901-382-6419	21827	Walter Tkachuk Consultant Shell Oil Co 17919 Fireside Dr Spring, TX 77379 Telephone: 713-251-0327	7543	Doug Walker Measurement Coordinator Marathon Petroleum Co 425 S 20th St Tampa, FL 33605 Telephone: 813-248-6730	11688
Louis E. Straub Program Manager Weights & Measures Section 50 Harry S Truman Parkway Annapolis, MD 21401 Telephone: 301-841-5790 FAX: 301-841-5999	6248	Guy J. Tommasi Sealer of Weights & Measures City of Middletown P. O. Box 1300 Middletown, CT 06457 Telephone: 203-344-3492 x492 FAX: 203-344-0136	214		

Charles Jr. Walters Inspector II Weights and Measures Golden Rock Shopping Center Christiansted-St.Cro, VI, 00820 Telephone: 809-773-2226	22152	Richard L. Whipple W & M Coordinator Natl Inst of Stds and Tech Quince Orchard & Clopper Roads Gaithersburg, MD 20899 Telephone: 301-975-3990 FAX: 301-926-0647	3486	Robert W. Zube Brownie Tank Mfg Co 1241 72nd Ave, NE Minneapolis, MN 55432 Telephone: 612-571-1744 FAX: 612-571-1789	10669
Irene B. Warnlof Retired Wts & Meas Official 9705 Inaugural Way Gaithersburg, MD 20879 Telephone: 301-926-8155	7145	Robert Wittenberger Metrologist Weights & Measures Laboratory PO Box 630 Jefferson City, MO 65102 Telephone: 314-751-3440	91		
Otto K. Warnlof Manager-Technical Services Natl Inst of Stds & Tech Admin Bldg A625 Gaithersburg, MD 20899 Telephone: 301-975-4026 FAX: 301-926-0647	233	Charles W. Wolfe Fairbanks Inc. 821 Locust Kansas City, MO 64106 Telephone: (816) 471-0231 FAX: (816) 471-02	22186		
Stanley I. Warshaw, Sc.D. Director, Office of Stds Serv. Natl Inst of Stds & Tech A603 Admin Bldg Gaithersburg, MD 20899 Telephone: 301-975-4001 FAX: 301-963-2871	4426	William J. Wolfe, Sr. State Superintendent Office of Weights & Measures 1261 US Route 1 & 9 South Avenel, NJ 07001 Telephone: 908-815-4840 FAX: 908-382-5298	12624		
Clifford A. Watson Consultant Perstorp R.R. 1, Box 129A Gower, MO 64454 Telephone: 816-424-3195	16558	Theodore O. Wright Director American Natl Metric Council 9644 Hilltop Road Bellevue, WA 98004-4006 Telephone: 206-454-5548 FAX: 206-861-0609	12832		
Richard H. Weber Metrology Lab 3M Co Bldg 544-1-02, 3M Center St Paul, MN 55144-1000 Telephone: 612-733-2674 FAX: 612-736-7325	684	Courtney Yelle Chief Sealer County of Bucks Cons. Protect. 50 North Main Street Doylestown, PA 18901 Telephone: 215-348-7442 FAX: 215-348-2019	16354		
Donald J. Weick Consumer Protection Weights & Measures 215 E 7th, Rm 353 Topeka, KS 66603 Telephone: 913-235-9630	3996	Richard S. Yurek Regional Lab Manager E.W. Saybolt & Co. Inc. 400 Swenson Drive Kenilworth, NJ 07080 Telephone: 908-245-3100	3153		
Raymond R. Wells President Sensitive Measurement Inc 200 SMI W Hampton St-PO Box 72 Pemberton, NJ 08068 Telephone: 609-894-2292 FAX: 609-894-0387	3484	Paul Zalon Director Regulatory Affairs Nestle Foods Corp 100 Manhattanville Rd Purchase, NY 10577 Telephone: 914-251-3487 FAX: 914-251-2961	7312		
Gary D. West Multi-Purpose Bur. Chief NM Dept of Agriculture PO Box 30005 Dept 3170 Las Cruces, NM 88003-0005 Telephone: 505-646-1616 FAX: 505-646-3303	8345	Andrew A. Zards Specialist Facilities Engineer Amoco Oil Co 200 E Randolph Dr Chicago, IL 60601 Telephone: 312-856-4073 FAX: 312-856-3401	1344		
Larry Wheeler Food Equipment Corp. Hobart World Headquarters Troy, OH 45374 Telephone: 515-332-2672	22134	Harold Zorlen Regional Supervisor MI Dept of Agric Reg VII 23777 Greenfield, Suite 320 Southfield, MI 48075 Telephone: 313-752-9369	9009		











