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Technology Administration  
National Institute of Standards and Technology

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# Report of the 77th National Conference on Weights and Measures

1992



## Abstract

The 77th Annual Meeting of the National Conference on Weights and Measures (NCWM) was held July 19 through 23, 1992, at the Stouffer Nashville Hotel in Nashville, Tennessee. The theme of the meeting was "Partnerships for Progress."

Reports by the standing and annual committees of the Conference comprise the major portion of this publication, along with the addresses delivered by Conference officials and other authorities from government and industry.

Special meetings included those of the 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 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.

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

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

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## Past Chairmen of the Conference

CONFERENCE	YEAR	CHAIRMAN
43rd	1958	J. P. McBride, MA
44th	1959	C. M. Fuller, CA
45th	1960	H. E. Crawford, FL
46th	1961	R. E. Meek, IN
47th	1962	Robert Williams, NY
48th	1963	C. H. Stender, SC
49th	1964	D. M. Turnbull, WA
50th	1965	V. D. Campbell, OH
51st	1966	J. F. True, KS
52nd	1967	J. E. Bowen, MA
53rd	1968	C. C. Morgan, IN
54th	1969	S. H. Christie, NJ
55th	1970	R. W. Searles, OH
56th	1971	M. Jennings, TN
57th	1972	E. H. Black, CA
58th	1973	George L. Johnson, KY
59th	1974	John H. Lewis, WA
60th	1975	Sydney D. Andrews, FL
61st	1976	Richard 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, NM
76th	1991	N. David Smith, NC
77th	1992	Sidney A. Colbrook, IL

## 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	Charles Burnes	None
Alaska	Aves D. Thompson	None
American Samoa	None	None
Arizona	Kelleen E. Moody	Jim Webbert
Arkansas	Sam F. Hindsman	None
California	Darrell A. Guensler	Barbara Bloch
Colorado	David R. Wallace	None
Connecticut	Allan M. Nelson	Raymond Kalentkowski
Delaware	William Lagemann	None
District of Columbia	Jeffrey X. Mason	Richard Siegel
Florida	Maxwell H. Gray	Jack Jeffries
Georgia	Curtis P. Williams	None
Guam	None	None
Hawaii	James E. Maka	None
Idaho	Glen H. Jex	None
Illinois	Sidney A. Colbrook	Stephen E. McGuire
Indiana	Sharon Rhoades	None
Iowa	None	None
Kansas	DeVern H. Phillips	None
Kentucky	Danny Willis	Randy Wise
Louisiana	None	None
Maine	Clayton F. Davis	Stanley Millay
Maryland	Louis E. Straub	None
Massachusetts	Charles H. Carroll	None
Michigan	Edward C. Heffron	Harold Zorlen
Minnesota	Michael F. Blacik	Mark Buccelli
Mississippi	None	None

State	Representative	Alternate
Missouri	Lester H. Barrows	David F. James
Montana	None	None
Nebraska	Steven A. Malone	Richard C. Suiter
Nevada	None	None
New Hampshire	None	None
New Jersey	Carl P. Conrad	None
New Mexico	Gary D. West	Fred A. Gerk
New York	John J. Bartfai	Ross Andersen
North Carolina	N. David Smith	Ronald D. Murdock
North Dakota	None	None
Ohio	John Steinberger, Jr.	Jim Truex
Oklahoma	Charles Carter	None
Oregon	Ken Simila	George Shefcheck
Pennsylvania	Dean F. Ely	None
Puerto Rico	Jose A. Torres-Ferrer	None
Rhode Island	Linda Maurer	None
South Carolina	Carol P. Fulmer	Billy Kennington
South Dakota	Michael Kumm	None
Tennessee	Robert G. Williams	Cathryn Pittman
Texas	Ed Price	James H. Eskew
Utah	Robert M. Smoot	None
Vermont	Bruce Martell	None
Virginia	J. Alan Rogers	G. Wes Diggs
Virgin Islands	Joycelyn Encarnacion	Juanita Bermudez
Washington	James H. Cammel	John Allen
West Virginia	Stephen L. Casto	None
Wisconsin	Alan J. Porter	Jim Akey
Wyoming	None	None

# Organization Chart of the 77th National Conference on Weights and Measures

## Operating Committees

Auditing Committee	
Chairman:	S. Casto, WV (1)
Members:	E. Hanish, Laporte Co., IN (2) R. Gunja, Kansas City, KS (3)
Coordinator:	J. Mindte, NIST

Resolutions Committee	
Chairman:	C. Pittman, TN (1)
Members:	M. Grenier, NH (2) G. Jex, ID (2) *M. Phillips, Indianapolis, IN (2) **R. Gunja, Kansas City, KN (2) E. Price, TX (2) A. Thompson, AK (1) B. Martell, VT (3)
Coordinator:	J. Mindte, NIST

Sergeants-At-Arms	
R. Freeman, TN	
V. Massey, Shelby Co., TN	

Credentials Committee	
Chairman:	J. Silvestro, Gloucester Co., NJ (1)
Members:	G. Tommasi, Middletown, CT (2) D. Ely, PA (3)
Coordinator:	J. Mindte, NIST

Nominating Committee	
Chairman:	N. David Smith <sup>e</sup>
Members:	L. Barrows, MO D. Guensler, CA C. Conrad, NJ R. Elliott, OK F. Gerk, NM J. Truex, OH

Budget Review Committee	
Chairman:	S. Colbrook, IL
Members:	F. Gerk, NM N. David Smith, NC H. Lodge, Dunbar C. Gardner, Suffolk Co., NY C. Brickenkamp, NIST <sup>e</sup>

Executive Committee and NTEP Board of Governors	
Chairman: <sup>e</sup>	S. Colbrook, IL
Chairman-Elect: <sup>e</sup>	A. Nelson, CT
Past-Chairman: <sup>e</sup>	N. David Smith, NC
(BoG Chairman)	
Treasurer: <sup>e</sup>	C. Gardner, Suffolk Co., NY
One Year:	J. A. Rogers, VA K. Simila, OR
Two Year:	R. Andersen, NY P. Nichols, Alameda Co., CA
Three Year:	D. Guensler, CA S. Malone, NE
President: <sup>n,e</sup>	J. Lyons, NIST
Executive Secretary: <sup>n,e</sup>	C. Brickenkamp, NIST
Technical Advisor: <sup>n</sup>	R. Bruce, Canada (Ex. Cmte. Only)

Weights and Measures Coordinator	
A. Turner, NIST	

Other Elected Officers	
Vice-Chairmen:	
T. Geller, Barnstable, MA	
C. Pittman, TN	
K. Thuner, San Diego Co., CA	
J. Truex, OH	

## Standing Committees

Specifications & Tolerances Committee	
Chairman:	*R. Helmick, AZ (1) **C. Carroll, MA (2)
Members:	J. Jeffries, FL (3) R. Suiter, NE (4) G. Shefcheck, OR (5)
Tech Advisors: <sup>n</sup>	H. Oppermann, NIST R. Marceau, Canada

Laws and Regulations Committee	
Chairman:	B. Bloch, CA (3)
Members:	T. Geller, Barnstable, MA (1) F. Clem, Columbus, OH (2) S. Rhoades, IN (4) L. Straub, MD (5)
Tech Advisors: <sup>n</sup>	K. Butcher, NIST G. Vinet, Canada

Education, Administration, & Consumer Affairs Committee	
Chairman:	M. Gray, FL (1)
Members:	R. Kalentkowsky, CT (2) J. Harnett, Orange Co., CA (3) *M. Coile, GA (4) **B. DeSalvo, OH (5) *M. Phillips, Indianapolis, IN (5)
Tech Advisor: <sup>n</sup>	J. Koenig, NIST

Liaison Committee	
Chairman:	A. Thompson, AK (2)
Members:	R. Davis, James River Corp. (1) J. Lacy, P&S, USDA (3) C. Davis, ME (4) *J. Melgaard, SD (5) **L. Barrows, MO (5)
Tech Advisor: <sup>n</sup>	K. Newell, NIST

Appointed Officials	
Chaplain:	*M. Coile, GA **W. Lagemann, DE
Parliamentarian:	C. Davis, ME
Assistant Treasurer:	G. Hanson, San Bernardino Co., CA

Task Force on Planning for the 21st Century	
Chairman:	D. Guensler, CA
Members:	T. Geller, Barnstable, MA N. David Smith, NC C. Kloos, Hunt Wesson, Inc. B. Martell, VT C. Glade, NCCE
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 (Grain Moisture Meter Sector only)  
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 T. Runyon, Seedboro Equipment Co.  
 F. Seeber, Shore Sales Co., Grain Elevator and Processors Society  
 C. Watson, Stein Labs, Perstorp Analytical, Foss Foods

## Legend

*n* - Non-Voting  
*e* - Ex-Officio

*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

\* Resigned

\*\* Serving unexpired term of resignee

Revised - July 1992



## President's Address

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

Good afternoon. It is once again my pleasure to be at the Annual Meeting of the National Conference on Weights and Measures. I am sorry that I had to miss last year's meeting in Philadelphia.

Chairman Sid Colbrook's theme this year is "Partnerships for Progress," and along those lines I'd like to take advantage of my dual roles as Director of NIST and President of the National Conference on Weights and Measures to discuss the unique partnership between NIST and the Conference — our mutual goals and objectives, and where I think we should be looking for our future.

"Partnership" has been a very hot topic at NIST this past year. Members of my staff and I have logged quite a few hours traveling around the country to participate in a series of National Technology Initiative workshops to foster research partnerships and technology transfer between Federal laboratories and the private sector. Even NIST, which long has prided itself on the number of cooperative ventures we pursue with industry has seen an explosive growth in CRADAs — Cooperative Research And Development Agreements — both with individual firms and with industrial research consortia.

Our Advanced Technology Program, which you may have heard about, continues to grow, sponsoring pivotal industrial research projects at the leading edge of most fields on the critical technologies list. An award from ATP requires the private party to match our funds dollar for dollar. Then NIST and the awardee become real partners sharing in the risks.

Similarly, our Manufacturing Technology Centers require matching non-Federal funding - most often from the States. We have five such centers in place and just today we are announcing the creation of two new ones, in Minnesota and California. These are cooperative partnerships to speed the transfer of useful technologies to our small and mid-sized manufacturers.

I mention all these things because the members of this Conference, a group which has been closely allied with our calibration and measurement labs since 1905, may feel left out of this talk of industrial research and technology transfer. That's silly. NIST and the NCWM represent perhaps the original model for partnerships in technology and we have had a glowing record of success for nearly a century.

Our mission at NIST is to support the U.S. economy through the development and commercialization of science and technology. This is a mission which goes well beyond thinking up a nifty new technology or process. It is up to us - NIST and NCWM - to maintain equity within the U.S. marketplace while enhancing the health and competitiveness of that marketplace on this continent and abroad. To ensure that when our manufacturers and business leaders go out into the world's markets to sell their goods and services, they can do so on a level playing field, their products competing on merit unhampered by conflicts between measurement standards or test procedures.

All of us have seen the biblical injunction on just weights and measures. That accuracy in marketplace measurements is essential to healthy commerce and trade is a truth as old as civilization. It is a truth that has brought us together — government researchers, regulators, manufacturers and instrument makers — for nearly nine decades.

And all our work is important. As an easy example, "merely" failing to enforce the requirement to subtract the weight of packaging material, or tare, from the weight used to compute the final price of meat not only robs the consumer, but also provides a fraudulent profit to the seller amounting to as much as the average honest profit margin of most supermarkets.

This is one major reason we find enlightened businesses so enthusiastically supporting this Conference - they are supporting the need for that "level playing field." Government's role is to ensure equity by providing safeguards against abuses. We must set and enforce the rules of the marketplace, applying our collective standards of equity and fairness to everyone. We must provide uniform standards across all governing bodies, acceptable to government and business and industry alike, so that the private market can capture the efficiencies of a free market. This is the task of the NIST laboratories. This is the task of this Conference. This is the task of your laboratories and your field enforcement agents.

As the ability of the United States to compete internationally is crucial to a healthy U.S. economy, so the need to standardize weights and measures practices and requirements nationally and internationally also is crucial.

#### Preparing for the Next Decade

In February of this year, we at NIST met with the management team of the Conference for an in-depth discussion about the challenges facing weights and measures nationally and the opportunities for Federal and State government, private business, and the National Conference on Weights and Measures to meet those challenges.

Your officers described many needs - from the weights and measures laboratory to the remote reaches of commerce in this nation and across our national borders. We explored those areas to which NIST and the NCWM could uniquely contribute. We agreed that those areas are:

1. Transferring technology in laboratory metrology
2. Developing national standards as models for both State and Federal regulations
3. Assisting the national economy to thrive in the future

#### First is Transferring Technology in Laboratory Metrology

In a very real sense, technology transfer is at the heart of legal metrology, the dissemination of measurement accuracy from the national level to and through the various levels of government and private sector measurement users and device manufacturers to the ultimate measurement user, the decision maker. The decision to be made may be as difficult as assessing the cost of a given amount of pollution or waste in the generation of manufactured goods or as easy as the selection and purchase of a piece of cheese in a supermarket.

The modern dissemination of accuracy from NIST to the States began in 1965 with a Congressional appropriation to provide mass, volume, and length standards, and the means to intercompare these standards with others, to the States. The State Standards Program envisioned that all 50 States, the District of Columbia, Puerto Rico, and the Virgin Islands could at least be accredited in tolerance testing, and today 46 jurisdictions maintain certification by NIST in either tolerance testing or calibration capability in mass, length, and volume. We need to bring that count up to the full 53, but still it is gratifying to observe the very significant developments in the State Standards Program.

- NIST now provides advanced training, and the States have upgraded their facilities, equipment, and expanded services. To provide validity to the measurements, the laboratories practice ongoing laboratory measurement quality control.
- States have expanded from basic mass, length, and volume to the much more difficult frequency and temperature measurements.
- States have expanded from tolerance testing for legal metrology purposes to mass calibration at the highest levels of accuracy for interstate businesses and high-tech manufacturers.
- The State Standards Program now provides proficiency testing using round-robin intercomparisons and experiments between public and private labs in different States and different parts of the nation.

When we implemented the State Standards Program in the 1960's, I don't think we were really aware of how successful the States would be -- not just in maintaining traceability for weights and measures regulatory purposes, but in providing services to local businesses and industry.

Dave Smith last year spoke strongly in his address about the State weights and measures laboratory needs from NIST. Conference leaders have asked that NIST's advances in ultrahigh precision mass measurement be made available to State laboratories because your local industries need it. After all, quality measurement is a prerequisite to quality manufacturing and quality products. I have since authorized establishment of a program of accreditation of private calibration laboratories. We will be using what we have learned in establishing the State Weights and Measures Laboratory Certification Program in this new program. We are using that effort to develop an "ultra-precision" mass calibration level for you and for private laboratories. Some State metrologists are collaborating in the work to establish the technical criteria by which this program will operate.

Your leaders have also asked that NIST press for recognition by other Federal and international standardization bodies of the NIST State Laboratory Certification Program in order to reduce the number of audits the State laboratories must endure to prove traceability and accuracy. We shall certainly help out on this. This is an important issue for private calibration labs as well. Both State and private laboratories seek procedures and certification by NIST to meet auditing requirements from other U.S. bodies as well as foreign, such as certification having met various Department of Defense standards, Nuclear Regulatory Commission standards, and ISO 9000 standards.

The second area in which this NIST-NCWM partnership can contribute is Developing National Standards as Models for Both State and Federal Regulations.

The successes of the NCWM in this regard are well known:

- All 50 States have adopted some edition of NIST Handbook 44 "Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Equipment." Approximately 37 States adopted the latest edition of Handbook 44 by reference. Relatively recently, we have seen these standards of test and specifications for measuring devices adopted by Federal regulatory agencies as well.
- The Packers & Stockyards Administration, the Federal Grain Inspection Service, and the Food Safety and Inspection Service, which are agencies of the U.S. Department of Agriculture, have adopted Handbook 44. The Food Safety and Inspection Service also has adopted NIST Handbook 133, "Checking the Net Contents of Packaged Goods."
- Forty-nine States, the Federal Grain Inspection Service, and the Food Safety and Inspection Service now acknowledge the National Type Evaluation Program (NTEP) Certificate of Conformance on measuring devices as proof of having met the design requirements and being capable of performing within the accuracy requirements of Handbook 44.
- The Federal Trade Commission has collaborated with the States through NIST and the NCWM to enforce their portion of the Federal Fair Packaging the Labeling Act and the Petroleum Marketing Practices Act.

I would like to see as a prime objective of the NCWM to build on these past successes, and to collaborate with other Federal agencies - to form partnerships with them.

For examples, there are the standards developed for the U.S. Postal Service, the consolidated code format provided for vehicle scales which might be adopted by the U.S. Department of Transportation, and prototype evaluation standards being developed with the Federal Grain Inspection Service for grain moisture meters and protein analyzers.



Twenty-two States have recently initiated or upgraded their motor fuel quality measurement capabilities. The Conference can provide the forum for the development of national consensus standards in the area of legal metrology.

The NCWM is in a unique position to assume a leadership role in fulfilling this objective because of its combination of procedures and policies that permit rapid standards development and full participation in the development of those standards by all interested and affected parties.

We must involve these other interested parties, to form new harmonization work groups within the NCWM structure to feed their technical advice back through NCWM committees, and to enlist Federal agency representatives to actively participate in national and international standardization. How do we do this?

I suggest that we call all interested parties together to discuss and resolve issues in legal metrology - not just the State and local governments and the industries they regulate - but the Federal agencies and the public they serve as well.

The third area for NIST - NCWM partnership is

#### Assisting the National Economy to Thrive in the Future

Our decentralized system of legal metrology, in which regulatory responsibilities are shared by Federal and State agencies sometimes can impede the ability of U.S. industry to counter international competition, diverting industry resources to meet smaller user markets than necessary.

When the United States entered into standards negotiations in the International Organization of Legal Metrology or OIML, it was the first nation to bring industrial representatives to the negotiating table. This has led to the acceptance of more practical, cost-effective international recommendations in that arena; but OIML standards and U.S. legal metrology standards are not yet in harmony.

The reasons are many: perhaps we believed that we had the luxury of time, similar to the 80 years the NCWM has had to develop a working relationship of trust and mutual need among the States. However, the European Community has selected OIML standards for its regulations. If a U.S. firm plans to sell to the EC, it will have to provide products that meet OIML requirements.

What if Canada, or our southern neighbors, or the Pacific Rim nations, adopt OIML standards? Will U.S. products made for U.S. consumption be shut out of these and other markets? Do we need to change our standards? Perhaps we'll be shut out only because we didn't fight hard enough to convince others of the legitimacy of our standards, or because we didn't see it as important enough to discuss at the time.

We must pave the way internationally, and our efforts will be important not just for our large businesses, but for our small businesses as well. The NCWM has a unique combination of procedures and policies and a history of cooperation between government and industry (very unusual in the United States) that permit rapid consensus standards development.

I urge you to cement this vital partnership that will serve our nation beyond our borders. We must expand this consensus approach that has proven so successful to our major trading partners to develop standards and procedures that facilitate, rather than hinder, trade. We need to unify Federal and State requirements before we can credibly negotiate in the international arena. It is my belief that type evaluations performed in the U.S. and recognized internationally should speed cycle times from design to production for U.S. equipment manufacturers. The United States cannot afford to remain an "island" nation; we must expand our vision to include our "New World" neighbors in legal metrology standards and practices.

In closing, I'd like to take a few minutes to recognize some of the people and organizations that have made significant contributions over the past year to the work of this partnership that we call the National Conference on

Weights and Measures. The assistance of the railroad industry has been invaluable in determining the accuracy of individual car weights measured in motion while coupled. Each measurement has cost from \$30,000 to \$100,000, and there have been more than six tests conducted. I'd like to recognize the contributions of John Robinson, from the Association of American Railroads, Joe Loyd, CSX Transportation, Bill GeMeiner, Chicago and North Western Railroad, Bob Brumbaugh, Systems Associates Incorporated, Casper Carroll, Illinois Central Railroad, and all the others who contributed to this extensive effort.

The Scale Manufacturers' Association organized and hosted roundtable discussions at every regional weights and measures conference to share issues and ideas on implementation of the National Type Evaluation Program in State enforcement schemes. I'd like to thank Ray Lloyd, Daryl Tonini, Dave Quinn, Terry James, and Tom Stabler. The rice, pasta, pet food, and meat industries have contributed thousands of hours to the design of field studies and the conduct of interlaboratory comparisons and field measurements. I'd like to acknowledge the special efforts of Tim Rugh of the Pet Foods Institute and Bob Fuehne, Ralston Purina Company. Bret Smart of the Federal Trade Commission has provided his expertise to the Laws and Regulations Committee. Dick Fisher of the Food and Drug Administration has been a real booster of the NCWM metric workshop and an advocate of coordinated Federal agency action in metric education and standards.

Several agencies under the U.S. Department of Agriculture have contributed time in training, standards-development, and regulatory coordination. Thanks are due to Dr. Rich Pierce and Mr. David Funk of the Federal Grain Inspection Service, Mr. Grae Berbano of the Food Safety and Inspection Service, and John Lacy and Paul Peterson of the Packers and Stockyards Administration. Representatives from the Legal Metrology Branch of Canada have provided analytical assistance to both the Specifications and Tolerances Committee and the Laws and Regulations Committee. Thanks are due to Mr. Bob Bruce, on the podium with me today, Mr. Renald Marceau, Mr. Gilles Vinet, Mr. Claude Bertand and Mr. Dave Morgan. And, of course, many, many weights and measures officials -- from State directors, through field enforcement officers, to laboratory metrologists and technicians -- have contributed many other thousands of hours to standards development, analysis, and measurements. Finally, the membership dues of each member of the Conference defray the cost of public sector participation in year-round standards development. To all of these committed individuals, agencies, and companies, I say "thank you" and keep up the good work!

## Chairman's Address

Sidney A. Colbrook  
Weights and Measures Program Manager  
Illinois Department of Agriculture

Mr. President, honored guests, and fellow members, welcome to the 77th Annual Conference on Weights and Measures. It is my privilege, as your Conference Chairman, to extend to all of you a cordial greeting. We are especially pleased to see that many of you have brought your families. To them, we extend a special welcome. I hope that this experience will be a memorable occasion for you.

I am impressed by the very warm welcome that was extended by our hosts, and we do thank them. We appreciate the assistance provided by Bob Williams and his staff during the preparation for this meeting. And to Cathryn Pittman, it's great to be in Nashville.

The National Conference on Weights and Measures is one of the nation's most successful and progressive organizations of its type. One of the reasons for its success and progress has been the participation and close interaction of State and local weights and measures officials, representatives of business and industry, members of the National Institute of Standards and Technology, other government officials, and consumers in general. Our Conference theme this year, partnerships for progress, is indicative of the cooperative spirit which exists among all Conference members. We must work together to maintain this spirit of cooperation in order to keep our Conference a viable and effective organization.

I have been fortunate to attend and participate in the four regional association meetings during the past two years; the first year with Chairman David Smith and most recently with Chairman-Elect Allan Nelson. Although the culture of each region varies somewhat, we are all surprisingly uniform in our ideas of how the marketplace should be regulated. We are finding that our regional associations are continuing to play a more important role in this National Conference. The work of the regional standing committees greatly assist the national committees in determining what course of action should be taken.

There have been several issues during the past year I would like to take this opportunity to discuss with you. The Task Force on the 21st Century, commonly referred to as the "Blue Sky" Task Force appointed by David Smith, has identified several of the key topics which we in weights and measures will be confronted with in the years to come. We have heard this morning a detailed report from the Task Force Chairman, Darrell Guensler. We appreciate the efforts of all members of this task force. It was particularly interesting to listen to the comments made by Carole Glade representing the National Coalition for Consumer Education. I believe we need to seek out more consumer involvement with the Conference.

The National Type Evaluation Technical Committees, one for grain moisture measuring devices and the other for protein analyzers, are well on their way to establishing type evaluation criteria for these devices. The Committees' first meeting was just a few months ago and we are already seeing results of that meeting with two proposed changes being considered this year to the Grain Moisture Meter Code. The Federal Grain Inspection Service has been very supportive to these committees.

Training continues to be one of the most important issues before the Conference. The Education Committee is recommending a voting item this year to establish a voluntary certification program for instructors. The Committee is also reviewing the procedures to keep the training modules up-to-date. Training to keep pace with the changes in today's technology is a never-ending process which must be considered to be one of our highest priorities.

The acceptance of the National Type Evaluation Program continues to grow. It is my understanding that the States of Nebraska, Michigan, New Mexico, Virginia, and Maryland have either adopted or are on their way to adopting NTEP. Many thanks to the members of the Scale Manufacturers Association who have conducted panel discussions of NTEP at the regional meetings and most recently, have held meetings with State directors regarding the adoption of NTEP. Several jurisdictions have adopted NTEP because of the support provided by SMA.

Fred Gerk and David Smith recognized the need to maintain and increase the support level of the Office of Weights and Measures for our programs. During the past year, several members of the Executive Committee have met with key legislators to explain our needs in weights and measures, and we have met with Dr. Lyons and several members of his staff to discuss these needs. We appreciate the support, direction, and encouragement you have provided, Dr. Lyons, and I am sure that under Allan and Tom's leadership, you haven't seen the end of us yet! We have identified two areas which we believe need immediate attention and those are funding to increase the capability of NIST to test all types of load cells and the mass packages for metrologists to perform calibrations of their mass standards in their own laboratories. The metrology laboratory is the backbone of our weights and measures program. We must maintain the integrity of these laboratories. I am looking forward to Georgia Harris' presentation on Wednesday afternoon regarding our metrology laboratories.

This leads me into one of the special presentations being made at the Conference this year. I would encourage all conference members to attend and participate in the National Council on State Metrication Workshop planned for Thursday afternoon which will be lead by Dr Ed Heffron. Participating in this workshop will be Dr. Gary Carver, who is responsible for the metric program at NIST.

We plan by the conclusion of the Conference this week to have appointed the members of the petroleum subcommittee. This subcommittee will assist those States which are becoming involved with the quality of motor fuel in their respective jurisdictions and will provide a forum within the Conference for States with a motor fuel inspection program to discuss issues of interest. All regions will have representation on this subcommittee.

We continue to work closely with members from the Canadian Legal Metrology Branch to eliminate any weights and measures trade barriers which may exist between our two countries. We appreciate their involvement with our Conference. Perhaps one day an international program will be in place which all countries will recognize.

I enjoy from time to time reviewing previous conference reports. One report contained items which were under consideration such as the method of sale of ice cream, the standardization of bread sizes, and the moisture loss of certain consumer products. These issues which sound rather familiar were being considered at the 18th annual meeting in 1925. I wonder what issues will be considered in another 59 years at the 136th Annual Conference!

This year has been quite a learning experience for me. I was very fortunate to have the assistance of Carroll Brickenkamp and her staff. Carroll is the person I have turned to all year long for her guidance. Ann Turner is quite a pro at making all of the necessary arrangements for the Conference. Thank you Carroll, Ann, and all of the rest of the weights and measures staff at NIST for your support. I would also like to express my appreciation to David Smith for your support and for educating me to the ways of the South. Looking ahead for a moment, we are fortunate to have Allan Nelson and Tom Geiler leading the Conference. With their abilities, the Conference is in good hands.

I would be remiss if I did not acknowledge the recent retirement of Sam Hindsman, a fellow colleague and good friend from Arkansas. Sam has been a staunch supporter of this Conference. I remember serving during the late 1970's on the grain moisture meter task force which Sam was the Chairman. With Sam's leadership ability, the task force capably addressed some rather complex issues. We all wish you the best, Sam and Mary Lou, and look forward to your continued involvement in the Conference along with all of the other active retirees from the Southern Association.

In closing, I have been told that I now qualify for membership in Charlie Greene's over-the-hill gang and most recently, I have earned the right to be called a "has been" by Fred Gerk and David Smith. But in all seriousness, I appreciate the support that you have all given me. I do not believe that there is a better organization with which one can be affiliated. Thank you for allowing me to be your conference chairman.



## Honor Awards Presentations

Dr. John W. Lyons, Director of the National Institute of Standards and Technology, presented Honor Awards to members of the Conference who, by attending the 77th 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

Dennis Schaffer, TEC America  
Paul Peterson, U.S. Department of Agriculture  
Arthur Hershbein, Retired, Dade County, Florida  
Kenneth Butcher, National Institute of Standards and Technology  
Karl Newell, National Institute of Standards and Technology  
L. F. Eason, State of North Carolina  
Lee Massey, Shelby County, Tennessee  
Joseph Giannina, Port of Corpus Christi Authority  
Wes Diggs, State of Virginia

### 15 YEARS

Harold Bradshaw, Clark County, Indiana  
Ann Turner, National Institute of Standards and Technology  
Thomas Geiler, Barnstable, Massachusetts  
Ross Andersen, State of New York  
Donald J. Hine, Retired, Consultant  
Robert G. Williams, State of Tennessee  
F. Michael Belue, Belue Associates

### 20 YEARS

Guy Tommasi, City of Middletown, Connecticut  
Louis Draghetti, Retired, Agawam, Massachusetts

### 25 Years

Edwin Hanish, Laporte County, Indiana

## Certificates of Appreciation

Sid Colbrook, Conference Chairman, presented Certificates of Appreciation to members of standing committees and annual committees who had completed their tenure on the following committees:

Raymond H. Helmick  
Specifications and Tolerances Committee

Thomas F. Geiler, Barnstable, MA  
Laws and Regulations Committee

Maxwell Gray, State of Florida  
Education, Administration, and Consumer Affairs Committee

Kendrick Simila, State of Oregon  
Executive Committee

J. A. Rogers, State of Virginia  
Executive Committee

Fred Gerk, State of New Mexico  
Budget Review Committee

Harvey Lodge, Dunbar Manufacturing  
Budget Review Committee

Chip Kloos, Hunt-Wesson, Inc.  
Associate Membership Committee Chairman

Steve Casto, State of West Virginia  
Auditing Committee

Cathryn Pittman, State of Tennessee  
Resolutions Committee

Aves Thompson, State of Alaska  
Resolutions Committee

Joseph Silvestro  
Gloucester County, New Jersey  
Credentials Committee

The Task Force on Planning for the 21st Century members completed the first step of their work and are recognized for their devotion to that task:

Darrell Guensler, State of California  
Thomas Geiler, Town of Barnstable, Massachusetts  
N. David Smith, State of North Carolina  
Chip Kloos, Hunt-Wesson, Inc.  
Bruce Martell, State of Vermont  
Carol Glade, National Coalition for Consumer Education

Special Recognition was given to **Joan Koenig** of the Office of Weights and Measures, National Institute of Standards and Technology for her leadership and management of the National Training Program Modules.

**Ralph Jones** and **Alex Schmall**, both of Spokane, Washington, were recognized for their excellent video presentation on Weights and Measures.

Two people leaving the area of Weights and Measures were recognized. **Fred Gerk** is now the Assistant Director, New Mexico Department of Agriculture, and **Sam Hindsman** will retire from the Arkansas Bureau of Weights and Measures. Both Fred and Sam are former Chairmen of this Conference and have worked many long hours on committees and made other contributions too numerous to mention. Both are wished many years of good health and continued success.

## **President's Award**

This is the seventh annual presentation of the president's award. This award is given for two levels of achievement. First is a banner presented to those directors representing States that have 100 percent membership, both state and local, of their weights and measures officials in the National Conference on Weights and Measures for the first time in the membership year July 1, 1991, ending June 30, 1992.

Those States that repeat with 100 percent membership are awarded a streamer for their banner. A streamer is presented for each year the State qualifies.

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

### **AWARD FOR FIRST YEAR BANNER**

Commonwealth of Puerto Rico

### **STREAMER AWARD FOR SECOND YEAR**

State of Colorado  
State of Indiana  
State of Iowa  
State of Nevada  
State of West Virginia  
State of Virginia

### **STREAMER AWARD FOR THIRD YEAR**

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

### **STREAMER AWARD FOR FOURTH YEAR**

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

### **STREAMER FOR FIFTH YEAR**

There are no States for 5-year award.

### **STREAMER FOR SIXTH YEAR**

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

### **STREAMER FOR SEVENTH YEAR**

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

State of Arkansas  
State of Nebraska

### **President's Certificate Award**

Five States qualify for the President's Certificate, with 100 percent of their State office staff members for the 1991-92 Conference year:

#### **FIRST YEAR AWARD:**

State of Illinois (with 41 members in their State office)

#### **SECOND YEAR AWARDS:**

State of Rhode Island

#### **THIRD YEAR AWARDS:**

State of New York  
State of Maine  
State of Wisconsin

Twenty-three (23) States and one Commonwealth have banners, and five (5) States have certificates, for a total of 29 States and one Commonwealth. We are especially gratified this year that the Commonwealth of Puerto Rico has 100 percent membership with all 25 of their weights and measures officials members.



## 1993 - Fortress Europe or Free-Trade Opportunity?

Dr. Seton Bennett  
Director, National Weights and Measures Laboratory  
United Kingdom

May I begin by saying how much of a pleasure - and an honour - it is for me to be addressing the 77th Annual Meeting of your National Conference on Weights and Measures. This Conference, a domestic event, has an outstanding international reputation and I am very grateful for the invitation to attend and participate in your activities and discussions.

The first of January 1993 will mark the completion of the European Community's single market, creating a market for goods and services of nearly 300 million people with the potential for expansion to include the Member States of the European Free Trade Association and even, eventually, the countries of central Europe. The dismantling of internal technical and administrative barriers to trade will reduce the cost and complexity of trading between Member States, but some fear the erection of a fortress Europe - hence the interrogative title of this paper. You will be disappointed to know that I am not going to give you a direct answer to the question in the title - preferring to stay away from the political issue of international trading policy. I shall concentrate instead on the practical implications of new European legislation for manufacturers of weighing and measuring instruments and weights and measures officials, leaving it to you to decide whether 1993 represents the construction of a fortress Europe or a free trade opportunity.

### A Short Lesson in European History

The Treaty of Rome was signed in 1957, but the initial European Community had only six members and very limited interests. Membership has grown to 12 countries, with the United Kingdom joining in 1972. An agreement signed earlier this year provided for the extension of the single market provisions to the seven countries of EFTA.

Early attempts at removing technical and administrative barriers to trade stumbled on the repeated and prolonged failure to agree to technical specifications which had, under Community rules, to be unanimously adopted. In 1985, the Council of Ministers approved a "New Approach" to technical harmonisation and standards, which limited legislation to the adoption of essential requirements, with which products placed on the market must conform. The task of producing detailed technical specifications for products was entrusted to standards bodies (and in particular the European standards bodies CEN and CENELEC). These standards will not be mandatory, however, but products meeting the requirements of the standards will be deemed to satisfy the essential requirements. In this way, technical innovation will not be inhibited, as technological developments not envisaged in the standards can still be introduced provided they comply with the essential requirements. It is assumed, of course, that the essential requirements are sufficiently basic and technology-independent not to get out of date.

This "New Approach", coupled with the introduction in the 1986 Single European Act of qualified majority voting on many legislative issues, including those relating to the single market, ensured that progress could now be made.

Legal metrology had long been seen as an effective technical barrier to trade as the requirements of Weights and Measures legislation were different in each country. Measuring instruments directives were therefore included in a legislative programme of some 300 items identified as requiring implementation in order to complete the internal market. The date set for the completion of this single market, with free movement of goods, people, services and capital, was 1 January 1993 - less than six months away. Much of the necessary legislation has been enacted, but weights and measures has once again proved difficult and slow.

## Directives

A Directive is a piece of European Community legislation, adopted by the European Council of Ministers following a cooperation procedure involving the European Commission and the European Parliament. In the case of single market issues, the Ministers now use a qualified majority voting procedure, and Directives, once adopted, have to be enacted separately in each Member State.

The first measuring instruments Directive to be negotiated was the Directive 90/384/EEC on non-automatic weighing instruments, which was adopted in June 1990, and comes into force on 1 January 1993. In addition to details of its scope and the essential requirements for non-automatic weighing instruments, this Directive contains, in its 16 articles and six annexes, provisions for establishing conformity assessment and for marking instruments which conform with the requirements. There is also a general inspection requirement to ensure that equipment in use continues to conform to the requirements of the Directive, although no particular inspection regime is specified. Arrangements for a transitional period are also included, so that existing national rules can continue to operate alongside the European requirements for a period of 10 years.

One problem which had to be overcome was the different extent of legal controls on weighing instruments in different countries. This is a long standing question, to which there is no easy answer. The Directive defines the scope under six headings:

1. determination of mass for commercial transactions;
2. determination of mass for the calculation of a toll, tariff, tax, bonus, penalty, remuneration, indemnity or similar type of payment;
3. determination of mass for the application of laws or regulations; expert opinion given in court proceedings;
4. determination of mass in the practice of medicine for weighing patients for the purposes of monitoring, diagnosis and medical treatment;
5. determination of mass for making up medicines on prescription in a pharmacy and determination of mass in analyses carried out in medical and pharmaceutical laboratories;
6. determination of price on the basis of mass for the purposes of direct sales to the public and the making up of prepackages.

Non-automatic weighing instruments used for any of these purposes must satisfy the requirements listed in the Directive. These include general requirements for design and construction, as well as metrological requirements for accuracy and immunity to influence factors. Instruments which do conform may be placed on the market and put into service throughout the community on the basis of a single conformity assessment without being impeded by the individual Member States. Such instruments will bear the EC mark of conformity (the CE mark).

The conformity assessment procedure will normally involve type approval followed by either verification by an independent body or a declaration of conformity by the manufacturer. The body responsible for type approval will issue an approval certificate which will contain;

- the conclusions of the examination;
- any conditions for its validity;
- necessary data for identification;
- a functional description.

In addition, relevant technical information (drawings and layouts) will be included in an annex.

The "declaration of conformity" is the procedure whereby a manufacturer who has adequately implemented a quality system, may declare that instruments conform to the approved type and satisfy the relevant requirements of the Directive. The purpose of the quality system is to ensure conformity of instruments placed on the market with the approved type and with the requirements of the Directive. It must be approved by an independent body designated for the purpose and will be subject to surveillance to ensure that the manufacturer fulfills his obligations arising from the quality system.

When an instrument is designed for a specific application, a single-stage conformity assessment procedure will be followed. In this case the instrument will be examined and tested by a single body, which attests that it satisfies the requirements of the Directive and applies the CE mark.

Each member State will designate bodies responsible for type approval, instrument verification and surveillance of quality systems. In the United Kingdom, my Laboratory, the National Weights and Measures Laboratory will be appointed for type approval, and verification will be the responsibility of local Trading Standards Departments, as under existing national laws. NWML has extensive type examination experience covering a wide range of measuring instruments. It is equipped with the necessary up-to-date testing facilities to provide a fast, efficient type approval service.

The approval and surveillance of company quality systems falls to independent Certification Bodies accredited by the National Accreditation Council. All these bodies will be notified to the European Commissions who will publish a list of notified bodies in the Official Journal of the European Communities.

The European Commission has now produced the first draft of a further Directive to cover a much wider range of measuring instruments. This working document, with its 16 articles and 18 annexes provides a framework of essential requirements and conformity assessment procedures which would be applied to individual classes of instruments (automatic weighing machines, water meters, gas meters, taxi meters etc.,) under the direction of a standing committee. Much work remains to be done on this Directive, the scope of which is expressed in very general terms. Its provisions would apply to instruments meeting two criteria. In the first place, measurements made with the instruments must affect the health, financial interest or legal position of an identified party who has no means of checking the results. Secondly, the Directive will only apply where measurements are made by unskilled operators or without operator intervention.

#### EC Type Approval

An application for type approval of a weighing machine may be lodged with one notified body (e.g. NWML) by the manufacturer or by his agent in the European Community. The application must be accompanied by the design documentation specified in the Directive, including designs and drawings, explanation of the operation of the instrument, and relevant test results.

The notified body will examine the type to establish its conformity with the essential requirements contained in Annex I to the Directive. The normal way of establishing conformity will be by demonstrating compliance with the harmonised European standard on non-automatic weighing instruments. This standard, which will be published this year, transcribes Recommendation 76, prepared and published by the international Organisation of Legal Metrology (OIML).

OIML is an intergovernmental organisation, with its administrative headquarters in Paris. It has 49 members and the principal work of drafting Recommendations on a very wide range of measuring instruments is carried out in more than 100 technical committees. European standards for measuring instruments will increasingly follow OIML documents. I cannot stress too much the importance of supporting this organisation to ensure good specifications with universal international acceptance.

#### Quality

Finally, I must say a few words about quality and quality standards. The successful operation in 19 countries of a legal metrology system based on New Approach Directives requires a high level of confidence that common standards are being applied by manufacturers and by the independent notified bodies responsible for conformity assessment.

In the case of a manufacturer making Declarations of Conformity, quality system requirements are spelt out in the Directive. These include documentation covering:

- quality objectives and organisational structure;
- description of the manufacturing process;
- details of examinations and tests;
- operation and monitoring of the quality system.

In practice, manufacturers' quality systems will be required to comply with the international quality standard ISO 9002. This standard is now well established and it has been applied in a wide range of environments. The notified bodies responsible for surveillance of quality systems will be looking to see that ISO 9002 has been applied in a way that satisfies all the specific requirements of the Directive and meets the particular needs of legal metrology.

There are now also a series of European Standards, based on the ISO Guides, which set out general criteria for certification bodies. In particular, EN 45001 deals with the requirements for bodies operating product certification (i.e., type approval and verification) while EN 45002 is applicable to bodies operating quality system certification. The Directive on non-automatic weighing instruments contains only minimum criteria for notified bodies. These are set out in a short annex and include requirements covering personnel, equipment, independence, confidentiality and civil liability insurance. By applying the relevant European standards in the EN 45000 series, Member States will be able to guarantee that these criteria are met, with common levels of confidence throughout the Community.

#### Questions

I am aware that I have left out much of the information about 1993 that I should have liked to include. I am also aware, as I warned you at the start, that I have not answered the question in the title of my talk, but I hope I have managed to give you some idea of the way in which the Single Market in measuring instruments will operate. I shall, of course, be happy to answer any other questions you may wish to put to me over the next couple of days during my stay here in Nashville. Alternatively, while NWML is not a general enquiry point for information about the European Community, I shall do my best to reply to any correspondence requesting information about measuring instruments Directives and European type approval.

Thank you for your attention.



## Weights and Measures in Canada

Robert Bruce  
Canadian Consumer & Corporate Affairs

Today, I want to share with you some of the history of Weights and Measures in Canada, some of the challenges that lie ahead, and the opportunities which I believe exist to work together with you to protect consumers and to enhance the prosperity and competitiveness of business in both of our countries.

The fact is that there are many similarities between the Weights and Measures programs in the United States and Canada. Many of our requirements for weighing and measuring devices and net quantity are already in harmony - but there are nevertheless several differences.

In my country, Weights and Measures administration is the exclusive constitutional authority of the Government of Canada. The provinces, territories and local jurisdictions play no role in this area.

Moreover, authority for Weights and Measures only relates to the determination of quantity in commercial transactions. We are not involved unless goods or services are sold, purchased, exchanged, consigned, leased or provided on the basis of measurement. For example, we do not approve weigh scales for use in laboratories or highway enforcement. We have no jurisdiction respecting quality determination - such as octane ratings in gasoline. However, if goods or services are traded on the basis of mass, length, or volume, or you are in the business of selling electricity and natural gas, then we are involved.

Canada was only four years old when the first Weights and Measures Act was proclaimed in 1871. Two years later, we had our first Gas Inspection Act and in 1894 the first Electric Light Inspection Act was brought into force. Several revised statutes have been proclaimed since then, and now legal metrology in Canada is governed mainly by the Electricity and Gas Inspection Act and the Weights and Measures Act.

In all, there are almost 500 individuals involved in the administration of these two Acts of Parliament. It is their only job. We have our headquarters in Ottawa, our national capital, where about 70 people are employed. The rest of our staff work out of 28 district offices throughout Canada, from Victoria, British Columbia, to St. John's, Newfoundland.

As in your country, we conduct four principal lines of business in the administration of Weights and Measures.

- ~ First, the Weights and Measures Act requires the use of defined legal units of measurement in commercial transactions. Each year more than 70,000 measurement standards belonging to government and industry are calibrated and certified by our staff. The standards are traceable to the primary basic units of measurement of our National Research Council (our equivalent of the National Institute of Standards and Technology).
- ~ Like you, we examine prototypical weighing and measuring equipment for approval. New and modified equipment to be used in commerce is examined and tested for compliance to ensure a population of weighing and measuring devices that are reliably accurate and that minimize the possibilities of fraudulent device usage. Last year more than 500 Certificates of Conformance were issued by our approval laboratories for new and modified equipment that was submitted for approval examination.

Thirdly, the Acts require that all approved devices be inspected before they are used in commerce to ensure compliance. Thereafter, they are inspected on a periodic and selective basis to ensure that they remain in compliance with prescribed accuracy tolerances and that they are not used in a fraudulent manner. Last year, we inspected more than 170,000 weighing and measuring devices in this manner.

We have calculated that our inspectors ensured the accurate measurement of more than \$100 billion of goods and services weighed or measured over these same devices, and detected and ensured the correction of more than \$170 million of inaccurate measurement. We also verified, through sampling, more than 2.7 million electricity and natural gas meters. In all, there are some 16 million such meters in use in Canada with annual energy transactions of about \$33 billion including the value of exports to the United States.

Finally, we periodically examine goods and services that are traded on the basis of measurement to ensure that they are measured and priced accurately within prescribed limits of error. Last year, we examined more than 8,000 lots containing over 4.7 million packages at the production and distribution levels of trade. We also examined an additional twenty thousand items offered for sale in the retail sector.

That is a lot of work and we believe that our inspectors have effectively served both the government and the people of Canada. However, we are in a rapidly changing world and the approach that has served us so well over the past 100 years or so, must be evaluated in the light of the many challenges that these changes present to us. There are many changes that have marked and continue to influence our economies - the globalization of markets, the formation of trading blocks, the speed of technological change and the pronounced interdependence of national economies.

The evolution of the global economy is not only changing production methods, the delivery of goods and services, and the nature of our transactions, it is also profoundly altering the relationship between the various players in the marketplace. All of which is to say that government policies respecting the measurement of goods and services must, above all, be considered a vital instrument for economic progress, as essential to the business community as it is to consumers and the national economy.

These new realities translate into increased pressure on companies. They must be able to offer better quality products at a lower price, while still taking account of the new values influencing the marketplace and remaining competitive with their domestic and international competitors.

In Canada, at this moment, more than 1,000 federal and provincial laws and programs affect the operation of our marketplace. A major study on program review in the mid 1980's estimated the cost of these programs to be \$30 billion annually. It is obvious that this entails not only significant costs for business, but this holds true as well for consumers and government.

So it is important to know the costs that our program and its requirements place on those that we regulate. It is also important to know the level of protection that the public and other dependent parties expect and what they are prepared to pay for this protection. The challenge, especially in this period of government restraint, is to find innovative ways of ensuring fair measurement while enabling companies to maintain and enhance their level of competitiveness. All this, while not diminishing the high level of confidence that Canadians place in fair and accurate measurement.

To succeed, I believe that we must not only change the way we manage our programs but we must alter the way we regulate our affected industries.

In Canada, we just recently completed our first Weights and Measures Business Plan which will fundamentally alter the way we manage our program. (While a business plan in government may seem an oxymoron, the use of this term illustrates our commitment to adopting a business approach to our operations.) Our government wants to change the classical bureaucracy characterized by clearly defined duties and formalized procedures, systems and roles. This model of management has left us ill-prepared to face the complex and rapidly changing demands of the marketplace. We fear that we are seen by the public and business communities as being inflexible, insensitive, and costly.

We intend to empower our managers and staff to improve performance. The move to increased autonomy, authority, and accountability is intended to help us become more effective (do things better), to become more

efficient (do them with fewer resources), but most of all to become more responsive (do the right things). To be more responsive we must communicate openly with our clientele and be flexible enough to adapt our operations to meet our clients' expressed wishes. To implement our plan we have made a commitment to:

- o deliver services in terms of our clients' needs and expectations - no longer will we decide what is best for consumers and business; we will ensure they are informed of the issues and provide them an equal role in decision-making.
- o inform our clients of the level of services they can expect; for example, we are committed to providing the same minimum level of service whether a business is located in Toronto or the Arctic.
- o ask our clients what they think of the quality of services as well as how and where they can be improved. Wherever possible, we want both business and consumers to share responsibility with us for ensuring fair measure. They must play a role in the decision making process and must be equal partners in the advancement of solutions to measurement problems.

In this regard, we have recently established an accreditation program for electric power and natural gas utilities and meter manufacturers. This program allows qualified parties to verify the accuracy of meters, using approved methods and standards traceable to our laboratories. This function was, until recently, only performed by government inspectors. The criteria for this program are based on the principles of the ISO 9000 series and similar Canadian Quality Assurance Standards. We expect that this partnership will lead to higher compliance through adherence to quality assurance standards while freeing our inspection staff to address some of the more serious measurement problems found in commercial and industrial metering installations. The business community sees the major impact of the accreditation program as a shifting of responsibility for meter accuracy from government to industry and the benefits as a higher awareness of quality resulting from a better quality product, faster delivery, expected longer meter life associated with the improvements, and saving costs of paying for government inspections.

- o recover a fair share of the cost of providing services, such as the inspection and verification of devices, from those who receive a direct benefit from these services. This will increase the equity of the revenue system from general taxation borne by the taxpayer to those individuals who derive a clear benefit from specific services. I expect that it will also introduce a degree of market-type discipline on the demand for services, and that users who pay will expect efficient, low-cost delivery of quality services.
- o and finally, to clearly state our objectives, establish our measurement standards, and provide the results to our staff and clients.

It is not just enough to change the way we manage, we must also change the way we regulate business so that it can succeed, and indeed flourish, with these new realities. In Canada, at this time, our government is taking a very serious look at regulation and its effects on our national prosperity. In Weights and Measures, we want to ensure that our regulatory requirements contribute to competitiveness and that they create a level playing field. In fact, we would like them to push our industries to new levels of innovation and technical excellence. We are reviewing our regulations to test whether they have created an undue burden for both business and the public; to ensure that they have not outlived their intended purpose; and to ensure their benefits outweigh their costs. Some of the issues that our government wants us to address are:

- o What are the costs of regulation to business in terms of dollars and competitiveness - "Is the game worth the candle?"
- o Since the costs of regulation will likely be passed on to consumers - how much protection are they willing to pay for?

- o In areas of rapidly changing technologies are there more effective regulatory approaches - when does a problem warrant regulatory intervention?
- o Do we have vehicles to address regulations that impede economic and technological development - how long does it take to get rid of such regulations?
- o In establishing regulations we must question what is the "value-added" rather than focusing on control.
- o And finally, regulations should be innovative rather than prescriptive in nature. (I wonder if we really have to make regulations that ensure scale graduations are not less than a few thousandths of an inch wide?)

Although our Weights and Measures systems in Canada and the United States are not always similar I expect that we face many of the same challenges. Both nations are working their way to economic recovery. Both face major challenges with regard to competitiveness and prosperity. Changing conditions are altering our markets and the way we must address them.

In many instances we have a shared agenda. Toward the objective of harmonization, the Executive Committee of this Conference has endorsed the work of harmonizing requirements with Canada and committed National Conference on Weights and Measures resources to participating in US/Canadian working groups. Two of my colleagues from Canada are technical advisors to your Specifications and Tolerances and Laws and Regulations Committees, and I have been afforded the opportunity and the privilege of participating in the deliberations of your Executive Committee.

To date, we have accomplished much together. Meetings have been held on the general subjects of load cell testing, suitability of equipment and point of sale tare. We have shared work in several areas of emerging technologies, including the development of requirements for mass flow meters, on-board weighing systems and metrological software.

In late 1990, industries in both countries were asked to identify differences in device requirements between the United States and Canada. We have met twice to discuss these differences, and although the differences have not been resolved, recommendations have been made to change either United States or Canadian requirements.

I believe that we need to continue to expand on this work to enhance trade across each other's borders, to address technological change, to effectively address the interdependence of our national economies and, where appropriate, to develop a united front in international standards negotiations. In fact, the Free Trade Agreement signed by our two countries requires that we harmonize technological regulations and standards on as wide a basis as possible. This work must, however, take account of the new realities!

I appreciate the opportunity to address the Conference today. I hope we will continue to work together to guide our respective weights and measures programs into the next century for the benefit of consumers and businesses in both of our nations. Let fair measure prevail. Thank you.



## **What Weights and Measures Directors Need to Know About Their Metrology Laboratories**

**Georgia L. Harris**  
Office of Weights and Measures, NIST

### **Objectives**

One of my primary objectives is to help States meet certification requirements. The certification process is a cooperative effort between NIST and your laboratory; the goal of the Office of Weights and Measures is to recognize good laboratory programs and to help detect and correct deficiencies in support of accurate measurements. (NIST certification is also called "accreditation.") However, I would like to stress to you the importance of the State laboratory and the benefits of certification by discussing the following questions:

- 1) Why do you NEED a laboratory and certification? Why should you WANT certification?
- 2) How does the information submitted on a regular basis support certification by NIST?
- 3) What changes should we plan for?

Many weights and measures directors already know why laboratory certification is important. In some of your States laboratory certification is a legal requirement. Most of you know what is required for certification, as well as why. It is obvious to you why OWM needs information to verify the work of the State laboratories. But even those of you who are familiar with the importance of certification may find the information presented here useful for convincing others. Some of you may not yet have had an opportunity to participate in the NCWM, or in the laboratory certification process; I hope that this information and the reference sources provided will help you meet your needs. Others of you prefer to entrust the "mysteries" of the laboratory to the metrologist; you may now gain the determination to take an active part in the laboratory certification process.

You all undoubtedly recognize the value of attending the Annual Meeting of the National Conference on Weights and Measures (NCWM) and in participating in our national level standardization efforts that affect all of our programs. We are working toward standardized laws, regulations, specifications, tolerances, and training efforts; at the metrology level we are working toward standardized procedures and traceable measurement results. Let me also stress the importance of the regional metrology meetings where training and measurement analysis are just as important to the standardization of measurements made in this country as the activities of the NCWM.

Keep in mind that laboratory measurements are the basis for all other weights and measures activities.

### **Why do you need a laboratory and certification?**

Accuracy of measurements is the objective of any laboratory. How do we verify or have confidence that measurements are accurate? The phrase, "traceable to NIST standards," is a part of every State's Weights and Measures Law (Sec. 3). Traceability is necessary to provide a legal basis for enforcement activities and to support business and industry. Certification provides evidence of traceability, and that a laboratory meets minimum guidelines and recognized criteria for accurate measurements. Without NIST certification, a laboratory does not provide the assurance of quality and NIST support for legal requirements; measurement traceability and accuracy may be questioned by outside users. On the other hand, benefits of certification include evidence for your customers, other government and private agencies, here and abroad, that your laboratory meets their needs for accuracy and that it provides reproducible, verifiable measurements. Certification is a value-added service for any outside user paying for these measurements.

## **Benefits of Maintaining a Laboratory and Certification**

### **Legal requirements**

The primary function of the weights and measures laboratory is to support the legal enforcement system. To meet your legal obligations, you have two realistic options: you can either maintain a laboratory and certification or you can obtain traceable services elsewhere.

If a judge questions the validity of field measurements, how can you prove that your measurements are adequate/accurate? What makes your measurements better than someone else's? You need confidence in laboratory results or field standards and equipment in the event that you must defend enforcement actions in court. NIST certification provides assurance to the courts and the legal system that the laboratory has demonstrated its capability to make accurate, valid, and traceable measurements.

Reciprocal acceptance of measurement results is very valuable to customers and service agents who may be regulated in several States. Certification provides evidence that States can use to evaluate whether or not they should accept another laboratory's measurements.

The Office of Weights and Measures receives numerous requests from industry during audits regarding the capability of the State laboratories; we write verification letters for the States as needed. During the last several months, there have been requests from industries in Texas, California, Michigan, and Georgia, to verify traceability and measurement control activities in these States. Based on information submitted on a regular basis, we were able to verify regular training activities, participation in regional training, maintenance of control charts, participation in round robin measurements, and NIST report numbers, all of which serve to substantiate measurement traceability. Without this data and without certification, no letters would have been written. When we receive requests for information regarding traceability in States that are not currently certified, OWM must respond that the State is not currently certified.

### **Businesses and government measurement needs**

A secondary service of the laboratory is to provide measurements for business, industry, and other government agencies. During the last 20 years, the number of calibrations performed in State laboratories has increased and the customer base of the laboratory has changed. Examples from Kansas and Minnesota show that the number of calibrations have been increasing, and also that the customer base has been shifting. It is interesting to note that approximately 50% of the laboratory services in the State of Minnesota meet needs other than those required for the legal enforcement of weights and measures laws. This percentage corresponds to activities reported by other States. The types of industries include: defense and aerospace, nuclear power, communications, computers, research and development, biomedical, environmental, quality assurance, and scientific equipment manufacturers.

Many laboratory customers market products and services internationally; they need measurement services and require proof of traceability such as provided by NIST certification. Many of them require services that meet ISO 9000 requirements. Do the State laboratories currently meet the needs of their customers? In most cases, yes. Are the measurements traceable to national standards? Usually. Certification provides an assurance that the capability exists and that there is evidence to support these claims. NIST is working to gain international recognition of our accreditation programs to give U.S. laboratories recognized and to minimize the number of audits.

Can our State laboratories withstand the rigorous auditing requirements necessary for international agreements? Not yet. International recognition requires stringent adherence to quality system documents and guidelines. To meet international standards, the most pronounced deficiency in the State laboratories is the lack of documentation and documentation control. The State Standards Program has stressed the importance of proficiency testing to evaluate whether measurements are accurate and traceable. However, international recommendations focus on the importance of the documentation of processes and controls to ensure consistency.

We will continue to need proficiency testing and will also need improved documentation. How many laboratories have documented the flow of test items through the laboratory? Illinois and Kansas have quality assurance documents that detail laboratory processes. One provides a step by step listing of the process and the other provides a diagrammed flow chart of the system. Very few laboratory documents are this thorough. How many laboratories have control programs in place for data sheets and control charts? Is there a formal evaluation of this internal documentation on a regular basis? We all have work to do in the area of program documentation.

### **Enhancement of fee-supported programs**

NIST certification of the laboratory provides the necessary recognition and a competitive edge for fee-supported programs. Many weights and measures programs are being forced to adopt a fee structure due to budget restrictions. A recent count indicated that 33 of the 50 State laboratories charge fees, and the average fee is \$34 per hour. Knowing how to "sell" your fee-supported laboratory programs through certification and good public relations will become increasingly important. Businesses increasingly want to know that their vendors have been accredited, and by whom.

Not only is certification necessary, but advertising measurement services has also become essential. Good public relations with your customers is crucial. Devoting extra effort to assist a customer will pay off in the long run. For example, the metrologist should take time to explain various items of information on a calibration report, such as the uncertainty statement, or the apparent mass values. This will pay off when you need to enlist the support of industry, for example, to improve an inadequate facility. Industry in North Carolina wrote letters to support the State in the process of obtaining a new facility due to their inability to provide small enough calibration uncertainties to meet the needs of these industries through NIST certification requirements.

### **No laboratory? No certification?**

What if a State chooses to close its laboratory or not seek certification? Options are available to meet the needs of your enforcement program if the maintenance of a laboratory and certification is deemed dispensable or inadequate, but the disadvantages often exceed short-term benefits. While there are costs and responsibilities associated with maintaining a laboratory, there are also costs associated with contracting with other States or private companies. Furthermore, you must be concerned with evaluating the accuracy of their measurement data. Your responsibility to ensure traceable measurements does not disappear. How will you verify measurements and obtain confidence in measurements provided by another State or a private business? How will you maintain control over the ongoing quality and traceability? What will happen if another organization is not able to handle your workload? These concerns will not go away because someone decides your State doesn't need a laboratory or doesn't need certification.

One State has been trying to obtain a new laboratory facility and will lose certification unless an adequate facility has been obtained by December 1992. [One deficiency in the current laboratory is excessive vibration in the mass laboratory due to octane and cetane engines in the petroleum laboratory. This vibration prevents making adequate mass measurements.] In the process of determining the consequences of the potential lack of certification, they investigated the costs of contracting for metrology services with another State. The costs include calibration fees, shipping expenses, downtime for inspectors, etc. In addition to actual expenses, can surrounding States can handle the extra workload? What will happen when an enforcement case is brought to court? Will the neighboring State be subpoenaed to testify that their measurements are traceable? How will this particular State judge the adequacy of the measurement services they receive? Will they audit another State laboratory? Will they request verification from NIST? These things can be accomplished, but they indicate the costs and associated controls necessary to support an enforcement program without a laboratory. Several States that lack certification send equipment to neighboring States for verification. States that accept equipment are usually recognized by NIST accreditation.

It is possible to comply with measurement traceability requirements by contracting with private laboratories: some government services are already contracted in this way. Petroleum quality testing is one example. However, government obligations cannot be met by handing over enforcement responsibilities to private



contractors. Problems with contracting with private industry include profit-driven motivations that may include cost-cutting practices, such as modification of established procedures and guidelines and minimizing training to satisfy cost/benefit ratios. Short-cuts in measurement traceability and measurement assurance are unacceptable. The implications and consequences of failure and of high error rates are unacceptable. Moreover, how will we verify data from private laboratories? Private laboratories may be certified in the future by NIST, but what will private industry services cost? More importantly, will the results provide the objectivity necessary for the enforcement program?

## **How do certification requirements support your need for certification and measurement traceability?**

The Office of Weights and Measures provides the means to ensure traceability of commercial measurements nationwide. It is OWM's goal to harmonize standards, not only in enforcement through adoption of Handbook 44, but also through use of standard operating procedures in the laboratories. The State Standards Program was established by NIST to provide the foundation for equity between buyers and sellers in the U.S. marketplace by maintaining and improving the competency, quality, and efficiency of staff and services of State metrology laboratories and by ensuring traceability of State standards to national standards. Certification requirements are established to effectively assure the accuracy of laboratory measurements on an ongoing basis. For certification, evidence/data must be available to provide confidence in measurement accuracy. NIST can not certify that a measurement capability exists without data to support that claim. We must have data to evaluate the quality of measurements. We obtain data from metrologists in the form of completed problems assigned during training, in the form of round robin data, and in the form of annual submissions of information from the self-evaluation and measurement control programs. Evaluation of the laboratory is also made through on-site assessments and through interaction at training sessions and at regional meetings.

How do you, as director, know that your laboratory measurements are accurate? How can OWM know that your measurements are reliable? What happens in the case of dispute, where one party has a measurement control program in place consistent with recommendations, and the other doesn't? Both parties may be providing accurate measurements, but outside parties, including you, must have proof in the event of a discrepancy. How do you know that measurements by another agency are good? At one time in the history of this country, discrepancies between jurisdictions were fairly common. We have come a long way, but we must maintain measurement control programs, and the programs must be part of a continuous process of quality maintenance and improvement. The demands for precision measurements and the documentation for the measurement services continue to increase.

Annual requirements relate to a number of items; each is used to verify or ensure your laboratory's competency to make adequate measurements. Requirements include a quality system description, an annual evaluation, an active measurement control program, and regular training of laboratory staff.

### **1. Quality System Description**

A written quality assurance program document is not only a NIST requirement; it is a necessity when providing services to any industry or government agency that must meet international requirements such as ISO 9000. The lack of a quality system document will immediately disqualify the laboratory from meeting international requirements. An example of a Quality System Description is provided in Appendix D of NBS Handbook 143. Appendix D is also available on the OWM bulletin board and can be downloaded; this facilitates the adoption of this important document by minimizing writing time. Several examples of Quality Documents have been circulated to State laboratories to assist in the preparation of working documents. A particularly good example is that of Illinois. In addition to having a quality manual, Illinois participates in regular internal audits to ensure that they are actually following the guidelines established in their quality manual.

## **2. Annual Evaluation**

Appendix C in Handbook 143 provides a self-evaluation form. An annual evaluation is required by OWM to furnish data to substantiate an ongoing process of measurement control. This information is also used to respond to verification requests. The Office of Weights and Measures evaluates the submitted information and provides comments and recommendations when certificates are issued. The period from October 1 through November 15 is set aside for the review of submitted data and for the preparation of certificates. No certificates can be issued until all material has been submitted; for the sake of program credibility, there can be no exceptions. Several States have had certification lapse due to lack of submission of certain materials.

While OWM uses annual self-evaluation material for its assessment, the same material provides your laboratory management an opportunity to evaluate the status of its own laboratory. The annual evaluation ideally should be used internally to determine weaknesses, strengths, short-term, and long-term goals for maintenance, improvement, and innovation. Setting attainable goals for the future allows your laboratory program to flourish or maintain current levels of quality; if you don't set goals, maintenance of current levels may be difficult. Incidentally, the same approach can be used on a regular basis to enhance the entire weights and measures program.

### **Evaluation Criteria**

Minimum guidelines for laboratory evaluation are established by the Office of Weights and Measures to ensure fair, uniform, consistent and credible evaluations. Guidelines are established and published to enable two people of differing perspectives to provide equivalent and objective evaluations. A combination of self-evaluations, on-site evaluations, and evaluation of annual requirements by NIST staff are used to evaluate each laboratory.

Technical criteria for evaluation of the laboratory are published in NBS Handbook 143, Program Handbook. Criteria are consistent with, and in support of, recognized, documented, good laboratory practices. Just as tolerances are selected so that uncertainties of the measurement are insignificant, particular laboratory criteria are selected to avoid measurement error.

#### **a. Facilities**

Specific criteria are established for the laboratory facility to limit undesirable effects on laboratory measurements. For example, balances and mass comparators used in the laboratories are extremely sensitive to environmental effects such as humidity and vibration. Under conditions of very low humidity, static charges can build up and cause erroneous readings in balances. The effects of vibration can cause excessive variation in mass measurement results. For this reason, technical criteria are established for allowable limits of humidity and vibration in the mass laboratory.

Original recommendations made to the States in the New States Standards Program of 1965 regarding facility requirements were adequate 20 years ago; they are no longer satisfactory for most States. Many States have realized this and have updated their facilities accordingly. Newer facilities have incorporated a number of state-of-the-art designs. Changes include laboratory designs with more space and safer methods for handling large weights, vibration isolation designs in the tables, floors and buildings and automated environmental control systems for precision mass measurements. Updates have also encompassed improvements in lighting, cleanliness, and security.

#### **b. Equipment and Standards**

Laboratory staff must have appropriate tools with which to perform their responsibilities. These tools include equipment and standards.

The most obvious, and most expensive, equipment in the laboratory are the balances and mass comparators. If you were to design a laboratory with a full complement of equipment today, the cost would be prohibitive.

Many States have been updating equipment that was received as a part of the New States Standards Program and are finding costs rather high. A recent memorandum sent to directors and metrologists indicated some of the balances and mass comparators that are currently appropriate and included manufacturers' list prices. Based on many budget limitations, there would be very few State laboratories if States were to fully furnish their own weights and measures laboratory in 1992.

Metric and U.S. Customary units are discussed in this paper. State laboratories have standards and training to provide measurement services using either system. Most metrologists prefer using the metric system. In fact, while I will discuss both units, we are ready to convert to the metric system.

A commonly recommended piece of equipment is an electronic mass comparator with a capacity large enough to handle 50-lb weights. The use of fully electronic mass comparators or balances can reduce test times so that the metrologist can handle increased workloads. The cost of this equipment can be recovered through improved efficiency in performing tolerance testing. The laboratory must have the right equipment to do things right.

Adding new measurement services requires additional equipment, such as large volume provers, stable temperature baths for thermometry, ovens and mills for moisture determinations, dead-weight systems or proving rings for testing wheel-load weighers, and octane engines and vapor pressure baths for testing petroleum quality, along with better methods of handling data reduction and storage of information through the use of computers. The list of equipment can be quite extensive in laboratories that are providing numerous services. Proper equipment is necessary in the laboratory just as a 31-lb weight kit is necessary to test and verify grocery scales and a 5-gallon test measure is necessary to test gas pumps.

Primary standards with current NIST-traceable corrections are imperative to the operation of the laboratory. In addition, to avoid undue wear of primary standards, the purchase and use of secondary and working standards is generally required. Regular surveillance of the traceability status through measurement control programs, such as control charts, and through interlaboratory testing (round robins) is absolutely necessary. "Close enough for government work" does not provide adequate traceability. NIST calibration of primary standards provides an accuracy level that is required for verification of measurements performed in the laboratory.

#### c. Staff

The metrologist must be fully competent by virtue of training and/or experience to perform the measurements required. It is difficult to describe the type of person best suited for the weights and measures laboratory. Written recommendations and examples of position descriptions can be developed; but there is more to staffing this exceptional position than education or experience requirements. Overall, the metrologist must be the type of person whose judgement can be implicitly trusted regarding the laboratory in terms of certification requirements, scheduling, assignments, and equipment.

The metrologist **MUST** be familiar with certification requirements. In position descriptions, the maintenance of NIST-certification should be a primary requirement of the metrologist; in some States, certification of the laboratory is a legal requirement. The metrologist must not only be familiar with the requirements, but must be able to incorporate them into the daily operation of the laboratory as an ongoing practice.

Implementing measurement control practices into the day-to-day operation is essential. For example, control charts should not be prepared the month before certification expires as a result of an OWM request. Control charts must be integrated into an ongoing process of measurement control and analysis. This real-time measurement control is regularly used by industry as a total quality management tool and should be used in the weights and measures laboratory as well. The director or administrator doesn't need to be familiar with the analysis of control charts (though it helps), but must realize that:

- 1) certain measurements must be made part of an ongoing measurement control process;
- 2) you should expect an annual review of measurement control activities in the laboratory by your metrologist and by NIST; and



3) you can entrust these responsibilities to the metrologist.

The continuous measurement control activities of your metrologist provides you and the Office of Weights and Measures confidence in your laboratory's measurement results.

A metrologist must have certain personality and character traits. In addition to the need for excellent communication skills, a metrologist must always ask "is this the BEST I can do?" The metrologist must be concerned with little details, must always question if the laboratory is doing the best possible job, and must be a perfectionist. "Best" does not always mean the most accurate, most precise, or most expensive piece of equipment; sometimes "best" means "appropriate." The metrologist must exhibit the judgement to know what is reasonable within the limits of the laboratory. The metrologist must have good judgement and must be trained to know when very precise measurements are necessary and significant.

An example of this judgement is the practice of measurement estimation to very precise levels. Many people believe that trying to read to 1/10 of a division is silly; indeed, it is silly and unreasonable to estimate to the nearest 0.01 mg when the tolerance is 100 mg. In mass measurements for commercial purposes, state-of-the-art equipment and procedures are unnecessary. However, in other measurement areas, such as volume, little details and the estimation process are significant. "Adequate" is not always good enough, particularly when tolerances and laboratory capabilities are comparable. We can look at the results of 5-gallon test measures tested in round robins to see how measurement uncertainty adds up so that total measurement variation, under ideal laboratory conditions, is equal to or greater than the tolerance of the test measure. This becomes significant when the uncertainty of the test standard is one-third of the tolerance on the meter. The amount of variation likely to exist under field test conditions is much greater than in the laboratory, therefore, the metrologist must provide the best possible service to enable inspectors and service agents to use adequately tested equipment. In such cases, attention to detail and the use of established test procedures is important to establish accuracy as well as consistency between inspectors, service agents, and legal jurisdictions.

Another concern related to 5-gallon laboratory tests is the decision made in some States to deviate from the recommended procedure for the field use of 5-gallon test measures which prescribes a 30 second delivery. Some States have switched to a "dump" method that takes approximately 10 seconds. The argument that this represents how the measure is used in the field is not adequate. Field methods must be consistent with laboratory procedures. The "dump" method is inappropriate because it is virtually impossible to empty a measure reproducibly between operators. Data shows that this particular procedural deviation contributes a systematic error of approximately one-third the tolerance on a 5-gallon test measure, due to differences in product retention. Documented procedures are established and must be followed to ensure national-level consistency and traceability. Differences that contribute to unnecessary variation must be minimized to ensure accuracy.

### **3. Measurement Control Program**

The measurement control program is a method for testing a laboratory's proficiency in providing claimed measurement services on an ongoing basis. Data must be available to substantiate measurement accuracy claims. The measurement control program includes control charts and round robin testing. This material must be submitted on an annual basis whether or not certification will expire at the end of the year.

Control charts are tools. Data from laboratory measurements are plotted on a graph. Metrologists should use their control charts to evaluate balances, procedures, and standards. Control chart data analysis provides an *internal* method to evaluate how well you are doing and whether or not the standards are "in-control." OWM evaluates and reviews control charts; they are not just filed. Many of you have probably read comments from OWM regarding balance standard deviations, the recommended surveillance of primary standards, or a recommended NIST calibration. These recommendations are intended to assist you in making decisions that will ensure continued measurement traceability.

Round robin measurements are interlaboratory tests, generally performed on a regional basis, and coordinated by NIST and each regional group. NIST pays for the shipping and calibration of measurement "test items" and

the results allow OWM to evaluate each laboratory with respect to others on a regional and national basis. A round robin artifact typically includes a NIST calibration for an *external* check on whether measurements agree with national standards. Each State must participate in round robin testing to maintain certification. This data is especially important for verification of the traceability of measurement services provided by the laboratory. The round robin analysis provides assurance that measurement services are accurate and traceable. Round robin measurements are evaluated at each regional metrology meeting.

#### **4. Training and Regional Meetings**

Attendance at the annual regional metrology meetings is also required for certification. Continued training ensures consistency among laboratories on a national level. Procedures are continually reviewed and improved; annual training through the regional measurement group meetings provides an opportunity to remain up-to-date. Measurement data from round robin measurements are reviewed at each regional metrology meeting to ensure traceability or to correct discrepancies.

Adequately trained personnel are a key requirement for good measurements. All personnel must receive training in order to obtain a comprehensive understanding of the measurement principles involved and of the procedures (SOP's) to be followed before being assigned to a certified State laboratory. While OWM evaluates the capability of laboratory staff during Basic and Intermediate seminars and by review of laboratory auditing program (LAP) problems which are assigned upon completion of training, ongoing capability must be demonstrated by completion of annual requirements, including the laboratory self-evaluation, performance of measurements for internal and external measurement control, and through participation in regional meetings. Additional professional capability and skills may be demonstrated by writing technical papers and through participation in professional organizations such as NCSL, ASTM, or ASQC.

We all have the responsibility to ensure that our metrologists are properly trained and qualified to make laboratory measurements. The Office of Weights and Measures will be happy to assist laboratory managers and directors in evaluating the capabilities of laboratory staff.

#### **References**

The Office of Weights and Measures publishes documents which specify the requirements for laboratory certification. Additional handbooks with laboratory procedures and guidelines contain standard operating procedures to ensure accuracy and consistency in making measurements. Evaluation criteria and certification requirements are detailed in the following publications:

1. NBS Handbook 143, Program Handbook (currently being updated)
2. NBS Handbook 145, Quality Assurance Handbook for Metrological Measurements (the "bible" for metrologists)
3. NIST Special Publication 791, Description of Laboratory Program and Directory

In addition to these familiar reference sources, Ross Andersen (NY) has developed a draft for a metrology Section of Module 23, Weights and Measures Administration Module, Part II. Copies of this draft are available for you today. Please complete the comment sheets provided at the end of the draft and submit them to Joan Koenig at the Office of Weights and Measures.

- \*\* 4. NEW in '92: Metrology Section, Administration Module, Part II

#### **Planning**

##### **Meeting the Needs of Business/Industry**

An editorial in the Washington Post on April 28, 1992, by Dr. John Lyons, the NIST Director, and President of the NCWM, indicated that "our laboratories are the infrastructure of science and technology." The laboratories



support science and technology much as roads and bridges support our transportation network. We must maintain support for these programs if we are to prevent their collapse. What may have been good enough in the past, is no longer good enough. Adequate is not good enough to compete in today's marketplace. State laboratory services no longer are limited to support our legal enforcement activities. We must actively support the needs of our businesses and industries.

International activities in harmonizing legal requirements affect U. S. businesses significantly, and we must all work together to enhance the competitiveness of U. S. business and industry. When we talk about "Partnerships for Progress," we can identify many government/industry partnerships. Offering the services of the State laboratory will gain recognition for your entire weights and measures program. We create consumer protection brochures and distribute information to the public about weights and measures, and participate actively in weights and measures week activities on a year round basis, but we must market our laboratory services as well.

Participation in the local meetings of professional organizations gives laboratory staff an opportunity to interact with peers from industry and provides an opportunity to inform people of the availability of laboratory services. For example, a "laboratory brochure" from Minnesota indicates that "State responsibility for assuring accurate measurements in Minnesota commerce dates back to 1885," and "because the laboratory's services are available to all, they enable a small company to compete with a corporate giant." The history of weights and measures is rich, but we cannot afford to rest on the oak leaves and scrollwork of our certificates. With increasing emphasis on a global marketplace and international trade, we must focus on meeting business and industry needs today and in the future.

### **New Programs and Criteria**

I have given some examples of laboratory requirements that have changed during the last 20 years. How will certification criteria develop in the future? Many changes will probably occur in the near future. Let me mention one.

Yesterday, Dr. Lyons mentioned a plan to accredit private laboratories. In mass and volume, we have agreed to duplicate the certification program of the State Standards Program. Private laboratories have been working within the regional metrology groups for a number of years. They have been attending annual meetings, participating in round robin measurements, and have repeatedly requested certification. The Office of Weights and Measures is currently working with the National Voluntary Laboratory Accreditation Program (NVLAP) of NIST to develop an accreditation program for private laboratories.

Plans for a program in mass include an "Ultra-precision" level, in addition to "tolerance testing" and "calibration." This new level will provide services one step closer to national-level capabilities for the States, but may require some upgrades in facilities, equipment, standards, and training requirements for the States. Benefits include acquiring the ability to calibrate your primary standards in your own laboratory and to provide more accurate services to industry at regional and local levels. In support of this, the Office of Weights and Measures is developing an Advanced Seminar in Precision Mass Measurements, to be offered March 8 through 12, 1993.

### **Managing Resources**

The Task Force on the 21st Century noted the need to emphasize quality management to allow Weights and Measures programs to flourish in competitive environments. Budget concerns increasingly limit laboratory programs. The Office of Weights and Measures will continue to provide assistance whenever requested to support your laboratory [and enforcement] programs.

The possibility of contracting with a neighboring State for laboratory services was suggested earlier; I fully expect that this will occur in the future. Several States currently have declining programs: for them, contracting for laboratory services may be more realistic, cost effective, and may provide a better service to the enforcement program than what is currently available. Some of these States already send much of their enforcement equipment to neighboring States for verification.

When we talk about certifying private laboratories, some of you may worry that the competition will result in a loss of income for fee-supported State programs. Based on data we have seen, losing business doesn't appear very likely. A number of private calibration companies provide NIST-traceable measurement services to industry, yet we continue to see an increase in the calibration workload of State laboratories. There is plenty of work to go around!

Maintaining certification is desirable as a competitive advantage. Measurements provided by the State laboratory provide objectivity important to industry. Some State metrologists, by virtue of their long experience in the State Standards Program, are in a distinct position to evaluate private calibration laboratories for conformance to accreditation criteria; this will provide an additional service to industry. Metrologists, through their specialized training, are quite familiar with quality control programs. Extra effort is required to maintain quality measurement programs; regular training will continue to provide State laboratories a competitive advantage and is worth the cost in terms of the benefits it provides to your local laboratories and industry.

As weights and measures officials, you are in a position to respond to questions and needs from your constituency and customers, questions from legislators, questions from businesses, and questions from judges when you take your enforcement cases to court. If you have innovative ideas about how we can work together to respond to the numerous requests for verification and justification, I hope that you will share these ideas with me and with one another. No one has all the answers; we must all pull together.

I have shared a number of specific examples from our files at NIST. Much of the information has been submitted as part of the annual evaluation process or in requests for assistance. I would like to thank everyone who has provided this material; it benefits everybody and I have enjoyed reviewing it. Many examples haven't been used: actually, several file drawers are full of excellent examples and I regret that I have been able to use only a small portion. Information is provided to the Office of Weights and Measures to assist in the evaluation of your laboratory. More importantly, this information enhances your own programs by providing evidence of quality programs and traceable measurements. You have a right to be proud of your efforts!

## **Legal Metrology in Europe**

**M. Kochsiek**

**Director of Technical and Scientific Services  
Physikalisch-Technische Bundesanstalt, Germany**

Harmonization of technical regulations and mutual recognition of testing certificates are of great significance for the realization of the Single Market from January 1, 1993, in Western Europe. The measures taken by the EC Commission and the tasks to be fulfilled by the metrological organizations in Europe will be briefly described.

After the political changes, metrology in Eastern Europe is in a phase of reorientation.

### **1. Introduction**

The main target of the European Communities (EC) since 1957 has been the establishment of a Single Market. Above all, its aim is to ensure the free circulation of goods and services between the member states. As regards trading, the decision was taken in 1991 to extend the Single Market to the member states of the European Free Trade Association (EFTA).

It has been a long way to realization of the Single Market; its building up, based on the harmonization of the legal and administrative regulations which had developed over many years in the various member states, went very slowly. Differing technical requirements and testing regulations in the member states imply that a pattern approval for measuring instruments subject to mandatory verification is required in each of the states.

In legal metrology where 20 individual directives are existing already, it showed that due to the unanimity required for the harmonization, only EC Directives for mechanical measuring instruments, i. e., which are not state of the art, could be adopted.

In 1985 the Council of the European Communities decided upon a new approach with the aim to guarantee free circulation of goods from January 1, 1993. This approach also contains measures concerning metrology.

### **2. New Approach for Technical Harmonization and Standardization within the European Communities**

The ideas of the new approach which are of particular significance for legal metrology are:

- Majority decisions instead of unanimity decisions whenever harmonization regulations are to be passed
- Introduction of an information procedure including the right to object, and the obligation for the member states and national standardization organizations to inform each other of draft regulations and intended standardization projects
- Incorporation of only essential requirements on the reliability of measuring instruments in EC Directives. Technical requirements are laid down in European Standards (CEN and CENELEC). If possible, the new Directives and pertaining EN Standards shall be in accordance with OIML Recommendations and ISO/IEC Standards.
- Binding nature of harmonized directives. National deviations are no longer permitted.
- Declaration of Conformity with the directives not only by governmental bodies but also by the manufacturer if his quality assurance system based on EN 29 000 (ISO 9000) is recognized and supervised by a so-called notified body.

Apart from the about 20 EC Directives which have no economic significance, only the EC Directive on "Non-automatic weighing instruments" is available as a model at present.

For several reasons the Commission has meanwhile decided not to pass any further individual directives on measuring instruments, but to propose to the Council to pass a directive of general character for measuring instruments. This directive, called "METRO", contains general requirements on measuring instruments in legal metrology including their scopes of application.

For the individual categories of measuring instruments special requirements, e.g., maximum permissible errors, are fixed. As regards technical requirements, reference is made to European Standards.

### 3. The Modular Concept

Within the framework of the new concept, it is regarded as being particularly important for the functioning of the Single Market to strengthen mutual confidence in the product qualities and the prescribed tests. Depending on the testing requirements which are laid down in the relevant directives, procedures have been fixed as modules.

This modular concept refers to all the products for which a conformity assessment is provided in the harmonized regulations. For legal metrology in its classical sense, modules B are relevant for EC type examination, modules D for verification or declaration of conformity with affixing of the EC mark of conformity (corresponding to the former verification mark), if the manufacturer maintains a recognized quality assurance system for production and testing or module F, if the verification office or another notified body carries out the verification. For individual products module G may be applied. In the medical field (in Germany still part of legal metrology at present) module A is provided as well.

### 4. Global Approach for Conformity Assessment

As was already mentioned, legal metrology developed over many years in the various member states, thus having different structures, objectives and acceptance on the part of government and citizen.

The objective of the global approach is the mutual recognition of tests and certificates in all the member states, independent of the fact whether a private or governmental body is involved. However, the responsibility has to be made transparent. Therefore, the member states have to designate those bodies which are responsible for application of the conformity assessment modules laid down in a directive. It is indispensable for the functioning of the Single Market that these notifications are made on equivalent prerequisites. Therefore, the directives contain minimum criteria for the notified bodies as regards means and equipment as well as technical competence and professional integrity of their staff. These criteria are considered to be met if the relevant standards of EN 45000 series (ISO/IEC-Guides) are complied with. However, the mere technical competence of the bodies is not sufficient. If there is to be confidence in their activities, they have to make their competence transparent to third parties as well. A possibility to gain confidence is, for example, that the bodies are recognized within a national accreditation system which itself has to work according to the criteria of the EN 45000 series.

The "global approach" shall create confidence in

- the quality and competence of the bodies responsible for testing and supervision
- the competence of the manufacturers and
- product quality.



Standardization of conformity assessment shall be realized via the modular concept.

If a measuring instrument complies with the relevant EC regulations, e.g., pattern approval, and has been successfully submitted to a conformity check, e.g., verification, the CE mark may be applied to the instrument. Closer details remain to be clarified.

## 5. Metrological Organizations in Europe

The growing close of Europe requires a stronger cooperation in the metrological field of the EC and EFTA countries and - most recently - with the Eastern European countries.

In this connection regional organizations were established over the last years, which fulfill consulting, coordinating, cooperation, and harmonization tasks.

Why are these metrological organizations so important?

The targets of legal metrology are to ensure correct measurements with adequate accuracy on the basis of binding requirements on units of measurement, measuring methods and measuring instruments. With 18 EC and EFTA countries with more than 10 different languages, there are many problems which may only be solved by experts. For example: the introduction of the SI system of units of measurement: apart from a transitional solution for Great Britain and Ireland, metric units are obligatory in all the countries. Whereas harmonization of the measuring methods is relatively easy, harmonization of the requirements on measuring instruments presents difficulties. One decisive reason is that historically grown requirements concerning protection of the citizen have to be taken into account.

Further problems arise in connection with

- the question which categories of measuring instruments shall be subject to mandatory verification
- the determination of the requirements to be met by measuring instruments
- the duration of the verification validity of the individual measuring instruments
- mutual recognition of testing results
- interpretation of regulations and standards
- linguistic barriers.

The following organizations are dealing with the solution of these problems.

Since 1987, EUROMET has been a cooperation of all Western European metrological state institutes including the EC Commission to try - via common projects of scientific metrology - to make the most of the existing personnel and equipment resources and to avoid duplication of work. Meanwhile there are about 127 projects where the various institutes cooperate, fulfill tasks and take over tasks to benefit other countries.

Since 1975, WECC has been a cooperation of the national calibration services, i.e., of the calibration laboratories and their accreditation bodies in Western Europe. Its aim is to develop mutual confidence between the national calibration services and to achieve mutual recognition of certificates on this basis. In 1990 an agreement on the mutual recognition of certificates was signed by the calibration services of nine countries. Agreements with third countries are under preparation. In the German calibration service 100 laboratories are accredited at present issuing certificates for 20000 standards annually to which several million measuring instruments in service are



connected.

Since 1990 WELMEC has been the cooperation of the Western European institutions responsible for pattern approval and verification: via WELMEC the metrological problems arising in legal metrology shall be coordinated and the EC Commission shall be given advice.

To complete the picture, the following institutions must be mentioned as well:

WELAC is the organization of the national accreditation bodies for testing laboratories; EUROLAB is the cooperation of the testing laboratories.

EOTC is an advisory and coordinating body in the EC Commission which was recently founded to deal with all the testing and certification problems arising.

#### 6. Situation in Eastern Europe

In the socialist countries, legal metrology was integrated in the national state-run metrology. Regionally there was a multilateral cooperation within the metrology section of the Standing Commission for cooperation in the field of standardization of the "COMECON" countries. Apart from the general coordination tasks the share of work in connection with the providing of standards and with the recognition of pattern approvals and verifications were the agreed aims. Quality assurance, including the metrological infrastructure, was taken care of by the state and not by the manufacturers.

After the political change all the Eastern European countries are on the point of passing their own metrological legislation including new structures; they are advised by competent colleagues from Western Europe. Regarding metrology, practically all the countries orient themselves to OIML Recommendations and ISO/IEC Standards internationally, and to the procedures and regulations of EC regionally.

Since 1991 COONET has been a cooperation of the former COMECON countries dealing with all the metrological problems. At the moment 60 draft projects are under discussion.

Due to the current restructuring, detailed information will only make sense in 1 or 2 years.

#### 7. Perspectives

From 1993 the same harmonized regulations and procedures will apply to non-automatic weighing instruments in the EC and EFTA countries for the first time. For all the other categories of measuring instruments harmonized regulations are under preparation. The advantages for all the manufacturers all over the world are

- equivalent requirements and procedures in all EC and EFTA countries
- only one EC pattern approval for import into all the member states without repetition of tests
- EC verification by a recognized body, e.g., by a verification office in an EC/EFTA country or a manufacturer provided that he maintains a recognized quality assurance system.

If the EC enters into an agreement with a third country even a foreign manufacturer may certify the conformity and affix the EC mark of conformity.

For the manufacturers an essential saving of costs and time in legal metrology will result.

## How to Sell Your Program to a Legislature

Krista L. Sanda  
Commissioner, Minnesota Department of Public Service

[This presentation was made during the Open Session of the Committee on Education, Administration, and Consumer Affairs on Monday, July 20, 1992.]

### I. Introduction

Thank you, Max, for that kind introduction. I am glad to be here in Nashville to talk to you about some of the successes that we at the Minnesota Department of Public Service have had in selling our octane enforcement program to our Legislature. I hope that this information will help you sell your programs, particularly during these times of strict resource rationing.

Before I go on to describe what we did, I'd like to stress that our success would have been impossible without a lot of hard work on the part of our staff. Some of them are here at this conference and I'd like to recognize them. Mike Blaik, our weights and measures division director, is here today. His hard work, knowledge, and dedication have been very valuable to me. Two members of Mike's staff are also here: David Koets and Mark Buccelli. My specific comments today focus on the Minnesota octane investigation and subsequent legislative package. I think that our model can be applied to just about any major government enforcement program, particularly in weights and measures. There are three parts that make up the Minnesota model. The first is, once a problem is identified, vigorous investigation should begin immediately. Second, aggressively publicize and educate the public and the regulated industry about the issue. Third, put together a legislative solution package and sell it to the lawmakers and persons in authority whose help you need to solve the problem that you have identified. I'll talk about each of these three steps and relate them specifically to our experience during the octane investigation in Minnesota.

But first, it's useful to know your arena. In Minnesota, Democrats control both Houses, Republicans control the governorship, and there is a \$580 million deficit. I'd like to emphasize that it is important to keep the big picture in mind--the result that you are trying to achieve. Our bottom line goal in doing the investigation was to obtain increased legislative authority and resources to do a better job of protecting the consumer, which is a responsibility we have been charged by Minnesota State law to do. I think we did an excellent job, and I'm very proud of the staff and all the effort that was involved. Actually, by the time we got to the legislature to do the asking, most people were already well aware of the problem. There really wasn't much selling involved, so that is proof that what we did worked very well.

### II. Problem Identification and Investigation

I became aware of the octane problem soon after I came to the Department of Public Service. As most of you know, octane is that ability of gasoline to prevent engine knocks. To the consumer, this is an obscure concept. We have several grades of gasoline, all at different octane levels. This is confusing. It's very difficult for consumers to determine if they are actually getting what they are paying for. You can't smell it, you can't hear it, you can't taste it, but you sure pay for it. I instantly realized that solving this problem was clearly the role of our department and that it was our job to insure that people are getting what they pay for.

One of our inspectors received a tip from a transport driver who told him he was ordered to put regular octane product in a premium storage tank. The incident started a number of our field inspectors talking, and we had a hunch that this was certainly more than an isolated incident.

We were aware of the work of other States, particularly North Carolina and Missouri. I also had studied the General Accounting Office Report discussing the problem. I knew we needed more specific information regarding Minnesota, that there was a good possibility we had at least as bad a problem as existed on a national level. I decided that it was my job as Commissioner of the Department of Public Service to protect the consumer from this kind of situation and it was my job to investigate further. And, I must tell you, that I decided to undertake this investigation even if it meant a resource drain in other areas, because I take very seriously the job of consumer protection and our mission of providing fairness in the marketplace. We devised a plan to go out and pull samples from gas stations and start investigating the extent of the mislabeling problem.

We also became involved in looking at the particular statutes and reviewing the authority that I as Commissioner had. We found out that we really did not have as much authority as we would have liked and had to work hand in hand with county attorneys and the State Attorney General's office to have the full authority that we needed to subpoena shipping manifests and invoices and such.

We kept our limited authority in mind as we designed and conducted our investigation. This later helped us when we designed and discussed our legislative proposal. We were able to point out specific problems and what specifically would alleviate them. Again keeping in mind our ultimate goal of getting additional resources to do our job better, we realized that informing the public was going to be important. We therefore involved our communication staff at a very early stage. It would be their job to let the public know about this problem. Even though the communication staff members weren't going to be involved in the actual drawing of samples, it was important that they understood the whole story and what we were trying to accomplish.

I think this early involvement not only helped them to understand the problem better but helped in their enthusiasm in selling our program. Having them involved in the early stages, even in talking about the design of the investigation, was also helpful. They thought of a couple of things that maybe we wouldn't have--things the media might want to know--and, if we could build that into our investigation we did.

### **III. Publicity/Media**

We realized early on that the Department of Public Service had difficulty in enforcing octane posting. In addition to limited resources of staff and equipment, there was a problem with our level of authority as I mentioned earlier. We knew that in the long term we needed more resources and authority. I made it clear right from the start that this was one of our primary goals.

We were also aware from the experience of other States that, as they vigorously enforced octane labeling, the extent of the problem declined. If we could find a couple of the violators and prosecute them and if we would let the media know about that, everyone would know that we were serious about doing our job. A few well publicized prosecutions would quickly make a number of violators stop their cheating and the problem would start to lessen.

It was a difficult balancing act between trying to keep the information that we had maintained confidential and having enough information to provide to the media and ultimately the public. This is the one part of the investigation process that was quite frustrating. I had to walk a tightrope at times. For example, we could not release the individual names of the outlets we had found to be selling mislabeled product because we needed to provide that information to our Attorney General for prosecution. Once we had released the names, we would not be able to prosecute. I wanted to go to the media prior to having a legal outcome, so I really had to weigh prosecution against public information.

My decision was to get as much information as possible to the public. We knew we had an issue that every consumer could relate to. Most Minnesotans buy gasoline at one time or another. We knew that in order to achieve our goal we had to get that information released. We ended up releasing the information in aggregate--we did not name the individual stations but provided to the media a list of 119 different communities that we

sampled. In total we sampled 208 stations and found a 17 percent failure rate.

The news release that our staff wrote also mentioned that our division was hampered severely by its equipment and facilities. We did this to set the stage for our upcoming legislative proposal. It was important to publicly state that this was a very difficult problem to examine and that we were really stretching our resources to even do the amount of investigation that we had already conducted. This really helped later in selling our legislative package.

We also worked with the industry. As our investigation unfolded, a number of industry representatives made inquiries about what we were up to. Since we wanted some legal action, we needed to be careful about confidentiality. The industry was aware obviously that we were looking into this problem. Before the news conference, we held a meeting with representatives from the petroleum industries at all levels including refiners distributors and retailers. We provided them with our results and told them exactly what we were going to say at the news conference. We told them we were going to ask the legislature for additional resources and authority. This early groundwork helped us when the media, and later the legislature, asked us "what does the industry think about this?" We could legitimately provide an answer that they agreed that there was a problem and were going to work with us.

During the news conference, we focused on future remedies as much as possible. The issue of the names of specific retail stations came up. As I mentioned, we could not release this information. Many media members pressed us on this issue, which made it harder to address the future and the remedy of needing additional resources. Nevertheless, we worked hard to get this point across. By continuing to talk about our role in preserving fairness in the marketplace, we were successful.

We also used the news conference to educate the public on how complicated the petroleum industry is. As you know, there are many levels from refiner to retail, and that makes it very difficult to trace where the initial mislabeling has occurred. We needed to explain this to the media and ultimately the public. We used the simplest terms possible. This helped us later when we had to sell our case. It showed that this is indeed a difficult problem and emphasized the need for additional resources to adequately enforce labeling requirements.

What were our results? The results were that through the news conference and industry contacts we received a fairly favorable response from the industry. Obviously they were not in total agreement with us but I think, because we drew them in and let them know what we were going to say, we did not get that many disparaging comments. This positive media coverage and a cooperative relationship with the petroleum industry set the stage for our legislative agenda.

#### IV. The Legislative Package

We timed the public announcement and the release of the results of our investigation with the upcoming legislative session. Our story hit the press about the middle of December and we went to the Legislature with our proposals in January. This timing was very important and was one of the reasons why I finally decided to release the information when I did. As I said earlier, by the time we got to the Legislature most people had heard of this issue. That undoubtedly helped us sell our proposal. It also helped that we could present it as a basic consumer protection issue and a legitimate role of government. This was not a partisan issue. As a result, our package received a very positive reception.

We knew how to design a regulatory program to address the problem. We knew what would work, so we drafted our proposal. When we sat down with the industry to present our ideas they welcomed them. Their only concern was that we provide a level playing field. They knew we had the expertise to deliver.

Mike Blacik and his staff also did an excellent job researching the proposals. We were specific about the technology we were proposing to improve enforcement. Providing this information in an organized fashion



showed the legislature that we had thought about what we needed to solve the problem and were asking for that and nothing more. As a result, there wasn't much haggling about the amount of money that was needed for our program. What we received was \$693,000 to purchase equipment and an addition to our staff complement of five positions.

Those of you interested in the technical details can talk to Mike Blacik. The new Minnesota equipment can also be used to enforce the upcoming oxygenated fuels requirement of the Federal Clean Air Act Amendments. We will be working in conjunction with our State pollution control agency to enforce that part of the plan. This is a good example of killing two birds with one stone. The Legislature also saw that as an important aspect. It adds another benefit to our proposal.

#### V. Conclusion

In conclusion, I'd like to say that the basic steps we went through in Minnesota during our octane investigation would be a useful model for most government programs. I think that same approach could be used in foods, grocery scales, or any kind of measurement and weight enforcement. The basic steps that we used were that we studied the problem thoroughly, investigated, and then provided the results to the public with a well-planned public relations effort. If you do your job completely, selling it is easy. Especially if your sales effort is linked directly to public good and service, you can't help but get the Legislative help you need when you ask for it.

Thank you again for letting me address you and talk about our successes in Minnesota. I hope you can learn from the comments I have made today and be even more successful in your own States and organizations.



## Final Report of the Executive Committee

Sidney A. Colbrook, Chairman  
Illinois

Reference  
Key Number

### 100 Introduction

This is the Final Report of the Executive Committee for the 77th 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. Items 101-3 and 101-12 were grouped as a "consent calendar" and adopted by a vote of 44 yea, 0 nay in the House of State Representative and a vote of 60 yea, 0 nay in the House of Delegates. The membership adopted the report in its entirety by a vote of 41 yea, 0 nay in the House of State Representatives and a vote of 60 yea, 0 nay in the House of Delegates.

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## Detail of Items

### Part I - Executive Committee

#### 101-1 I Organization, Appointments and Assignments, Status Report

Chairman Colbrook made the following appointments during his tenure (July 18, 1991 to July 23, 1992).

##### *Executive Committee*

Mr. J. Alan Rogers was appointed to replace Mr. Ken Butcher on the Executive Committee. Mr. Kenneth Butcher, former head of Weights and Measures for the State of Maryland, joined the National Institute of Standards and Technology (NIST) in July of 1991 as Weights and Measures Coordinator; he is now the Technical Advisor for the Laws and Regulations Committee and administrator for several national and international working groups for the International Organization of Legal Metrology (OIML) in NIST's Standards Management Program.

##### *National Type Evaluation Technical Committee -- Grain Moisture Meter and Protein Analyzer Sectors*

Chairman Colbrook made the following appointments to the two new NTETC sectors on Grain Moisture Meters and Near Infrared Protein Devices. Dr. Lowell Hill, University of Illinois, was appointed to head both sectors. Dr. Richard Pierce, Federal Grain Inspection Service, agreed to serve as Technical Advisor to both sectors.

##### *Public Sector Members*

(member not yet named) Canadian Grain Commission  
Randy Burns, Arkansas  
Tina Butcher, NIST  
David Funk, Federal Grain Inspection Service  
Henry Oppermann, NIST  
Joseph Rothleder, California  
Cheryl Tew, North Carolina  
Robert Wittenberger, Missouri  
Richard Wotthlie, Maryland

##### *Private Sector Members*

James Bair, Millers National Federation  
John W. Barber, Dickey-john, Motomco  
Allen Butler, Perten Instruments  
M. Emori, Kett Electric Laboratory (Grain Moisture Meter Sector only)  
Charles Hurburgh, Jr., Iowa State University  
Daniel Kaminsky, Trebor  
John McClenethan, Growmark, Inc.  
Terri McLain, Sartorius Instruments  
Thomas O'Connor, National Grain and Feed Association  
Allison Pflug, CSC Scientific (Grain Moisture Meter Sector only)  
Robert Rachlis, Bran + Luebbe  
Tom Runyon, Seedboro Equipment Company  
Fred Seeber, Shore Sales Co., Grain Elevator and Processors Society  
Clifford Watson, Stein Labs, Perstorp Analytical, Foss Foods

Les Barrows, MO, was appointed to serve the remaining term of Jim Melgaard, SD, who retired and resigned from the Liaison Committee.

Barbara DeSalvo, OH, was appointed to serve the remaining term of Michelle Phillips, Indianapolis, IN, on the Education, Administration, and Consumer Affairs Committee. Ms. Phillips had to resign due to her jurisdiction's inability to fund her participation in the National Conference on Weights and Measures.

## Executive Committee

William Lagemann, DE, was appointed to serve as Chaplain at the 77th Annual Meeting. Martin Coile, GA, resigned from the Education Committee and as Chaplain. Mr. Coile's replacement on the Education Committee was named by the incoming Conference Chairman. [Editor's Note: On July 23, incoming Chairman Allan Nelson named Max Gray, FL, to serve the remaining 3 years of Mr. Coile's appointment.]

Constantine Cotsoradis, MD, was appointed as a public sector member on both the Belt-Conveyor and Measuring Sectors of the Technical Committee on National Type Evaluation; Philip Sanford, Thayer Scale, Ronald Dietrich, Kaskaskia Valley Scale Company, and Ron Penner, Riede Systems, were appointed to serve on the Belt-Conveyor Sector; and Timothy Scott, Rosemount, Inc., was appointed to the Measuring Sector.

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

N. David Smith, NC, and Carole Glade, National Coalition for Consumer Education, were appointed to the Task Force for Planning for the 21st Century. The other members are Tom Geiler, Barnstable, MA, Bruce Martell, VT, and Chip Kloos, Beatrice/Hunt-Wesson, Fullerton, CA; the Task Force is chaired by Darrell Guensler, CA. Also see Item 101-4 for appointments to the Petroleum Subcommittee to the L&R Committee.

Below are summaries of other NCWM organizational discussions not reported elsewhere.

### *ASHRAE and Energy Allocation*

Pat Nichols, Alameda County, CA, was asked to represent the NCWM at the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) Guideline Project Committee 8P, Energy Cost Allocation of Comfort Residential Buildings.

**Background:** Although the energy allocation systems may incorporate a customary measuring instrument that can be tested using traditional weights and measures procedures, the NCWM position is that the systems cannot be thoroughly tested and verified by weights and measures. The Liaison Committee had sought an appropriate organization to properly establish standards and guidelines for energy allocation systems. ASHRAE expressed willingness to establish these standards. Due to the work the NCWM has already done in this area and the close relationship of these systems to the devices now regulated by weights and measures, NCWM voting membership was sought by ASHRAE. Pat Nichols chaired the NCWM Energy Allocation Systems Task Force.

At the Interim Meeting, Mr. Nichols transmitted a request from the chairman of ASHRAE GPC-8P as to whether the Conference would provide or fund translations of German documents in the area of energy cost allocation. The Conference is contributing the costs for Mr. Nichols participation in the ASHRAE meetings; funding translation services is beyond what the Executive Committee believes is necessary for full participation within the standards development process.

## 101-2 I Organization, Status of Canadian Representatives

**Background:** Canadian government representation and participation in the ongoing work of the Specifications and Tolerances (S&T) and Laws and Regulations (L&R) Committees has grown from attendance at the Annual Meeting and Interim Meeting to partnerships on specific projects of mutual benefit to save resources of both nations. The final reports of the S&T and L&R Committees listed the names of the Canadian government representatives who participated as "Technical Advisors;" the S&T and L&R Committees and the staff of the Office of Weights and Measures (OWM), NIST, felt strongly that the contributions of their Canadian counterparts should be recognized on the committee reports.

The position of Technical Advisor is not formally recognized in the Constitution and Bylaws of the NCWM. "Advisory" membership is a specific class of NCWM membership available to representatives of Federal government agencies, State and local government agencies, but does not apply to weights and measures, enforcement officials, representatives of foreign government agencies, and retired people. The name of Technical Advisor was first applied in 1980 when the membership program of the NCWM was instituted; prior to that, the term "staff assistant" was used



in the standing committee reports to refer to NIST OWM staff. Section 4 of the Bylaws describes the position of Executive Secretary as "...the executive officer of the conference, the secretary and executive officer of the Executive Committee, and the non-voting secretary to each standing committee..." Since the Executive Secretary is normally the Chief of the OWM, the Executive Secretary delegates to OWM staff the position of "non-voting secretary" of each standing committee.

The Technical Advisor is instrumental to the success of the Conference, administering the committee or sector to which assigned, providing background data for the issues on the group's agenda, and recording the results of the meetings in the form of documented reports. The position has evolved as the NCWM has grown; some task forces and small, single-objective groups have not had a Technical Advisor as such, although they have had technical or administrative assistance from OWM staff (such as preparing a background report on NCWM members for the Nominating Committee). Prior to 1992, all of the standing committees and NTETC sectors have had Technical Advisors assigned by the Executive Secretary from OWM staff. When there have been staff shortages in OWM, NCWM committees and groups have had to be curtailed. More recently, the Federal Grain Inspection Service of the U.S. Department of Agriculture has formally agreed to provide the Technical Advisor for the National Type Evaluation Technical Committee Grain Moisture Meter and Protein Analyzer Sectors (Dr. Richard Pierce). This has been a major change to the traditional approach and one which OWM wants to expand upon in order to multiply the capabilities of the NCWM.

The issue of formal recognition of the responsibilities and scope of the Technical Advisor for each organizational element of the Conference will be explored at the next Interim Meeting.

The question of whether the Canadian representatives should be Technical Advisors or members of the Committees was explored. Technical Advisors do not have a vote, nor do they have a fixed term of office. Membership on the standing committees is for 5 years. In addition, the question of whether additional representation of Canada be sought by the Conference for other Committees, such as Executive, Liaison, and Education, was explored. Mr. Robert Bruce, head of the Canadian Legal Metrology Branch, discussed these issues with the Executive Committee.

It was the opinion of the Committee and Mr. Bruce that the positions of Technical Advisors were more appropriate for Canadian government representatives than Committee membership. Since Canada and the United States have only begun the process of harmonizing their legal metrology requirements, it would not be appropriate for Canadian representatives to have voting rights within the Conference. If the Canadian representatives were made Committee members, a special class of non-voting committee membership would have to be created. Although it is envisioned that participation by any individual representative will be for several years in order to maintain continuity, representation for more or less than 5 years by any given Canadian representative cannot be guaranteed.

Mr. Robert Bruce, LMB, will provide liaison between the United States and Canada for the Executive and Education Committees. When the Executive Committee sits as the NTEP Board of Governors during appeals, there is no Canadian representation.

The Executive, S&T, and L&R Committees all thank the Canadian government for the contributions of Mr. Renald Marceau and Mr. Gilles Vinet to the standing committees. In addition, Mr. Claude Bertrand and Mr. David Morgan have served as public members on the National Type Evaluation Technical Committee's Weighing and Measuring Sectors.

### 101-3 VC Organization, Number of Votes in House of State Representatives

(This item was adopted as part of the consent calendar.)

**Background:** The NCWM Constitution and Bylaws, (NCWM Publication 1) Article VI - Voting System, Section 1 - House of State Representatives, B. Composition, Paragraph 2 reads as follows:

The District of Columbia and the U.S. Commonwealths and Territories that have weights and measures programs similar to those of the States (for example, have followed the uniform laws and regulations and have adopted Handbook 44) are also allowed representatives.



## Executive Committee

For the last 2 years, American Samoa and Guam have been provided placards and placed on the Credentials Committee's list of State Representatives. They are rarely able to attend the Annual Meeting. The U.S. Territory of the Mariana Islands has never been represented. When the number of votes needed to indicate a majority of States was developed, whether or not they were all represented, only 53 Representatives were envisioned: 50 States, DC, Virgin Islands, and Puerto Rico. A majority was therefore 27 Representatives if all 53 possible were present. If American Samoa and Guam are formally given State Representative status, the number of votes needed to pass a recommendation might conceivably be 29 for a majority if all 50 States, the District of Columbia, and 5 Commonwealths and Territories were present for voting.

The Executive Committee does not believe that the rare or infrequent attendance of representatives from Guam, American Samoa, or the Mariana Islands should change the requirements for at least 27 votes in the House of State Representatives to be cast in favor or in opposition to an issue to render that vote official. One Committee member noted that it is difficult enough to pass or fail any voting item; the effect of absentee State Representatives is similar to negative votes. However, it was agreed that any voting item needs to be ratified by a majority of States in order to ensure a true national majority no matter how few States are represented (as long as there are at least 27). However, the Executive Committee believes that the voting rules need clarification that a majority rules if there are more than 53 State representatives present for voting.

**Recommendation:** Revise Bylaws, Article VI Voting System, Section 3 Minimum Votes, A. House of State Representatives as follows:

**A minimum of 27 votes in favor of, or 27 votes in opposition to, an issue must be cast for the vote to be considered official. If 54 or more votes are cast in the House of State Representatives, a majority of the total votes is required to pass (or defeat) the issue.**

### **101-4 I Organization, Formation of Petroleum Subcommittee to the Laws and Regulations (L&R) Committee**

**Background:** The Executive Committee agreed by mail ballot to establish a Subcommittee on Petroleum under the L&R Committee. The establishment of a Petroleum Subcommittee is a step beyond the areas of gross and net quantity determinations traditional to weights and measures; the subject addresses petroleum quality measures - for motor fuels, oils, automotive and vehicle fluids in general - including vapor pressure measurements, research and motor octane, and the presence and amount of oxygenates. The Subcommittee will provide advice and technical guidance to the Laws and Regulations Committee and provide a forum within the NCWM for States with motor fuel programs. The Executive Committee plans that it will eventually have membership from private petroleum interests, the vehicle manufacturers, the environmental interests, the consuming public, and both Federal and State regulatory agencies - those involved with the environment, occupational and general health, motor fuel quality, and taxation.

Concerns were expressed at the Interim Meeting as to how many members should be appointed, from what segments of the petroleum, chemical, or manufacturing industries or consumer population the subcommittee members would be drawn, and the rules to govern voting. The Executive Committee believes that the strength of the Conference within its committees is that each issue addressed by them is delineated and described in enough detail and with enough time for information and data to be collected that a clear consensus usually emerges on most issues before voting. Although some balance will be sought when making appointments to the Subcommittee, the Executive Committee believes that the total number of representatives from the private sector may be larger than the number of public sector representatives. The Subcommittee can decide how to resolve issues for which there is no clear consensus. Since decisions and advice provided by the Subcommittee must still be acted upon by the L&R Committee, which is comprised entirely of weights and measures officials, a balance of views of industry and weights and measures officials will be maintained.

At their Interim Meeting, the L&R Committee developed a work plan and list of priorities for the new Subcommittee. See their report for more information.

The Executive Committee decided initially that the NCWM could underwrite the costs of 5 or 6 public members in meetings held by this Subcommittee (as is presently done, for example, for NTETC sector meetings). Chairman

Colbrook sent a memorandum soliciting nominations of candidates, inviting the participation of more public members than the Conference could support, and requesting the sponsoring agencies to underwrite the participation of their nominees on the Subcommittee so that more than 5 or 6 public sector members can participate. Meetings of 2-3 day duration (initially only once in the 1992 calendar year), separate from the Interim and Annual Meetings (similar to the NTEC sector meetings), are planned.

In concert with the incoming Chairman, Allan Nelson, Chairman Colbrook appointed Celeste Bennett, MI, as Chairman of the Subcommittee on Petroleum; Randy Jennings (TN); Barbara Bloch (CA); Eric Hamilton (FL); Charles Gardner (Suffolk Co., NY); Ron Hayes (MO); N. David Smith (NC); Jose Torres-Ferrer (PR); Bill Butterbaugh (National Propane Gas Assn.); Marilyn Herman (Herman & Assoc.); Bob Reynolds (Downstream Alternatives); William Scheller (Scheller & Assoc.); Dan Moenter (Marathon Oil Co.); Jim Williams (API); Lew Gibbs (Chevron); Jim Peeples (Clean Fuels Devel. Coalition); and Sydney Andrews (Consultant) as members. Due to the importance of this work, the Executive Committee decided that Conference will underwrite the participation of all the public sector members named. The Subcommittee is scheduled to hold its first meeting this fall. The Executive Secretary reported that Mr. Richard Whipple from OWM would serve as Technical Advisor.

## 101-5 I Organization, Formation of Safety Subcommittee to Education Committee

**Background:** The Task Force on Safety completed its work at the conclusion of the 76<sup>th</sup> Annual Meeting. One of its recommendations was to establish a subcommittee to the Education Committee to address safety in the weights and measures workplace. The Task Force identified several areas of responsibility with which the subcommittee should be charged:

- Address any questions pertaining to safety in the weights and measures workplace, including field, laboratory, and office environments.
- Expand upon the approach used in the revisions of the Examination Procedure Outlines and extend the approach to other types of routine activities such as package checking.
- Update and share information pertaining to safety in the weights and measures workplace by including, for example, a regular section in the W&M Today newsletter.
- Provide a listing of information available in the safety library established by the Task Force.
- Provide the National and regional 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.
- Assist in revising the National Training Program training modules to include safety information.
- Assist the Metrologists' Group to revise laboratory documents to include safety information.
- Identify sections of Conference documents that should be revised to include safety information. This would require review of other standing committee recommendations and reports.
- Maintain a working relationship between the U.S. Occupational Safety and Health Administration and the Conference.

The Task Force recommended that the Subcommittee not be expected to provide analyses of individual safety programs, and that it meet only when needed. The Executive Secretary asked that the Education Committee review the Task Force's recommendations, delineate further objectives and scope for a subcommittee and make recommendations, including membership and meeting schedule (if any are necessary), to the Executive Committee.

The Education Committee discussed this issue at its Interim Meeting and recommended to the Executive Committee that a subcommittee be formed to act as a focal point and clearinghouse for safety in the workplace issues. They reported that at least one of the regional weights and measures associations is considering the possibility of

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establishing its own safety group if a national focus is provided. They reported that the S&T Committee had referred the issue of above-ground storage tanks for motor fuel (and the safety concerns surrounding testing at these installations) to the Education Committee and they suggested that this might more appropriately be considered by a broader spectrum of specialists than those comprising the Education Committee. Mr. Malone (NE) reported another potential safety issue that he had heard about, that weight lifting cranes in Florida over 10 years old had been x-rayed, revealing stress cracks, and that this situation probably existed in the equipment of many weights and measures jurisdictions.

The Committee was apprised of the work of OWM staff on safety-related issues. Mrs. Joan Koenig completed a revision of NCWM Publication 12, "Examination Procedure Outlines for Weighing and Measuring Devices;" the revision is based on the 1992 edition of Handbook 44 and incorporates the safety reminders and information developed by the Task Force on Safety. Ms. Georgia Harris, manager of OWM's Metrology Program, reported that safety considerations are being incorporated into the laboratory publications wherever pertinent. The contents of the Safety Library are available from Ms. Joan Mindte of OWM upon request. The Executive Secretary noted that the W&M Today Newsletter could incorporate a column on safety notes and news, but would need contributions of information and news from the NCWM membership.

In its discussion of this issue, some members of the Executive Committee expressed the opinion that safety should become part of the Education Committee's name. Further discussion of this idea suggested that more analysis of the committee and subcommittee structure of the Conference was needed (see Item 101-6).

In discussions with the former chairman of the Task Force, Charles Gardner, the Executive Committee determined that a focal point for safety issues was needed. At the Interim Meeting, the Executive Committee tentatively decided that the Education Committee could serve as the focal point for the time being. When the task of revising each training module is initiated, it would be the responsibility of the reviser to incorporate pertinent safety considerations and the task of the Education Committee to be sure that these considerations were incorporated. This is not considered an ideal solution, however, because the amount of time that the Education Committee can devote to individual safety issues is limited due to its responsibilities for developing and revising the training modules.

In subsequent discussions by telephone, Mr. Gardner agreed to assume the position of "Safety Liaison." Whenever a safety issue arises that needs consideration by experts in a given industry, Mr. Gardner, as NCWM Safety Liaison, will seek their assistance. If he is able to obtain guidance and advice, he will pass the information on to the weights and measures community in articles in the W&M Today Newsletter. He will report his activities to the Education Committee.

The Safety Liaison requests any information concerning administrative guidelines that jurisdictions or businesses may have on safety procedures concerning returning motor fuel to above-ground storage tanks be forwarded to the NCWM.

## 101-6 I Organization, Committee and Subcommittee Structure

Throughout the Interim Meeting, the Executive Committee returned to the issue of organizational structure of the technical committees of the Conference. The objectives of the National Conference are many:

- to provide a national forum for the discussion of all questions related to weights and measures administration as carried on by officials of the Federal government and regulatory officers of the States, commonwealths, Territories, and Possessions of the United States, their political subdivisions, and the District of Columbia;
- to develop a consensus on uniform laws and regulations, specifications, and tolerances for weighing and measuring devices, and on testing, enforcement, and administrative procedures;
- to encourage and promote uniformity of requirements and methods among jurisdictions; and
- to foster cooperation among regulatory officers themselves, and between them and all of the many manufacturing, industrial, business, and consumer interests affected by their official activities.



The Executive Committee has a responsibility to review the organizational structure and recommend optimum operating designs to maximize the Conference's objectives and meet its goals. The successes of the NCWM and its technical sponsor, NIST/OWM, are well known:

- All 50 States have adopted some version of NIST Handbook 44 (H44), "Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Equipment;" 38 States automatically adopt the latest edition of H44 by reference.

Relatively recently, these standards of test and specifications for measuring devices have also been adopted by a few Federal regulatory agencies.

- The Packers & Stockyards Administration, the Federal Grain Inspection Service, and the Food Safety and Inspection Service, all of the U.S. Department of Agriculture, have adopted H44. The Food Safety and Inspection Service has also adopted NIST Handbook 133, "Checking the Net Contents of Packaged Goods."
- The Federal Grain Inspection Service, the Food Safety and Inspection Service and all but one State now acknowledge the National Type Evaluation Program (NTEP) Certificate of Conformance (CC) on measuring devices as proof of having met the design requirements and being capable of performing within the accuracy requirements of H44.
- The Federal Trade Commission has collaborated with the States through NIST/OWM and the NCWM to enforce their portion of the Federal Fair Packaging and Labeling Act and the Petroleum Marketing Practices Act (motor fuel octane requirements).

Uniformity among the States and among Federal and State agencies is in some cases now a reality (for example, with respect to Handbook 44 recognized as the standard by both the States and the U.S. Department of Agriculture). There are many areas for additional successes whose tasks can be facilitated with slight changes to the organizational structure.

#### *Present Committee Structure and Alternatives*

Except for the Liaison Committee, each standing committee is composed of five active members. The Subcommittee on Petroleum and the National Type Evaluation Technical Committee sectors are not limited in type of membership or in members' length of service on the subcommittee or sector. Since their recommendations funnel upward through a standing committee, the final decision is made by regulatory officials. As more Conference standards are adopted by Federal agencies, there may be reason at some future time to consider Federal agency representatives as standing committee members. Federal agency representatives are now technical advisors (their present roles in L&R and S&T Committees) and National Type Evaluation Technical Committee (NTETC) Sector members.

The Chairman normally reappoints the NTETC sector members each year, although the membership of the sectors is not limited in number, and any volunteer (except for public sector participants) is ordinarily appointed or reappointed on request. (Travel and expenses are reimbursed by the Conference for public sector participants from State and local government.) It has been suggested that there may be reason to appoint the sector and subcommittee members for a fixed number of years (say three) in order to provide for new points of view and to infuse new ideas and perspectives into the voting membership.

There may be a need to reformulate the objectives of the committees and perhaps to establish additional subcommittees to optimize the Conference goals. For example, although the Liaison Committee is pursuing a consumer information pamphlet, this would ordinarily have been the responsibility of the Education Committee, whose full title is the Committee on Education, Administration, and Consumer Affairs. (The Technical Advisor to the Education Committee drafted an outline of the consumer information pamphlet; the Liaison Committee and its interim Technical Advisor put the first draft together from that outline.)

The Education Committee has devoted almost all its time to the development and revision of the training modules, and it is anticipated that this will continue as the Committee's top priority. Additional efforts need to be expended

## Executive Committee

by some group within the Conference on the administration of weights and measures; the Education Committee is now focussing on the development of a module on weights and measures administration. For additional needs beyond module development, however, the formation of subcommittees and delegation to them of specific tasks under the Education Committee may be appropriate.

The Executive Committee has received several suggestions concerning revision of the structure of NCWM committees. Due to its workload, it has been suggested that the S&T Committee be split into two parts - one committee for weighing and another for measuring. In further discussions at the Annual Meeting, however, the Executive Committee agreed to look at maintaining a single S&T Committee (after all, the General Code applies to all devices) and exploring the concept of subcommittees or working groups to develop specific issues.

In addition to the Subcommittee on Petroleum under the L&R Committee, a subcommittee on moisture loss has been suggested, in order to address many individual commodities in this area. The L&R Committee Technical Advisor has been inundated with technical and managerial work in this latter area.

Another suggestion at the Interim Meeting was to reformulate the Liaison Committee as a subcommittee to the Executive Committee, since much of its work is implementation of Executive Committee (general Conference) issues. The Task Force on Planning for the 21st Century recommended (see appendix) that the work of liaison with other organizations be incorporated into the work of every group within the Conference rather than just the Liaison Committee. After discussing the Task Force recommendations, the Liaison Committee met with the Executive Committee at the Annual Meeting and proposed to assign each member of the Liaison Committee to another standing committee in order to bridge the gap between their roles as liaison experts and the work of the other committees. Aves Thompson, chairman of the Liaison Committee was invited to participate in the rest of the Executive Committee deliberations at the Annual Meeting. See the Liaison Committee report for the other committee assignments.

Concerning international collaborations, the NIST/OWM has formed bilateral working groups with Canada with the objective of harmonizing legal metrology requirements between the two nations, initially in the areas of requirements and test procedures for scales, liquid measuring devices, mass flow meters, in-motion railway scales, belt conveyor scales, lubricating oil meters, and electronic audit trails. The NCWM has committed itself to long-term participation in these working sessions. These bilateral working groups will probably expand in time to include Mexico and other American and Caribbean nations. Should these working groups feed into the S&T and L&R Committees? At the Annual Meeting, the Executive Secretary reported on a meeting in April with Canada's LMB, in which Canada agreed to do a technical comparison of the U.S., Canada, and OIML requirements for static weighing scales, with the objective of meeting to discuss this analysis in the fall. A working group will be formed of weights and measures enforcement officials, Federal agency representatives, and device manufacturers and users to explore the issue of harmonization of requirements with Canada. It appears logical that this working group report to the S&T Committee.

NIST/OWM and the NCWM, through NIST, have been asked to provide technical assistance in labeling and packaging issues being discussed as part of the North American Free Trade Agreement negotiations, and the United States has accepted responsibility in this area in OIML. It seems reasonable to establish working groups within the NCWM in this area. Expansion of involvement in standards development to include Federal and international harmonization efforts appears to require an expansion in the committee and subcommittee (or working group) structure of the NCWM.

### *National Standards as State and Federal Regulations*

It should be a prime objective of the NCWM to build on its past successes; to collaborate with those agencies without measurement device or measurement practice standards (for example, as NIST/OWM has done with the U.S. Postal Service, and as the NCWM should do with the U.S. Department of Transportation for vehicle weighing); and with those whose standards might be interpreted as conflicting with NCWM standards (for example, the U.S. Food and Drug Administration in its new responsibilities for promulgating regulations under the 1990 Nutrition Labeling and Education Act), asking them to participate in the standards development process within the NCWM.

The bilateral U.S.-Canadian working groups may become models of what must be formed on specific issues with Federal agencies. For example, in the wake of the Nutrition Labeling and Education Act, the NCWM should now



form a working group to resolve differences and establish uniform packaging, labeling, and method of sale standards with the Food and Drug Administration, U.S. Department of Agriculture, and the Federal Trade Commission.

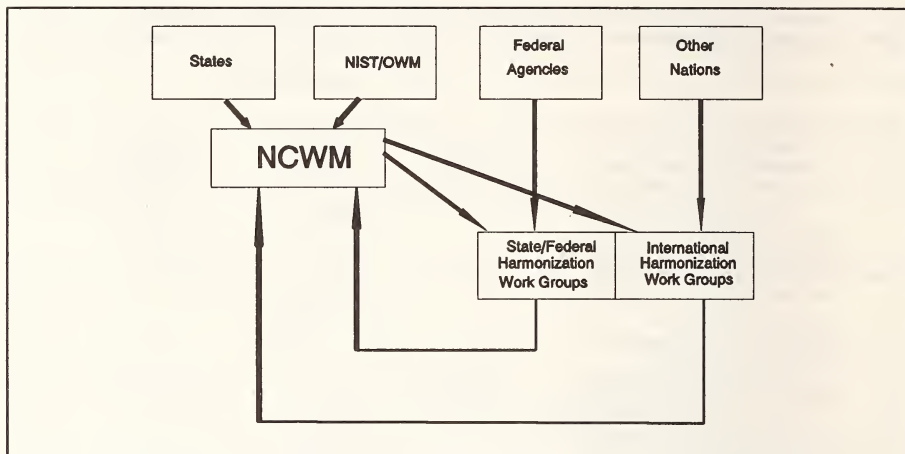
The table below illustrates current NCWM interactions and possible future collaborators.

Private Industry & Assns.	Political Subdivisions & Assns.	Standards Writing Organizations	Federal Agencies	International, Nat'l/Regional Organizations
Device Manufacturers	States	NCSL	NIST/OWM	Canada
Packagers	Counties	ASTM	NIST/NVLAP	Mexico
Petroleum Companies	Cities	AOAC	USDA P&S FGIS FSIS	EC
Retailers	State Police	ANSI	FDA	OAS
Supermarkets/Grocers	State Patrol	AFDO	FTC	OIML
Farmers	NASDA		DoT	ISO
Food Processors	Natl Conf. of State Legis.		USPS	UN/Codex
Scale Manuf. Assn.			EPA	GATT
Natl Indus. Scale Assn.			DoD	NAFTA
Internatl Soc of W&M			GSA	EFTA
Food Manuf. Instit.				

Shaded areas are those organizations with which NCWM or NIST/OWM has collaborated. Unshaded organizations are possible future collaborators.

The NCWM has a unique combination of procedures and policies that permit rapid standards development, full participation in standards development by all interested and affected parties, due process protection in order to ensure that the final standards are consensus standards and, finally, feedback mechanisms to correct standards, if necessary. Weights and measures influence has expanded into motor fuel quality (approximately 22 States have recently initiated or upgraded their motor fuel quality measurement capabilities); commodity quality measures such as moisture and protein (FGIS has underwritten the standards development costs of public sector member participation in the area of grain test equipment); shipping and postal scales; and law enforcement scales for highway weight control. The NCWM has been asked to assist agencies such as State departments of transportation, departments of taxation, and State police in interpreting and simplifying H44 for law enforcement purposes and developing other regulatory standards documents. The NCWM must broaden its understanding of who its customers are, to include other enforcement officials, Federal as well as State or local, and those who use mass measurements in their business or service as also deserving representation.

The first step is to involve interested parties, to form new harmonization work groups within the NCWM structure to feed technical advice back through NCWM committees (see figure on next page), and to enlist Federal agency representatives to be Technical Advisors, as FGIS has provided for the NTETC Grain Moisture Meter and Protein Analyzer Sectors, and as Canada's Legal Metrology Branch has provided to the S&T and L&R committees.



Harmonization work groups must feed back into the Conference.

Just as the NTEP Board of Governors uses the National Type Evaluation Technical Committee sectors as its subcommittees in the development and discussion of technical issues, and as the L&R Committee now has a Subcommittee on Petroleum, there appears to be a need to establish more subcommittees under L&R in the areas of (1) quality assurance and assessment programs for processes and products, (2) registration of service agencies, and (3) licensing of commercial measurement equipment users, and (4) development of moisture loss test methods and collection of data also requires in-depth technical knowledge and consultation.

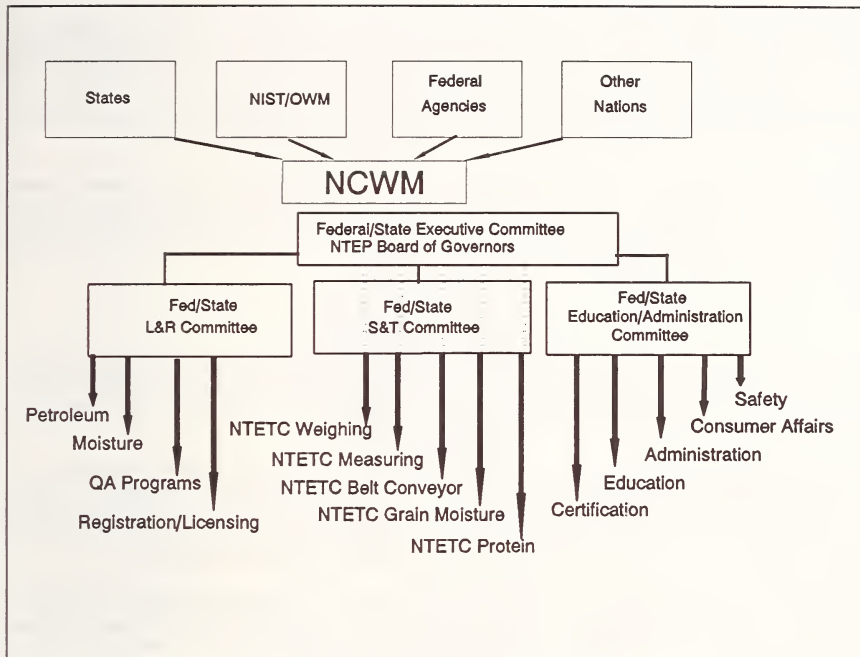
It may become necessary to subdivide the many issues confronting S&T among several working groups for specific projects.

Similarly, the Education, Administration, and Consumer Affairs Committee is presently overburdened with its work of reviewing and initiating new and revised training modules. Subcommittees in the areas of education delivery, inspector and repair agency certification, and administration of weights and measures programs may have to be established.

A subcommittee on safety under the Education Committee has been proposed; consumer affairs may also need a separate working group or subcommittee. All of these committees may need to be reconstituted as Federal/State committees to enlist the participation of all regulatory agencies.

The global nature of our economy mandates taking a broader view of what the NCWM is, what its goals and objectives must encompass, and with whom it must develop partnerships.

The Executive Committee seeks further input on restructuring the standing committees. The Executive Secretary noted that any modifications to the committee structure be designed with adequate consideration given to who might act, either within OWM or outside, as Technical Advisor to any additional group. No action was taken on this issue; it is expected to be deliberated further next year.



More subcommittees may be needed.

See also the report of the Task Force on Planning for the 21st Century appended to this report.

## 101-7 I Publications, Status Report

### *NIST Publications*

The 1992 Handbooks 44 and 130 were mailed in October to NCWM members who requested them. Instead of a wholly new Handbook 133, a second supplement was published because the U.S. Department of Agriculture, Food Safety and Inspection Service (FSIS) adopted the Third Edition of Handbook 133; these regulations took effect January 2, 1992.

If NIST had published a new Handbook 133 in October 1991, it would have been the Fourth, or 1992 Edition. Approximately 7,000 meat and poultry plants, which are not familiar with the annual NCWM revision process, would have requested the Third Edition of Handbook 133 from the U.S. Government Printing Office and would have been told that there is no such document if a fourth edition had replaced the third. The second supplement to Handbook 133 was mailed in October to the NCWM members who requested it.

Although the NCWM membership has increased to over 3,200 members, of whom more than 2,800 potentially could request all NIST Handbooks free of charge, only 2,206 copies of NIST Handbook 44, 1992 edition, "Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices," 1,926 copies of Handbook 130, 1992 edition, "Uniform Laws and Regulations," and 1,643 copies of Handbook 133, Supplement 2, "Checking the Net

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Contents of Prepackaged Commodities," have been requested. A total of 2,860 members (all members as of the date of publication except retirees who pay no dues and receive only the newsletter) have received NIST Special Publication 816, "Report of the 76<sup>th</sup> National Conference on Weights and Measures, 1991." NCWM members must now specify which NIST publications they desire on their renewal notice or application form when they join the Conference. The change in membership policy to supply the handbooks and NCWM publications only to those members who request them has substantially reduced publication costs. Members should be aware that they may not receive the report of the Annual Meeting proceedings if do not renew their membership by September 15 each year.

The L&R and S&T Committees have accepted the tasks of more closely conforming to NIST printing policy of metric only or metric with inch-pound units optionally following in parentheses. Major editing has been necessary in order to follow the NIST policy. OWM Technical Advisors have recommended changes to the S&T Committee for NIST Handbook 44 and to the L&R Committee for NIST Handbook 130; see their reports for information about the changes recommended to these publications.

### *NCWM Publications*

Conference members automatically receive NCWM Publication 15 "Agenda of the NCWM Interim Meeting," NCWM Publication 16 "Announcement Book and Committee Reports of the 77<sup>th</sup> NCWM," and the newsletter "W&M Today." Members must select NCWM Publication 2, "Weights and Measures Directory" when they join or renew membership. Only 1,553 members requested NCWM Publication 2.

Publication 12 "Examination Procedure Outlines" was revised to follow the 1991 edition of Handbook 44; copies were distributed to State and major local jurisdictions in August and 252 copies were sold for a net income \$1,425. Another edition of Publication 12 following the 1992 edition of Handbook 44 and incorporating safety concerns was completed and provided to the State weights and measures directors in January; copies will be offered to those on the Conference mailing list at a reduced price of \$12 to Conference members (\$24 to nonmembers).

NIST published several hundred copies of Publication 19, the report of the Task Force on Safety. Complimentary copies were provided to State weights and measures directors and delegates to the 76<sup>th</sup> Annual Meeting. Announcement was made in W&M Today of its availability free of charge to any Conference member who requested it; copies are still available.

### *NCWM Publications - National Type Evaluation Program*

Copies of Publication 5 and Publication 5A "NTEP Index of Device Evaluations" were sent to State and major local weights and measures agencies free of charge and offered to NCWM members for \$20 for Pub 5 and \$15 for Pub 5A, to nonmembers for \$35 for Pub 5 and \$30 for Pub 5A in August, 1991. Only 145 copies of Publication 5 and 37 copies of Publication 5A were printed and sold.

NCWM Publication 5 was revised in June 1992. It has been sent to all State directors. A flyer on its availability to all members will be sent after the Annual Meeting.

The revision to Publication 14 "NTEP Administrative Procedures, Technical Policy, Checklists, and Test Procedures" has been delayed until the end of 1992. Copies will be provided to all State weights and measures directors and NTETC sector members, and will be offered for sale to the Conference mailing list and at a reduced price to Conference members.

### *NCWM Publications - National Training Program*

A revision of NCWM Training Module 20, Vehicle-Tank Meters, was published December, 1991. It tracks the 1992 edition of Handbook 44. The revision of Module 5, Vehicle and Axle-Load Scales was completed at the end of February. Because of the length of time to revise it, it is based on the 1991 edition of NIST Handbook 44.



## 101-8 I Membership, Status Report

There were 3,470 members at the end of the 1991-92 membership year; the breakdown of that membership is shown in Figure 1. Appendix A shows the composition of the NCWM mailing list. Figure 2 shows the membership growth since 1987.

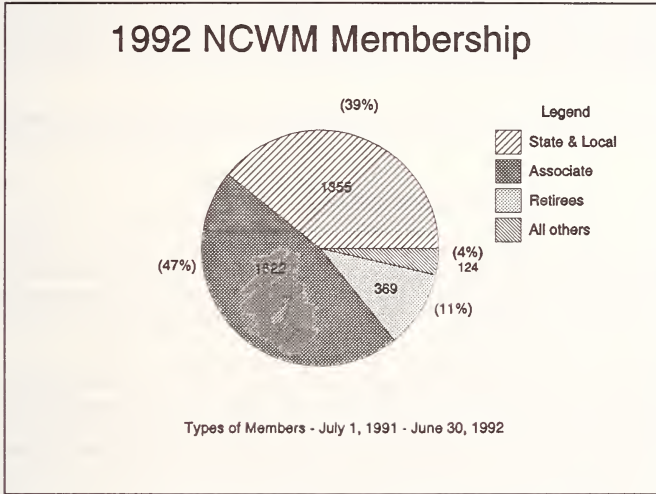


Figure 1

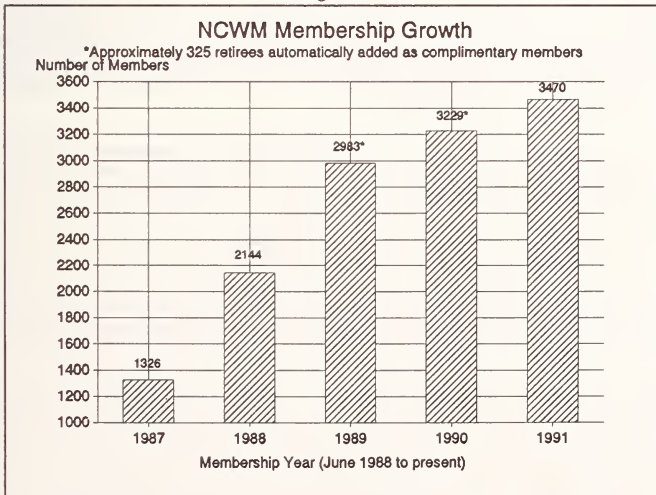


Figure 2

## Executive Committee

The 1992 proposed operating budget is based on a membership estimate of 3,170 paying members. Since retired members pay no dues, this figure translates to (3,170+380) or 3,550 total members.

To reach more regulatory agency and business representatives who need Conference products, the OWM has entered registered repair firm mailing lists kept by many States and into the NCWM database generated addresses for several bulk mailings announcing the availability of NIST handbooks and Conference publications, plus the relative cost savings to members as compared to nonmembers. One more State's list of registered repair firms has to be entered. Local jurisdictions in those States that do not keep State-wide lists of repair firms will be contacted to distribute membership applications and to obtain county lists of repair firms. OWM is now adding petroleum program personnel to the NCWM database.

The Executive Committee considered the efforts towards adding members as critical to supporting the work of the Conference.

### 101-9 I Finances, Treasurer's Report

Mr. Charles Gardner reported on the 6-month close-out period from July 1 to December 31, 1991. See Appendix B for the Treasurer's Report. The Auditing Committee reviewed the accounts in July at the Annual Meeting. Consideration will be given to having the Auditing Committee attend the Interim Meeting next year in order to provide a more timely review of the new fiscal year accounts which coincide with the calendar year and close out December 31, 1992, rather than waiting until July 1993 for the Auditing Committee review.

The funding of the National Type Evaluation Program was discussed, including activities of the National Type Evaluation Technical Committee sectors, standardization and administration of Participating Laboratory activities, and underwriting potential appeals activities. In addition, the cost of auditing device and component production processes, the cost of delivery of training seminars, the costs of further module development and revision, as well as the costs of standards development in general, including travel and per diem expenses for Conference representation at a growing number of meetings and tests, were all discussed. Expenses are anticipated to exceed income by nearly \$50,000 in the 1992 fiscal year.

In order to fund its mission, priorities were set and funding sources were studied, including training tuition, membership and meeting registration fees. The Executive Committee decided by mail ballot to charge a meeting registration fee for the Interim Meeting. Since the Committee made the decision after the Annual Meeting, they also decided that the registration fee would be waived for public sector standing committee members who are not reimbursed for the registration by their jurisdiction.

The budget for FY 92 was revised with all unobligated funds delineated (see Appendix C). The draft budget for FY 93 was outlined. The Budget Review Committee met during the week of the Interim Meeting in order to review the revised FY 92 budget and become familiar with the new accounting structure.

### 101-10 I Finances, Associate Membership Fees

**Background:** A Subcommittee to the Associate Membership Committee, composed of Richard L. Davis, James River Corp., Christopher B. Guay, Procter and Gamble Inc., and David W. Quinn, Fairbanks Corp. wrote to the Executive Committee:

It is industry's desire to provide maximum support to the Conference. As the Conference embarks on new and expanded programs, we want to continue a supportive role in the development and execution of these programs to ensure their success. In order for us to provide this desired support and to continue our annual sponsorship of a reception for the Conference members to show our gratitude and thanks, and to spread that support equally among all associate members who benefit from these programs, we would like to suggest a dues increase. This would then eliminate the necessity for the Associate Membership Committee to make yearly solicitations from industry members to support our functions.

These funds are proposed to be used for

- (a) sponsorship of an "Industry Night" reception, with a spending cap, and
- (b) programmatic support in such areas as training module development, consumer education brochures, train-the-trainer expenses, NTEP maintenance, etc. The intent of the Associate Membership Committee is to spread these monies over time equally among the committees to support their needs. This would be done year by year at the discretion of the Associate Membership Committee as needs arise, and might result in one committee receiving all of the excess funds in one year, and on other years, it might be divided between two or more committees.

Because the Executive Committee opposed a two-tier dues structure last year, the Associate Membership Committee proposed two alternatives this year:

- (1) an increase of all membership dues from \$35 to \$50, or
- (2) an increase only of associate members dues from \$35 to \$50.

The Executive Committee discussed this issue at length. Even though the Conference proposed budget calls for spending more than anticipated income, a cushion of carryover funding should last approximately 2 years. Therefore, the Executive Committee rejected an across-the-board dues increase at this time.

The Executive Committee decided to take the recommendation of the Associate Membership Committee and increase the dues of Associate members (both U.S. and foreign) to \$50. The extra \$15 per member will be deposited in a special account exclusively for the use of the Associate Membership Committee with the understanding that a spending cap would be applied to the Industry Night reception. The remainder of the funds would be disbursed to the National Conference during the Annual Meeting, and announced by the Associate Membership Committee during the Liaison Committee Report to the Conference. The Executive Committee will annually submit a list to the Associate Membership Committee suggesting priorities where funds are needed for the year. This year, Chairman Colbrook and incoming Chairman Nelson recommended that the Liaison Committee's Consumer Pamphlet be underwritten by the Associate Membership Committee's funds. The Associate Membership agreed to fund this pamphlet and made their announcement through the Liaison Committee report, given at the Annual Meeting.

The American Petroleum Institute recommended that the regional weights and measures associations consider the approach used by the National Conference for their associate members as well.

## 101-11      I      Finances, Budget Review

The Budget Review Committee proposed and the Executive Committee adopted a 1991-92 budget at the Interim Meeting in January 1991. At the 76<sup>th</sup> Annual Meeting, a new fiscal year, to coincide with the calendar year, was adopted. A 6-month reporting period was established to bridge between the two fiscal years at the time of changeover. The Budget Review Committee met at the Interim Meeting 1992 to study the revised budget adopted at last year's Interim Meeting to determine whether any changes were needed for the Fiscal Year 1992 and in anticipation of receiving a new draft budget from the Executive Secretary for the 1993 fiscal year. The Budget Review Committee met at the Annual Meeting and recommended a budget for the 1993 calendar year. The final 1992 and 1993 budgets are appended to this report. Obligated expenses are outpacing income such that the cash balance will be expended by the end of fiscal year 1993.

**101-12 VC Policy, 1.3.1. Procedures for Establishing the Budget and Administering Funds of the NCWM**

(This item was adopted as part of the consent calendar)

**Background:** The fiscal year was changed from July 1 - June 30 to January 1 - December 31. In order to give sufficient lead time for setting priorities and estimating income and expenses, the Executive Secretary recommended changing the time for setting and adopting the fiscal year's budget from the Interim Meeting to the Annual Meeting. In addition, the Budget Review Committee has met prior to the Interim Meeting for the last two years, rather than using discussion by letter and telephone only.

**Recommendation:** Change the procedures in NCWM Publication 3, "Policy, Interpretations, and Guidelines," 1.3.1. as follows:

- (II) Budget
- (B) The NCWM Executive Secretary shall, within 120 days<sup>2</sup> after the ~~Annual Meeting~~ Interim Meeting, propose a tentative budget for the following fiscal year<sup>3</sup> to include: (see policy for rest of text).

<sup>2</sup>to permit study of the Treasurer's first quarter report.

<sup>3</sup>The fiscal year for the NCWM is from ~~July 1 through June 30~~ January 1 through December 31.

In addition, change (II) Budget (A) establishing a Budget Review Committee and its responsibilities as follows:

- (3) make necessary adjustments to the Executive Secretary's proposal (see (II)(B)) by deliberation through the use of correspondence, meetings, and/or conference calls.
- (4) Present a tentative budget at the ~~Interim Meeting~~ Annual Meeting to the Executive Committee for acceptance. The Executive Committee may return the tentative budget to the Budget Review Committee for adjustment(s) to enable acceptance by the Executive Committee. Normally, these adjustments are expected to be completed prior to conclusion of the ~~Interim Meeting~~ Annual Meeting.

Revise (II) Budget (C) not only to change the Annual to Interim Meeting schedule, but also to correct a typographical error referring to the Constitution and Bylaws that should have referred to Policy and Guidelines 1.3.1.:

The proposed tentative budget submitted by the Executive Secretary within 120 days after the ~~Annual~~ Interim Meeting to the Conference Budget Review Committee, as described in ~~Constitution and Bylaws~~ (II)(A) and (II)(B), shall use the same account receipts and expenditures categories as described in (IV)(A). [Editor's note: (IV)(A) was changed at the 76<sup>th</sup> Annual Meeting as part of the Executive Committee's report.]

**101-13 I Meetings, Networking with Other Associations**

The International Society of Weighing and Measurement (ISWM) hosted a meeting of all the trade and professional associations at the 76<sup>th</sup> Annual Meeting. Representatives gave short reports about their goals, objectives, and membership. Participants were enthusiastic about the information exchanged and the opportunity for furthering mutual objectives. For example, several device-specific organizations expressed an interest in exchanging views with device user groups and device installation and repair groups. Those who attended the ISWM-hosted meeting at the Annual Meeting agreed to participate at a similar meeting held at the Interim Meeting, if the Conference would conduct it.

At the Interim Meetings, ISWM, the Scale Manufacturers Association, the Scale Dealers Association, National Industrial Scale Association, the American Association of Railroads, the Food Marketing Institute, the American Paper Institute, the American Petroleum Institute, the American Meat Institute, the National Coalition for Consumer



Education, the National Association for Consumer Affairs Administrators, and Federal agencies including the Federal Trade Commission, the U.S. Department of Agriculture Federal Grain Inspection Service and Food Safety and Inspection Service met with the Executive Committee and the Liaison Committee to further explore mutual objectives and projects. See Appendix A of the Liaison Committee Report for their individual reports. Note especially the report from the American Paper Institute on recycling and the Federal Trade Commission on octane testing. Further meetings will be conducted on specific topics of mutual interest, such as metric labeling, harmonization with other standards, in-motion weighing, and privatization.

### *Metric Conversion*

Dr. Gary Carver, the new head of the Metric Program at NIST, visited with the Executive Committee several times during the Interim Meeting. He requested the opportunity to combine a metric program with the Annual Meeting in Nashville. He announced that the Federal Fair Packaging and Labeling Act would be revised to require metric labeling if the NIST authorization bill is passed in the next Congress. [Editor's note: President Bush signed this bill into law on February 14, 1992. This bill requires metric labeling on all products under the Federal Fair Packaging and Labeling Act by February 14, 1994.] A metric workshop in partnership with the National Council on State Metrication was held on Thursday at the conclusion of the Annual Meeting. See the Laws and Regulations Committee Report for further information.

## 101-14 I Meetings, Annual and Interim, Work Schedule and Technical Sessions

### *Interim Meeting Work Schedule*

The Committee acknowledged the need to emphasize to the general NCWM membership the purpose of the Sunday Committee meetings during the Annual Meeting and Interim Meetings. Sunday sessions are for agenda review and work sessions for the Committees. They are not intended as small hearings on the issues. Anyone may attend, but only the Committee members may participate.

The policy delineating the appropriate reasons for conducting a closed session (e.g., proprietary NTEP appeals), requiring prior approval by the Chairman or Chairman-Elect, and that such closed meeting will be posted at least a day in advance, when possible has been printed in the Interim Agenda. However, another warning was added that it will not be possible to alert potential attendees if a Committee needs to hold any part of its meeting as a closed session on Sunday since that is the opening day of the Interim Meeting.

### *Annual Meeting Work Schedule*

The Regional Weights and Measures Associations have usually met concurrently on Wednesday from 10:00 a.m. to noon, before voting. We have been asked to give the Regionals more time for their meetings and have rescheduled them to begin at 8:30 a.m. and continue until noon on Wednesday.

### *Technical Sessions at the Interim and Annual Meeting*

Technical presentations were incorporated into the Interim Meeting schedule this year; the Joint Session had presentations on such subjects as audit trails and the Nutrition Act. This session was filmed and is available either at the cost of the video tape or on free loan to NCWM members. A half-day session on quality performance and competitiveness, including a presentation by a representative of Federal Express, the only service company to win the Malcolm Baldrige National Quality Award, was held Thursday afternoon of the Interim Meetings week.

Georgia Harris presented "What Weights and Measures Directors Need to Know about Their Metrology Labs" at the 77<sup>th</sup> Annual Meeting in Nashville. Drs. Manfred Kochsiek, Germany, and Seton Bennett, United Kingdom, gave presentations on the European Community. Ms. Krista Sanda, Commissioner of the Minnesota Public Service Commission, provided her insight on expanding weights and measures programs during tight fiscal periods. A metric workshop was held at the end of the Annual Meeting.

## **101-15      I      Meetings, Annual and Interim, Future**

### **77<sup>th</sup> NCWM**

Weights and measures officials from the Southern Region who had never attended an Annual Meeting were provided free meeting registration; they could attend (but not vote) for the cost of membership (\$35.)

The Executive Committee decided to provide an outing, jointly sponsored outing with the Associate Membership Committee, on the General Jackson, a stern-wheel paddle boat, with dinner and show; it was provided to every delegate. Retirees and guests were charged a nominal \$20 per ticket. First-time attendees who registered at the special \$35 rate had to pay the full charge.

### **78<sup>th</sup> NCWM**

The Central Weights and Measures Association presented two suggestions for the Committee's consideration for the 78<sup>th</sup> annual meeting: Cincinnati, OH or Kansas City, MO. A report by the Conference Coordinator was presented at the Interim Meeting. Only Kansas City had three hotels available during the July week we requested: the Hyatt and Westin with a somewhat isolated location, and the Ritz-Carlton near the Country Club Plaza. The Country Club Plaza is a very large outdoor shopping center, built in the 1920's and modeled after a Spanish town in architecture and outdoor fountains. After the Interim Meeting, the Ritz-Carlton lowered its rates further, and the Executive Secretary signed a contract with them for \$95 plus tax, single or double occupancy, for July 17-22, 1993.

### **79<sup>th</sup> NCWM**

The Measurement Standards Section of the Colorado Department of Agriculture has invited the National Conference to consider holding the 79<sup>th</sup> Annual Meeting in Denver or Breckenridge. Denver is 340 miles from the exact center of the U.S. and has food and hotel costs below Philadelphia, Chicago, and Washington D.C.; 15 airlines serve the Denver airport. It has an ideal climate for the Conference's July meeting.

## **101-16      I      Program, NCWM Representation at LMB Meetings, Canada**

The Committee reviewed the current level of NCWM participation at (1) meetings held between the OWM and the Legal Metrology Branch (LMB) Canada on various issues in the general area of harmonization of requirements and (2) meetings Canada conducts for its LMB gravimetric, volumetric, and commodities specialists from all their provinces. These latter meetings are held approximately twice a year for 3-4 days each. Since these latter meetings deal mainly with operational issues encountered in Canada, the Committee sees these meetings as a lesser priority than those specifically called in areas of potential harmonization. The NIST Office of Weights and Measures has now expanded its representation at the specialist meetings to include weighing, liquid measuring, and commodities.

Moving toward the objective of harmonization, bilateral working groups between LMB and OWM have been formed and meet twice a year. Meetings have been held on the general subjects of suitability of equipment, load cell testing, railroad weighing, and point-of-sale tare. Because neither country has requirements in certain areas, work has been shared in the areas of audit trails, mass flow meters, and on-board weighing. A meeting was held in April 1992 in Ottawa on the broad issue of the security of device software and software modification. The Chairman appointed Jim Truex to represent the NCWM at that meeting. The Chairman will appoint Conference representation as appropriate to upcoming bilateral working group meetings. Longer term representation from the Conference will be sought, with the Chairman making decisions about representation with recommendations from the Executive Secretary based on the agenda of each meeting.

Discussion concerning appropriate representation rejected the suggestion that the chairpersons of the appropriate standing committee attend the various meetings due to the need to have long-term input and contributions from any given Conference representative. One suggestion was put forth that a 5-year appointment to a standing committee be planned so that the first year of the committee member's time would be spent in familiarization with the Conference national committee agenda and work, the second through fourth years on both the Conference committee and in bilateral working group activities with Canada, and the fifth year committee chairman. In any event, the

selection of NCWM representation cannot be based merely on Committee membership. Choice should also depend upon a representative's experience and knowledge in a particular subject matter.

The Scale Manufacturers Association announced its intention to establish relations with the Canadian Association of Scale Manufacturers, and requested whether it might also send representation to the bilateral working group meetings. Mr. Bruce, LMB chief, Canada, did not foresee any obstacles to manufacturer participation, although there were no plans to make the meetings small conferences or even as large as NTETC sector meetings in this country.

In late 1990, industry was requested to identify differences in device requirements between the U.S. and Canada. The LMB and OWM staff have met twice to discuss those differences identified by industry. The meetings have resulted in recommendations to change either the U.S. or Canadian requirements, although not all issues have been resolved. Work is continuing in this area. There have been several recommendations to change requirements in NIST Handbook 44; these are noted in the S&T report.

The U.S. and Canada worked together this spring to develop a preliminary plan for harmonization, including subject area and time-frames for action, incorporating the different processes and procedures for each country to adopt necessary changes. See the letters to and from LMB and the Executive Secretary appended to this report. (See Appendix D.) Further meetings are scheduled for the fall to develop a consensus on what might be the Nation's future directions in harmonization.

It should be stressed to the Conference membership that the need for harmonization is derived from the need for U.S. manufacturing sectors to be able to sell their products anywhere in the world. Ideally, if they could manufacture their products to the same legal metrology standards across national borders, the number of identically performing products manufactured could be increased, perhaps reducing the manufacturing costs per unit. This is the reason the NCWM Executive Secretary and Mr. Bruce, LMB, Canada requested industry by memo two years ago to identify "trade irritants" between the two countries, that is, those issues which get in the way of U.S. device manufacturers doing business across national borders. This is the rationale behind the NCWM exploring the need to better communicate and, ideally, harmonize weights and measures requirements between the United States and Canada.

## 101-17 I Program, OWM and NIST

The Long Range Plan of OWM (available upon request) was presented. The Executive Secretary provided a status report on additional staffing it will provide to the Conference. Ken Butcher has been named as L&R Committee Technical Advisor. Tina Butcher has been named as Technical Advisor to the National Type Evaluation Technical Committee (NTETC) Weighing Sector; she will continue as Technical Advisor to the NTETC Measuring Sector. Richard Whipple has been named as Technical Advisor to the NTETC Belt Conveyor Scale Sector and will advise the Subcommittee on Petroleum. Fixed budgets have not permitted OWM to replace staff lost when Al Tholen left OWM and Carroll Brickenkamp took over as Chief. In addition, due to budget limitations, Karl Newell has been transferred for the remainder of the fiscal year to the National Voluntary Laboratory Accreditation Program (of which Al Tholen is now Chief). Karl's duties have been reassigned to Dick Whipple and Tina Butcher. Mr. Constantine Cotsoradis, from the Maryland Department of Agriculture Weights and Measures program, participated in the type evaluation and device programs of the OWM from February, 1991 to February, 1992; he returned to Maryland Weights and Measures to operate their NTEP Participating Laboratory in the area of weighing devices. Maryland Weights and Measures desires to add liquid measuring devices to its repertoire as a Participating Laboratory in the future; but at the present time, the Intergovernmental Personnel Agreement that provided Mr. Cotsoradis, in order for him to become familiar with NTEP and to provide assistance to OWM, had to be discontinued.

Many high priority tasks have been slowed in their accomplishment and the initiation of others has been delayed owing to lack of OWM resources. Plans are underway to achieve a greater benefit from the NIST and NCWM partnership. Their shared resources should enable additional priorities and objectives to be met.

The bottleneck to much of the work moving forward is the necessity to document, for the membership, the alternatives and decisions reached by NCWM working groups and the rationale behind these decisions, and to coordinate, collect, and report data to substantiate technical decisions. Committee members are assisted when NIST Office of Weights and Measures staff document alternatives, document decisions, and propose and coordinate data to support committee work. This is the first year that technical advisors have been drawn from other than NIST; FGIS has contributed 1/4 of Dr. Richard Pierce's time as technical advisor for the two NTETC sectors underwritten by that agency to establish



type evaluation standards for grain measuring equipment. Much more than 1/4 of Dr. Pierce's time goes into this effort. When considering the number of committees and working groups requiring technical advisors (five standing committees, one subcommittee, three other NTETC sectors, and at least four working groups - privatization, metric, checkweighers, and U.S./Canadian harmonization), it is clear that the Conference must assist NIST in obtaining adequate staff to support this national standardization process. For its part, NIST will continue to seek out other agencies and organizations that share its objectives in particular areas in order to provide adequate technical advice and perhaps contribute a technical advisor. Unfortunately, most U.S. voluntary standards development organizations obtain their technical expertise from volunteers, just as the NCWM active membership is comprised of volunteers with other full-time jobs and professions. In order to develop standards in a timely fashion, without undue burden on its volunteers, the NCWM vitally depends on NIST for its secretariat services beyond merely scheduling and administering meetings. Also unfortunately, the NCWM cannot buy this expertise from office temporary services. This issue will continue to be explored at the next Interim Meeting.

## 101-18 I Program, National Training

The Committee met with the Committee on Education, Administration, and Consumer Affairs to discuss the status and needs of the National Training Program. The development of modules has provided "official" text books for the training of weights and measures practitioners. With 14 modules "on the shelf", the questions are: How is this amount of training going to be delivered to all "new" weights and measures officials? What is appropriate training for the 3000 officials and thousands of industry representatives who are not "new" to weights and measures? Are the training modules too long for more experienced officials? How can training be provided in the current climate of reduced budgets and time constraints?

Major policy and procedural questions must be resolved to establish a formal, national, recognized delivery system. We need a plan for a robust system involving all of the resources that can be mustered; training must be put on a permanent, routine, and "required" basis. This is necessary just to "catch up." Despite the significant increase in training materials and delivery, training in the U.S. is still inadequate. In light of tight budgetary resources for regulatory agencies, the Conference will have to decide whether delivery of training has a high enough priority to warrant expending funds and technical resources.

### *Technical Education as a Means of Achieving Our Goals*

- As of 1991, all 50 States, DC, Puerto Rico and the Virgin Islands have signed letters of agreement with the NCWM to participate in the National Training Program Certification of Inspectors Program.

Many States have not implemented their certification program and certified inspectors. Now there appears to be a need for certification of repair persons. Development and commitment to inspector certification must be broadened to include certification of device repairers, using the same principles and minimum specifications in training and field evaluation. Additional impetus for this activity was provided by the U.S. Department of Agriculture Food Safety and Inspection Service's adoption of NIST Handbook 44 as requirements in Federally inspected plants. The thousands of plants and hundreds of thousands of devices now required to meet Handbook 44 simply overwhelm weights and measures resources for testing all these devices. The only solution is registration of service personnel; and careful monitoring of this system can be achieved only by the States instituting programs of service agency certification based on training in excess of stated minimum.

- A set of 28 publications constituting 14 two-volume training modules on subjects as diverse as the testing of loading-rack meters to the inspection of packaged commodities has been published; training in these modules has been provided to more than 4800 individuals. Three laboratory training courses in mass, volume, and length have been provided to more than 70 laboratory managers and technicians.

How can new modules be financed and how are existing modules to be kept up-to-date? Where is the expertise to produce technically correct modules with the proper level of technical complexity and anticipating the types of enforcement dilemmas that the technology generates? Encumbering membership funds to both produce new modules and maintain the currency of existing modules may be the route to adequate training manual development and maintenance, but finding the right person or firm to produce the modules is still a very great problem. A new module costs approximately \$50,000 to produce from working group drafts and outlines.



The NIST/OWM will continue to conduct regional schools for instruction in the new modules; intensify its train-the-trainer programs in specific modules; deliver training in specialized subjects (including laboratory metrology, LP Gas meter testing, packaging and labeling, and package net contents control); and will survey and report on state training. NIST/OWM intends to formulate short courses in more advanced areas than the basic modules; last year, Henry Oppermann, Karl Newell, and Joan Mindte produced a videotape of the revisions to Handbook 44. It was a huge success. However, in light of staff reductions, the update was not produced this year, and the short courses have also been delayed.

States have taken on the task of providing training by assigning one or more trainers from their own staffs to deliver modules and more advanced updates and State-specific training. The Institute of Weights and Measures (IWM) and the International Society for Weighing and Measurement's "Scales on Saturday" provide critical training delivery to both weights and measures regulatory officials and device maintenance and repair firm personnel. IWM has been instrumental in providing training to visitors from other countries.

State needs for technical assistance, including training on weights and measures devices and systems, continue to grow. Training modules have provided the much needed source of technical and administrative textbooks for use in training. They have also made the State officials keenly aware of the extent to which training in the past has been inadequate. They are therefore, requesting more assistance in training their staffs.

The problem of keeping the training modules that track NIST Handbooks 44 and 130 up to date when annual revisions are made to the handbooks must be resolved. The dearth of technical resources within NIST/OWM makes accomplishing this task within OWM an unachievable goal. In addition, more detailed explanations and interpretations must be incorporated into the training modules to clarify the handbooks and their field application. For example, examination procedure protocols must be revised to incorporate in-depth testing of the software that controls most measurement devices today. Another area needing development is training on difficult-to-measure commodities. Ideally, NIST/OWM and the NCWM need to revise and republish all modules needing modification after each annual revision of H44, H130, and H133 before January of the next year. Access to a central computer network would facilitate the downloading of any updated module on an as-needed basis. However, the monumental task of updating the modules is more the obstacle than how to deliver hard copy or electronic versions.

New modules in motor fuel quality sampling and testing, grain moisture meter laboratory and field procedures, as well as new methods of training delivery are needed. NIST/OWM is filming training that it provides, editing these video tapes where possible and distributing them to the States. If these tapes were accessible by computer (the future of CD ROM technology), the administration and distribution costs might be reduced.

The Task Force on Planning for the 21st Century has begun investigating alternative means for accomplishing weights and measures regulatory objectives, including training; the Privatization Work Group is expected to continue this investigation. Their explorations will have a direct impact on the Administration Module being developed under Education Committee direction. See the report of the Task Force that appears as an appendix to this report.

Another \$15,000 was allocated by the Executive Committee at the Annual Meeting for management by the Education Committee, to be divided among the four regions. Similar to the Train-the-Trainer allocation of the last two years, the Executive Committee requested the Education Committee to invite proposals from the regionals and to review and manage the disbursement of these monies. Unlike the earlier allocation, the Executive Committee requests that fewer restrictions be applied to the proposals; for example, the allocations may be used for travel reimbursement or for training in a particular module or modules, rather than generic training for trainers.

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

Dr. Sam Chappell, NIST, updated the Committee at the Interim Meeting on the work and plans of OIML as they affect the NCWM. This was combined with a report prepared by Mr. Ken Butcher, NIST, on an OIML draft Document on "Quality Assurance as Applied to Initial Verification of Measuring Instruments" prepared by the United States and Item 102-3 on the "OIML Certificate System for Measuring Instruments."

*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 in Paris, France from October 7-9, 1991. Representatives for 40 of the 49 member nations attended. At that meeting the following significant reports and decisions were made:

- Four new OIML Recommendations were approved, including the revision of R76 on "Nonautomatic Weighing Instruments."
- A report was presented on the "OIML Certificate System for Measuring Instruments." At present, the Certificate System includes six OIML Recommendations on categories of measuring instruments. The following OIML Member Nations have indicated their intention to participate in the System and have named an "Issuing Authority" for some or all of the instruments covered: Belgium, Czechoslovakia, Denmark, France, Germany, Hungary, People's Republic of China, Netherlands, Norway, Romania, Spain, Sweden, United Kingdom, and the U.S.S.R.
- A draft of new "procedures" for the technical work of OIML based on the ISO/IEC directive on "Participation in Standardization" was discussed. These new "procedures" were developed by the BIML (International Bureau of Legal Metrology) in response to a request from CIML to revise the existing "Working Method of OIML Secretariats." A task group, made up of representatives of Poland, the U.S.A., and BIML, was established to edit the proposed new "procedures" taking into account comments presented by CIML members at the meeting and by correspondence. The work of the task group was presented to the CIML Presidential Council at its meeting in February 1992.
- A draft "Guide to the Drafting and Presentation of OIML Recommendations" was approved subject to some minor revisions in response to comments presented by members of CIML.

The next meeting of CIML is scheduled for November 2-6, 1992 in Athens, Greece in conjunction with the Quadrennial International Conference of Legal Metrology. Representation from the National Conference on Weights and Measures will be Mr. Allan Nelson, NCWM Chairman at that time.

*CIML Presidential Council*

The Presidential Council of CIML is its executive steering committee. It met from February 10-12, 1991 in Paris, France. The principal items on the agenda were:

- A review of the current technical work of the Secretariats.
- A review of the draft of the new "procedures" for the technical work of OIML prepared by the ad hoc editing group that met just prior to the meeting. This new draft was sent out in April by BIML to CIML for review and vote. These new "procedures" are expected to be approved by CIML at its next meeting in November 1992.
- A review of a proposed new organizational structures. Technical Committees and Subcommittees will replace the existing Secretariats to improve the efficiency and timeliness of the technical work of OIML. Proposed new structures were sent by BIML to CIML for review in May, and, based on the comments received, BIML will propose final new structures in August with a request to member nations to indicate which committees they wish to request responsibility for as well as those on which they wish to be either a participating (voting) or observing (non-voting) member. New organizational structures are expected to be approved by CIML for implementation at its November 1992 meeting.

*Activities of OIML Secretariats*

This part of the report provides: (1) an identification of work, either Recommendations (Rs) or Documents (Ds), being developed in Pilot Secretariats (PSs) and Reporting Secretariats (RSs) 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.

o PSSD "Dynamic Measurement of Liquids" (Germany)

- PSSD/RS1 "Meters with Measuring Chambers or Turbines" (Germany and France) - An IWG meeting was held from October 28-31, 1991 in Paris, France to discuss a third preliminary Recommendation combining R5, R27, R57, R67, and R77 (Volume Meters, Ancillary Equipment, General Provisions, Particular Assemblies, and Metrological Controls, respectively). A fourth preliminary draft was received and distributed for review in June with a request for comments by the end of August 1992.

- PSSD/RS5 "Data for the Calculation of Quantities of Liquids" (U.S.A.) - The Secretariat sent an inquiry in May 1992 to the IWG regarding a proposed revision of R63 "Petroleum Measurement Tables" to include a reference to ISO 91-2 "Petroleum Measurement Tables - Part 2: Tables based on a Reference of 20 °C" (11/15/91). The response received so far supports the proposal.

- PSSD/RS7 "Methods and Devices for the Verification of Measuring Instruments for Liquids" (Japan) An IWG meeting was held to discuss the second preliminary draft Recommendations on "Pipe and Measuring Assemblies" and "Fuel Dispensers for Motor Vehicles" in Tokyo, Japan during November 25-27, 1991. A report on that meeting has not been received.

- PSSD/RS9 "Vortex Meters" (Japan) An IWG meeting was held discuss a first preliminary draft on the subject in Tokyo, Japan during November 25-28, 1991. A report on that meeting has not been received.

- PSSD/RS10 "Direct Mass Flow Meters" (U.S.A.) A draft Recommendation on "Direct Mass Flow Measuring Assemblies for Quantities of Liquids" has been approved by CIML by correspondence. The draft Recommendation is expected to be further approved at the November 1992 meeting of CIML and adopted by the 9th Quadrennial Conference.

o PSSS "Static Measurement of Quantities of Liquids" (Portugal)

- PSSS/SR12 "Static Direct Mass Measurement of Quantities of Liquids" (Australia) - The Secretariat prepared a third preliminary draft Recommendation on the subject taking into account the decisions of the IWG meeting held on May 16-17, 1991 in the United Kingdom at which the United States was represented. This new draft was received in February 1992, and the United States responded with comments in May 1992.

o PS7 "Measurement of Mass" (U.S.A.)

- PS7/RS2 "General Problems - Electronic Devices" (U.S.A.) - A draft revision of R74 on "General Requirements for Electronic Measuring Instruments" was approved by CIML by correspondence. The revised R74 will be on the agenda for approval at the November 1992 meeting of CIML and for adoption by the 9th Quadrennial Conference.

- PS7/RS4 "Nonautomatic Weighing Instruments" (Germany and France) - A draft revision of R76 on "Nonautomatic Weighing Instruments" has been approved by CIML by correspondence and at its meeting in October 1991. The revised R76 will be on the agenda for adoption by the 9th Quadrennial Conference.

- PS7/RS5 "Automatic Weighing Instruments" (United Kingdom) - The United States was represented at a IWG meeting in the United Kingdom from 10-12 February at which the following drafts were discussed: (a) a revision of R50 on "Continuous Totalizing Automatic Weighing Instruments (Belt Weighers)," (b) a revision of R51 on "Checkweighing and Weight Grading Machines," and (c) a revision of R61 on "Automatic Gravimetric Filling Machines (Hoppers)." The following Recommendations were approved by CIML by correspondence: "Automatic Rail Weighbridges" and "Discontinuous Totalizing Automatic Instruments (Totalizing Hopper Weighers)." These drafts will be on the agenda for approval at the November 1992 meeting of CIML and for adoption by the 9th Quadrennial Conference.

- PS7/RS8 "Load Cells" (U.S.A.) The revised R60 on "Load Cells" was approved at the October 1990 CIML meeting in Portugal and will be on the agenda for approval by the 9th Quadrennial Conference in November 1992. The Secretariat is now drafting "test methods" and a "format of the test report" for this Recommendation so that it can become a part of the "OIML Certificate System."



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

- PS8/RS5 "Weights Used in Trade and Industry" (Belgium and U.K.) A draft Recommendation on "Weights of Classes E1, E2, F1, F2, M1, M2, and M3" has been prepared mainly through 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 distributed for simultaneous comment and vote at the Reporting and Pilot Secretariat levels in July 1991. A 2nd draft is being prepared by the Secretariat based on the comments received on that ballot.

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

- PS22/RS4 "Principles of Initial and Subsequent Verification" (U.S.A.) A first draft OIML Document on "Quality Assurance as Applied to Initial Verification of Measuring Instruments" was prepared by the Secretariat and distributed to participants of the IWG for review and vote in November 1991. This first draft is based on the decisions at an IWG meeting, held in France on October 10-12, 1991, at which a previous preliminary draft on the subject was reviewed. This first draft was also sent to members of the NCWM Executive Committee and other U.S. interested parties for review. The Secretariat is now preparing a draft Document, based on the comments received, that will be sent to CIML for final vote and approval. This draft Document establishes principles whereby a manufacturer may provide a "declaration of conformity" of newly produced measuring instruments to the performance requirements of OIML Recommendations and other international standards.

## 101-20 I Program, Task Force on Planning for the 21st Century

Darrell Guensler, Chairman of the Task Force, reported to the Executive Committee at the Interim and Annual Meetings on the progress of the Task Force since its last report at the 76<sup>th</sup> Annual Meeting. (See Appendix E).

At its meeting, April 29 - May 1, the Task Force agreed that its work was not over, but that it should pause in planning and identifying key issues, shift direction, and take on the highest priority task that it saw, the issue of privatization. The Task Force planned a meeting on this issue at the 77<sup>th</sup> Annual Meeting in Nashville.

It was decided that (1) the Conference needed to put together a group that is uniquely able not only to explore the issue of privatization, but also to discuss the issue with legislators, governors, and fellow businesses, and (2) NIST staff resources do not at this time allow both the identification of issues and the exploration of the highest priority issue. Therefore, the work of the Task Force on Planning for the 21st Century was concluded at the 77<sup>th</sup> Annual Meeting, with the intent to continue the planning activities perhaps later in 1993. A new Working Group on Privatization was named at the Annual Meeting. Its charge is to explore and define the limits of government and the private sector in commercial weights and measures activities: testing, calibration, certification, regulation, enforcement.

The Executive Committee expresses its deep appreciation for the contributions of this group: the workshop on quality at the 1992 Interim Meeting; the recommendations for active public relations assistance; and the exploration of a national weights and measures law. Worthy of particular commendation is its insight on the issue of privatization and their shift to this issue as of highest priority to the Conference.

[Editor's Note: As a result of the Task Force's recommendations, Chairman Colbrook and Chair-Elect Allan Nelson met at the Annual Meeting with the Task Force, together with a new group to study the issue of privatization, so that the Task Force could pass its insight and recommendations along to this new group. Many of the public members on this new working group were Task Force members, providing continuity and understanding. Incoming Chairman Nelson announced the membership of this new working group in his remarks on Thursday of the Annual Meeting.]

## 101-21 I Policy, Production Load Cells

**Background:** Some manufacturers, as well as many weights and measures agency members of the NCWM, have expressed concern as to whether or not production load cells comply with Handbook 44, paragraph T.N.8. The Executive Committee, with the assistance of NIST and several weights and measures agencies, conducted a limited study to determine whether production NTEP Class III L load cells performed equivalently to those given Certificates of Conformance (CC's) by NTEP: there was significant indication that they do not in all cases. Four pairs of load cells were obtained by weights and measures officials from the manufacturer or distributor to obtain a "snapshot" of

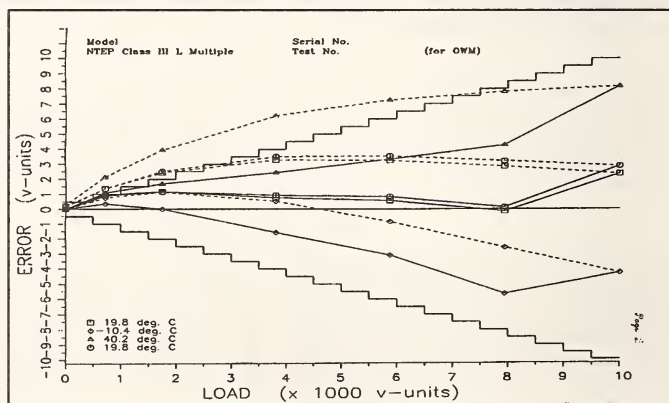
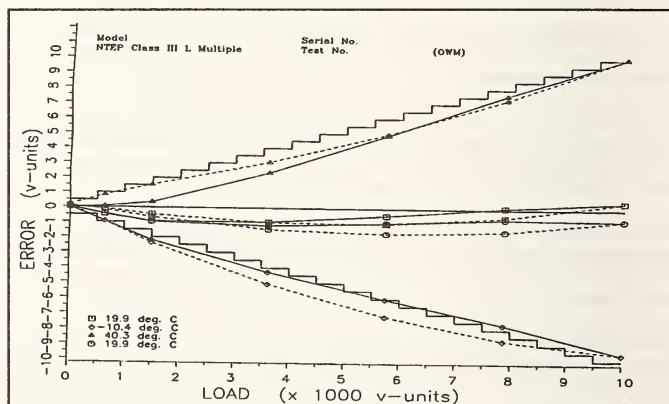
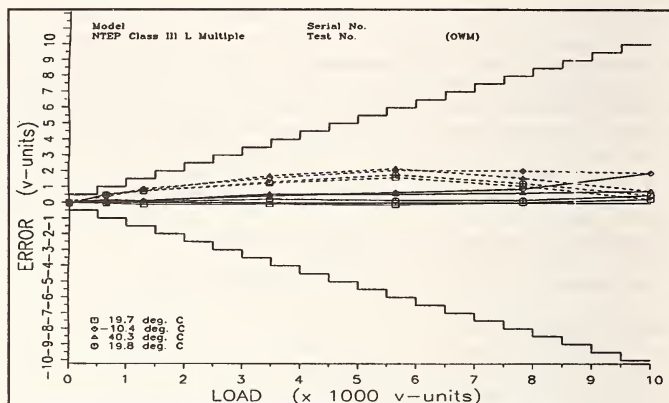


the level of compliance of production cells and their performance curves relative to those that had been submitted for type evaluation. Both large and small companies were included in the sample collection process. Companies were not aware in advance that load cells were to be obtained for test. All contacted companies cooperated, but one company did not have load cells of the desired models or capacities in stock. Consequently, four of the five contacted companies submitted load cells for test. In three cases, the weights and measures officials picked load cells at random from stock; in the other case the process of obtaining the load cells was unusual. In that latter case, the weights and measures official was not permitted to pick out the cells for tests or even to witness the process of obtaining the load cells and packaging them for shipment, which might have significantly affected the result. The companies provided the load cells at no cost to the NCWM or to NTEP. The NCWM paid for the cost of NTEP testing. The NIST Force Group tested the cells at a reduced cost to the Conference. (The cost of testing these cells would ordinarily have been \$24,000; the Force Group charged the Conference only \$15,000.)

The tests of the eight production load cells obtained for this testing indicate that:

- Some cells passed and some cells failed.
- In at least one case, both cells from the same company passed.
- In at least one case, both cells from the same company failed.
- The data do not indicate that large companies performed any better than small companies or vice versa. The sample was too small to draw any conclusions to this effect, although the data would not support any correlation in results for large and small companies.
- For some tested cells, the critical error (the ratio of load cell error to the tolerance) error over the temperature range was greater than 3 for a tolerance of  $0.5v$ , (where  $v$  is the load cell verification division) that is the load cell error exceeded the tolerance by more than 3 times. The smallest critical error (for a tolerance of  $0.5v$ ) was 0.64, meaning the worst error for the best cell took only 64% of the tolerance.
- For at least one load cell, the load cell error covered virtually the entire tolerance range ( $+/- 10v$ ) at capacity, with the error being just out of tolerance on one limit. At  $-10^{\circ}\text{C}$  the load cell error curve was out of tolerance along the lower "branch" of the tolerance "funnel," and at  $40^{\circ}\text{C}$  the cell was out of tolerance along the "upper" branch of the tolerance "funnel."

Production load cells had been tested in the past. Mr. Ken Yee provided an overview of results from all production load cells the Force Group has tested, not just the 8 cells collected in this study; this overview included production from both large and small manufacturers. It seemed that the performance of the "best" cells was getting better. See the graphs below for a pictorial representation of the results for three cells. The solid lines indicate the results from an increasing load and the dashed lines indicate decreasing load; the step-like lines indicate the tolerances. For other conclusions drawn by the Executive Committee, see below.



### *The Need for a Feedback Mechanism in NTEP*

The Executive Committee discussed what action should be taken to monitor the compliance of both scales and load cells with the influence factors requirements. It was agreed that compliance with the influence factors requirements cannot be determined by ordinary field enforcement testing. In addition, there have been reports that certain devices in the field do not match the designs of those given NTEP CC's. In discussions during other parts of the Interim Meeting, the Executive Committee was apprised that certain scales may not match the prototype versions that received NTEP Certificates. Either the model numbers of scales that are intended for noncommercial applications are the same as commercial versions, or changes that included noncommercial functions were made subsequent to evaluation.

The Executive Committee has determined that verification that production devices and load cells comply with the original type needs to be added to the system so that NTEP integrity can be preserved. As the NTEP Administrative Procedures states:

The physical and metrological characteristics of copies of a type submitted for evaluation under NTEP are expected to be representative of production devices.

The Executive Committee believes that a system for ensuring that production devices and components match the original types is needed. The Committee recommends the establishment of a centrally administered program verifying NTEP results that includes some kind of verification, either at the production location or at initial installation. Representative samples of production would be selected and tested either at the production facility or at a Participating Laboratory in order to verify that production matches type. Further discussions will be held with industry to explore the possible ramifications of such a process. See the additional discussion under Item 102-1.

The Committee recommends that NCWM Publication 14 be strengthened in wording so that the NTEP Certification will be withdrawn when production devices or performance do not match type.

### *The Need for an NTEP Maintenance Fee*

Since ordinary field enforcement techniques do not reveal noncompliance with T.N.8, actual testing with its additional costs, rather than just a visit to the factory or distributor, will be necessary to determine whether production matches type. However, testing of production equipment, to assure that it meets type is only one cost of maintenance of NTEP. The development of test methods and checklist standards by the National Type Evaluation Technical Committee Sectors is currently underwritten by general Conference membership fees. The costs of convening the Board of Governors and the Participating Laboratory technical staff have also been borne by the Conference. Other administrative costs of NTEP continue to increase, including developing, printing, and distributing publications listing current CC's. Other costs are part of the administrative charge levied by NIST for the issuance and circulation of the Certificates of Conformance themselves and for performing tests for companies (which do not receive CC's) that fail to pay their bill. When appeals have been lodged in the area of load cells, NIST has purchased the load cells in question, but cannot afford to do this in the future.

Therefore, the Committee recommends that the Constitution and Bylaws be amended to permit the Board of Governors to assess an NTEP maintenance fee. This fee would cover the testing of production devices to verify whether they match type and the conduct of other NTEP operations, such as the National Type Evaluation Technical Committee Sector meetings, meetings of the Participating Laboratory staff, Board of Governor meetings called only for appeals, as well as testing associated with appeals. See also the recommendations in Item 102-1.

These costs will have to be carefully examined. NIST staff estimate that approximately 1,100 unique certificates have been issued since 1986. With the rapid change in technology over time, probably no more than 75% of these certificates represent devices still being produced. This is a significant issue since the Executive Committee is recommending an annual maintenance fee. If a manufacturer does not wish to maintain a current CC (because he may discontinue a particular line of equipment, for example), he may elect not to pay the maintenance fee and the Certificate will then be allowed to expire at the end of the period covered by the maintenance fee. The annual cost associated with NTEP standards development (sector and participating laboratory meetings) is currently approximately \$50,000, not including the costs of testing production devices or conducting appeals.

The Committee plans to revise NCWM Publication 1 "Constitution and Bylaws" Constitution, Article VII - Fees and Dues as follows:

The annual membership fees, ~~and the registration fees for meetings, the Annual Meeting and the maintenance fees for the National Type Evaluation Program~~ shall be established (and may be revised) by a majority vote of the Executive Committee at any official meeting of that Committee.

This revision will be recommended at the next Interim Meeting. The Constitution may be amended at any Annual Meeting after proposed changes are included in the Agenda of the Executive Committee for the Interim Meeting and published in its Tentative Report. Since changes were not included in the Agenda of the 1992 Interim Meeting, it will be discussed and recommended for the 1993 Interim Meeting and Annual Meeting.

Revise Bylaws, Section 5 - Duties and Fields of Operation of Committees, A. Executive Committee

The Executive Committee, subject to the overriding authority of the Conference itself:

(No change to items 1, 2, 3, and 4.) Add the following:

5. fixes the annual maintenance fee for retaining a National Type Evaluation Program Certificate of Conformance.

## Part II - NTEP Board of Governors

### 102-1 I Finances, NTEP Operations and Funding

The Committee discussed plans for the future administration of the NTEP program. The Executive Secretary reported on how other organizations (e.g., Factory Mutual and Underwriters Laboratories) fund their testing programs. For example, UL requires that the manufacturer sign a contract providing for both prototype evaluation and unannounced factory inspection of production devices in order to maintain a UL listing. The manufacturer's facility must be evaluated and approved. UL reviews initial information and provides an estimated cost that must be approved by the manufacturer before any work begins. Estimated costs include labor, material, phone calls, pictures, and so on. As testing progresses, if costs exceed estimates, UL requests additional funds. Products are assigned different categories depending upon anticipated use, environment, volume of manufacture, lifetime, and these categories dictate the frequency of factory inspections and can affect the fees charged.

For low volume products, an annual fee is charged to cover random, unannounced factory inspections approximately four times per year. The nameplate is approved by UL for these low volume products, but does not receive a UL serial number. For high volume products, a surcharge of so much per hundred labels (or nameplates) is established, to cover the factory inspections. UL approves the nameplate, and issues UL serial numbers to an approved nameplate manufacturer who sells them to the product manufacturer. The UL cost per nameplate covers the costs of the field inspections, the number of which is determined by the number of nameplates used. Similar administrative processes could be incorporated into NTEP.

The magnitude of an NTEP maintenance fee will depend upon (1) the costs associated with the standards-development process within NTEP, (2) the costs associated with conduct of verifications that production matches type and (3) the size of the population of certificates. The amount of funding needed to operate other aspects of NTEP would include the public member participation in the NTETC sector meetings (2 Weighing Sector, 1 Belt Conveyor Scale Sector, 1 Measuring Sector per year for \$20,000), meetings of the Participating Laboratory staff (one per year at \$4,000), one meeting of the Board of Governors at \$6,500, totaling more than \$30,000. The testing of approximately 15 production devices or components could be kept to a cost of approximately \$45,000. NTEP management reports that of the approximately 1,700 Certificates issued since 1985, about 1,100 are unique and still valid (that is, about 600 amendments or revisions have been issued, and only 14 of the 127 CC's issued in 1985 are still valid due to the influence factors requirement that went into effect in 1986). Of the approximately 1,100 certificates, it is likely that only about 750 of these apply to devices or components still in production, since the amount of time over which a given model of device is produced is about 3 to 5 years.



No annual maintenance fee can go into effect until the Constitution and Bylaws are revised to give the Executive Committee the authority to set NTEP fees. NTEP management will report whether a fixed date for annual renewal or a maintenance fee renewable on the anniversary date of the Certificate is more easily administered.

**Committee Recommendation:** This item is linked to the discussion in Item 101-21. Since the Bylaws must be changed before an NTEP maintenance fee can be considered, the Committee will continue to refine the wording of this proposal during the coming work year. The Committee will revise NCWM Publication 14, "National Type Evaluation Program Administrative Procedures, Technical Policy, Checklists, and Test Procedures"; Part I, Subpart D. Consider the following proposed wording for National Type Evaluation requests:

To obtain a type evaluation, the applicant shall:

(no change to parts 1, 2, and 4)

3. authorize the billing of all associated costs incurred by NIST administration, NTEP maintenance, and the Participating Laboratory conducting the evaluation.

Revise Subpart K. Period of Validity of Certificate of Conformance, as follows:

The Certificate of Conformance remains valid unless (1) an annual maintenance fee is not paid, or (2) withdrawn as the result of a specific determination by NTEP (See paragraphs 1 and 2, below.)

#### 1. Withdrawal of Certificate of Conformance

Approval may be withdrawn (1) for deficiencies in the type, (2) when production devices do not meet type, or (3) when the Certificate expires because the annual maintenance fee was not paid, but only as an action of last resort.

Revise Subpart M. Certificate of Conformance, 6. Post-Evaluation - Responsibility of Manufacturer:

As a result of requesting an evaluation and accepting the Certificate of Conformance, the manufacturer implicitly asserts that all devices manufactured as the type referenced in the Certificate of Conformance are the same type. If a production device is found with a model number corresponding to that referenced in the Certificate of Conformance, that does not conform to the type, the Certificate of Conformance may be withdrawn. Devices can be programmed with options that do not comply with Handbook 44, provided that instructions or other safeguards are in place to ensure that the devices are placed into commercial use with software applicable to commercial use.

Questions regarding the conformance of manufactured devices to the "type" for which a Certificate of Conformance was issued will be addressed using the existing verification system based on the following premises:

1. existing NTEP policies are sufficient to address production devices;
2. NTEP is limited to the initial type evaluation of devices (although a Certificate may be withdrawn because production is not equivalent to the type);
3. the field enforcement process and initial verification of production using NTEP administrative resources is responsible for ensuring that production devices comply with Handbook 44 (this may include obtaining production devices or components and subsequent evaluation of these devices or components); and
4. if (a) the field verification process reveals a history of abnormally high device failure, or (b) the field verification process reveals that a production device does not match the type for which the Certificate was issued; or (c) the commercial device or its software does not possess a unique model number distinguishing it from noncommercial versions; or (d) subsequent laboratory evaluation of the device or component reveals that it does not comply with the influence factors, this information may be used in withdrawing a Certificate of Conformance for cause.

## 102-2 I Program, Acceptance by the States

The Scale Manufacturers Association updated the Board of Governors on the status of their drive to assist States to adopt the Uniform Regulation for National Type Evaluation. The report was given by Daryl Tonini, Technical Director of the Scale Manufacturers Association at the Interim Meeting.

The NCWM/SMA Program for Adoption of the Uniform Regulation for National Type Evaluation was initiated in December 1990. The primary objective of the first year of the joint program was for the NCWM and SMA to serve as a catalyst to encourage state jurisdictions to adopt the Uniform Regulation for National Type Evaluation (URNTE).

The main vehicle for the program was a panel presentation at regional weights and measures and industry group meetings. The panelists included an individual from a weights and measures NTEP jurisdiction, a user, and a scale manufacturer. This activity, for the first six months of 1991, was reported to the NCWM last July in Philadelphia at its Annual Conference.

Since the 76<sup>th</sup> annual Conference, the panel appeared on the programs of the Western Weights and Measures Association (WWMA) Conference in Boise, ID in September, and the Southern Weights and Measures Association (SWMA) Conference in Lexington, KY in October 1991.

Panelists at the WWMA were Ken Simila, Administrator, Measurement Standards Division, Oregon Department of Agriculture; William GeMeiner, Manager, Weights and Measures, Chicago and Northwestern Railroad; and David Quinn, Product Manager, Fairbanks Scales.

Panelists at the SWMA were Tina Butcher, Physical Scientist, NIST; James Vanderwielen, USDA, Packers and Stockyards; and W. Terry James, Cardinal/Detecto Scales.

Both panels were very well received and the panelists' efforts were noted and commended. There appears to be a "get on the band wagon" mood among the weights and measures jurisdictions. Evidence of this was seen in an unsolicited resolution adopted by the SWMA, urging by name, five state jurisdictions to consider the URNTE for adoption at the earliest possible opportunity.

Since initiation of the joint program, the following States have completed or initiated formal action to adopt the URNTE: Nebraska, Michigan, New Mexico, Oregon, Virginia, and Maryland. Due to the high leadership profile of these jurisdictions in the NCWM, their movement for adoption is anticipated to send a very positive signal to other States which have not yet adopted. The directors in Idaho, Nevada, Florida, South Carolina, and Indiana have stated their intention to adopt at the first available opportunity.

It should be noted that there appears to be very little objection to adoption of the URNTE; however, administrative and other considerations will require effort to overcome in several other states. Acceptance of NTEP Certificates of Conformance in the non-URNTE States is nearly universal.

The program for 1992 was described:

Send follow-up letters to State directors offering continued assistance and support for those who have newly adopted the URNTE and encouraging those who have not to take positive steps to get the adoption process underway.

Keep the issue alive by developing an NTEP session at the regional meetings. A quarterly NTEP newsletter was proposed and discussed. Costs could be minimized by including the newsletter in the OWM W&M Today mailing.

Continue needed NTEP training. The delivery of training to jurisdictions is complicated by limited travel funds, critical shortages of staff and reduced budgets. The SMA offers to work with OWM to develop innovative ways to get this critical part of the job underway in 1992.

Continue support to States as they proceed with adoption.

Supporting letters have been prepared for Maryland and will be provided, as needed, for Virginia. The subject of NTEP administration may deserve to be addressed in an administrative manual (Module 23 Part I) for directors.

Overall, the NCWM/SMA program was a success in its first year. A great deal has been learned regarding the commitments that are inherent in adoption of URNTE. Much remains to be done as emphasis is shifted from adoption to uniform enforcement of NTEP.

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

Dr. Sam Chappell, NIST, described the provisions and requirements of the proposed OIML Certification Plan. See Appendix J, pages 168-186 of the Executive Committee report in the Report of the 76<sup>th</sup> National Conference on Weights and Measures 1991 for a copy of the "OIML Certificate System for Measuring Instruments." The Board of Governors needs input from U.S. manufacturers to determine whether NTEP Policy and procedures should be revised in order to pursue reciprocity with other OIML nations. The Executive Secretary has responded to one inquiry concerning OIML reciprocity from a European manufacturer who owns significant U.S. scale manufacturing interests.

During the Board's review of the OIML Certificate System last year, OWM was requested to determine the impact of ISO/IEC Recommendations 25 and 38 on the NTEP Participating Laboratories. The certification requirements for State Weights and Measures Laboratories including Participating Laboratories are found in NBS Handbook 143 "State Weights and Measures Laboratories Program Handbook." This handbook is currently being revised and updated by Ms. Georgia Harris, OWM Laboratory Metrology Manager. The 1985 edition of NBS Handbook 143 was based on the 1982 edition of ISO/IEC Recommendation 25 "General Requirements for the Competence of Calibration and Testing Laboratories" and the 1983 edition of ISO/IEC Recommendation 38 "General Requirements for the Acceptance of Testing laboratories." The 1983 edition of ISO/IEC Recommendation 38 is still current. ISO/IEC 25 was updated in 1990. Mr. Ken Butcher, NIST, combined the main parts of NBS Handbook 143 and the two ISO recommendations. The 1990 edition of ISO/IEC 25 reflects many new requirements that will strengthen the integrity and improve quality control in State weights and measures laboratories and in NTEP Participating Laboratories. The 1990 edition of ISO/IEC 25 includes among its new provisions, requirements for computer hardware and software (for security and internal controls), requirements for a quality manual and assurance programs, requirements for outside suppliers, a complaint handling system and guidelines for the handling of test items. Inclusion of ISO/IEC 25 will enable State laboratories to provide calibration and testing services meeting the ISO/IEC 9000 series of standards. Ms. Harris will be incorporating all pertinent details of ISO/IEC 25 into the revision of Handbook 143. Copies of ISO/IEC 25 and 38 are available from OWM upon request.

Dr. Chappell also introduced the Committee to the U.S.-drafted Document on "Quality Assurance as Applied to Initial Verification of Measuring Instruments." He provided a presentation of the principles for declaring conformity of a weights and measures device to documented standards. The outline of his presentation is given below and a copy of the draft document is available upon request. The substance of this draft is being studied for its possible application in establishing an initial verification program under NTEP.

#### *Principles for Declaration of Conformity of a Measuring Instrument to Documented Standards*

##### *Elements of Metrological Control*

1. Pattern (Type) Evaluation
2. Initial Verification
3. Subsequent Verification

*ISO/IEC Guides*

ISO/IEC Guide 22	"Information on Manufacturer's Declaration of Conformity with Standards or other Technical Specifications" (1982)
ISO/IEC Guide 38	"General Requirements for Acceptance of Inspection Bodies" (1988)
ISO/IEC Guide 43	"Development and Operation of Laboratory Proficiency Testing" (1984)
ISO/IEC Guide 45	"Guideline for Presentation of Test Results" (1985)
ISO/IEC Guide 49	"Guideline for Development of a Quality Manual for a Testing Laboratory" (1986)
ISO 9000	"Quality Management and Quality Assurance Standards - Guidelines for Selection and Use" (1987)
ISO 9001	"Quality Systems - Model for Quality Assurance in Design/Development, Production, Installation, and Servicing" (1987)
ISO 9002	"Quality Systems - Model for Quality Assurance in Production and Installation" (1987)
ISO 9003	"Quality Systems - Model for Quality Assurance in Final Inspection and Test" (1987)
ISO 9004	"Quality Management and Quality Systems Elements - Guidelines" (1987)

*Metrological Control by Responsible Authorities*

- Provide direct inspection and surveillance or utilize a third party
  - establish criteria for third parties, if utilized
  - determine adequacy of manufacturer's facilities, procedures, and measuring and test equipment
  - determine the suitability of the manufacturer's quality system
- Conduct periodic announced and unannounced inspection and surveillance
- Establish procedures and the mechanism for issuing a declaration of conformity
- Establish an appeals mechanism
- Procedures for the appointment of manufacturer to participate
- Defining minimum necessary conditions for participation
  - approved pattern, if required
  - scope of quality system: category, class, or complexity of instruments
  - identify applicable regulations, standards, and test methods
  - issuance and withdrawal of a "declaration of conformity"
  - program validation by responsible authorities or authorized organization
- Process of program validation
  - announced and unannounced inspections, surveillance, and testing
  - checking quality system including records and witnessing procedures
- Conditions for withdrawal of an appointment
- Established appeals mechanism

*Internal Audit by Manufacturer*

- Documented audit procedures
- Planned and conducted at periodic intervals
- Carried out by trained personnel outside area audited
- Results reviewed by responsible persons
- Corrective actions documented
- Audit results available for review to outside authorities

*Declaration of Conformity*

- Label or mark (Applied to instrument or immediate package)
  - manufacturer's identity or logo
  - Serial numbers, lot number, or date code



**Certificate**

- Manufacturer's address
- Trade name, type, serial number, lot number or date code
- Regulations, standards, and approved pattern, is required
- Reference to test methods, or procedures
- Location of supporting data
- Date of issue and signature of responsible persons
- Identification of authorization

**ords****Pattern Approval****Design**

- Material and Components
- Design Modifications

**Production****n-Service Record****uirements for the Quality System****Documented quality system (quality manual)****Authority and responsibility****Organizational structure and trained personnel****Inspection of significant components and materials****Test methods, are procedures, including sampling****Measuring and test equipment****Identification of instruments****Handling, storage, and transport****Records****Internal Audits****asuring and Test Equipment****Suitable testing environment, qualified personnel, and current instructions and data****Documented performance criteria (maximum permissible errors)****Calibrating or qualifying procedures****Maintaining working standards and reference materials****Marking and/or labeling****Scheduling for periodic checks****Identifying equipment not covered****Records of probable effects for non-conforming equipment****2-4 I Program, NTETC Sectors on Grain Moisture Meters and Protein Analyzers**

The Conference established two new sectors under the National Type Evaluation Technical Committee; the Grain Moisture Meter Sector and the Protein Analyzer Sector. The first meeting of these sectors was held in Kansas City, Missouri, December 17 - 20. Reports of the progress of these sectors was given by the Technical Advisor, Dr. Richard L. Smith, from the U.S. Department of Agriculture, Federal Grain Inspection Service both at the Interim and Annual Meetings.

**Moisture Meters.** At its December meeting, the sector agreed that few changes in the existing Handbook 44 code of practice would be required. They felt that moisture measurement technology should not be inhibited by the Handbook 44 code, and that type evaluation approval should emphasize instrument performance. There was considerable discussion of the need to design instruments used in direct grain sales in such a manner that they do not facilitate fraud. Concern was expressed that this might be more difficult to achieve with present designs of near infrared analyzers than for moisture determination than with other more traditional designs of moisture meters. The sector agreed that

air oven methods referenced in the Handbook 44 code should continue to be the most current FGIS reference method.

Several issues are to be resolved before type evaluation criteria can be developed for moisture meters. A subcommittee was assigned to review these issues and draft a document outlining test procedures prior to the next meeting. Subcommittee members include Rich Pierce, Dave Funk, Jim Rampton, Cliff Watson, Jack Barber, and Bob Wittenberger. Mr. Henry Oppermann, NIST, also participated in the subcommittee's meeting. The subcommittee of the NTETC Moisture Meter Sector met at the FGIS Technical Center in Kansas City on March 18-19, 1992, to develop type evaluation test procedures for moisture meters. The subcommittee reviewed existing FGIS, NCWM, and OIML test requirements and agreed that many of these tests, with appropriate revision, should be included as part of an NTEP type evaluation. Type evaluation test procedures were outlined for several of these tests. The subcommittee also suggested several changes and additions to the Grain Moisture Meter code in Handbook 44.

*Protein Analyzers.* At its first meeting in December, the Sector decided that a Handbook 44 code would be drafted for near infrared reflectance and transmittance protein analyzers. Several design criteria previously identified by FGIS would be incorporated into the draft. There was general agreement by sector members that type evaluation criteria previously used by FGIS should be revised to form the initial draft of NTEP test criteria. This draft would be available for review prior to the next meeting.

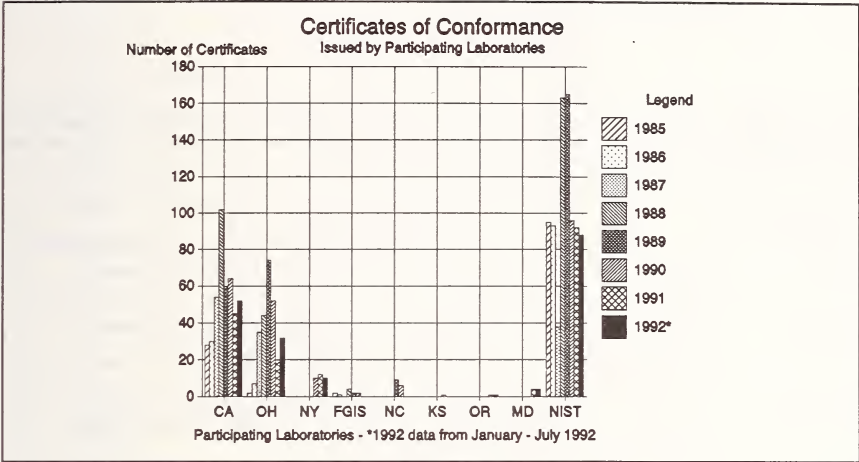
The NTETC Grain Moisture Meter and NIR Wheat Protein Analyzer Sectors met on June 10-12, 1992, in Alexandria, Virginia. Most of the June sector meeting was devoted to discussion of Handbook 44 code and type evaluation procedures for moisture meters. Sector members suggested several changes to the checklist, many of which will require changes to the Grain Moisture Meter Code in Handbook 44. It was suggested that acceptance tolerances be dropped from Handbook 44 and that the maintenance tolerances be revised to better reflect moisture meter performance capabilities. A NIR Handbook 44 draft code was only partially reviewed at the meeting, but Sector members suggested that several items be changed in both the NIR area and the Grain Moisture Meter code.

The consensus of the sector members was that they should concentrate on developing test criteria for moisture meters in an attempt to bring the NTEP test program on-line by the fall of 1993. The Grain Moisture Meter Subcommittee will meet prior to that time (August 19-21, 1992 in St. Louis) to further develop detailed test procedures. In order to finalize changes to the Grain Moisture Meter code in Handbook 44 and reach agreement on type evaluation test criteria for moisture meters in time to get the materials on the agenda for the January 1993 Interim Meeting, the next Moisture Meter Sector meeting is scheduled for October 5-7, 1992, in Chicago, Illinois.

At their next meeting, the Executive Committee will discuss the issue of how to support an ongoing calibration monitoring program required for grain moisture meters.

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

The Executive Secretary reported on the work of the Participating Laboratories, including their workload and planning for addition of capabilities to conduct evaluations. She reported on the certificates issued by laboratory, conversions from Provisional to Full, and status of Pre-NTEP certificates.



Total number of Certificates of Conformance (CCs) issued in 1991 .....	285
New CC numbers issued .....	169
Total actual evaluations performed .....	104

Evaluations performed by laboratories

California .....	45
Ohio .....	20
New York .....	12
Maryland .....	4
Oregon .....	1
NIST/OWM .....	3
Force Group - Load Cells .....	19

The remaining 65 CCs were issued as a result of paper review many of which resulted in CCs issued to distributors of devices.

Addenda/Amended CCs .....	116
Categories of Addenda	
$v_{min}$ changes <sup>1</sup> .....	45
Device modifications <sup>2</sup> .....	67
Amended <sup>3</sup> .....	4

<sup>1</sup>These certificates were amended to change  $v_{min}$  values resulting from the increased tolerance for Class III L scales for the temperature effect on zero.

<sup>2</sup>Device modifications may include changes in model designations or changes to standard features and options that do not require further evaluation.

<sup>3</sup>Amended certificates indicate reissuing a certificate with amended as an extension to the CC number and are issued to correct errors in certificate information.

Of the 169 new CC numbers issued

Pre-NTEP ..... 6  
Provisional ..... 11  
Full ..... 152

**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:

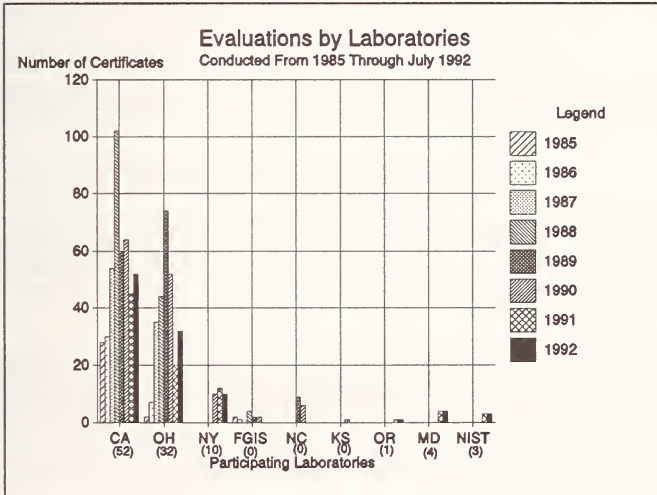
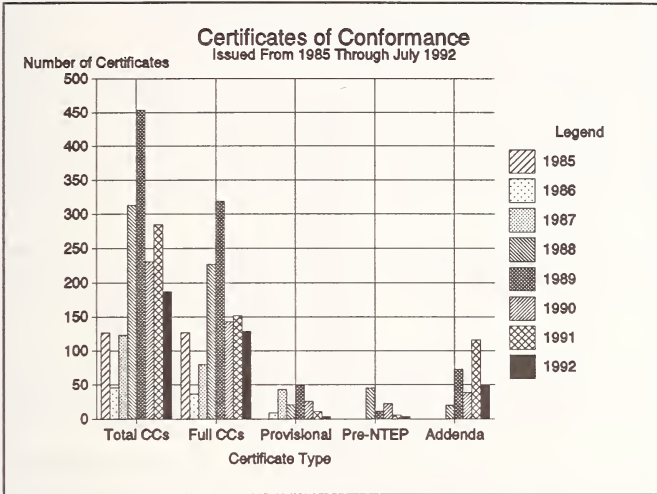
Laboratory	Areas of Authorization
Alabama	In process of becoming an authorized participating laboratory for performance testing of large capacity scales.
California*	Design and performance evaluation of scales, cash registers, metering devices, service station consoles, and taximeters.
Kansas	Performance evaluation of large-capacity scales.
New York*	Design and performance evaluation of scales and cash registers. Expansion into liquid measuring devices is under discussion.
Maryland*	Design and performance evaluation of scales.
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.
Oregon	Recently authorized to conduct performance evaluations of large capacity scales.
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.
*Note: All participating laboratories marked with an asterisk are equipped to conduct influence factors requirements testing and are authorized to perform belt-conveyor scale testing.	

Mr. Constantine V. Cotsoradis completed one year of work with the NIST Weights and Measures Program through an Intergovernmental Personnel Act exchange between the State and Federal Government to gain the knowledge and experience needed to manage the authorized participating NTEP laboratory at Maryland Weights and Measures. He also assisted the Specifications and Tolerances Committee.

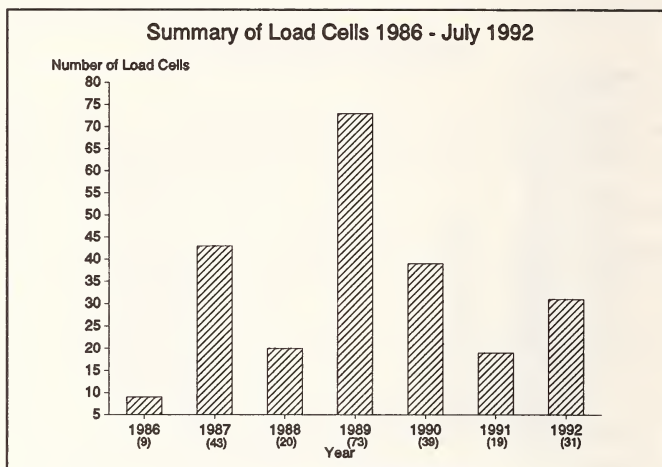
Mr. Richard Whipple, recently joining the staff of the NIST Weights and Measures Program, is responsible for the administrative management of the NTEP Program, including receiving and reviewing requests for evaluation and generating reports.

The following graphs are summaries of NTEP Certificates of Conformance and evaluations performed between the time period of 1985 and July 1992. The first graph is a summary of the total number of Certificates of Conformance issued, the second graph is the total number of device evaluations resulting in Certificates of Conformance conducted by the participating laboratories, and the third graph is a summary of load cell evaluations performed by the Force Group at NIST.





Information on the number of evaluations performed by NIST is not available at this time for the period from 1985 through 1990.



NIST can currently test most load cells in compression from 1,800 to 50,000 kg (4000 to 120,000 lb), and load cells in tension from 1,800 to 12,500 kg (4,000 to 28,000 lb.). NIST can also test load cells in tension from 90 to 225 kg (200 to 500 lb) and will be able to test load cells in compression from 90 to 225 kg (200 to 500 lb) by the end of 1992. No plans are in process for testing load cells in the range from 225 to 1,800 kg (500 to 4,000 lb); however, a recent decision by NTEP (June 16, 1992) permits the load cell selected for type evaluation, which was previously to be selected from the "middle of the range," now can be selected from any part of the range to accommodate the NIST/NTEP test capability. NIST is also working with the State of California to develop NTEP test capability below 90 kg (200 lb) before the end of the year.

## 102-6 I Test Procedures, Belt Conveyor Scales

At the Interim Meeting, Mr. Constantine Cotsoradis updated the Board on the status of testing belt-conveyor scales. A Certificate of Conformance was issued for one belt-conveyor scale that successfully completed the field permanence test and laboratory test of the NTEP process. Another device completed the field permanence test phase and is undergoing laboratory evaluation. These two scales were our first experience with applying the NTEP checklist and test procedures for belt-conveyor scales.

The laboratory testing of these devices has raised some questions concerning the checklist. Specifically, the questions relate to obtaining the necessary resolution for conducting the test, when to apply the "Allowable Weighing Error" tolerance, and whether it is necessary to conduct static and dynamic tests. These items were reviewed at the NTETC Belt-Conveyor Scale Sector meeting in June 1992. It was decided that, since static tests did not give equivalent results to dynamic tests, dynamic tests would be the sole judge of conformance for type evaluation. Belt conveyor scales will be tested in the manner for which they are designed and as they are used.

The checklist for belt-conveyor scales is not contained in the current edition of NCWM Publication 14. It will be included in the new edition of NCWM Publication 14 expected to be published this fall. In the interim, individuals wishing to obtain a copy of the Belt-Conveyor Scales checklist should contact the Office of Weights and Measures, Mr. Dick Whipple.

## 102-7 I Program, Discontinuation of Provisional CC's for Load Cells

At the 1991 Annual Meeting, the Board revised the policy regarding NTEP Provisional Certificates of Conformance (CC) issued to load cells. In the past, Provisional CC's were permitted an indefinite life in those instances when NTEP was unable to test the load cells at NIST. The revised policy requires all load cells for which Provisional CC's

have been issued to be tested by August 1, 1992 for an upgrade to a full CC. The Board's objective is to discontinue issuing Provisional CC's for load cells as of January 1, 1993. One exception to this will be hydraulic load cells due to NTEP difficulty to conduct tests on these load cells. It will be necessary to retain the concept of Provisional CC's for some devices, but the objective is to eliminate Provisional CC's for load cells, other than hydraulic. The Board believes it necessary for a manufacturer to demonstrate, beyond the mere submission of data to NTEP, that a given load cell family is capable of complying with Handbook 44. The NTEP policy requires load cells to be tested by the NIST Force Group whenever possible. This policy has been clarified to include load cell families when part of the range of capacities falls within the test capability of NTEP. NIST can currently test, in compression, most load cells from 180 to 50,000-kg (400 to 120,000-lb) capacity, load cells in tension from 1800 to 12,500 kg (4,000 to 28,000 lb), and tension or compression load cells from 90 to 225 kg (200 - 500 lb).

Previous policy gave manufacturers the option of upgrading Provisional CC's to full CC's through witnessing repeat tests on the load cells using the manufacturer's test facilities. The revised policy requires manufacturers to upgrade Provisional CC's to full CC's through repeat tests on load cells witnessed by NTEP representatives; witnessed testing will be accepted only when NIST does not have test facilities.

If a manufacturer does not request testing within the time period specified in the new policy, the Provisional CC will be withdrawn. A memorandum was sent out August 22, 1991 notifying load cell manufacturers to contact the Office of Weights and Measures to make the necessary arrangements to schedule action to upgrade existing Provisional CC's. It was expected that most existing Provisional CC's would be scheduled for an upgrade within 3 to 6 months.

As a result of this program, at least 25 of the 57 existing Provisional Certificates for load cells will be withdrawn. As many as six more certificates may be withdrawn as of August 1, 1992. Availability of test equipment and test scheduling may delay the upgrading of some certificates beyond August 1. An addendum to Publication 5 on load cells showing the status of all load cell certificates, including those withdrawn, will be available in September.

The following general guidelines apply to these load cells:

- Load cells on Provisional Certificates of Conformance to be withdrawn may be sold until August 1, 1992, but shall not be installed after August 1, 1992.
- Load cells on Provisional Certificates of Conformance to be withdrawn, but installed before August 1, 1992, shall remain certified until replaced (through routine replacement).
- Provisional Certificates of Conformance to be upgraded shall be upgraded by August 1, 1992 (unless delay is caused by NTEP scheduling).
- All Provisional Certificates of Conformance not upgraded by August 1, 1992 will automatically be withdrawn (unless delay is caused by NTEP).
- Load cells may continue to receive Provisional Certificates based on data received from the manufacturer until January 1, 1993, but arrangements must be made within 90 days from the date the Provisional Certificate is issued to upgrade to a full Certificate of Conformance.
- After August 1, 1992, load cells on withdrawn Provisional Certificates of Conformance may be replaced only by load cells with full Certificates of Conformance.

## 102-8 I Policy, Extensions of Existing Vehicle Scales

The extension of existing installations of relatively short vehicle scales appears to be an active business. Some of the extensions include widening a portion of the load-receiving element to 12 feet when the rest of the scale is 10 feet wide. Several requests have been received for interpretation as to whether or not NTEP evaluations are required for the "extension kits." This depends upon whether the extension of the scale is actually a unique modification of an existing device or if a new weighing/load-receiving element is added to the existing scale to create a multiple-weighing element system. If an extension consists of adding a separate weighing/load-receiving element, it is appropriate for an NTEP jurisdiction to require the weighing/load-receiving element to have a type evaluation.

Weights and measures officials need assurance that the extension kit is an appropriate extension or modification, that is, of an appropriate design, of adequate strength, and with capacity to interface properly with the existing scale.

The Board of Governors has determined that extensions are subject to type evaluation if they are "kits," that is, if there is more than a single unit of the extension manufactured. An extension that is a custom one-of-a-kind installation, is not subject to type evaluation. Ideally, any modification to a scale should be approved by a proper engineering authority, preferably the manufacturer of the original scale.

Due to the need to test the accuracy (by conducting a distributed load test, a concentrated load capacity test, and at least one strain load test) of the scale to which any extension is attached, and because the extension may be marketed as being appropriate to be added to a scale not of the same manufacturer as the extension, the Board is referring this interpretation to the NTETC Weighing Sector to provide appropriate test methods and any other pertinent criteria for evaluation of extensions. The Board recognizes the difficulties this policy decision entail, including the difficulties in selecting an appropriate type evaluation site.

This interpretation does not alleviate the enforcement problems that weights and measures officials encounter in the field, such as extensions made from parts scavenged from other scales; such an extension is considered a one-of-a-kind device not subject to type evaluation. However, it is a modification of the original design and should be subject to extensive initial evaluation in the field. The performance of scale extensions is installation-dependent.

At its June meeting, the NTETC Weighing Sector recommended that the Board of Governors review this issue further. The sector was divided in its opinions; some members agreed with the Board that extensions should be subject to type evaluation if they are "kits," that is, if more than one unit of the extension manufactured. However, some members expressed their belief that field performance testing by the weights and measures jurisdiction is sufficient. Obviously, at least in some instances, it will be impossible to evaluate all possible combinations of scales for which the kits may have been designed. The Committee will review this issue at its next meeting.

## **102-9 I Policy, NTEP Limit for Testing Large-Capacity Vehicle Scales**

There have been recent inquiries regarding the NTEP test procedures to be applied to very large vehicle scales for weighing off-the-road vehicles. Some have platform sizes as large as 21 m by 4 m (70 ft by 14 ft), concentrated load capacities over 110,000 kg (250,000 lb), and capacities exceeding 225,000 kg (500,000 lb). The need for NTEP evaluations of these scales, the costs associated with these tests, and the resources needed to test these scales, adequately were reviewed. The Board of Governors was asked to consider whether or not NTEP should establish a limit on the maximum size of vehicle scale that will be tested under NTEP.

The Board decided not to establish a limit on the maximum size of vehicle scale to be tested under NTEP since a manufacturer could claim a size just beyond the limit in order to escape the requirement for evaluation. If the device might be used commercially (such as the sale of coal by a mine to a public utility), and is assembled from readily-available off-the-shelf parts (and therefore not one-of-a-kind), then the manufacturer may have the device NTEP evaluated. However, the Board does not want the scarce resources of Participating Laboratories to be stretched beyond present capabilities, since the ability to test such large capacity devices may exist only during NTEP evaluation. Manufacturers of very large devices should be warned that Participating Laboratories may have to place requests for type evaluation of these devices at a relatively low priority. NTEP does not currently accept cryogenic devices nor wire or cordage measuring devices for evaluation due to their relatively infrequent commercial application. Very large capacity weighing devices fall into a similar category; however, NTEP has evaluated very large capacity scales before, and will continue to do so depending upon resources.

The Board also requested the NTETC Weighing Sector to review existing test procedures for (1) appropriate test pattern(s) and (2) issues of safety when testing very large capacity devices.

The Weighing Sector subsequently recommended that, while some of these devices may not truly be "one-of-a-kind", they should be handled on a case-by-case basis as if they were "one-of-a-kind," with weights and measures jurisdictions performing the testing. Due to the difficulty of establishing standardized test procedures, it was determined that NTEP could provide jurisdictions with guidance and assist them in developing a procedure for evaluating the device.



## 102-10 I NTEP Appeal on Counting Scales

The Board of Governors heard an appeal on NTEP denying a certificate for a counting scale. A manufacturer requested that a CC be issued for a scale with counting scale features by having NTEP state on the CC that the count features were not evaluated or certified. Stated another way, the Board of Governors was asked to establish a policy to permit unevaluated features that may be used commercially to be present on devices that receive NTEP Certificates of Conformance. The Board concurred with the decision to deny a certificate for the following reasons:

### *Contrary to NTEP Policy to Examine Only Part of a Device*

It is contrary to NTEP policy to issue a CC to a device by examining only part of the device that may be used commercially. It is a basic premise of NTEP that devices for which CCs are issued must comply with Handbook 44. Type evaluation is based on the various checklists and test procedures developed by the Technical Committee on National Type Evaluation under the policy established by the Executive Committee of the National Conference on Weights and Measures. The scope of NTEP evaluations was most recently summarized in a memorandum dated January 3, 1991 (see Appendix F). This policy memo is being reviewed for further clarification for printers.

It is NTEP policy to issue CCs for: (a) complete weighing systems whether or not self-contained; (b) other complete devices; (c) separate main elements (e.g., indicating elements and weighing/load-receiving elements), or (d) load cells. NTEP does not issue CCs for only parts of devices or of main elements. The weights and measures aspects of the device or main element must comply with Handbook 44 or it does not receive a CC.

The NTEP Administrative Procedures (on page 5 of Publication 14) defines "type" as:

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

A "Certificate of Conformance" is defined (on page 5) as:

A document issued by the National Institute of Standards and Technology based on testing by a Participating Laboratory, said document constituting evidence of conformance of a type with the requirements of this document and the NIST Handbooks 44, 105-1, 105-2, or 105-3.

These definitions indicate that the device, not merely part of the device, is submitted for evaluation and must comply with Handbook 44. Evaluating a counting scale only on its weighing capability is equivalent to examining only part of a device.

NTEP does not evaluate features that do not fall under weights and measures authority, such as accounting functions, inventory controls, and manager reports; however, those features that may be used commercially and which would fall under Handbook 44 are subject to type evaluation. Counting scales could be used commercially for the sale of various items, such as electronic components (e.g., resistors, diodes, and transistors), the sale of nuts or bolts by count in a hardware store, or paper from a stationery store.

### *Function Keys*

The Weighing Sector of the NTEP Technical Committee addressed function keys that have been included on devices submitted for type evaluation. Many of these keys may be programmed to perform a variety of operations, not all of which may be legal for trade. The decisions of the Weighing Sector made at the June 1989 follow (see page 139 of the 1991 NCWM report for the meeting summary):

- a. Programmable keys may be included in a Certificate of Conformance if the keys are not metrologically significant.
- b. If programmable keys perform metrologically significant functions, then the functions of the keys must be evaluated under NTEP.

- c. Any function keys that are used in a transaction must be marked specifically to reflect the operation of that key.
- d. The manufacturer must notify NTEP if, after the NTEP evaluation, metrologically significant features are added to a device through these keys.

The position clearly indicates that metrologically significant features are to be evaluated if they appear on a device and are to be included on a device that receives an NTEP CC. Counting features are metrologically significant.

#### *Jurisdictions Must Be Able to Rely on Devices with CCs for Use in Commerce*

Issuing a CC to a device without evaluating those features that may be used commercially (and would thus fall under Handbook 44) undermines the foundation of NTEP. Devices for which CCs are issued must comply with Handbook 44. It is believed that most States do not recognize counting scales as "legal for trade" devices. The Specifications and Tolerances (S&T) Committee has been requested to develop criteria for Handbook 44 for counting scales, which were on the S&T agenda in 1988 and 1989. The project was not undertaken due to the lack of resources, input, and priority. Counting scales are back on the S&T agenda for 1992.

To permit device features that may be used commercially while leaving a portion of the features unevaluated is counter to the objectives and purpose of NTEP. If jurisdictions cannot rely on devices with CCs (and their standard features) for use in commercial applications, then States would be justified in establishing and maintaining their own type evaluation programs. This would undermine the foundation of NTEP. If the Board of Governors sets the precedent of permitting metrologically significant but unevaluated features on devices with CCs, then companies might request that various features be excluded from evaluation. Excluded features might not comply with Handbook 44, might be used fraudulently, or might not be suitable for commercial use. If the Board of Governors were to conclude that it is appropriate to allow unevaluated features on devices that may be used commercially, then grain moisture meters incorporating scales could receive a CC for the scale portion of the device. The existence of a CC for the scale portion of the grain moisture meter could easily be misinterpreted by potential customers and misrepresented by sales representatives to suggest that the entire device has received a CC. This would be misleading and detrimental to the objectives of NTEP.

A decision by the Board of Governors to permit counting features on scales with CCs would preempt the NCWM process of developing Handbook 44 criteria for these scales, thereby allowing counting features to appear on commercial scales without adequate regulations in place.

#### *User-Defined Units of Measurement Are Not Permitted on Commercial Devices*

Several companies offer scales with a "user-defined" unit of measurement. With this feature the device user can input any factor to convert the internal resolution of the scale into any other "measurement unit" that is useful for the operator. For example, this type of feature is used in plants that bottle liquids to convert weight into volume for the purposes of checkweighing packages to determine if they are filled to the labeled quantity. "User-defined" units of measurement have not been permitted on commercial devices due to their great potential for fraud. Under the concept of evaluating only part of a device to receive a CC, then this type of non-certified feature on a scale could be permitted.

#### *Issuing This CC Would Require a Change in NTEP Policy or Constitute Preferential Treatment*

This action would represent preferential treatment for the company requesting the certificate and is unfair to competitors who have been required to modify their equipment before a CC was issued. It has been a long-standing practice of NTEP (both OWM and the other Participating Laboratories) not to evaluate counting scales nor to permit scales to have counting scale features if they are to be used in commercial applications. Many other companies have been refused CCs due to the presence of counting features and required to modify their devices before a CC was issued. Other companies have not submitted some scale models for type evaluation because they understood that NTEP would not evaluate the devices.

Two scales with counting features have mistakenly received NTEP Certificates of Conformance, but this does not justify changing NTEP policy or justify issuing another Certificate for another scale with counting features. To issue

a CC to a scale with counting features would create a situation of unfair competition and give the manufacturer preferential treatment when others have been refused. The manufacturers of the two scales with counting features that have been given CCs will be required to disable these features on any further commercial devices produced under these CCs.

### *Weights and Measures Would Have Enforcement Problems*

Counting scales are widely used in noncommercial applications. To "open the door" to counting scale features on commercial devices may create a major enforcement problem for weights and measures officials to control the use and establish the accuracy of the counting feature.

It is common for devices to be programmed with features, parameters, or capabilities that do not comply with Handbook 44. It is much more cost effective to address variations in requirements for different countries by incorporating different features or operating characteristics in software than in hardware. In this way, the "same" device hardware may be used in many different countries and in different applications. The enforcement official must determine at the time of initial inspection of a new device whether or not the proper features and parameters have been selected for the application. Including the counting features on a device with a CC will make it more difficult for the enforcement official to prohibit the use of the counting feature in commercial applications (despite a disclaimer regarding the counting features in the CC). Purchasers of a device (and most weights and measures officials) rarely have the CC for a device available in its entirety. If the device model is listed in NCWM Publication 5, many people will conclude that the device model and all its features comply with Handbook 44. Determining those applications where it is appropriate to use a counting scale or counting features will be difficult. The accuracy of counting scales is an issue of great concern as described below.

### *NTEP Does Not Know What Requirements to Apply to Counting Scales*

If a CC were granted, this would allow devices to be marketed with features that may not be in compliance with requirements that may ultimately be applied to counting scales. Criteria for counting scales must be developed before counting scales can be used in commercial trade. There are no universally accepted criteria for the design and evaluation of counting scales. Even the accuracy to be required on count has not been established.

Assuring accuracy in count and identifying those products for which it is appropriate to use counting scales to determine the quantity is difficult because it is believed counting scales do not include the capability to address the variability in the individual items to be weighed, many scales do not include safeguards to assure that the size of the sample is adequate relative to the resolution of the scale, and test procedures to determine the accuracy of counting scales have not been adequately developed.

A basic requirement should be established that the count feature must meet the existing tolerances for commercial devices. Count is a variably-defined weight unit (in contrast with the "user-defined" unit discussed earlier) that often has greater resolution than the displayed scale division. As such, the count should be required to meet class II or class III tolerances since the count feature will be used in those types of applications. It is easy to deduce that a class III scale with a count feature that provides much higher resolution than the displayed weight value will not meet the commercial device tolerance, because if the scale could meet the tolerance with higher resolution, the manufacturer would be marketing the scale with the higher resolution.

Permitting scales with counting features into the commercial market prior to the resolution of the critical issues for counting scales would be detrimental to uniformity in weights and measures enforcement and in competition among companies. Therefore, it is inappropriate to permit scales with counting features to be allowed in the commercial measurement system until these issues have been resolved. "Count" is just another unit of measurement; weights and measures should resolve these issues and where count may be suitable for use before counting features appear on any commercial devices.

### *Summary*

The NTEP Certificate constitutes evidence of conformance of a type with the requirements of NIST Handbook 44. NTEP will not issue a Certificate for only a part of a device or main element. Although NTEP does not evaluate features that do not fall under weights and measures authority, such as accounting functions, inventory controls, and



manager reports, NTEP must evaluate features that may be used commercially, and such features include counting features. At present there are no requirements in Handbook 44 for counting scales; requirements must be developed and included in Handbook 44 before NTEP can evaluate any counting scale. Weights and measures enforcement agencies must be able to rely on devices with NTEP Certificates as being appropriate for use in commercial applications.

## **102-11 I NTEP Appeal Procedures**

The Board of Governors has decided that certain procedures should be followed when filing an appeal under the NTEP Administrative Policy. These procedures should be incorporated in NCWM Publication 14.

1. When an appeal is lodged, a copy of the letter requesting the appeal will be sent to all members of the Board of Governors, to the NTEP management at NIST, and to the Participating Laboratory or other appropriate party upon whose action or inaction the appeal is lodged, or with whom the dispute concerns.
2. The party upon whose action or inaction the appeal is lodged will be given the opportunity to provide written comments concerning the appeal. Copies of the written comments will be made available to the Board of Governors and to the party lodging the appeal.
3. In order to preserve objectivity on the part of the Board of Governors, no oral arguments or oral comments or discussions will be heard by any member or members of the Board of Governors unless or until a hearing is held to decide the appeal.
4. The Chairman of the Board of Governors will explain how an oral argument in an appeal hearing will be conducted.
  - a. The Chairman will provide an opportunity for each side to present its arguments and to question the other side.
  - b. The Chairman will ask if either side in a dispute has any objections to the manner in which the appeal will be conducted.
  - c. The Chairman may ask for assistance or testimony from a third party (for example, from a Participating Laboratory).
  - d. The Chairman will ask that any Board of Governor member not vote if there is a conflict of interest (for example, if the appeal concerns actions taken by a member of the Board).
  - e. The Chairman will ask that both sides to an appeal leave the room at the same time for final decision by the Board.
5. The Chairman will notify both parties to an appeal orally immediately following a decision, and follow up with written notification.
6. The Board will avoid the use of conference calls for final decisions as far as possible. If a conference call is used to conduct its business, (a) the conference call will be conducted with all parties that would attend an in-person meeting connected at the same time, and (b) all present on the call reminded that they can express, at any point in the discussion, their discomfort in not being able to obtain nonverbal as well as oral comments, views, and opinions.
7. The reports of the S&T Committee will be considered as rationale for the standards, similar to legislative history as a tool to understand the intent of the Committee and Conference.

As part of an appeal, the Board determined that an ambiguity in Handbook 44 may exist; in order to avoid the possibility of field enforcement agents interpreting Handbook 44 differently than the Board had interpreted it, the Board requested the S&T Committee to clarify the Handbook 44 paragraph at this Annual Meeting. Publication 3, "Policy, Guidelines, and Interpretations" 1.1.1. Committee Agenda Items, Submission and Management, requires that



all issues to be voted upon be published in the Announcement Book and Committee Reports. It permits exceptions to the policy "to meet an emergency situation." Because of the potential impact on device manufacturers, enforcement officials, device users, and the NTEP laboratories, the Board felt, at least initially, that the issue was an emergency item, and requested the S&T Committee to place the item on their voting calendar as an emergency item. After further reflection, the Committee requested that the S&T Committee withdraw the item as an emergency item. Enough of the membership expressed confusion about the issue that the Committee decided that it needed further explanation and the opportunity for the entire voting membership to study and discuss the item. Accordingly, the Committee requests the S&T Committee to address the issue of interpretation of paragraph S.1.1. of the Scales Code at the next Interim Meeting.

The policy in Publication 3 concerning the procedures to follow in the event of an emergency needs clarification. As a result of their deliberations, the Board preliminarily decided that the policy in Publication 3 needed modification. The policy presently requires the Committee "to request unanimous consent of the Conference." The Board interpreted this to mean (1) unanimity to hear the item and (2) normal voting rules to apply for adoption of the item. At this point in time, the Board is of the opinion that unanimity is an unreasonable demand on the Conference; one vote against the motion to hear the issue will kill the discussion. The Board is inclined to consider Robert's Rules of Order, that is, 2/3 to hear the item. Additionally, the Board believes that any Standing Committee considering an item as an emergency should get concurrence of the Executive Committee before taking the item to the Conference as an emergency item. Comments are encouraged. The Executive Committee will discuss this item during the next Interim Meeting.

S. Colbrook, Illinois, Chairman

A. Nelson, Connecticut, Chairman-Elect

N.D. Smith, North Carolina, Past Chairman and Chairman of NTEP Board of Governors

R. Andersen, New York

D. Guensler, California

P. Nichols, Alameda County, California

S. Malone, Nebraska

J.A. Rogers, Virginia

K. Simila, Oregon

C. Gardner, Suffolk County, NY, Treasurer

C. Brickenkamp, NIST, Executive Secretary

R. Bruce, Legal Metrology Group, Canada, Technical Advisor to Executive Committee

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

Appendix A - Composition of NCWM Mailing List (as of 6/30/92)															
Category	NCWM Members					Nonmembers				Total			% of total who are members		
	1990 as of June	1991 as of June	1992 as of Jan	1992 as of June	1-6/92 % in- crease	90	91	92	90	91	92				
State	759	755	726	769		744	778	818	1503	1533	1587	50.4	49.2	48.4 <sup>5</sup>	
County	335	369	369	381		614	576	586	949	945	967		35.3	39.0	39.4
City	231	228	199	205		370	357	346	601	585	551		38.4	38.9	37.2
Subtotal	1325	1352	1294	1355		4.7	1728	1711	1750	3053	3063	3105			
US Industry	1249	1455	1412	1614	14.2	3695	5790	15241	4944	7245	16855	25.2	20.1	9.5 <sup>6</sup>	
Industry (foreign)	28	28	26	29		60	149	151	88	177	180		32.0	15.8	16.1
Subtotal	1277	1483	1438	1643		3755	5939	15392	5032	7422	17035				
US govt	45	50	47	50		149	157	186	194	207	236		23.0	24.0	21.8
Foreign govt	23	25	23	26	81	84	92	104	109	118		22.1	22.9	22.1	
State & local govt (not W&M)			13	19 <sup>7</sup>			349				368			.05	
Retirees	29	319	387	370	-1.1 <sup>2</sup>	-- <sup>2</sup>	-- <sup>2</sup>	-- <sup>2</sup>	351	319	370	100. <sup>2</sup>	100. <sup>2</sup>	100. <sup>2</sup>	
	351 <sup>1</sup>														
Subtotal	419	394	470	465		230	241	627	649	640	1092				
Guests						181	233	326	181	233	326				
Total	3021	3229	3202	3463 <sup>3</sup>	8.1	5894	8124	18095	8915	11353 <sup>4</sup>	21558	33.9	28.4	16.0 <sup>8</sup>	

<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 cost, all retirees were made members.

<sup>2</sup> All retirees on the mailing list are members. Purging of obsolete or inaccurate information has resulted in a decrease of 11%.

<sup>3</sup> Membership increase between June 1991 and June 1992 was 254 (an increase of 7.9%).

<sup>4</sup> The mailing list is a list of individuals who are trying to repair their list kept by State; this will continue (petroleum device repair firms are currently being entered).

<sup>5</sup> The mailing list is a list of individuals who are trying to repair their list kept by State; this will continue (petroleum device repair firms are currently being entered).

<sup>6</sup> The proportion of weights and measures officials in the mailing list has grown, the proportion who are associate members has decreased.

<sup>7</sup> A new membership category has been established to include State and local government employees other than weights and measures (e.g., consumer advocacy, law enforcement personnel, etc.).

<sup>8</sup> Over 10,000 constituents were added to the potential Associate Member category since January 1, 1991. We continue to recruit these individuals as members through ongoing marketing of NCWM, its resources, services, and publications.

## Appendix B Treasurer's Report

Final Balance As of December 31, 1991

START ..... \$114,778.54

### INCOME

411-Registration Fees ..... \$17,100.00  
 412-Membership Fees ..... \$37,835.00  
 413-Interest ..... \$ 2,865.47  
 414-Other Income ..... \$ 1,560.00

#### 481-Special events:

    481.1-Annual Meeting ..... \$ 1,921.00  
 Total 481-Special events ..... \$ 1,921.00

#### 482-Publications:

    482.1-Training Modules ..... \$ 1,117.00  
     482.2-NCWM Pubs ..... \$ 8,058.00  
     482.3-Videos ..... \$ 15.00  
 Total 482-Publications ..... \$ 9,190.00

485-Promotional ..... \$ 995.07

TOTAL RECEIPTS ..... \$ 71,466.54

TOTAL INCOME ..... \$186,245.08

### EXPENSES

#### 511-Annual Meeting:

    511.1-Hotel, Food ..... \$23,159.82  
     511.2-Equipment, supplies ..... \$ 385.00  
     511.3-Regis Personal/Photo ..... \$ 1,419.71  
     511.4-Printing/Copying ..... \$ 1,350.00  
     511.5-Awards ..... \$ 1,514.01  
     511.6-Treas/Committee Exps ..... \$ 667.65  
 Total 511-Annual Meeting ..... \$28,496.19

#### 512-Interim Meeting:

    512.1-Hotel/Food ..... \$ -190.72  
 Total 512-Interim Meeting ..... \$ -190.72

#### 513-Committee Operations:

    513.1-Exec Cmte/NTEP BOG ..... \$ 434.71  
     513.3-S&T ..... \$ 258.33  
     513.5-Liaison ..... \$ 91.74  
     513.6-NTEP Tech Cmte ..... \$ 2,520.04  
 Total 513-Committee Operations ..... \$ 3,304.82

Executive Committee

Final Balance As of December 31, 1991 (Continued)

514-Special Programs:		
514.1-21st Century Task Force .....	\$ 3,508.53	
514.9-Miscellaneous .....	\$ 875.90	
Total 514-Special Programs .....		\$ 4,384.43
515-Chairman's Expenses:		
515.1-Chairman's Expenses .....	\$ 5,632.02	
515.2-Chairman Elect's Expenses .....	\$ 5,000.00	
Total 515-Chairman's Expenses: .....		\$10,632.02
516-Administrative:		
516.1-Equipment/supplies .....	\$ 253.94	
516.2-Serv/contr/personnel .....	\$ 6,608.16	
516.3-Mailing/PO Box .....	\$ 102.00	
516.5-Bank charges .....	\$ 105.29	
516.6-NTP/CEU/Copyrt/Equip .....	\$ 1,674.44	
516.9-Miscellaneous .....	\$ -150.00	
Total 516-Administrative .....		\$ 8,593.83
518-NTP: Training .....	\$ 1,801.36	
Total 518-Administrative .....		\$ 1,801.36
581-Special Events:		
581.1-Annual Meeting .....	\$ 4,750.45	
Total 581-Special Events .....		\$ 4,750.45
582-Publications:		
582.1-Modules .....	\$ 301.00	
582.2-NCWM Publications .....	\$ 4,275.50	
Total 582-Publications .....		\$ 4,576.50
TOTAL EXPENSES .....		<u>\$ 66,348.88</u>
BALANCE .....		\$119,896.20
BANK ACCOUNTS		
NEW YORK .....	\$ 81,310.37	
MARYLAND .....	\$ 314.24	
CD#1 .....	\$ 26,078.89	
CD#2 .....	\$ 12,192.70	
BALANCE .....		\$119,896.20



## Appendix C

### National Conference on Weights and Measures Budget for 1992 and 1993 (Jan 1 - Dec 31)

#### Chart of Accounts

#### 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**

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

Balance Sheet Accounts		
Assets		Liabilities
	Carry-Over as of Jan 1, 1992	
100 Total Assets	\$119,896.20	200 Total Liabilities
110 Current Assets		
111 Signet Bank	314.24	
112 European American Bank	81,310.37	
120 Other Assets		
121 Certificates of Deposits	12,192.70 26,078.89	
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 including special accounts for the Associate Membership fees and outing costs;
- (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, including the National Type Evaluation Program (NTEP) at this time but to be placed into a reimbursable account if the NTEP maintenance fee is implemented;
- (7) Printing and publication expenses; and
- (8) Training delivery including Train-the-Trainer

### **Reimbursable Accounts**

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

- (1) Special Events;
- (2) Publications;
- (3) NTEP Operations for which an NTEP maintenance fee is under consideration;
- (4) National Training Program including reimbursable training delivery; and
- (5) Promotions.

## Income and Expense Accounts

INCOME		EXPENSES	
400	Total Income	500	Total Expenses
410	General Revenues	510	General Expenses
411	Registration Fees	511	Annual Meeting
411.1	Annual	511.1	Hotel, Food Service
411.2	Interim	511.2	Equipment, AV, Office, Supplies
		511.3	Personnel/Photographer
		511.4	Printing/Copying
		511.5	Awards
		511.6	Treasurer & Committee Expenses
		511.7	Printing of Announcement Book
		511.8	Associate Membership Account
		511.9	Miscellaneous
412	Membership Fees	512	Interim Meeting
412.1	Government	512.1	Hotel, Food Service
412.2	Associate	512.2	Equipment/Personnel/Printing/Misc.
		512.3	Exec Committee
		512.4	L&R Committee
		512.5	S&T Committee
		512.6	Education Committee
		512.7	Liaison Committee
		512.8	Other Committees & TF
		512.9	Printing of Agenda

Executive Committee

INCOME	EXPENSES
<p>413 Interest</p>	<p>513 Other Meetings - Committees</p> <p>513.1 Exec Committee/Board of Governors</p> <p>513.2 L&amp;R Committee</p> <p>513.3 S&amp;T Committee</p> <p>513.4 Education Committee</p> <p>513.5 Liaison Committee</p> <p>513.6 NTE Technical Committee</p> <p>513.7 Annual Committee</p>
<p>414 Associate Membership Account</p>	<p>514 Other Meetings - Task Forces/Spe Ctes</p> <p>514.1 Privatization Work Group</p> <p>514.2 Checkweigher Work Group</p> <p>514.3 OIML</p> <p>514.4 FPLA - Metric Work Group</p> <p>515.5 US-Canada Harmonization Work Group</p> <p>515.6 Petroleum Subcommittee</p> <p>514.9 Miscellaneous</p>
	<p>515 Chairman/Chair-Elect</p> <p>515.1 Chairman</p> <p>515.2 Chairman-Elect</p> <p>515.3 Regional Breakfast</p>
<p>416 Other Income</p>	<p>516 Administration</p> <p>516.1 Equipment, Supplies, Stationery</p> <p>516.2 Contracts, Personnel</p> <p>516.3 Mailing &amp; P.O. Box</p> <p>516.4 Treasurer's expenses (bond)</p> <p>516.5 Bank Charges</p> <p>516.6 NTP (CEU Registry, copyright, equipment, supplies)</p> <p>516.9 Miscellaneous</p>



INCOME	EXPENSES
	517 Printing, Publications 517.1 Membership 517.2 NCWM Pubs for members 517.3 Consumer Pamphlet 517.4 Video updates of H44 and H130 517.9 Miscellaneous
	518 Training & Train-the-Trainers 518.1 Train the Trainer 518.2 Training
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 482.3 Videos 482.4 H-133, 3rd Edition	582 Publications 582.1 Modules 582.2 NCWM Publications 582.3 Videotapes 582.4 H-133, 3rd edition
483 NTEP Operations	583 NTEP Operations
484 NTP Seminars	584 NTP Seminars
485 Promotions	585 Promotions
486 Grain Equip Coop Agreement	586 Grain Equip Coop Agreement

## Operating Budget for Fiscal Years 1992 and 1993

(Jan 1 to Dec 31)

The 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) 1993;
- the budgeted amount for FY 1992; and
- the comparable actual amount for the FY (1990-1991).

The 6-month close-out is not shown because of the lack of intercomparability of these numbers with an entire year's income and expense.

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

### Income

Account		FY 93 Budget	FY 92 Budget	FY 90-91 Actual
Number	Description			
400	Total Income	\$238,500	\$221,450	\$178,679.92
410	Income, General Funds	\$199,500	\$189,500	
411	Registration Fees	\$39,000	\$35,000	\$27,000
411.1	Annual Meeting	\$30,000	\$30,000	\$27,000
411.2	Interim Meeting	\$5,000	\$5,000	-0-
412	Membership Fees	\$129,500	\$122,500	\$126,339
413	Interest	\$2,000	\$2,000	
414	Associate Membership Account	\$33,000	\$30,000	
416	Other Income			
Expense & Income (Reimbursable)				
490	Income, E&I	\$39,000	\$31,950	
481	Special Events	\$4,000	\$2,500	\$4,846.16
481.1	Annual Meeting	\$3,000	\$2,500	
481.2	Interim Meeting	\$1,000	-0-	
482	Publications	\$15,000	\$11,250	
482.1	NTP Modules	\$2,000	\$2,000	\$9,985.75
482.2	NCWM Publications	\$7,000	\$6,500	\$1,981.00
482.3	Videotapes	\$6,000	\$2,250	
482.4	Handbook 133, 3rd Ed	-0-	\$500	
483	NTEP Operations	-0-	-0-	
484	NTP Seminars	\$3,000	\$1,200	
485	Promotional	\$2,000	\$2,000	\$2348.20
486	Grain Equipment Co-operative Agreement	\$15,000	\$15,000	

Footnotes to INCOME

411 FY92 and FY 93: 411.1 Annual Meeting Registration Fee. Based on 300 registrants @ \$100.00 each (Registration Fee). 1991 registration fees totalled \$27,000. 1992 preregistration of paying delegates approximately 300 of which at least 10% are first time attendees and will not pay registration fee. Another 30 on-site registrants will meet expected level of 1992. 1993 Annual Meeting in Kansas City: how to draw attendance?

FY 92 and FY 93: 411.2 Interim Meeting Registration Fee. Based on 100 registrants at \$50. Remaining delegates are subsidized by the Conference.

412 FY 92: membership in 1991/92 year ending June 30, 1992 was 3,470 of which 3,100 were paying members. We anticipate membership income in calendar year 92 to be equivalent to approximately 3,500 members; 1,500 active, 2,000 associate.

FY 93: 412.1 Active Membership Fee. 1,500 active members @ \$35.00 = \$52,500.

FY93: 412.2 Associate Membership Fee. Based on 2,200 associate members at \$50 = \$110,000. \$15 of the \$50 will be moved to Associate Membership Account, 414 (= \$33,000).

413 Interest on Certificates of Deposit

414 Associate Membership Account. This is the \$15 per Associate Member to be administered by the Associate Membership Committee. FY92 estimate of 2,000 x \$15 = \$30,000; FY93 estimate of 2,200 x \$15 = \$33,000.

416 Other Income.

481 This account is split into two subaccounts (481.1 and 481.2) to track income associated with the annual and interim meetings. The account includes funds collected from delegates and spouses for optional events, such as outings, tours, etc. The income and expense accounts (581.1 and 581.2) track expenses associated with each meeting.

482 This account is split into four parts (482.1 through 482.4) to record income derived from the sale of training Modules, NCWM Publications, videotapes, and NIST Handbook 133, respectively. This account is related to Expenses Accounts 582.1 through 582.4.

482.1 Only one new module will be printed in 1993. Sales will depend on change to publications policy. At present all holders of modules receive updates and revisions. Sales in 1991/92 have been \$2200. Sales in 1992 and 1993 are expected to be the same.

482.2 NCWM Pubs: Pub 5, 5B, 12 are "best sellers" generating sales of about \$7,000 in 1991/92.

482.3 Videotape updated H44 and H130; sales of 150 copies at \$15 in 1992; sales of 300 copies in 1993 at \$20.

482.4 Sales of reprinted H133, no longer available from US Government Printing Office. This account may have to expand to reprint H44 1991 version which 3 agencies under USDA have adopted and which publications are out of date. \$200 in 1991/92, anticipate \$500 in 1992; anticipate reprinting whole handbook in 1993.

483 NTEP Maintenance Fee may be determined by July 1993. It will not be administratively implemented before January 1, 1994.

484 This account is related to Expense Account 584 (the cost of conducting seminars that are reimbursed). 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 1992, this

## Executive Committee

approach generated \$1,200 for 1 seminar (travel and per diem of instructor plus incidentals such as module printing, coffee breaks, etc. ). With fiscal constraints, we do not expect more than \$3,000 in FY93. Industry participants pay for registration of their CEU's. Income is deposited here.

485 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.

486 This is a Cooperative Agreement signed with the U.S. Department of Agriculture Federal Grain Inspection Service to develop standards and test methods for grain measuring equipment.

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 on the table located in "Footnotes to Expenses."

### EXPENSES

Number	Account Description	FY 93 Budget	FY 92 Budget	FY 90-91 Actual
<b>General Funds</b>				
500	Total Expenses	\$288,000	267,400	\$168,7
510	Expenses, General Fund	\$249,500	\$220,200	
511	Annual Meeting	69,100	\$62,000	\$22,7
512	Interim Meeting	51,700	45,000	\$13,0
513	Travel - Committees	33,300	28,500	\$18,9
514	Travel-Task Forces/Special Committees	25,900	20,000	\$32,3
515	Chairman/Chair Elect	12,000	10,000	\$6,8
516	Administration	21,000	17,000	\$23,8
517	Printing/Publications	21,500	32,000	\$14,8
518	Training & Train-the-Trainer	15,000	\$5,700	
<b>Expense &amp; Income (Reimbursable)</b>				
580	Expenses, E&I	\$38,500	\$47,200	
581	Special Events	\$4,000	\$2,500	\$23,3
582	Publications	\$11,500	\$11,500	\$11,8
583	NTEP, Operations	-0-	\$15,000	
584	NTP, Seminars	\$6,000	\$1,200	
585	Promotional	\$2,000	\$2,000	\$9
586	Grain Equipment Cooperative Agreement	\$15,000	\$15,000	



Footnotes to EXPENSES

Ac- count Num- ber	Sub Ac- count	Description	FY 93	FY 92
511		Annual Meeting	\$69,100	\$62,000
	511.1	Hotel, Food Service, Meeting services, etc.	25,000	\$22,500
This subaccount includes the Chairman's reception, Opening Session reception, coffee & rolls at breakfast time, annual committees' breakfast or lunch, etc. and any other expenses (buses to outing) not covered. FY 93: 15% inflation in costs predicted from FY 92.				
	511.2	Equipment, AV, Office, Supplies	4,600	\$4,000
	511.3	Personnel, Photographer	4,600	\$4,000
This includes Convention Bureau staff at registration and hourly personnel in the staff office. FY 93: 15% inflation added to FY92 budget.				
	511.4	Printing/Copying	\$8,000	\$5,000
This includes printing the addendum sheets. FY 93: 5% inflation added to FY92 budget.				
	511.5	Awards	2,900	\$2,500
	511.6	Treasurer & Committee Expenses	\$2,000	\$2,000
	511.7	Printing of Announcement Book	8,000	\$7,000
The estimated cost for printing the Announcement Book is \$14,000 if outside printers bid without the economies of scale available to the Federal government. This cost has been reduced by going through GPO as low bidder for us.				
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), Handbooks 105-1,2,3, and any NCWM publication of fewer than 25,000 impressions.				
	511.8	Associate Membership Account	\$17,000	\$15,000
Estimated cost of outing - joint function with Associate Membership				
	511.4	Miscellaneous		
512		Interim Meeting	51,700	\$45,000
	512.1	Hotel, Food Service	4,600	4,000
	512.2	Equipment, Personnel, Printing	6,600	6,000
	512.3	Exec Committee	4,600	4,000
	512.4	L&R Committee	4,600	4,000
	512.5	S&T Committee	4,600	\$4,000
	512.6	Education Committee	4,600	\$4,000
	512.7	Liaison Committee	4,600	\$4,000
	512.8	Other Committees & TF/Nominating, Budget Review, Auditing	10,500	\$9,000
Expenditures for committees is the largest single expense in the Interim Meeting. FY92: 33 officers were reimbursed for travel at a cost of \$29,000. This includes Nominating, Budget Review, and 21st Century TF, besides standing committees. FY 93: 45 officers to be reimbursed; including Nominating, Auditing (instead of Budget Review, and 3 work groups)				

## Executive Committee

Ac- count Num- ber	Sub Ac- count	Description	FY 93	FY 92
	512.9	Printing of Agenda	7,000	\$6,000
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 \$5,000. This is not an archival document; it is cost of doing the business of the Interim Meeting.				
513		Travel - Committees	33,300	21,000
	513.1	Executive Committee - Board of Governors	7,000	\$6,000
	513.2	Laws & Regulations Committee	\$3,500	\$3,000
	513.3	Specifications & Tolerances Committee	3,500	\$3,000
	513.4	Education Committee	3,500	\$3,000
	513.5	Liaison Committee	0	0
	513.6	NTE Technical Committees: 2 weighing sector; 1 meas sector; 1 belt conveyor	\$14,000	\$12,000
	513.7	Annual Committees We will need to call the Budget Review in either at the Annual Meeting or prior to it	1,800	\$1,500
514		Travel - Task Forces, Special Committees:	25,900	\$20,000
	514.1	Privatization Work Group	3,500	\$3,000
	514.2	Checkweigher Work Group	\$2,900	\$2,500
	514.3	OIML	\$3,000	\$3,000
	514.4	FPLA - Metric Work Group	\$3,500	\$3,000
	514.5	U.S. - Canada Harmonization Work Group	\$7,000	\$3,000
FY 92: one meeting in Oct 92; FY 93: 2 meetings expected				
	514.6	Petroleum Subcommittee	\$5,000	\$4,500
8 public members nominated				
	514.9	Miscellaneous	\$1,000	\$1,000
515		Chairman/Chairman-Elect	12,000	\$10,000
	515.1	Chairman, Travel, per diem	\$5,500	\$5,000
	515.2	Chairman-Elect, Travel, per diem	\$5,500	\$4,000
	515.3	Breakfast Meetings at Regionals	\$1,000	\$1,000
516		Administration	21,000	\$17,000
	516.1	Equipment	1,000	\$1,000
	516.2	Contracts, Personnel	15,000	\$12,000
	516.3	Mailing & PO Box	2,500	\$1,500
	516.4	Treasurer's bond	500	500
	516.5	Bank Charges	500	\$500
	516.6	NTP (CEU registry, copyright, equipment, supplies)	1000	\$1000

Ac- count Num- ber	Sub Ac- count	Description	FY 93	FY 92
	516.9	Miscellaneous	500	\$500
517		Printing and Publications	\$21,500	\$32,000
	517.1	Membership	3,500	\$3,000
This includes the printing of membership invoices and Publication 6, the membership brochure. The costs of mailing first-class are assumed by NIST.				
	517.2	NCWM Publications for members	\$7,000	\$6,000
FY 92: Pub 2 \$6,000				
FY 93: NCWM Publication 2 (Directory) (\$7,000)				
	517.3	Consumer Pamphlet	\$5,000	\$17,500
	517.4	Video updates of H-44/H130	\$5,000	\$5,000
	517.9	Miscellaneous	1,000	\$500
518		Training	\$15,000	
	518.1	Train-the-Trainer		\$5,700
FY 92: \$5,700 carryover obligation from FY 91/92 inadvertently left out of expenses in 1991 report.				
FY 93: Propose providing another grant for training to Regional groups.				
	518.1	Training	\$15,000	
Propose training grants to be proposed by regional groups; awarded by Education Committee.				
Reimbursables				
581		Special Events - Reimbursable	\$4,000	\$2,500
	581.1	Annual Meeting	3,000	\$2,500
This is reimbursable part of annual event.				
	581.2	Interim Meeting	1,000	-0-
582		Publications - Reimbursable	11,500	\$11,500
	582.1	NTP, Modules	5,000	\$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	\$6,000
Estimated printing costs of Publication 5 & 5A (NTEP Index of Evaluations) @ 700 copies = \$4000; Publication 12 (EPO's) @ 800 copies = \$2000; Publications 1, 3, 7, 9, 10, 11, 13, 14, 17, 18 assumed by NIST; FY 93 larger number of copies will partially offset inflation estimates.				
	582.3	Videotapes		
	582.3	H-133, 3rd Edition		500
583		NTEP Operations	-0-	\$15,000
A maintenance fee for NTEP operations cannot be implemented before Jan 1, 1994. We will keep accounts during 1992 of all costs incurred for NTEP operations under other accounts and summarize it here for future planning in anticipation of reimbursement. FY92: paid for testing of production load cells.				
584		NTP Seminars	\$6,000	1,200
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 1993 year at \$1500 per session.				

Executive Committee

Ac- count Num- ber	Sub Ac- count	Description	FY 93	FY 92
585		Promotions	\$2,000	\$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.				

Carryover assets from Jan 1, 1992:	119,896.20
Income 92	221,450
Expenses 92	267,400
Estimated carry over Jan 1, 1993:	73,946.20
Income 93	238,500
Expenses 93	288,000
Estimated carry over Jan 1, 1994:	24,446.20

This is close to the reserve of \$25,000 recommended by the Executive Secretary.

Because of the rate of drain on reserves, the proposed maintenance fee for NTEP Certificates should begin by January 1994 in order to accommodate the programs of the Conference.



## Appendix D U.S./Canada Plans

June 15, 1992

Robert Bruce  
Legal Metrology Branch  
Canadian Consumer and Corporate Affairs  
301 Laurier Avenue West, 5th Floor  
Ottawa, Canada K1A 0C9 026

Dear Bob:

We sincerely appreciate your hospitality during our visit in April to discuss the harmonization of legal metrology requirements between Canada and the United States. We feel that the importance of this collaboration cannot be overstated.

To summarize my understanding of our discussions: The U.S. has been considering the need to reformat its codes in Handbook 44; Canada wants to reformat its codes. It seems appropriate to rebuild the codes from the ground up; not actually to change the requirements, but to repackage them. We agree to begin harmonization of entire existing codes, by focussing first on device requirements. In order of priority, we agreed to first address static scales, then liquid meters (including gasoline dispensers, wholesale meters, vehicle-tank meters, milk meters, and LPG meters, but not mass flow meters or water meters), then in-motion weighing. We will begin with static weighing devices of all capacities and will focus on requirements for performance, design, marking, and test procedures.

Other areas of interest, but of lower priority, are counting scales, volume measuring devices, vapor measurement, wire, fabric, and cordage devices. We will continue to address new technology together. In addition, we will continue to keep involved and informed in each nation's individual priorities.

Concerning harmonization efforts, we agreed that installation requirements can probably be ignored, and that they can continue to vary between the two countries. In addition, suitability of equipment requirements can also probably be ignored, since these requirements will determine where equipment could be installed. We will not, however, disregard any requirement that will affect performance. Therefore, we will pay careful attention to harmonization of test procedures, but not to issues relating to installation or suitability.

We will intercompare OIML recommendations, U.S., and Canadian requirements, and analyze the separate requirements in terms of their effect on existing equipment. You in the Legal Metrology Branch of Canada have volunteered to do the initial intercomparison. We will then convene a working group meeting (tentatively set for the fall of 1992 in the U.S.), with participants from the National Conference on Weights and Measures (NCWM), National Institute of Standards and Technology (NIST), and Canada to make initial recommendations. We believe industry participation is crucial at this meeting and in this working group. A draft document of recommendations will then be made available to all NCWM members for discussion and refinement. The Working Group will reconvene to discuss any comments and input received, and to incorporate appropriate items into a draft. Then the document (discussion draft) will go to the NCWM Specifications and Tolerances Committee for their recommending adoption by the Conference. Our objective is to complete discussion drafts for both weighing and liquid measuring by July 1993.

If we are to collaborate on this task on an equal footing, it is our belief that NIST must undertake the intercomparison of the next major code, that for liquid meters. Henry has informed me, however, that Renald has already begun this intercomparison of requirements. As we regretfully informed you in April, the NIST Weights and Measures Program currently has no technical resources to spare beyond its absolute minimum

## Executive Committee

responsibilities for the NCWM and the National Type Evaluation Program. We informed you that NIST did not have any resources to devote to the analysis of existing codes before the next fiscal year (10/92). It is still my belief that we at NIST must address how this challenge can be met. We must make sure that the weights and measures officials, industry, and device users of both nations know and endorse the collaboration between us, with a clear understanding of the resources that this collaboration requires.

In order to achieve these objectives, we will discuss our mutual intentions with NIST, the NCWM Executive Committee and the Task Force on Planning for the 21st Century. In January 1992, the Executive Committee endorsed the work to harmonize requirements with Canada and the mutual working groups that have expanded our understanding of the audit trails issue and have produced a mass flow meter code. The Committee committed NCWM resources to participating in the U.S./Canadian working group sessions in the future, planning to appoint appropriate long-term representation according to the particular objectives and task(s) of the working group(s). With the sizeable commitment of Canada to provide the first intercomparison of U.S., Canadian, and OIML standards for static weighing devices, it will be necessary for the NCWM to commit itself to not only underwriting participation, but also making more use of work processes such as it has developed for the National Type Evaluation Technical Committee Sectors. An expanded number of work groups appears to be needed to address the resolution of issues within the time constraints that developing technology demands. Our industries need global markets opened to them. We need to form trading partnerships not only to enhance trade across our near neighbor's borders, but to develop a united front in international standards negotiations, most important of which is OIML.

What must be transmitted to all concerned is the fact that most device requirements in Canada and the United States are in harmony already. However, the additional requirements for electronics that are included in OIML recommendations will have to be considered from their total cost/benefit, including the long-term cost of having standards different from OIML.

Thank you also for arranging meetings with John Buchanan, Steve Clarkson, and Jacob Heilik. All these discussions were extremely helpful. I hope you received the newsletter article that we faxed you last month announcing your presentation (enclosed). If there are errors, we can make corrections in the final program. Let me or Ann Turner (301-975-4012) know.

Although only my signature appears below, this letter of appreciation comes from Henry Oppermann and Tina Butcher as well. Will you please convey our thanks to your entire staff, including Renald Marceau, David Morgan, Claude Bertrand, Pat Hardock, Declan McElvoy, Randy Byrtus, and Michel Maranda.

Sincerely,

Carroll S. Brickenkamp, Ph.D.  
Chief, Office of Weights and Measures  
Executive Secretary, National Conference on Weights and Measures

cc: Executive Committee  
Henry Oppermann  
Tina Butcher  
Task Force for Planning for the 21st Century  
Scale Manufacturers' Association



Consumer and  
Corporate Affairs Canada

Consommation  
et Corporations Canada

Legal Metrology Branch  
301 Laurier Avenue West  
5th Floor  
Ottawa, ON  
K1A 0C9

Your file    Votre référence

Our file    Notre référence

1992-07-08

Dr. Carroll S. Brickenkamp  
Chief, Office of Weights and Measures  
United States Department of Commerce  
National Institute of Standards  
and Technology  
Administration Building 101  
Room A 617  
Gaithersburg, MD 20899

Dear Carroll:

The purpose of this letter is to briefly respond to your letter of June 15, 1992 regarding the work sharing and harmonization initiatives that we are undertaking.

I am in general agreement with the content of your letter. I share your view that this work is important to effectively address technological changes, to enhance trade opportunities and to develop, where appropriate, a united front in international standards negotiations.

Our approach to the harmonization process will afford us not only the opportunity to "repackage" our requirements but to ensure that these requirements provide protection to dependent parties and contribute to competitiveness, innovation and technical excellence. For each requirement, I believe, we must ask "Is the game worth the candle?", and if the benefits do not exceed the costs then other remedies will be necessary.

...2

Canada

Dr. Carroll S. Brickenkamp  
1992-07-08

-2-

I concur that our harmonization initiative should initially address weigh scales and liquid meters. Other device types are of less priority. In Canada, counting scales do not fall within the purview of the *Weights and Measures Act* and , unless this should change, we will not be developing requirements specific to these devices. Similarly, vapour measurement devices are not regulated under the *Weights and Measures Act*. They are, however, subject to the provisions of the *Electricity and Gas Inspection Act*, and I expect that you will wish to communicate on this matter with my colleagues in the Electricity and Gas Division.

As you indicated, Canada will undertake the initial intercomparison of requirements for static weigh scales and liquid meters. I expect that you will be able to participate more fully this fall. Given the importance of this work I hope that we will both have sufficient resources to complete discussion drafts by the summer of '93.

Thank you for the kind words respecting your visit to Ottawa in April. I too believe that the importance of our collaboration cannot be overstated. I know that my staff feels as I do and appreciate the opportunity to work with you, your staff, and NCWM representatives in these areas of mutual interest.

Sincerely,



Robert C. Bruce



## Appendix E

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

#### Final Report Executive Summary

##### *Introduction*

The Task Force on Planning for the 21st Century last met on November 7 and 8, 1991. Two new members were appointed by Chairman Sid Colbrook: N. David Smith and Carole Glade (replacing Mary Heslin). Also in attendance at the meeting were Chairman-Elect Allan Nelson, NCWM Executive Secretary Carroll Brickenkamp, Tina Butcher of OWM/NIST and Carol Fulmer of the State of South Carolina.

##### *Issues and Recommendations*

###### *Quality Assurance Programs*

A major portion of the meeting dealt with Quality Assurance Programs. Tina Butcher, having spent several months working with the Malcolm Baldrige National Quality Award Program (MBNQA), provided information regarding the introduction of the quality management process into weights and measures programs. One reason the Task Force is emphasizing the concept of quality is to enable weights and measures organizations to flourish, or even just survive, in competitive environments. Government agencies compete with one another for a portion of Federal tax revenues. Although implementation of quality assurance programs in management and operations will not necessarily save threatened programs, there are strong reasons to increase effectiveness and efficiency in an already viable program, into which category most weights and measures enforcement programs fall. The application criteria and guidelines developed for the MBNQA provide a framework for planning, assessing, and implementing improvements in agency's operations.

A key concept of the Baldrige criteria is customer satisfaction. A weights and measures agency has many "external" customers, including retail stores, device owners, device manufacturers, device repair firms, packagers, and ultimate consumers. The agency also has "internal" customers, such as the inspector, the secretarial staff, the Commissioner or Director of the parent agency, the Governor or Mayor, the State or District Attorney, and the State Legislators or local governing council. Once these customers have been defined, the agency can address satisfying these customers and how to measure whether customer satisfaction increases or decreases with changes in service. Communications between the parties as to the kind of services or products the other needs or wants, and recognition that each is the other's customer, are necessary to providing satisfaction in product or service.

In addition to customers, an agency has "suppliers," those companies or persons who provide services or products that the agency uses to deliver a product or service to its own customers. The weights and measures agencies' suppliers may include the data processing, personnel, or billing departments, printers of forms, and testing equipment manufacturers. Just as certain persons or companies may be an agency's customers, these same persons or companies may be an agency's suppliers. For example, the agency wants to satisfy the needs of its Legislature by providing it with recommendations for public service laws; similarly, the Legislature needs to provide an agency with enforceable laws. Thus, the Legislature is a supplier of services to the weights and measures agency. The question becomes how to assure quality of services and products from suppliers.

**Recommendation:** The Task Force recommended that arrangements be made for a presentation at the Interim Meeting by a representative of one of the companies that has won the National Quality Award or a member of the MBNQA Board of Examiners. It also recommended that a short workshop be added to the Interim Meeting to introduce participants to the quality criteria developed by the MBNQA, and in which participants would develop examples and ideas for implementing these criteria in their own organizations. This is a first step that is envisioned to continue at the Regional Weights and Measures Conferences and, possibly, at the Annual

## Executive Committee

Meeting. The goal of the Task Force is to promote the development of a "best practices" database of ideas and examples that any weights and measures jurisdiction can implement.

A presentation and workshop on quality was held as part of the Interim Meeting 1992.

### *Public Relations*

Another portion of the meeting, devoted to follow-up of the Task Force's previous recommendations regarding "networking," centered on better utilization of newsletters and other publications to tell the "Weights and Measures Story." The issue of informing the public of the benefits of an effective weights and measures program was explored in depth. It was concluded that the NCWM should be more proactive in this area and, at the very least, should take better advantage of naturally occurring events to generate favorable publicity.

**Recommendation:** The Task Force recommended that the Executive Committee consider hiring a free-lance writer to develop articles for publication in newsletters, trade publications and appropriate magazines. The Task Force further recommended that the Associate Membership Committee be enlisted to determine whether a member company would be interested in providing a marketing expert to advise the Task Force at a future meeting regarding how to improve our techniques in this area.

### *National Weights and Measures Law*

The Task Force continued its discussions regarding the feasibility of adopting a national weights and measures law in order to reduce problems created by lack of uniformity. The Task Force agreed that NCWM would still be the developing body for regulations if such a law were enacted, and State and local weights and measures agencies would retain the responsibility of enforcing weights and measures requirements. After much discussion of the merits and need for such a law, it was concluded that, in order for such a proposal to have a chance for success in Congress, the affected industry would need to commit itself to passage of the law.

**Recommendation:** The Task Force recommended that the Associate Membership Committee be consulted regarding its interest in taking the initiative in the development of a National Weights and Measures Law.

The Associate Membership Committee was asked to assist with a marketing expert and to explore whether there was a need from their perspective for a National Weights and Measures Law. See the Liaison Report for the results of their meeting.

### *Future Meeting Agenda*

The Task Force has scheduled its next meeting April 29 through May 1 in Asheville, NC. The subjects to be discussed include:

- Follow-up of Interim Meeting issues.
- Exploring alternative means of accomplishing weights and measures objectives.
- Follow-up of remaining high priority issues (see July, 1991 report)
- Consideration of additional issues as identified.
- Future role of the Task Force.

The Task Force on Planning for the Twenty-First Century was formed in 1990 by Chairman N. David Smith at the 75th Annual Meeting of the National Conference of Weights and Measures (NCWM). This report is a summary of its fourth meeting held in April 1992 and is a compilation of the conclusions of the Task Force.

The priorities listed below have been designated by the Task Force as those needing immediate attention because of their impact on weights and measures. Other issues are identified as important and should be addressed over the next few years in order to prepare for the year 2000.

The Task Force will meet at the 77th Annual Meeting to review information regarding privatization and to pass its findings along to the Working Group on Privatization that will hold its initial meeting in conjunction with the final meeting of the Task Force.

#### PRIORITY AREAS:

##### 1. Uniformity of laws, regulations, and their interpretation and implementation (national and international)

NCWM should form one or more working groups, with representation from business, consumer groups, and State and Federal agencies, to plan and implement means for obtaining more uniformity in weights and measures requirements and uniformity of implementation; promoting, perhaps even codifying, the use of the National Conference on Weights and Measures as the standardizing body and the NCWM Uniform Weights and Measures Law as the model for a Federal law.

There are several specific areas needing first, national, then, international harmonization: net weight requirements; metric package labeling; prototype evaluation of load cells, scales, and other weights and measures devices, to name a few.

##### 2. Education and Outreach

NCWM must shoulder the responsibility of the leadership organization dealing with any weights and measures issue. This will require a greater investment in time and resources towards public relations, consumer education, and defense of weights and measures regulation and programs.

The Liaison Committee currently has the responsibility for interaction with other groups and individuals. All committees and individuals within the NCWM must become responsible for the liaison function and incorporate other organizations in the planning and development of Conference activities.

##### 3. Technology

- a. NCWM, NIST, and individual Federal, State, and local agencies must develop and expand an electronics communications and information system and network. Sharing information on a real time basis of educational, administrative, regulatory, and interpretative matters is now of critical importance so that real uniformity can be practiced.
- b. Not only new, but existing technology must be incorporated into the weights and measures field in order to increase effectiveness and impact. Hand-held computers, bar-code scanners, and data-base sampling of non-compliant businesses are a few examples.

##### 4. Management

The Conference must grow from a "small business" to a "corporation" in management and philosophy. A hierarchical system of management will probably be necessary, without sacrificing the excellent teamwork and mutual responsibility already a hallmark of the organization.

- a. Working groups, comprised of experts in the field, should be utilized where appropriate for each committee within the NCWM on a project-by-project basis, similar to the National Type Evaluation Technical Committee Sectors. Examples are metric labeling under the Federal Fair Packaging and Labeling Act, and the Petroleum Subcommittee.
- b. Quality management is an important ingredient to a successful weights and measures program, both in the private as well as the public sectors. The NCWM should sponsor training on the quality process and incorporate quality concepts into all existing modules.

- c. International issues will take on more importance in the years ahead. The NCWM must position itself, together with NIST, to be the leadership organization for the United States in international weights and measures issues, harmonizing Federal agency weights and measures concerns with those of the States, and harmonizing where necessary for U.S. business with other Western Hemisphere nations and with OIML.
- d. Privatization may well change the weights the measures regulatory field. The NCWM must plan and prepare the public, regulatory, and private sectors for effective government within the budgetary constraints driving this issue.

## National Conference on Weights and Measures

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

#### Report

**CHARGE:** The Task Force on Planning for the 21st Century was appointed by Chairman N. David Smith in 1990 to assess the changes and impacts on weights and measures in the 21st Century. The Task Force was charged with:

- identifying issues which would change the nature of weights and measures;
- reviewing possible strategies for addressing these issues, and;
- presenting recommendations to the NCWM Executive Committee for review and action.

**MEMBERS:** The membership of the Task Force was appointed to represent weights and measures geographical diversity and to incorporate business and consumer input. The current members of the Task Force are:

Darrell Guensler, (chairman) -- California  
N. David Smith -- North Carolina  
Bruce Martell-- Vermont  
Chip Kloos -- Hunt-Wesson (Associate Membership Committee chairman and business representative)  
Carole Glade -- National Coalition for Consumer Education (consumer representative)  
Tom Geiler -- Barnstable, Massachusetts

Carroll Brickenkamp, Office of Weights and Measures, National Institute of Standards and Technology acted as Technical Advisor. When the Task Force was first formed, Mary Heslin, formerly of the Department of Consumer Affairs for the State of Connecticut, served as consumer liaison. Albert Tholen, formerly Chief of the Office of Weights and Measures, served as Technical Advisor.

The Task Force met several times in 1991 and 1992 to discuss and review issues and to learn from outside experts (Tina Butcher, NIST, worked with the Task Force on the issue of quality management, and Henry Oppermann, NIST, provided the Task Force with a glimpse of future technology.) This report is a summary of the findings of the Task Force. The issues listed as priorities have been designated by the Task Force as those impacting Weights and Measures the greatest and needing immediate attention. Other issues are identified as important and should be addressed over the next few years in order to prepare for the twenty-first century.

From its first meeting, Chairman Guensler made clear his objective not just of identifying issues, but of catalyzing their implementation or resolution within the Conference. Almost its first action was the recommendation that a group on petroleum quality be established within the Conference. The Executive Committee established a Subcommittee on Petroleum Quality under the Laws and Regulations this year. Another recommendation of the Task Force pertaining to quality management was begun by hosting a short workshop at the Interim Meeting on the care and feeding of the "internal" and "external" customer. This workshop was led by a representative



of Federal Express, the only service company (as compared to manufacturing companies) to receive the Malcolm Baldrige National Quality Award.

#### **Continue Long Range Planning**

While many issues have been identified and are under review or being addressed, the Task Force strongly recommends long range planning as a key management issue for the Conference. An issue identification and planning "group" should continue within the Conference in order to keep the flow of ideas and issues coming in and to identify recommendations for the resolution of these issues.

The planning group should serve as a conduit or "hour glass filter" through which ideas flow in and out and are sorted out or sifted through. This two-way communication is essential to the success of the Conference and continuing its service to its customers.

The Task Force is gathering information on privatization from a variety of sources for review and consideration at a meeting in July. This issue will be reviewed in more detail later in the year.

**TASK FORCE STRUCTURE:** The members of the task force have agreed that planning for the future has not yet been completed. If the Chairman determines that the Task Force should continue, it is recommended that the membership be expanded to include more experts in the areas of business and technology. Chairman Guensler has agreed to continue to serve but not as chairman. A representative of a federal agency -- in a position of authority to act for and respond to its agency -- should also be added. Continuity is important, and longevity is a concern. Current members should stay on for a time and rotate off to ensure the free flow of new ideas and information.

**PRIORITY AREAS:** The Task Force identified four key areas which will have impact on all issues relating to weights and measures. These areas are:

1. **LEGISLATION AND REGULATION** -- existing or needed legislation and regulation on the national, state, local and international levels;
2. **EDUCATION AND OUTREACH** -- education and training of weights and measures officials and the private sector; outreach by the Conference to weights and measures offices and the internal and external customers; consumer and business education and the education of the media, press and Congress.
3. **TECHNOLOGY** -- current technology and its role in the future; the impact of technology on the functions and role of weights and measures officials; systems and devices and the impact on education and enforcement.
4. **MANAGEMENT** -- quality of weights and measures products and services internally and externally; personnel development and retention and re-training; training and information; National Conference format and organizational structure; efficiency and effectiveness in carrying out weights and measures functions and responsibilities.

#### **PRIORITY RECOMMENDATIONS**

##### **REGULATION/LEGISLATION:**

**Background:** Handbook 130 "Uniform Weights and Measures Law" recommends in Sections 4 through 10, that the (1) specifications and tolerances of weighing and measuring devices; (2) the packaging and labeling regulations, (3) the regulations governing the methods of sale of commodities; (4) the standards governing unit pricing; (5) the standards governing registration of service agencies; (6) the standards governing open dating of perishable foods; and, (7) the requirements for type evaluation of weighing and measuring devices, be those adopted by the National Conference on Weights and Measures. The Uniform Weights and Measures Law also requires the establishment of a State weights and measures agency with responsibility to administer this law.

One of the greatest problems cited by regulatory officials and industry is the lack of uniformity across jurisdictional boundaries. One of the major objectives of the National Conference on Weights and Measures is to achieve uniformity in weights and measures laws, regulations, and methods of test. Unfortunately, many State weights and measures laws do not permit timely updating of their regulations so that the annual update and revision of Handbook 44, for example, does not get adopted by the States when intended, that is, on January 1 in the year following the Annual Meeting in which the Conference acted. Many States have a limited ability to adopt NCWM recommendations; in the wake of fiscal austerity programs, most States have a limited ability to enforce their regulations. The State of California, for example, must go through a complicated process to revise its Business and Administrative Code to track Handbook 44. This process delays the adoption of the current version of Handbook 44 by several months. Because California operates as a Participating Laboratory for the National Type Evaluation Program, its type evaluation laboratory must use the most recent, up-to-date version of Handbook 44 months before California field staff may enforce it.

The Task Force investigated the idea that the U.S. Congress could adopt the Uniform Weights and Measures Law as a Federal law, exactly as currently written. No Federal regulatory agency would be established; rather, this would mandate that States always enforce the most recent version of NCWM recommendations and would also mandate a State (and local, if desired) weights and measures regulatory enforcement agency. It would, in addition, mandate that the NCWM recommendations would become regulatory requirements. For those States used to "going their own way," this would be a difficult pill to swallow; however, it would make State and local enforcement officials take the importance of their vote within the Conference much more seriously. If a majority of both houses adopt a given recommendation, that recommendation would become the "law of the land." No Federal regulatory agency would be established.

One concern the Task Force members expressed was whether such a law could reference a standards-development body as the means for regulation maintenance and interpretation. Members of the Task Force pointed out that Federal policy (OMB Circular 119A) recommends using voluntary standards as Federal standards. The latest edition of the standards of the Association of Official Analytical Chemists is referenced in the regulations promulgated by the Food and Drug Administration. Closer to weights and measures, the Food Safety and Inspection Service regulations specifically require industry and States to negotiate gray areas for moisture loss in meat and poultry products through the National Conference on Weights and Measures.

The Task Force believes that strong lobbying for a Federal law must first be accompanied by a clear understanding of what is being asked: not the establishment of a Federal bureaucracy, but a codification of local weights and measures enforcement. Also, from the weights and measures officials' point of view, it could be seen as very self-serving, even as means of job preservation; therefore, the Task Force believes that this is an initiative that industry needs to support and sell. Unfortunately, the Task Force acted too quickly on this issue; the Chairman of the Associate Membership Committee made a presentation to representatives mainly from the packaging industry at the January 1992 Interim Meeting. The Nutrition Labeling and Education Act of 1990 was just in the process of being implemented. It specifically preempts the States from enforcing any labeling requirements, including those of net weight labeling, that are different from those set forth by the Food and Drug Administration. The packaging representatives at that meeting did not see the issue of nonuniformity as any longer of major importance. Representatives from the device manufacturing and servicing industries were not present. Issues with respect to the relationship between regulators and regulated industries concerning a national weights and measures law include: (1) device manufacturers and retailers would no longer have a dumping ground for noncompliant product; (2) there is no cultural tradition within the United States for cooperation between the public and private sectors.

**Recommendation:** The Task Force recommends that a working group be established to educate the Conference, its members, and the public about the need for uniformity in legal requirements over the entire nation. The Uniform Weights and Measures Law as presently recommended by the National Conference should be considered as a model for a national law.

The major elements of a national law should be:

No Federal agency should be set up to enforce weights and measures regulations. Local and state weights and measures officials should be required to be key enforcement agents.

The National Conference on Weights and Measures should be the standards-setting body that will maintain and keep current the technical and administrative requirements that State and local government agents will enforce. Voting members will remain regulatory officials; business representatives should continue to retain nonvoting membership status; consumer and device-user interests must be educated about weights and measures and brought into the NCWM standards development process.

**Further Considerations:** Two issues of importance surface in the area of uniformity:

The role of Federal agency representatives that share regulatory and enforcement responsibility with States in certain areas must be determined. Perhaps the Federal Grain Inspection Service should have voting rights on issues impacting the weighing of grain, for example.

Perhaps sections should be drafted to be added to the Uniform Weights and Measures Law to mandate training and certification for regulatory officials and service agency representatives.

Neither issue is unique to consideration of a national weights and measures law. These issues should be investigated in light of the current structure of the Conference and the adoption of the Law by States.

**Recommendation:** Investigating the advisability of a national weights and measures law is only part of the issue of uniformity; there needs to be more uniformity in enforcement of weights and measures requirements, rather than uniformity only in the requirements themselves. By this is meant the lack of uniformity in interpretation of what constitutes an acceptable commercial practice or acceptable device for use in a given commercial application. This is where greater resources need to be expended by the States, Federal government, NCWM, and industry to (1) develop a consensus within the Conference on these interpretations, before practices or devices that are judged unacceptable become widespread, and then (2) educate the public, the enforcement agents, and businesses concerning these practices.

If all jurisdictions had the same laws and regulations in place, and interpreted the same, then it would be possible to share inspectional resources and data across jurisdictional borders; business could be treated more equally from jurisdiction to jurisdiction, and the public could be informed and educated at lower cost because their rights would be the same across the nation.

**Immediate Action Item:** Of immediate impact, the Task Force recommends that the impact of the metric labeling provisions of the Federal Fair Packaging and Labeling Act (FPLA) and the State preemption and enforcement provisions of the Nutrition Labeling and Education Act (NLEA) be reviewed and a NCWM strategy devised.

**Summary on Uniformity:** The Task Force suggests that the NCWM develop working groups on these three issues: a Federal weights and measures law; metric FPLA; and, NLEA. These working groups should be formed with representation from business, consumer groups, regulators, and other interested parties to develop a long term implementation plan for each area. These groups should be charged to work together to provide consumer understanding of the new labeling requirements and develop a strategy and network for consumer education about the legislation.

## EDUCATION AND OUTREACH

**Background:** There has been a general hue and cry for the last couple of years from State and local weights and measures agencies about the need for help in defending their agencies in years of fiscal austerity within the government. For many years before this most recent fiscal crisis, there have been complaints that the general public does not understand what weights and measures regulation is all about or the need for it. Weights and Measure Week was originated in part to deal with this problem, to provide a special opportunity within the year to get out and tell the reasons for weights and measures to the general local community. The NCWM has a

## Executive Committee

publication called "Weights and Measures Week Guide." The Conference Liaison Committee's responsibility is to interface with outside organizations and individuals. The Education Committee's responsibility includes consumer affairs. However, the Task Force feels that the Conference is not doing enough.

The National Conference on Weights and Measures is the leadership organization and key group to deal with any weights and measures issue within any forum. The Conference must take additional responsibility for this leadership role with respect to:

- federal agencies;
- legislatures, Congress, and legislative staff;
- foreign governments and international standards-development organizations;
- user businesses, such as the retail and wholesale marketing trades;
- educators;
- the press;
- consumer organizations; and
- the general public.

To do this the NCWM must:

- establish a broader network with other professionals on the local, state, national, and international level;
- invite experts in to the conference in related areas (such as in the petroleum safety area, State departments of transportation, or the institutional packaging area);
- develop Conference products for, and systems for interfacing with, these other professionals, providing something of values (what's in it for me) to all involved and concerned; and
- develop measurable and visible actions for the consumers, business community, and enforcement organizations and members.

**Recommendations:** To lead, educate and inform others outside the field, the NCWM should incorporate the liaison function of the Liaison Committee into all committees. The role of the Liaison Committee should be shared by all groups and individuals within the Conference. The Executive Committee should incorporate the liaison function into the objectives of all the committees and groups within the Conference.

Perhaps the Liaison Committee should be divided and assigned as advisors to other groups within the Conference and be dissolved as a formal committee. This will (1) provide a transition and pass the expertise of liaison to the other groups; and, (2) free Conference resources for other important work. A working group should be formed under the Education Committee to address consumer affairs more proactively. The Liaison Committee's development of a consumer brochure on weights and measures is a good first step; this consumer outreach must expand. One option the Executive Committee might explore is the assignment of the Liaison Committee as a whole to the Educational Committee to complete its work on the consumer pamphlet before dividing its membership to advise the other committees and groups.

## TECHNOLOGY:

The issue of technology was close to the hearts of all the weights and measures officials on the Task Force; nevertheless, the Chairman left the in-depth exploration of this subject until the April 1992 meeting. Henry Oppermann, NIST, provided his expertise during this phase of the discussions.

Trends in the device technology area can be focussed on the cost versus the benefit of improved technology. Businesses of every sort want to reduce their labor costs, so in service industries, the use of computer-stored tare weights is on the increase because this eliminates one of two weighings for each transaction (full and empty). Weights and measures regulation must also factor in cost/benefit ratios, because as the cost of weighing increases, the cost of errors in weighing also often increase proportionately. For this reason, in-motion weighing systems are increasingly replacing static weighing for commercial transactions. The attempt to reduce labor costs within the manufacturing sector is revealed by the increasing use of labor outside the United States to manufacture devices. On-board weighing systems is another result of users demanding less time for the total operation of which weighing is just one part. There is increasing pressure on weights and measures to recognize on-board weighing systems for trash and garbage pickup to be class IIII devices; in terms of suitability, the users



will be satisfied as long as the system holds up over time under severe use and environment. The decision of suitability, is in many opinions, more an issue of the dollar value of the error not the absolute size of the error in terms of weight. At the present time Handbook 44 specifies tolerances in terms of the device technology; efforts are underway to define tolerances in terms of the commodity value.

Another technological issue is that of software controlling the computers that are either built into the device or even control the device remotely. Almost every device coming onto the marketplace today is capable of computer control; these computers are collecting and using data in wider applications than controlling the accuracy of a measurement. Inventory and accounting data are collected; even individual customer's likes and dislikes! Type evaluation cannot control this software; user customized modifications are offered after evaluation; this requires much greater knowledge and sophistication on the part of the weights and measures field enforcement personnel to properly test and examine the measuring systems. The issue of how to seal such computer controlled equipment is only part of the complexity introduced by this technology. It is becoming increasingly imperative for weights and measures enforcement officials to practice some type of "transaction verification" in order to determine whether the entire marketing system is fair; type evaluation can only partially serve the public.

Computers enable manufacturers to automate the testing and adjustment of devices; this capability must be anticipated and adopted by the weights and measures official. If testing devices is all that the weights and measures official perceives as his or her job, then he or she can truly be replaced by a computer. Of great importance, however, is how the government is going to manage and control this capability so as to maintain equity in the marketplace. Government will require more highly trained regulatory officials, capable of investigating selectable features and other device/computer changes. This trend leads to the absolute necessity of providing some minimum level and amount of training and minimum certification not only for government inspectors but also for device service agents as well. The infrastructure for the delivery of this training and maintenance of expertise has only been begun to be built. The training modules for beginning inspectors have not been developed for device service agents. A training delivery system is not yet in place. State and local government agencies continue to view the cost of ongoing training as a cost that can be cut in lean times. The central development of training materials and training coordination by NIST is not being maintained or developed because of the erosion of resources at NIST. NCWM has not yet committed its resources to training delivery either to pay the way of trainers (except for train-the-trainer training) or to pay the way for students.

**Recommendation:** Education of the weights and measures professional should be the absolute first priority of the weights and measures community, culture, and the Conference.

#### **Computer Network**

The time to evaluate a given marketing transaction through transaction verification, that is, the verification of accuracy and equity by actually conducting a transaction is much longer than device testing by itself. A shift to transaction verification will therefore require sampling of businesses, devices, and practices, rather than 100% device testing, if government costs are to be contained. This will require additional shifting of the jurisdiction to the use of computers to keep track of which businesses, devices, etc., need more frequent or less frequent investigation. Hand-held computers linked by cellular telephone to a central database will eliminate the need for two persons to collect the data as is often done today - one in the field hand recording measurement values, and one in the office keyboarding the data into a computer. However, the data across geographic areas from different jurisdictions, States, or businesses should be combined and analyzed for more efficient and effective and fair weights and measures administration. The National Conference on Weights and Measures, in partnership with NIST, must explore the development and expansion of an electronic communications system and network for the purposes of:

communication between and among weights and measures officials, federal agencies, the public, businesses, trade and professional organizations, and others with a stake and interest in weights and measures information; and

## Executive Committee

sharing of information and data nationally, locally and internationally on a real time basis.

Such data should include interpretations, compliance data (secure against unauthorized access), assistance to businesses on type evaluation, standards in development, and access to foreign standards development and U.S. standards assistance overseas.

**Recommendation:** To develop this issue, the NCWM will need to do the following:

- a. Identify the needs and priorities of internal and external customers such as local officials, local and national business entities, trade associations, federal agencies, and legislators.
- b. Identify the resources needed to establish this electronic network and communication system. These priorities include such things as personnel, finances, hardware, software, experts and expertise, existing databases.
- c. Identify the impact of this network and system on management, training, personnel, results, phase-in periods, fees and profits (if any), privacy, confidentiality, and other such issues.

## MANAGEMENT:

### Voting Rights in the Conference

The Task Force discussed whether it was necessary to modify the membership and voting status of the Conference. One of the concerns explored is that of the need to involve the consumer more in the Conference.

However, the average consumer and consumer groups must be educated in basic measurements and the balance of government and business roles in trade before they can contribute to weights and measures standards development. State and local weights and measures officials represent the interests of the retail consumer in NCWM deliberations; this may not be the ideal solution, but it has seemed to work to this date. Education of members concerning this responsibility should preserve this role.

The Task Force debated the issue of whether other membership classes than active weights and measures officials should have a vote within the Conference. The industry representative stated that industry representatives wanted a vote within the Conference.

The standards developed by the Conference are intended to be adopted by State and local weights and measures jurisdictions. It has been the long-standing tradition that State and local government representatives needed the reassurance that the national standards developed by the Conference were the final decision of government officials like them, not of industry. The number of industry members exceeds the number of active weights and measures officials in the Conference; interim and annual meeting attendance is often heavily skewed toward industry representation. The trust developed over the years in the standards would be in jeopardy if industry were given the vote on the base standards developed by the Conference, for example, on Handbooks 44 or 130.

In fact, industry has several voices and votes within the Conference: they have voting rights in the sectors of the National Type Evaluation Technical Committee; these sectors develop type evaluation criteria and test procedures as reasonable interpretations of Handbook 44. As such, the final decisions concerning Handbook 44 and NTEP must funnel back through the S&T Committee or the Executive Committee acting as the NTEP Board of Governors, and ultimately to the voting membership. Industry also has the privilege of the floor before and during any committee or general voting session. Weights and measures agencies depend heavily on industry representatives for training, as well as issue and standards development (the new Scales Code and the concept of concentrated load capacity are two examples). The interrelationship and partnership of government and industry within the Conference is most effective and unusual in spite of industry not having a vote on the base standards. If industry representatives were considered for voting status, a balance with consumer interests would become necessary.

It was suggested by the industry representative on the Task Force that a single member be added to each committee; however, the weights and measures representatives expressed concern that no single industry representative could adequately represent the breadth of issues any committee discusses, for example, peat moss and food in L&R, metering and weighing in S&T.

Industry heavily influences any committee action; the need to develop a consensus demands that business interests be considered. It is Conference policy that business representatives be named to advise individual committees; this is the role that NTETC sectors play to both the S&T and Executive Committees. The Petroleum Subcommittee will have industry representation and will act in an advisory capacity to the L&R Committee. Business and industry representatives have provided contributions in drafting and editing the training modules. Business and industry are represented on the Liaison Committee. The Task Force anticipates as more working groups are formed within the Conference on specific issues, even greater industry and business participation will be sought.

**Recommendation:** The Task Force recommends that the voting membership in the conference remain with weights and measures officials. The issue of voting rights when more Federal agencies adopt Conference standards, as has the Federal Grain Inspection Service, the Packers and Stockyards Administration, and the Food Safety and Inspection Service of the U.S. Department of Agriculture, must be considered, however. Weights and measures officials would not relish veto powers given to the Federal agencies, but perhaps would be willing to explore Federal agency representatives having a vote equivalent to State and local government officials if the agency has shown the same commitment to adopt Conference standards.

**Recommendation:** The working groups established by the Conference should be selected from experts in any given field or issue; however, the Conference should strive to involve the expertise not only of industry (both device manufacturers and users), consumers groups, federal agency, and foreign government representatives, as well as regional weights and measures representation whenever possible.

To do this, the National Conference must:

- get more people with various expertise to the conference meetings and involved with and knowledgeable about weights and measures activities and mission;

- educate and empower working groups as to what they can do to achieve uniformity in requirements and methods of test; and delegate and authorize members to act for the Conference;

- develop educational programs for the members of the conference in areas not traditionally related to weights and measures such as legislation, technology, sampling, investigative techniques, auditing methods, and quality management;

- communicate with NIST management and Congress the importance of the technical management of issues and the role as clearinghouse and trainers that the NIST Office of Weights and Measures staff provide to the Conference, and that this resource needs additional financial support to properly provide the secretariat for the Conference;

- assist the staff of NIST through partnership efforts on specific projects by State, local government, and business representatives; and

- redesign the NCWM organizational chart to improve the operations of the Conference, to establish lines of responsibility and accountability, and to increase member participation in goal setting, planning, prioritization.

#### Quality Management

Quality and delivery of the best product or service desired by the customer will continue to be a major focus of business and government well into the 21st century. The Task Force explored the quality process and held a

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workshop on quality in weights and measures at the interim meeting. During this workshop, the approach used by Federal Express toward quality was discussed. Awareness was raised as to how local weights and measures officials can implement these approaches.

**Recommendation:** The Task Force recommends that the Conference, through its Education, Administration and Consumer Affairs Committee, find appropriate training which it could recommend to Conference members on quality management, and that quality management be incorporated in all existing and newly developed training modules.

The Task Force offers to appoint a member to work with the Education Committee to serve as a conduit for quality-related information and expertise.

To do this, the Education Committee should establish a quality work group to learn the principles of quality management, and develop best practices for weights and measures government and private sector use.

Quality is greatly impacted by teamwork and networking. The Conference should continue to address these issues through educational opportunities both nationally and regionally.

## International Issues

Membership of the Conference includes business and industry concerns. The international nature of today's economy demands that U.S. businesses and industries have access to foreign markets. This requires a new partnership of U.S. government agencies with U.S. businesses to negotiate for harmonized requirements across national borders. The U.S.-Canada Free Trade Agreement is being expanded to include Mexico. U.S. weights and measures standards are somewhat less restrictive than European standards and may be more palatable to Western Hemisphere nations. If American weights and measures standards can be developed that represent the needs of North, Central, and South American nations, American philosophies could be more persuasive within such international standards development bodies such as the International Organization of Legal Metrology.

**Recommendation:** The National Conference on Weights and Measures in partnership with NIST must proactively position itself to be the leadership organization for the United States on international weights and measures issues. The NCWM should work to do what's needed to structure the organization and to act in order to accomplish this.

To do this the NCWM must:

- bring its mission statement and organizational documents in line with the international objectives of the nation;

- develop harmonized requirements across Federal, State and local jurisdictional boundaries;

- develop plans for international reciprocity in test methods and type evaluation certificate recognition;

- incorporate education on international issues for internal and external members and organizations;

- act on these issues immediately because of the needs of our economy and its dependence on the success of private capitalists; and

- establish the secretariat of the NCWM (NIST) as an center for weights and measures information and resources to the national and international weights and measures communities.

## Conclusions

The most pressing need at this time is to determine the limits of privatizing weights and measures service and regulation. There is a strong perception that weights and measures is only a measurement service, that of device



testing in order to determine if the device needs maintenance or repair. Our public leaders and businesses often do not grasp the regulatory aspects of weights and measures, that of providing a level playing field, a fair marketplace in which honest businesses can make a profit honestly, and in which consumers can buy a product or service by the amount that they are led to believe they are buying. In the sense that this government regulatory function is a service to the public, weights and measures is still a "service." The testing and repair of 100% of the population of devices in any jurisdiction can indeed be turned over to the private sector, but government must still monitor the honesty of businesses trading with the public and other businesses by weight or measures, and must then add monitoring of the private service agencies that do the majority of testing devices. The Task Force suspects that this will require more resources rather than less, with better trained government officials, with more sophisticated equipment to properly control the marketplace and keep it a fair and equitable environment for trade.

**Recommendation:** The Task Force believes that it should shift its focus from planning to an in-depth exploration of the issue of privatization. If the Conference does not immediately begin to define the limits of privatization, there will be fewer weights and measures regulatory programs in the future for which to plan!

The Task Force should also continue to explore and review the impact of the following on weights and measures:

- Electronic marketplace (television and telephone sales); mail order sales by weight or measure
- Environmental issues (charging the consumer for the weight of garbage; labeling of "recyclability")
- Demographics and cultural diversity (english as a second language for a large proportion of our citizens)
- Consumer education and involvement (education in measurement, as well as education as to how a consumer can protect him or herself)
- Certification/training of weights and measures (both public and private sector)
- Metric education and understanding/use

Submitted by:

Darrell Guensler, Chairman

## **Appendix F**

### **Equipment to be submitted for Type Evaluation**

January 3, 1991

MEMORANDUM FOR State Weights and Measures Directors

From: Henry Oppermann  
Device Technology  
Office of Weights and Measures

Subject: Equipment to be Submitted for Type Evaluation

The National Conference on Weights and Measures (NCWM) and the Office of Weights and Measures strongly encourage States to adopt the Uniform Regulation for National Type Evaluation. The number of States requiring devices to have National Type Evaluation Program (NTEP) Certificates of Conformance (CCs) before the equipment is installed for commercial use is increasing. This trend has generated a number of inquiries as to which equipment must be submitted for type evaluation when a jurisdiction requires devices to have an NTEP CC.

#### **I. What equipment is evaluated under NTEP?**

As a general rule, NTEP evaluates the following devices when designed for commercial use:

1. equipment for which specific type evaluation criteria have been developed;
2. devices for which detailed and specific criteria exist in Handbook 44 and which are a significant part of the commercial measurement system, e.g., mechanical beam floor scales; and
3. new types of equipment for which standardized criteria do not exist, but it is judged to be beneficial to evaluate the equipment to establish criteria or standardize requirements before the devices reach significant numbers in the commercial measurement system, e.g., mass flow meters.

A point of extensive debate by the NTEP Committee Sectors has been whether or not NTEP should conduct type evaluations on computers. During discussions on this issue, it was determined that a more definitive basis was needed to define the scope of type evaluation for the many weighing and measuring systems that incorporate computers. The conclusion was to define the scope of a type evaluation based upon the design of the weighing or measuring system rather than on the definition of what constitutes a "computer." The basic principle was established that NTEP will evaluate all equipment to the point of the first indicated or recorded representation of the final quantity on which the transaction is based.

#### **II. Scales and Weighing Systems**

The NTEP conducts type evaluations on the following scales, main elements, and components of weighing systems. This list may not be all-inclusive.

1. Complete scales
2. Indicating elements, data processing systems for scales, software, and controllers
3. Software packages
4. Weighing elements (including the load-receiving element)
5. Load cells

6. Electronic cash registers
7. Printers (when necessary)

Type evaluation criteria are published in NCWM Publication 14, "National Type Evaluation Program: Administrative Procedures, Technical Policy, Checklists, and Test Procedures." Criteria exist for virtually all digital scales for weighing static loads. Included in this category are price computing scales, point-of-sale scales for cash registers, shipping scales, floor scales, vehicle scales, railway track scales, and hopper scales. Criteria have been developed for belt-conveyor scales and automatic bulk-weighing systems.

Many companies manufacture only indicating elements or weighing elements (with load-receiving elements) for a scale which are used with equipment manufactured by other companies to assemble the complete scale. These companies can submit these main elements for type evaluation and receive a separate CC for the main elements. If NTEP cannot evaluate a complete scale or weighing element in an environmental chamber because the device is too large, then the load cells must be evaluated separately to determine compliance with the influence factors requirements of Handbook 44. **The type evaluation of load cells is done only to demonstrate that the load cells used in a scale or weighing element comply with the influence factors requirements of Handbook 44.**

Listed below are examples of components combined to form a specific type of weighing element. If intended for commercial use, these weighing elements need a type evaluation regardless of whether or not the load cells have a CC.

- A hook, tray, or basket with an attached load cell constitutes a hanging scale weighing element.
- A tank or hopper mounted on load cells constitutes a hopper/tank scale weighing element and load-receiving element.
- A metal plate with load cells mounted under it constitutes a bench, platform, or floor scale weighing element and load-receiving element.
- A vehicle scale weighbridge with load cells mounted under it constitutes a vehicle scale weighing element and load-receiving element.

#### One-of-a-Kind Devices

There are times when a scale manufacturer customizes a device to meet specific and unique needs of a customer. In these instances, the costs of an NTEP evaluation are not justified.

Under the NTEP policy of one-of-a-kind device, if a company is customizing a scale design to meet unique demands for a specific installation and a scale design for the specific needs is not commercially available, then a State may accept the design of the scale without an NTEP evaluation pending its own inspection and performance testing to satisfy itself that the scale complies with Handbook 44 and is capable of performing within the Handbook 44 requirements for a reasonable period of time under normal conditions of use.

### III. Liquid-Measuring Devices and Systems

The NTEP conducts type evaluations on the following liquid-measuring devices, main elements, and components of liquid-measuring systems. This list may not be all-inclusive.

1. Retail motor-fuel dispensers
2. Service station control consoles
3. Measuring elements (meters)
4. Meter registers
5. Point-of-sale systems (service station controllers/cash registers)
6. Software
7. Automated, card-activated retail motor fuel systems
8. Mass flow meters

Type evaluation criteria are published in NCWM Publication 14, "National Type Evaluation Program: Administrative Procedures, Technical Policy, Checklists, and Test Procedures."

#### IV. Common Misconceptions

**Misconception:** Many people have the misconception that if indicating elements and load cells with Certificates of Conformance are purchased, they can be assembled with weighing elements of their own design and have a system that is "type approved." The design of a weighbridge and the mounting of load cells is critical to the performance of a scale, particularly for large capacity scales, such as vehicle and hopper scales. The CCs for the load cells only satisfy the influence factors requirements of Handbook 44. The weighing element and weighbridge must have a separate type evaluation to determine the performance characteristics of the design and to demonstrate permanence over a specified time period. Device performance may depend upon the installation of the device, the structural design and strength of the assembly, and off-center loading characteristics. A weighing element that uses type evaluated load cells is not "type approved" unless the weighing element (or complete scale) has a separate CC. This includes any weighbridge or hopper scale that is placed directly on load cells (with CCs) to comprise a scale or weighing element with a load-receiving element.

**Exception:** There is only one circumstance under which a type evaluation of different hopper scales may not be necessary when different hoppers are used. If a manufacturer of a weighing element (load cell or lever system) for a hopper scale also constructs the weighbridge on which the hopper will be installed and has a type evaluation (including the permanence test) performed on the weighbridge, then hoppers of similar design from other manufacturers, with capacities equal to or smaller (to perhaps 50 percent) than the capacity of the hopper that was tested, and of the same mounting configuration, may be installed on the weighbridge without requiring a type evaluation on the additional systems provided the installation is consistent with the specifications of the weighbridge manufacturer.

**Misconception:** If the design of a scale that already has an NTEP CC is "copied," then the scale they are manufacturing using the "copied" design is "type approved." The performance of a device is affected by many factors including the basic design of the device, the strength of the material used, and the quality of manufacture. Some aspects of the device design and manufacture may require special components, fixtures, or manufacturing skill to obtain the desired performance. These characteristics may not be obvious to the someone who copies a design. Consequently, a Certificate of Conformance applies only to the models of the device listed on a CC and only for the manufacturer or distributor listed on the CC.

A Certificate of Conformance is owned by the company that requested the type evaluation and paid for the evaluation. The NTEP has procedures that permit other companies to market devices manufactured by other companies provided specific authorization has been obtained and the devices are manufactured consistent with the original device that was evaluated. The NTEP permits minor cosmetic differences in these devices to permit the relabeling of the device and to accommodate other nonmetrological differences for marketing purposes.

The NTEP policy and practices are summarized below.

#### V. Conclusion

Due to limited OWM resources to manage the NTEP program and provide training, limited resources in the NTEP laboratories, and the lack of adequate checklists and/or test procedures for some types of devices, not all devices can be evaluated. However, in the interest of uniformity and fair competition, it is important for weights and measures officials and device manufacturers to understand which devices must be submitted for type evaluation when an NTEP Certificate of Conformance is required by a State. We encourage you to distribute this memorandum to any business in your jurisdiction that may need this information.

The NTEP has received excellent support from weights and measures officials and device manufacturers when type evaluations are conducted. We look forward to continued cooperation among device manufacturers, device users, and weights and measures officials to continue to improve the operation and effectiveness of the National Type Evaluation Program.



## Final Report of the Laws and Regulations Committee

Barbara J. Bloch, Chairman  
Assistant Division Chief  
California Division of Measurement Standards

Reference  
Key Number

### 200 Introduction

This is the Final Report of the Laws and Regulations Committee for the 77th Annual Meeting of the National Conference on Weights and Measures (NCWM). This report includes the recommendations adopted by the voting members attending the Annual Meeting; it is based on the Committee's deliberations at its Interim Meeting, January 12-17, 1992, the information and testimony provided prior to and during that meeting, and the deliberations and information presented at the Annual Meeting. The Committee was assisted in its work by Richard Fisher, representing the Food and Drug Administration, and Graesanto Berbano, representing the Food Safety and Inspection Service of the U.S. Department of Agriculture. The Committee would like to acknowledge their valuable assistance during the Annual Meeting.

Table A identifies items in the Report by Reference Key Number, item title, and page number. The first three digits of the Reference Key Numbers of the items are assigned from the subject series listed below. Table B lists Appendixes related to specific issues. Voting issues are indicated with a "V" after the item number. Items marked with an "I" after the item number are for information. At the Annual Meeting, several voting items were grouped into a consent calendar and voted on as a whole. Consent calendar items are marked with a "VC". The items marked with a "W" were withdrawn by the Committee. Table C summarizes voting results.

This Report contains recommendations to revise or amend National Institute of Standards and Technology (NIST) Handbook 130, 1992 edition, "Uniform Laws and Regulations," or NIST Handbook 133, "Checking the Net Contents of Packaged Goods," Third Edition and Supplements 1 (1990) and 2 (1991). Revisions proposed by the Laws and Regulations Committee are shown in **bold face print** by ~~crossing out~~ what is to be deleted and underlining what is to be added. New paragraphs proposed for the handbooks are designated as such and shown in **bold face print**. Proposals presented for information are shown in *italic type*. The symbol "\$" is used to designate section.

### Subject Series

Handbook 130 - General	210 Series
Uniform Laws	220 Series
Weights and Measures Law (WML)	221 Series
Weighmaster Law (WL)	222 Series
Motor Fuel Inspection Law (MFIL)	223 Series
Uniform Regulations	230 Series
Packaging and Labeling Regulation (PLR)	231 Series
Method of Sale of Commodities Regulation (MSCR)	232 Series
Unit Pricing Regulation (UPR)	233 Series
Voluntary Registration of Servicepersons and Service Agencies for Commercial Weighing and Measuring Devices (VRSR)	234 Series
Open Dating Regulation (ODR)	235 Series
National Type Evaluation Regulation (NTER)	236 Series
Motor Fuel Regulation (MFR)	237 Series
Interpretations and Guidelines	238 Series
NIST Handbook 133 - General	240 Series
Other Items	250 Series

**Table A**  
**Index to Reference Key Items**

Reference Key No.	Title of Item	Page
<b>210</b>	<b>NIST Handbook 130 - General</b> .....	<b>133</b>
210-1 I	SI Metric Amendments and Other Changes .....	133
210-2 VC	Effective Enforcement Date of Uniform Regulations .....	133
<b>231</b>	<b>Uniform Packaging and Labeling Regulation</b> .....	<b>134</b>
231-1 VC	Decorative Wallcovering Borders .....	134
231-2 I	10.5. Combination Packages and 10.6. Variety Packages .....	135
231-3 I	10.X. Mechanical Pump Dispensers .....	135
<b>232</b>	<b>Uniform Regulation for the Method of Sale of Commodities</b> .....	<b>136</b>
232-1 VC	Eliminate Size Restrictions on Bread Loaves .....	136
232-2 W	1.5.2.X. Fresh Mollusks Removed from the Shell .....	137
232-3 I	1.5.X. Meat, Poultry, Fish, and Seafood - Packaged with Other Packages of Food .....	137
232-4 I	1.12. Ready-to-Eat Food .....	137
232-5 V	1.13. Home Food Service Plan Sales .....	139
232-6 W	2.X.X. Flat Glass .....	139
232-7 VC	2.25. Baler Twine .....	141
232-8 W	2.X. Products Dispensed from Mechanical Devices .....	142
232-9 I	Hardwood Lumber - Measurements in Retail Sales .....	142
232-10 V	Potpourri .....	145
<b>232 &amp; 237</b>	<b>Uniform Motor Fuel Inspection Law and Regulation</b> .....	<b>147</b>
237-1 I	The Subcommittee on Petroleum .....	147
<b>238</b>	<b>Interpretations and Guidelines</b> .....	<b>148</b>
238-1 VC	Display of Standard Conformance Statements on Package Labels .....	148
<b>240</b>	<b>NIST Handbook 133</b> .....	<b>149</b>
240-1 I	Combine Sampling Plans A and B .....	149
240-2 I	Moisture Loss for Ice-Packed Poultry .....	150
240-3 V	Moisture Loss for Dry Pet Foods .....	150
240-4 I	Moisture Loss for Pasta .....	154
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240-6 W	Polyethylene/Test Methods for Bags .....	155
240-7 I	MAV's for Polyethylene Bags .....	155
240-8 I	Aerosol Products -- Testing Procedure for Foam and Nonfoam .....	155
240-9 VC	5.3.3. Baler Twine .....	155
240-10 I	Gray Areas for Meat and Poultry Products .....	156
240-11 I	SI Metric Amendments to NIST 133 .....	156

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240-12 I	Section 3.18. Meat and Poultry from Federally-Inspected Plants . . . . .	157
240-13 VC	2.3.1. The Inspection Lot of Standard Pack Packages . . . . .	157
<b>250</b>	<b>Other Items . . . . .</b>	<b>158</b>
250-1 W	Industry Standards or Practices and Weights and Measures Requirements . . . . .	158

Table B  
Appendices

Appendix	Title	Reference Key No.	Page
A	Home Food Service Plan Sales	See Item 232-5	160
B	Baler Twine Test Procedure for Length	See Item 240-9	162

### Order of Presentation

The report was presented to the membership as follows:

1. The Consent Calendar was presented and adopted.
2. Items 232-5 and 232-10 were presented separately and adopted.
3. Item 240-3 was presented. A proposal from the floor to change the item's status from voting to permit further study failed.
4. Item 240-3. A proposal from the floor to change the Committee proposal failed.
5. Item 240-3 as proposed by the Committee in the addendum sheets was presented and adopted.
6. The report in its entirety was then ratified.

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**Table C**  
**Voting Results**

Reference Key No.	House of State Representatives		House of Delegates		Results
	Yes	No	Yes	No	
200 - Consent Calendar	38	0	43	0	Passed
232-5 Home Food Service	31	7	44	0	Passed
232-10 Potpourri	41	0	48	0	Passed
240-3 Motion to discuss amendment	39	0	48	0	Passed
240-3 Motion to change to Information Item	8	25	9	39	Failed
240-3 Motion to amend	12	29	7	37	Failed
240-3 Committee Proposal	32	7	39	8	Passed
Entire Report	42	0	48	0	Passed

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**Details of All Items**  
(In order by Reference Key Number)

**210                      NIST Handbook 130 - General**

**210-1                      I            SI Metric Amendments and Other Changes**

**Background:** At the Interim Meeting, the Committee began a study to determine how NIST Handbook 130 should be revised to bring it into conformance with several new Federal requirements. The primary units of measurement to be in Handbook 130 are to be in the International System of Units (SI). Last year, Dr. John Lyons, the NIST Director and NCWM President, directed that all NIST publications use SI units. Supplementary inch-pound units may also be used, but primary quantities must be stated in SI units.

Another issue relates to the Federal Fair Packaging and Labeling Act (FPLA), which preempts any State regulation that is not identical to Federal requirements. On August 3, 1992, President George Bush signed an Act passed by Congress (Public Law 102-329) which amended the FPLA to require SI units on certain packages subject to the FPLA. Random weight packages and packages put up at the retail store level are exempted from the requirements for SI units. The amendments permit either unit of measure to be primary, and also permit the use of the term "mass" instead of "weight." These amendments to the FPLA will take effect on February 14, 1994.

The study has not yet included changes to bring Handbook 130 into conformance with a "metric" FPLA because the Congressional action on FPLA was not completed until the week of the 77th Annual Meeting. The Committee recognizes that the SI amendments to FPLA will have a major impact on the requirements in the Packaging and Labeling, Unit Pricing, and Method of Sale of Commodities Regulations. The Committee intends to make the conversion of Handbook 130 to SI units a priority over the next year so that changes can be adopted at the 78th NCWM. The Committee will coordinate its work with the Food and Drug Administration and Federal Trade Commission in order to develop uniform requirements. The Committee is aware that several issues must be addressed before a completely SI handbook is possible. Among the more difficult issues is the need for a complete revision of the Uniform Unit Pricing Regulation, which does not now include metric values.

Another significant issue discussed was the Nutrition Labeling and Education Act (NLEA) of 1990, which preempts any State requirements relating to net weight, identity, and responsibility that are not identical to Federal requirements. Specific proposals for changes to Handbook 130 that may be required under the NLEA have not yet been developed because the Committee is waiting for responses from the Food and Drug Administration (FDA) to its comments and inquiries about the impact of NLEA on the WML, PLR, MSCR, and UPR. The Committee intends to work closely with FDA to resolve any areas of conflict that arise so that the recommendations of the NCWM are identical to Federal requirements.

**210-2                      VC        Effective Enforcement Date of Uniform Regulations**

(This item was adopted as part of the consent calendar.)

**Background:** This was item 250-2 on the Interim Meeting Agenda. A jurisdiction that adopts several of the NCWM Uniform Regulations by reference requested that the effective date be stated explicitly, as it is in NIST Handbook 44, G-A.7. Effective Enforcement Dates of Code Requirements. The intent is to eliminate any confusion caused by the absence of a clearly specified effective date.

**Committee Recommendations:** Add a new paragraph in Section I - Introduction in NIST Handbook 130 to specify January 1 of the year following adoption by the NCWM as the effective date for Uniform Regulations. Revise the Amendments Table in NIST Handbook 130 by adding a statement indicating the effective dates of annual changes to the regulations:

**F. Effective Enforcement Dates of Regulations.** - Unless otherwise specified, the new or amended regulations listed in this section shall become effective and subject to enforcement on January 1 of the year following adoption by the National Conference on Weights and Measures.

- a. Uniform Packaging and Labeling Regulation
- b. Uniform Regulation for the Method of Sale of Commodities
- c. Uniform Unit Pricing Regulation
- d. Uniform Regulation for the Voluntary Registration of Servicepersons and Service Agencies for Commercial Weighing and Measuring Devices
- e. Uniform Open Dating Regulation
- f. Uniform Regulation for National Type Evaluation
- g. Uniform Regulation for Motor Fuel

## 231 Uniform Packaging and Labeling Regulation

### 231-1 VC Decorative Wallcovering Borders

(This item was adopted as part of the consent calendar.)

**Background:** The Wallcovering Manufacturers Association (WMA) requested that decorative wallcovering border be exempted from the requirements for bidimensional commodities in subsections 6.7.3. and 6.8.7. These subsections required rolls of wallcovering border to be labeled with length and width declarations and, in some cases, area or dual quantity declarations based on the width of the product. The requirements could be interpreted to require three different quantity declarations on similar products, depending on the width of the border. As examples:

For SI units:

7.6 cm x 4.5 m
10 cm x 4.5 m
5.2 m <sup>2</sup> (11.4 cm x 457 cm)

For inch-pound units:

3 in x 180 in (5 yd)
4 in x 180 in (5 yd)
5.6 ft <sup>2</sup> (4.5 in x 5 yd)

According to WMA, the existing requirements did not specify uniform labeling information for similar products, which hindered value comparison by consumers. Further, the WMA pointed out that the requirement for an area declaration was unnecessary for this type of product because only length and width measurements are critical in terms of the end use by consumers. The recommendation will harmonize the labeling requirements for wallcovering border to a single standard, requiring that all border material be labeled with the width and length in terms of the largest whole unit; for example; the three examples given above can be uniformly labeled as follows:

For SI units:

7.6 cm x 4.5 m
10 cm x 4.5 m
11 cm x 4.5 m

For inch-pound units:

3 in x 5 yd
4 in x 5 yd
4.5 in x 5 yd

**Committee Recommendation:** The following exemption was proposed for Section 11.

**11.34. Decorative Wallcovering Borders --** Decorative wallcovering borders, when packaged and labeled for retail sale, shall be exempt from the dual quantity requirements of subsections 6.7.2., 6.7.3., 6.8.6., and 6.8.7.;

provided the length and the width of the border are presented in terms of the largest whole unit in full accord with all other requirements of the regulation.

## 231-2 I 10.5. Combination Packages and 10.6. Variety Packages

**Background:** This was Item 231-12 in the Report of the 75th NCWM, 1990, page 89, and Item 231-5 in the Report of the 76th NCWM, 1991, pages 199-200. In 1990, the Committee proposed to adopt the requirements promulgated by the Federal Trade Commission (FTC) concerning variety and combination packages because: (1) they are more specific than existing requirements in the PLR, 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 Food and Drug Administration (FDA) has no definitions or requirements for combination or for 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 continues to receive comments from Weights and Measures Officials supporting the proposal to adopt the FTC requirements. The Committee will request a formal interpretation from FDA as to whether State regulations patterned after FTC's requirements may be imposed on products under FDA jurisdiction or if the Nutrition Labeling and Education Act of 1990 preempts States from adopting this type of labeling. As an alternative, the NCWM might petition FDA to amend its regulations to bring them into conformity with FTC. The objective is to reach agreement among FDA, FTC, and the NCWM on the appropriate requirements for variety and combination packages.

## 231-3 I 10.X. Mechanical Pump Dispensers

**Background:** This was Item 231-13 in the Report of the 75th NCWM, 1990, pages 89-90, and Item 231-6 in the Report of the 76th NCWM, 1991, page 200. (See these reports, for a full discussion of the issue.) The Committee considered submitting a petition to the Food and Drug Administration (FDA) to request a change in Federal regulations to require mechanical pump package systems to dispense the labeled weight. The Committee is aware that this type of packaging has been extended beyond toothpastes and is now being used to package such products as cheese spreads and honey. The Committee received comments from the Northeastern Weights and Measures Association (NEWMA) expressing concern over the possible impact of a "to deliver" requirement on other types of packaging, including toothpaste tubes and hand-pump dispensers (such as those used for hand lotions). The NEWMA questioned how far the requirement would reach and whether the economic impact would benefit consumers or lessen the competitive position of manufacturers who use this type of packaging. At the Interim Meeting, the Committee considered asking the Food and Drug Administration to evaluate whether this type of packaging would be considered a "misleading container" under the provisions of the Federal Food, Drug, and Cosmetics Act (21 § 343(d) Misleading Container). That section defines a package as misbranded if the container is so made, formed, or filled as to be misleading. At the Annual Meeting, the Committee received additional comments on this issue and decided to resolve the issue in cooperation with industry.

The Committee will initiate a joint effort with industries that use mechanical pumps and other dispensers to consider the possibility of establishing a performance requirement for this type of packaging. The goal of this effort will be for (1) weights and measures and industry to agree to a performance standard for pump dispensers and (2) file a joint petition with both the Food and Drug Administration and the Federal Trade Commission to propose a performance requirement for any type of mechanical pump packaging. For example, the requirement might specify that mechanical pump systems deliver "at least" a specified percentage of the labeled contents. The intent of such a requirement would be to prohibit the sale of any dispenser that does not deliver a "minimum amount" of its labeled contents. The Committee plans to organize a working group prior to the 1993 Interim Meetings to initiate work on this issue. A status report will be presented as a part of the Interim Agenda.

## 232 Uniform Regulation for the Method of Sale of Commodities

### 232-1 VC Eliminate Size Restrictions on Bread Loaves

(This item was adopted as part of the consent calendar.)

**Background:** The issue of bread loaf size restrictions was addressed at the 72nd NCWM in 1987 and again at the 76th NCWM in 1991. In 1987, the NCWM voted to permit the sale of 12-ounce bread loaves and, in 1991, the sale of 6-ounce loaves. In July of 1991, the American Bakers Association (ABA) requested an amendment to Section 1.2. of the MSCR to permit the sale of 20-ounce loaves of bread. The ABA, whose members produce 80 percent of all baked goods in the United States, submitted a recommendation containing justifications similar to those that influenced the NCWM's vote to permit the 6- and 12-ounce loaf sizes. The ABA proposal is supported by the Food Marketing Institute, a trade association which represents over 1,600 grocery suppliers and retail grocery chains in the United States. The justifications presented to the Committee for permitting the sale of 20-ounce loaves include the following:

- a. Limitations on bread sizes not accommodate different consumer preferences and do not allow industry to respond flexibly to consumer preferences. Consumers want a wide range of breads, from "whole wheat" and "light" white bread to "gourmet" loaves based on recipes from other countries in order to satisfy the desires of specific segments of our culture. Prohibiting certain sizes may interfere with the ability of consumers to choose bread based on different desires for quality and variety.
- b. There have been no reports that consumers are deceived by the existence of 20-ounce loaves (or by other sizes).
- c. When bakeries are required to stop producing a specific loaf size, they may have to replace existing baking pans, handling equipment, and trays at substantial cost. Changes in loaf sizes require new laboratory analysis for nutritional content, new packaging and labeling, changes in advertising, ordering, and pricing information.
- d. Value comparison is possible through labeling requirements that provide information on net weight and dual quantity declarations.
- e. Package size proliferation is controlled by market factors, such as the cost of store shelf space, competition, and consumer choice.

At the Interim Meeting, representatives from several States with bread laws informed the Committee that restrictions on bread sizes were difficult or impossible to enforce. The Committee believes that, if all current size restriction laws were rigidly enforced, there would be substantial opposition from consumers, bakers, and the food marketing industry. In many cases, the laws are not enforced because they are out-of-date or no longer needed since the advent of the Federal Fair Packaging and Labeling Act and similar State regulations that require net weight labeling. Several comments were received on the issue of "ballooning" (entraining air in the bread to inflate the size of the bread loaves), which indicate that consumer purchasing decisions and competition control this type of deception. The Committee continues to encourage jurisdictions to adopt the Uniform (Voluntary) Unit Pricing Regulation to assist consumers in value comparisons. The Committee reviewed the ABA proposal along with the history of this issue and decided that the MSCR should reflect the realities of the constantly evolving marketplace. Therefore the Committee recommended the elimination of the size restrictions on bread loaves from Section 1.2.

**Committee Recommendation:** Remove the loaf size restrictions from Section 1.2. Bread. Retain the requirement that bread be sold by weight and the exemption from labeling for "stale bread." Replace Section 1.2. with the following:

**1.2 Bread.** -- Bread kept, offered, or exposed for sale, whether or not packaged or sliced, shall be sold by weight. The wrappers of bread that is sold and expressly represented at the time of sale as "stale bread" shall not be considered packages for labeling purposes.



**232-2 W 1.5.2.X. Fresh Mollusks Removed from the Shell**

(This item was withdrawn.)

**Background:** This was Item 232-3 in the Report of the 76th NCWM Report, 1991, pages 203-204. Please see that report for further discussion on this issue. The Committee had requested information on problems with the methods of sale for fresh mollusks (other than oysters) to determine if specific requirements were needed. The Committee withdrew this item because it did not receive any information that indicated problems in the marketplace.

**232-3 I 1.5.X. Meat, Poultry, Fish, and Seafood - Packaged with Other Packages of Food**

**Background:** This was Item 232-3 in the Report of the 75th NCWM, 1990, page 94. Please see that report for background information. The Committee will petition the U.S. Department of Agriculture (USDA), requesting the adoption of labeling requirements for combination packages.

**232-4 I 1.12. Ready-to-Eat Food**

**Background:** This was Item 238-1 in the Report of the 76th NCWM, 1991, pages 212-213. Please see that report for earlier discussions of this issue. At the Interim Meeting, the Committee reconsidered the issue of ready-to-eat foods and the concerns expressed over previous recommendations for changes in the regulation. The majority of comments received by the Committee supported action that would permit the sale of this type of food in supermarkets. Several comments emphasized the need to provide fair competition between the menu items offered for sale in restaurants and those sold in supermarkets. The Committee shares these concerns, but does not agree that the answer to the issue of fair treatment is to regulate restaurant foods. The Committee has not received any comments that lead it to believe consumers are being misled or confused by sales practices in restaurants.

The Committee is aware that consumer buying habits and food marketing practices are constantly changing. Retail food stores compete with restaurants and fast food outlets in the prepared, ready-to-eat market. The traditional methods of sale required in retail grocery stores for ready-to-eat food items put grocers at a substantial competitive disadvantage compared to restaurants and fast food outlets that sell the same or similar items. An industry representative testified that consumers want to purchase these foods in supermarkets, but find it difficult to relate the cost per pound of a ready-to-eat item in the supermarket to the common method of sale used in a restaurant or fast food establishment (for example, "by each"). The industry indicated that allowing supermarkets to offer ready-to-eat food for sale by the piece would enhance value comparison by consumers. When purchasing ready-to-eat items in the supermarket, most consumers do not compare the price per pound, for instance, to the unprepared product, but rather take the total cost of the meal into consideration. Consumers then compare that price not only to other products in the grocery store, but to the same prepared items they might buy were they dining at a restaurant or purchasing a meal at a fast food establishment. The following list is presented to illustrate a few of the menu item foods that would be included under the definition of ready-to-eat foods. The list is not intended to be all inclusive. Some examples of Ready-to-Eat food items:

- Servings of pastas
- Cooked, whole chickens or turkeys
- Bar-b-que ribs by the slab or piece
- Stuffed clams, oysters, shrimp, and fish
- Slices of cake, pie, and quiche
- Sandwiches, egg, and spring roll
- Buckets or tubs of chicken or fish
- Servings of chili or soup
- Servings of salads, vegetables, or grains such as rice
- Meat/vegetable pockets/pies
- Tacos, fajitas, enchiladas, tostadas
- Stuffed peppers, tomatoes, and cabbage
- Knishes
- Pickles
- Pizzas, whole or sliced
- Cookies and brownies

The Committee heard comments during the Interim Meeting that restaurants sell such items by the piece or in small, medium, or large size portions, whereas supermarkets are required to sell them by weight or measure. Representatives from the food industry indicated that supermarkets are not inclined to sell by the piece any ready-to-eat food items that have traditionally been carried in their delis and sold by weight (such as sliced cold cuts or cheese, and prepared salads). Consumers are familiar and comfortable with the pricing and method of sale of these items, and grocers are reluctant to change the system. According to the Food Marketing Institute (FMI), which represents grocery retailers nationally, the supermarket business is highly competitive. Grocers depend on return business, and therefore most grocers would not risk "shorting" consumers by selling them inconsistent portions when offering ready-to-eat items by the piece. Rather, they would work to employ strict practices and controls to ensure uniform servings. FMI contacted their members from throughout the United States, grocery retailers large and small, regarding the sale of ready-to-eat food. Each agreed that the concerns raised initially by supermarkets in the northeastern part of the country are valid across the country. Retailers told FMI that their consumers would prefer to see ready-to-eat food items priced by the piece so they can easily determine the product's value.

In its deliberations to develop a definition for ready-to-eat foods, the Committee agreed that attempting to limit the definition to only items "prepared on the premises" was unreasonable because it would be impossible to enforce, especially if the term "prepared" is not defined. The Committee took the position that how the products are advertised and sold is the issue to be addressed, not where products are "prepared" or what constitutes "preparation." The Committee recognized that many items sold in restaurants, fast food outlets, and supermarkets are prepared in central kitchens and then distributed to the various retail outlets, and that this is the trend for the future. The Committee also decided that attempting to develop an all inclusive list of products that could be sold as ready-to-eat food would be difficult because of the wide scope of products; in addition, it would be difficult to keep such a list current.

The NCWM first addressed the issue of ready-to-eat food at the 43rd NCWM in 1958. At that time, the terms "carry-out meal" and "menu items" were used to provide illustrations of what the Committee intended to exempt from any specific method of sale. These broad terms allowed the individual jurisdiction to establish, according to its marketplace needs, policies or individual regulations to address which products had to be sold by weight, measure, or count. The key to applying the proposed requirement is to focus on how a product is advertised. For example, if a product is advertised in the same way as a food item is on a restaurant or fast food outlet menu, it could be sold by weight, measure, or count.

The Committee considered the importance of this issue, which is of national significance, and believes that action by the NCWM is needed to provide the States and industry with uniform guidance. The Committee proposed to amend Section 1.12, Ready-to-Eat Food to permit the sale of any ready-to-food by weight, measure, or count (count includes serving sizes such as small, medium, or large) if the food is sold from bulk and is ready for consumption. The proposed definition for "Ready-To-Eat Food" is comparable to the definition for restaurant foods used by the Federal Food and Drug Administration regulations that implement the Nutrition Labeling and Education Act of 1990. At the Annual Meeting, the Committee heard comments that the proposal was not supported by the Central and Northeastern Weights and Measures Associations and several members of industry. Therefore the item was carried forward as an informational item to allow for additional review and development of alternative proposals.

**Committee Recommendation:** *Replace Section 1.12. with the following:*

*1.12. Ready-to-Eat Food.*

*1.12.1. -- Definition:*

*Ready-to-Eat Food. - is food offered or exposed for sale from bulk, whether in restaurants, supermarkets, or similar food service establishments, that is ready for consumption though not necessarily on the premises where sold.*

*1.12.2. -- Ready-to-Eat Food.- Ready-to-Eat food may be sold by weight, measure, or count (count includes servings). This exemption does not apply to sliced luncheon meat or cheese when these are not sold as part of a ready-to-eat food item.*

## 232-5 V 1.13. Home Food Service Plan Sales

(This item was adopted.)

**Background:** This was item 232-7 in the Report of 76th NCWM, 1991, page 205. The proposed section on Home Food Service Plan Sales received widespread support from the regional weights and measures associations and other interested parties. The Committee recommended adoption of the proposal as contained in Appendix A. 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 a lack of uniformity and may not provide full disclosure of information on net weights and unit prices to facilitate value comparison. The new section will regulate the sale of any food item or items alone or in combination with non-food products or services, sold in a consumer's home, whether or not there is a membership fee or similar charge. Section 1.11. Sale of Meat by Carcass, Side, or Primal Cut deals specifically with bulk meat sales; this new section would encompass much more varied "food service" sales. The proposal originally included a section on prohibited trade practices; however, this section was deleted because the Committee felt that it would be more appropriate for a State's Attorney General or Consumer Protection Agency to recommend these requirements for adoption. The proposal defines such terms as "home food service plan," "contract," "item price," and "service charge." The Committee was concerned that the item prices do not include service charges. The majority of comments indicate that weights and measures officials are satisfied that the proposal provides for adequate disclosure of service charge information. The Committee believes that the disclosure requirements will ensure that consumers have the opportunity to make informed purchasing decisions. The proposal includes a section (1.13.3.-Advertisement of Home Food Service Plans) that will require the disclosure of any service charges in connection with the advertised plan. 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 Committee would like to point out that the proposed section will apply to all commodities sold as part of a home food service sales plan, including meat. The requirements of Section 1.11. Sale of Meat by Carcass, Side, or Primal Cut of the MSCR will be retained and will continue to apply to other bulk sales of meat. At the Annual Meeting, the Committee received comments recommending that the unit pricing section be amended to require the "bundling," or inclusion, of service charges. The Committee declined to recommend changes to the unit pricing requirement because consumers must receive detailed written information on the total cost of services at the time of purchase. They also have a 3- day right to cancel, during which time they can determine the value of the services and products received and reconsider the purchase. The Committee did amend its original recommendation by eliminating the exemption for plans that cost less than \$200. Requirements were added to require sellers to include written information on the type and costs of services associated with the plan.

**Committee Recommendation:** Adopt the Method of Sale for Home Food Service Plans presented in Appendix A.

## 232-6 W 2.X.X. Flat Glass

(This item was withdrawn.)

**Background:** This was Item 232-14 in the Report of the 76th NCWM, 1991, pages 210-211. Prior to the Interim Meeting, the Flat Glass Marketing Association (FGMA) submitted the following proposal for a method of sale for flat glass. The proposal was not received in time for publication in the Interim Agenda, so it is presented below for review by interested parties. The proposal would provide formal recognition of non-uniform, "traditional industry rounding practices." Namely, rounding measurements up to the next: (1) even or (2) full inch for purposes of calculating charges for sheets of flat glass. Primary glass product manufacturers round up to the next full inch; all other transactions (for example, wholesaler to retailer) are rounded to the next even inch. The proposal would recognize these practices and permit some sellers to round measurements up to the nearest even inch, while others round up to the next whole inch. These measurements would then be used to compute the square foot area (not rounded) of a piece of glass. In the marketplace, the proposal would translate into the possibility of three different area measurements for the same piece of glass, depending on where the seller is in the chain of distribution:

Example 1: If a customer orders a piece of glass 22 9/16" x 33 7/16", any of the following area measurements would be possible:

Using actual dimension measurements : 5.2391 sq.ft.

Using dimensions rounded to the next higher full inch : 5.4306 sq.ft. (23" x 34")

Using dimensions rounded to the next even inch : 5.6667 sq.ft. (24" x 34")

The maximum difference of results = 0.42 sq.ft., or 8% of actual sq.ft.

Example 2: If a customer orders a piece of glass for a storm door 33 7/16" x 74 5/16", the following area measurements would be possible:

Using actual dimensions : 17.2557 sq.ft.

Using dimensions rounded to the next higher whole inch : 17.1875 sq. ft. (34" x 75")

Using dimensions rounded to the next even inch : 17.9444 sq.ft. (34" x 76")

The maximum difference of results = 0.69 sq.ft., or 4% of actual sq.ft.

The proposed method of sale would also include the adoption, by reference, of several American Society for Testing and Materials (ASTM) standards relating to glass. These ASTM standards relate to the manufacture of flat glass and include tolerances for length, width, and thickness measurements.

**Flat Glass Marketing Association proposal for addition to MSCR:**

*Section 2.X. APPLICATION. - This section applies to flat glass advertised, priced, sold, billed, or invoiced on the basis of area measure intended for use in architectural, residential, furniture, appliance, and specialty applications.*

*(NOTE: Glass intended for automotive, or marine applications and other glass which is sold to meet American National Standards Institute Standard Z26.1, Safety Glazing Materials for Glazing Motor Vehicles and/or Federal Motor Vehicle Safety Standard No. 205, Glazing Materials are excluded. Bent or curved glass is also excluded.)*

*2.X.X.X. Flat Glass - Includes the primary glass products: float, sheet, plate, wired, and rolled. Flat glass also includes heat strengthened, fully tempered, laminated, insulating, and other specialty products made from the primary products but excluding automotive, marine, bent, and curved products noted in Section 2.X.*

*2.X.X. Full Disclosure - The following information shall be provided when flat glass is advertised or sold:*

*(a) A delivery ticket, invoice, or other sales document shall be provided and shall contain the following information presented in clear and conspicuous type:*

- 1. A statement of the measurement practices used in the determination of the area of the glass. For example: "Even [or odd] inch dimensions are invoiced as specified, fractional inches will be rounded up to the next even [or whole] inch."*
- 2. A declaration of the nominal dimensions of the glass ordered.*
- 3. A declaration of the rounded up area of the glass on which the price is based.*

*(b) When measurement practices include the practice of rounding up, a notice of this practice shall be clearly and prominently stated in all the seller's advertising, catalogs, quotations, price lists, invoices, and retail sales areas.*



*2.X.X. Dimensional Tolerances - Length, width, and thickness tolerances of flat glass shall conform to the applicable American Society for Testing and Materials (ASTM) Specification as follows:*

- (a) Float, sheet, plate, and rolled glass: ASTM C 1036, Standard Specification for Flat Glass.*
- (b) Heat strengthened and fully tempered glass: ASTM C 1048, Standard Specification for Heat Treated Flat Glass.*
- (c) Laminated Glass: ASTM C 1172, Standard Specification for Laminated Architectural Flat Glass.*
- (d) Individual panes of glass used in the assembly of Insulating Glass units shall meet the appropriate specification listed above for the glass type(s) incorporated in the assembly.*

The Committee considered the FGMA proposal and decided not to recommend its adoption by the NCWM because it would not require the use of accurate measurements necessary to establish a uniform method of sale. Specifically, the proposal would not have required a single measurement standard for flat glass sales. The Committee urges the FGMA to: (1) formulate and implement an industry-wide program to establish uniform measurement practices; and (2) encourage its members to fully disclose measurement practices in all transactions, invoices, and advertisements using the actual dimensions of flat glass sheets. The Committee would like to commend the representatives of the Flat Glass Marketing Association for their efforts in developing the proposal for full disclosure in flat glass sales. The Committee is fully appreciative of their interest and tireless effort to establish a uniform method of sale. The Committee will continue to support the FGMA in its efforts to address the issues presented in this item.

## 232-7 VC 2.25. Baler Twine

(This item was adopted as part of the consent calendar.)

**Background:** This was Item 232-15 in the Report on the 76th NCWM, 1991, page 211. Please review the report for further background on this issue. Either polypropylene or sisal baler twine, is used by farmers in automatic baling machines. Prior to the 64th NCWM, a method of sale for baler and binder twine required sale by length, net weight, and knot strength. A tolerance of 5 percent of the declared length was allowed as part of that requirement. The entire requirement was revoked at the 64th NCWM in order to remove the tolerance on the declared length. Length declarations are the most important factor for farmers, for whom the weight is an indication of strength. For manufacturers, it is a quantity statement that ensures fair competition. Recent surveys by several U.S. jurisdictions reveal that some manufacturers label packages of baler twine with length and net weight declarations, while other manufacturers provide only the net weight. Many packers provide only length declarations disguised as a model number. For example, "Model No. 9000" implies 9000 ft in the package. Since the 64th NCWM action, some cordage manufacturers have provided farmers with information on the knot strength using the weight declaration, a knot strength declaration, or other supplemental statements. At the 1992 Interim Meeting, the Committee learned from Bret Smart, Federal Trade Commission, that knot strength (as an element of identity) was not required under FTC interpretations because baler twine is not a "consumer commodity" as defined under the Federal Fair Packaging and Labeling Act.

Since 1988, the Canadian Legal Metrology Branch (LMB) has conducted an extensive survey of baler twine. This study included products from Canadian and U.S. manufacturers, as well as products from other countries, including Germany, Portugal, Brazil, and the United Kingdom; many of the same products are in the U.S. marketplace. The Canadian study found that when tested for length, 50 percent of the sisal and 27 percent of the polypropylene products with length declarations were rejected for failing to meet the average requirement. Copies of the Canadian study are available from the Office of Weights and Measures. When baler twine lengths and weights were tested several years ago in the United States widespread shortages in length and weight were also found. At that time, weights and measures officials were alerted to probable shortages in packages of baler twine.

Several manufacturers have complained about the lack of agreement in labeling requirements for baler twine between the United States and Canada. There have been similar complaints about the lack of uniformity among States in the United States. At the 1991 Interim Meeting, the Committee recommended adding an interpretation and guideline

to Handbook 130 that would have interpreted the PLR to make it clear that declarations of weight and length were necessary on packages of baler twine since neither weight nor length alone is fully informative to users.

The Committee recommended adoption of a method of sale to require that baler twine be sold by length and weight. The new section will ensure that farmers are provided with the product information they need, and will ensure equitable marketing practices. Canada's LMB intends to follow the NCWM action on this issue and adopt a similar requirement. This will establish a uniform method of sale for baler twine in both the United States and Canada. The Committee is also recommending a test procedure for rolls of baler twine that utilizes weight to verify the length declaration on rolls of baler twine. The test procedure is based on Canada's procedure for testing baler twine; it specifies how to obtain sample lengths of twine from a roll and specifies a tension of 5 kilogram or 10 pounds when measuring length. The Committee recommended this procedure for inclusion in NIST Handbook 133 under Item 240-9. At the Annual Meeting, the Committee received comments that the recommendation should include requirements for tensile or knot strength (twine used for rolls would bear a tensile strength declaration, whereas twine used for bales would bear a declaration of knot strength). While the Committee recognizes that knot or tensile strength may be important to end users, it is reluctant to recommend adoption of these requirements at the Annual Meeting without providing specific guidance on the test methods to be used to verify the accuracy of the statements. The Committee welcomes comments or recommendations, including suggested test methods for tensile and knot strength for future consideration and possible inclusion in the method of sale for Baler Twine.

**Committee Recommendation:** Adopt the following method of sale for Baler Twine:

**2.25. Baler Twine.** -- Baler twine shall be sold on the basis of length in meters or feet, and net mass or weight by kilograms or pounds.

## **232-8                      W                      2.X. Products Dispensed from Mechanical Devices**

(This item was withdrawn.)

See Item 232-18 in the Report of the 75th NCWM, 1990, for background on this subject. The Committee will focus its efforts on Item 231-3 in this agenda. See the discussion under Item 231-3.

## **232-9                      I                      Hardwood Lumber - Measurements in Retail Sales**

**Background:** This was Item 238-4 in the Report of the 76th NCWM, 1991, page 213. Please see that report for additional background on this issue. In 1990, a weights and measures official contacted NIST concerning a complaint about a purchase of hardwood lumber. The price of the lumber was quoted as a certain amount per board foot; however, the actual dimensions of the hardwood lumber were considerably less than the labeled amount when converted to board feet (1 board foot = 12 x 12 x 1 in = 144 cu in). For example, a 6-foot by 7-1/4-inch by 3/4-inch board was labeled 4 board feet, the labeled amount corresponding to dimensions of 6 feet by 8 inches by 1 inch. When contacted about the complaint, an official of the National Hardwood Lumber Association (NHLA) indicated that it was industry practice to declare the number of board feet in a piece of lumber as the dimensions before the piece was surfaced. This complaint prompted a complete review of the current Section 2.12. on hardwood by the NHLA and the Committee. Based on the review, it was decided that a complete revision of Section 2.12. was needed. The goal was to clarify and broaden the section to include any subsequent processing of the lumber, rather than just kiln drying.

At the Interim Meeting for the 77th NCWM, the Committee reviewed a proposal from the NHLA that included a major revision of Section 2.12. In its proposal, the NHLA indicated that hardwood lumber intended for retail sales is kiln dried, surfaced on four sides, and manufactured to stock sizes as is done for softwood lumber. The recommended changes provide a clearer format for this section and include a table that specifies minimum sizes for hardwood lumber after it has been kiln dried and surfaced. The table specifies nominal inch-pound and minimum inch-pound dimensions and metric equivalents of the inch-pound minimum dimensions. In addition, the proposal: (1) recognizes current manufacturing and sales practices; (2) requires sizes similar to those for softwoods so that

consumers will be able to compare equivalent sizes (see §2.10, Softwood Lumber, pages 89-91, Handbook 130, 1992 edition); and (3) will enable consumers who mix different woods in the same project to avoid matching problems because the different woods will be manufactured to similar standards. The NHLA intends to publish the proposed table in its Rules for the Measurement and Inspection of Hardwood Lumber.

The Committee did not recommend this item for adoption in 1992 in order to allow for a wider review by interested parties, including industry, trade, and consumer groups. This additional time was considered necessary for the following reasons: (1) the proposal includes requirements that were not published in the Committee's agenda; (2) the proposal constitutes a major revision of the requirements for hardwood and its impact on all segments of the marketplace has not been considered (this proposal does not apply to hardwood flooring); (3) the Committee received very few comments on the proposal from weights and measures officials and industry members; and (4) the Committee is aware that the U.S. Department of Commerce Voluntary Product Standard PS 20-70 on Softwood Lumber is under revision by the American Lumber Standards Committee, and changes in that standard may effect the hardwood lumber proposal. The Committee published the proposal to allow ample time for review by all interested parties. The Committee will initiate contacts with trade associations, retailers, and other interested parties and solicit comments from industry and weights and measures officials.

**NHLA Recommendation:**

**2.12. Hardwood Lumber - Retail Sales**

*This section does not apply to hardwood flooring.*

**2.12.1. Definitions. --**

**2.12.1.1. Board Foot.** -- *Is the inch-pound unit of volume measurement for hardwood lumber. A board foot is the volume of an unsurfaced board 1-foot long, 1-foot wide, and 1-inch thick or its equivalent. For surfaced lumber, the board foot is based on measurements before surfacing. Lumber less than 1-inch thick is considered 1-inch.*

**2.12.1.2. Surface Measure.** -- *Is the unit for area measurement for hardwood lumber. The surface measure shall be determined by multiplying the full width of the piece in inches and fractions by the standard length (see 2.12.1.5. Standard Length) in feet, dividing by 12, and rounding up or down to the nearest whole foot.*

**2.12.1.3. Representations.** -- *A "representation" shall be construed to mean any advertisement, quotation, offering, invoice, or the like that pertains to the retail sale of hardwood lumber.*

**2.12.1.4. Squares.** -- *Lumber manufactured with equal dimensions of width and thickness. (For example: a 3-inch x 3-inch piece or a 12-inch x 12-inch piece)*

**2.12.1.5. Standard Length.** -- *Standard lengths are 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, and 16 feet. Fractional lengths are rounded down to next lower standard length (for example: if a board is 6 ft 8 in long its length is rounded down to the 6 ft standard).*

**2.12.1.6. Standard Thickness.** -- *Standard thicknesses for rough lumber are 3/8, 1/2, 5/8, 3/4, 1, 1-1/4, 1-1/2, 1-3/4, 2, 2-1/2, 3, 3-1/2, 4, 4-1/2, 5, 5-1/2, and 6-inches.*

**2.12.2. Kiln Drying. --**

**2.12.2.1. Measurement Before Kiln Drying.** -- *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 kiln-dried at the request of the purchaser, the kiln drying charge shall be clearly shown and identified on the quotation and invoice.*

**2.12.2.2. Measurement After Kiln Drying.** -- *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.*

*2.12.3. Random Width Lumber.--*

*2.12.3.1. Random Width Lumber. -- Random width lumber of standard thickness (see 2.12.1.6. - Standard Thickness) is sold by board foot measure.*

- a.) For lumber 1-inch thick, board measure is equal to the surface measure (see 2.12.1.2. - Surface Measure).*
- b.) For lumber greater than 1-inch thick, board measure is obtained by multiplying surface measure by the thickness in inches and fractions of inches.*
- c.) Except for squares, which are sold by length and width (see 2.12.1.4. - Squares), lumber less than 1-inch thick board measure is counted as surface measure (see 2.12.1.2. - Surface Measure).*

*2.12.4. Sizes for Surfaced (S4S) Lumber Manufactured to Stock Widths.--*

*2.12.4.1. General. -- Hardwood lumber is normally manufactured to random widths. Stock width boards are special items manufactured to pre-determined widths, normally for retail sales.*

*2.12.4.2. Representations. -- The use of nominal dimensions shall be allowed if the table of Minimum Surfaced Sizes for Kiln Dried Hardwood Lumber is prominently displayed to the customer and the term "nominal" or "nom" is also used in conjunction with any representation of dimensions.*

*2.12.4.3. Minimum Surfaced Sizes of Kiln Dried Lumber (width and thickness).-- Table 1 shows the minimum sizes for the stock widths listed. This table only includes both dimensions for 1-inch and 2-inch stock width lumber. Hardwood lumber is also manufactured in 1-1/4 inch (1-inch surfaced) and 1-1/2 inch (1-3/16 inch surfaced) thicknesses. For these additional thicknesses, use the nominal and minimum widths from the table for the other thicknesses. For example: a board with the nominal dimensions of 1-1/4 inches x 4 inches would have minimum thickness of 1-inch and width of 3-1/2 inches.*



<i>Table 1 - Minimum Surfaced Sizes for Kiln Dried Hardwood Lumber</i>		
<i>SI Sizes</i>	<i>Inch-pound Sizes</i>	
<i>Minimum Sizes Thickness and Width in millimeters</i>	<i>Nominal Thickness and Width in inches</i>	<i>Minimum Sizes in inches</i>
38 x 88	2 x 4	1-1/2 x 3-1/2
38 x 139	2 x 6	1-1/2 x 5-1/2
38 x 184	2 x 8	1-1/2 x 7-1/4
38 x 234	2 x 10	1-1/2 x 9-1/4
38 x 285	2 x 12	1-1/2 x 11-1/4
19 x 164	1 x 1	3/4 x 3/4
19 x 38	1 x 2	3/4 x 1-1/2
19 x 63	1 x 4	3/4 x 2-1/2
19 x 88	1 x 6	3/4 x 3-1/2
19 x 139	1 x 8	3/4 x 5-1/2
19 x 184	1 x 10	3/4 x 7-1/4
19 x 234	1 x 12	3/4 x 9-1/4
19 x 285	1 x 12	3/4 x 11-1/4

*Note 1: The dry thickness of nominal 1-1/2-inch lumber is 1-3/16-inch. The dry thickness of nominal 1-1/4 inch lumber is 1 inch. Nominal and minimum widths for these thicknesses are shown above.*

*Note 2: The SI equivalents for 1-inch and 1-3/16-inch lumber are 25 mm and 30 mm respectively.*

232-10

## V Potpourri

(This item was adopted.)

**Background:** The Office of Weights and Measures has received several requests from States and fragrance manufacturers for assistance in establishing a uniform method of sale for packaged and bulk potpourri. The Federal Trade Commission (FTC) has authority to regulate packaged potpourri under the Fair Packaging and Labeling Act (FPLA). Under the FPLA, only one method of sale is permitted for any packaged product to facilitate easy value comparison by consumers. Since the mid-seventies, the FTC has recommended that packaged potpourri sold in interstate commerce be labeled by net weight. Potpourri sold in decorative containers or sachets is to be considered and "air freshener unit" and may be sold by count. Several potpourri manufacturers and retailers have expressed an interest in selling packaged potpourri by dry volume. They contend that weight does not provide a good indication of the useful contents of the package where the amount of odor depends on volume or surface area of the mixture, not weight. Another factor is that the net weight of a package depends on the density of the materials used in the potpourri mix. The Committee, aware that several potpourri packagers label their products by volume (dry pints or cubic inches), believes that NCWM action is necessary to eliminate confusion over the method of sale to be used when

this product is packaged. The FTC recommendation for sale by weight does not apply to bulk sales, but only to packaged commodities. In 1983, in the absence of any Federal regulation, the NCWM adopted a guideline to permit the sale of potpourri by either weight or by volume when packaged prior to sale (and not in decorative containers) or when sold from bulk. The reason for this decision was that the WML permits either declaration as long as accurate quantity information is provided (for example, small fruits and berries are permitted to be sold either by weight or by volume). Since it is reasonable to sell potpourri from bulk by either method, it did not seem reasonable to require packaged potpourri to be sold by weight. (see NIST Handbook 130, 1992 edition, Interpretations and Guidelines, Section 2.3.14. Potpourri, page 155).

NCWM action was needed to eliminate the confusion and provide weights and measures officials, manufacturers, and retailers with guidance on an appropriate method of sale for potpourri. The FTC has indicated that it will support the NCWM position on this issue if only one method of sale for packaged products is recognized. The Committee recommended that potpourri packaged in advance of sale be sold by weight. The Committee solicited industry input on this proposal and requested that those manufacturers who want to sell by dry volume present their comments and justifications for consideration by the NCWM. However, no comments on this issue were received. The Committee was convinced that it is unreasonable to recommend weight as the only method of sale for bulk sales. The main reason was that, due to suitability considerations, only a Class II scale may be appropriate for this product. The Committee heard comments that most retailers do not sell enough of this product to justify the cost of this class of device. The Committee was concerned that, due to these factors, the effort to provide accuracy may not be worth the expense, which would be passed on to consumers. It was felt that it would be easier to limit bulk sales to volume if sources for reasonably priced, legal dry measures were identified and made available to retailers through fragrance manufacturers and trade associations. The Committee recommended that both volume and weight be permitted in bulk sales until the issue of reasonably priced devices which conform to legal requirements was addressed. The original proposal included a note on the type of device to be used to measure potpourri in bulk sales. The Committee decided that this type of requirement was not appropriate for inclusion in a method of sale because device requirements are adequately controlled under Section 4. - Technical Requirements for Weighing and Measuring Devices (page 16) of the WML. The Committee intends to (1) develop a "Potpourri Fact Sheet" for use by jurisdictions in educating sellers on the correct method of sale of this product in packages and from bulk and (2) identify potential sources for dry measures that conform to Section 4.45. Dry Measures Code of NIST Handbook 44 so that sellers can purchase suitable measuring devices.

**Committee Recommendation:** Adopt the proposed Section 2.25. - Method of Sale for Potpourri

**2.25. Potpourri - Potpourri shall be sold as follows:**

- a. Potpourri packaged in advance of sale shall be sold by weight, except when sold in a decorative container or sachet, which may be sold by count.
- b. Potpourri sold from bulk shall be sold by weight or by dry volume.

## **232 & 237      Uniform Motor Fuel Inspection Law and Regulation**

### **237-1            I            The Subcommittee on Petroleum**

**Background:** In response to the recommendations of the Laws and Regulations Committee and the Task Force on Planning for the 21st Century, the Executive Committee has established the Subcommittee on Petroleum. During the Interim Meeting, the Laws and Regulations Committee received comments and recommendations on the issues the subcommittee should include in its work plan. The Executive Committee has established the membership structure for the subcommittee; appointments will be made by the Conference Chairman.

#### **Mission Statement for the Subcommittee on Petroleum**

The Laws and Regulations Committee developed the following mission statement and work plan for the subcommittee. The Subcommittee on Petroleum will serve as the focal point in the NCWM on laws and regulations issues relating to petroleum and motor fuels. It will provide advice and technical guidance to the Laws and Regulations Committee on issues that come before the Conference and provide a forum within the NCWM for States with motor fuel programs.

#### **Work Plan**

The following goals are listed in order of their priority for the subcommittee:

- Update and expand the Uniform Motor Fuel Inspection Law to recognize the needs of State programs in regulating and testing alternative motor fuels and petroleum products.
- Update and expand the Uniform Motor Fuel Regulation to reflect current test procedures and standards for motor fuel and petroleum products.
- Update the NCWM recommendations for a Basic Motor Fuel Testing Laboratory.
- Establish a forum for NCWM participation in the development of standards, test methods, and measurement assurance in cooperation with the American Society for Testing and Materials and other standards organizations.
- Establish close relations with consumer and other State, local, and Federal agencies involved in related issues.
- Conduct surveys on compliance activities and serve as a clearinghouse on technical and other information related to petroleum inspection.
- Develop training modules under the National Training Program for both laboratory and field activities and address safety issues.

**Background and future tasks --** At the time of their adoption, the Uniform Motor Fuel Inspection Law and Motor Fuel Regulation were only "bare-bone efforts" and have not been substantially updated to reflect the needs of motor fuel inspection programs. In the process of establishing motor fuel programs, most States have contacted other jurisdictions with similar programs. The current law does not address requirements for petroleum products other than motor fuel (for example, motor oil, engine additives, antifreeze, or brake fluids) which are equally important for consumers. The Motor Fuel Regulation does not implement the law with administrative details as most regulations ordinarily do; it has been revised to recognize gasoline-oxygenate blends. The subcommittee should solicit technical input from States operating motor fuel quality programs and from industry in order to: (a) update and expand the Uniform Law and Regulation and update the recommendations for a Basic Motor Fuels Testing Laboratory (Section 2.6.6. in the Interpretations and Guidelines Section of NIST Handbook 130, page 168); (b) address new motor fuel issues, for example, alternative fuels; and (c) provide a forum within the Conference for States that operate a motor fuel regulatory program. This is not intended as "competition" with the American Society for Testing and Materials

(ASTM) in the development of test methods; ASTM methods will continue to be referenced as the required test methodology. Rather, the subcommittee should help to develop NCWM positions on fuel standards developed by ASTM or other standards development organizations.

Future work for the subcommittee should include the development of training modules on petroleum inspection and testing for the National Training Program in cooperation with the Education Committee. The modules would be used by jurisdictions with petroleum programs to increase uniformity of inspections and to provide technical and administrative guidance to agencies that intend to establish programs. The subcommittee should also address issues relating to safety that involve petroleum products and work with the Office of Weights and Measures to develop measurement assurance and other technical requirements for laboratory certification. In addition to the work mentioned above, the subcommittee may conduct surveys on conformance of petroleum products from across the country and serve as a clearinghouse for up-to-date technical information on petroleum inspection.

## 238

### Interpretations and Guidelines

#### 238-1

#### VC Display of Standard Conformance Statements on Package Labels

(This item was adopted as part of the consent calendar.)

**Background:** The Wallcovering Manufacturers Association requested the Conference's position on the use of conformance statements on the labels of wallcovering and border material. This issue relates to wallcovering products that originate from manufacturers in Europe where a declaration of conformance to a specific government standard is required on consumer packages. Thousands of product "standards" or "Euronorms" are being established for the European Community. Conformance declarations are required to provide consumers and customs officials with information on the product. The issue relates to the use of such statements as "manufactured to standard EN235" on labels of wallcovering that are imported from Europe. The WMA requested the Committee's opinion on the use of this type of statement if a package is labeled in conformance with sections 6.11.1. - Supplementary Quantity Declarations and 8.1.4. - Free Area. One question is whether the display of the conformance statement would be permitted provided that it did not include an unacceptable quantity declaration. Another question concerns the need to comply with the requirement for adequate free area around the quantity declaration when the conformance declaration is placed on the label. It was the Committee's opinion that conformance statements on package labels would not violate any provisions of the PLR if the requirements of 6.11.1. and 8.1.4. are met.

The Committee recommended this interpretation for inclusion in Handbook 130 because it is likely that this type of notice will become common as more and more free market trading areas are opened to expand international trade. This interpretation does not indicate acceptance or endorsement of any requirements contained in product conformance statements.

**Committee Recommendation:** Add the background information and the following interpretation to the "Interpretations and Guidelines" section of Handbook 130.

**2.6.7. Product Conformance Statements -- Interpretation:** References to a product's conformance with product standards (for example, "manufactured to standard EN235" or similar product conformance statements) on labels for wallcovering or other products, are not considered qualifying terms and do not violate 6.11.1. Supplementary Quantity Declarations of the Uniform Packaging and Labeling Regulation, *provided* the requirements of § 8.1.4. Free Area are met.



**240-1 I Combine Sampling Plans A and B**

**Background:** The Western and Southern Weights and Measures Associations recommended that the Committee explore the feasibility of merging the two sampling plans in NIST Handbook 133 into one. The Committee received several comments supporting the proposals from weights and measures officials and industry. Several people suggested that the Committee harmonize NIST Handbook 133 with International Organization of Legal Metrology (OIML) Recommendation 87 - Net Contents in Packages. The Committee will include consideration of the OIML Recommendation in its review of this item. Copies of this OIML Recommendation are available from the Office of Weights and Measures. The current Handbook 133 sampling plan Categories A and B were adopted by the NCWM in 1985. Category A plans utilize larger sample sizes and offer a high degree of confidence that the lot is indeed short for lots that average less than the label declaration. Category B sampling plans utilize smaller sample sizes and offer a lesser degree of confidence. The Category B plans are predominantly used by weights and measure inspectors because they are faster and more efficient. Category B plans also force packagers to target higher than the labeled declaration on the average.

The Committee received the following proposal which merges Category A and B sampling plans into a single table. The proposal specifies the Category B approach for smaller "retail size" lots (less than 250 packages) and switches to a Category A approach for lots with more than 250 packages. Larger sample sizes and sample correction factors are provided for situations where a higher degree of confidence is considered necessary for taking larger lots off-sale. The proposal will automatically lead the official directly into taking larger sample sizes for larger lot sizes. The merger of the two plans should result in simpler, easier to apply procedures that include the best attributes from the two plans. The proposal would add a sample size of 10 for lots with 250 packages or less. It would also add an additional sample size of 315 packages for lots over 50,000. For lots with more than 250 packages, the sampling plan utilizes a correction factor to ensure at least a 95 percent confidence level in the results. The correction factor must be used for large lots with a greater economic value, when it is desirable to achieve a high degree of confidence in how well the average sample error may represent the average lot error before action is taken. According to the proposal, use of a correction factor is not recommended for sample sizes of 10 packages; however, a correction factor of 0.2719 could be included for use with the smaller sample size to provide a 95 percent confidence level. The Committee presented the proposal for review and comment by weights and measures officials, industry, and other interested parties.

*Proposed Sampling Plan for NIST Handbook 133*

1	2	3	4	5
<i>Lot Size (N)</i>	<i>Sample Size (n)</i>	<i>Minimum Tare Sample Size</i>	<i>Allowable Number of MAVs</i>	<i>Correction Factor</i>
$\leq 10$	100%	2	N/A	N/A
11 - 250	10	2	N/A	N/A
251 - 800	30	2	1	0.1570
801 - 2,000	80	5	2	0.1216
2,001 - 5,000	80	5	3	0.09613
5,001 - 15,000	125	5	5	0.07691
15,001 - 50,000	200	10	7	0.06080
$\geq 50,001$	315	10	10	0.04844
<i>N/A = Not applicable</i>				

**240-2 I Moisture Loss for Ice-Packed Poultry**

**Background:** See Item 240-3 in the Report of the 75th NCWM, 1990, page 106, for background discussion. The U.S. Department of Agriculture has requested that the NCWM determine, approve, and publish a gray area for ice-packed bulk poultry. At the Interim Meeting, the Committee heard from a representative of the Food Marketing Institute that its membership continues to experience shortweight problems on deliveries of ice-packed poultry. The Committee also received information from several States that indicates that the original effort to work out an easy system of backbilling for shortages has not been completely successful. Especially hard hit are small retailers in markets with a limited number of suppliers. In many cases, when the small retailer attempts to backbill or resolve shortages, the supplier refuses to honor the backbilling charges or tells the retailer to find another supplier. The Committee is especially interested in receiving additional comments from parties that have information on local problems involving shortweight ice-packed poultry. The Committee is committed to developing the gray area approach to help resolve this long-standing problem. The Committee will continue to pursue this issue in cooperation the National Broiler Council, U.S. Department of Agriculture, and the Food Marketing Institute. (For related information, see Item 240-10, Gray Areas for Meat and Poultry Products, in this report.)

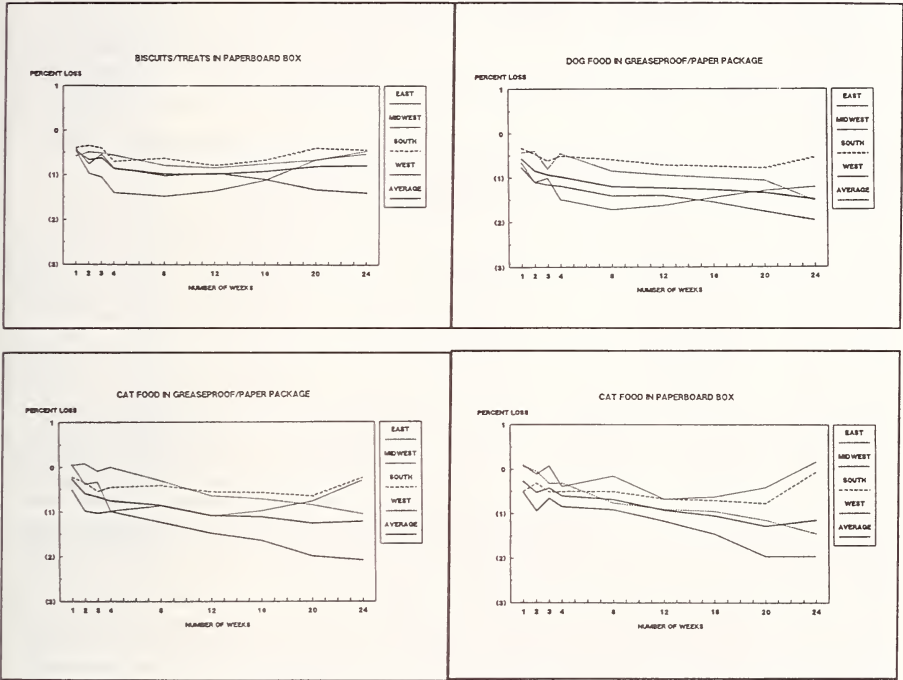
**240-3 V Moisture Loss for Dry Pet Foods**

(This item was adopted.)

**Background:** See Item 240-3 in the Report of the 76th NCWM, 1991, pages 217-219, for background on this item. The Pet Food Institute (PFI) submitted a proposal for a 4 percent gray area for dry pet foods. Dry pet foods are those having a moisture content of 13 percent or less at the time of pack. The proposed gray area would apply only to dry pet foods packaged in fiberboard boxes or kraft paper packaging. The original proposal from PFI was intended to develop "look-up tables" to allow inspectors to determine moisture loss on dry pet foods on a case-by-case basis. After two studies conducted in cooperation with weights and measures officials in several States from several areas of the country, the PFI found that moisture variations among the different regions were too wide and that specific moisture losses could not be predicted in a reliable manner. The results of these studies, which are presented below, indicate that dry pet foods can lose up to 5 percent of the labeled weight to moisture loss. In the studies, 97 percent

of the lots tested fell within the 4 percent gray area proposed by PFI. The following graphs show the average moisture loss results of the products studied in 1990 and 1991.

Moisture Loss by Region



The following table summarizes the results of the study on a Regional Weights and Measures Association basis for dog and cat pet foods and treats packaged in kraft bags and fiberboard boxes.

**All Extruded Dog and Cat Foods and Baked Treats**

By Regional Weights and Measures Associations	Northeastern	Central	Southern	Western	Total	Percent of lots that would be in the gray area at each level of moisture loss
Total Lots Weighed	43	40	45	83	211	
% Moisture Lost	Number of lots with at least one weighing at the moisture loss level indicated.					
< 2.0	30	25	38	44	137	65
2.0	8	4	4	10	26	77
2.5	2	3	2	10	18	86
3.0	2	4	1	5	12	91
3.5	1	4		7	12	97
4.0				2	2	98
4.5				3	3	99
5.0				1	1	100

The Committee received comments at the Annual Meeting expressing concern over the application of a single 4 percent gray area for the whole country since the results of these studies indicate that some variation exists among regions. The Committee decided that it would approach the gray areas on a national basis because of the impracticality of performing the dozens of studies that would be needed to define and develop reasonable recommendations on a regional basis. The Committee amended its original recommendation for a 4 percent gray area by reducing the recommendation for a gray area to 3 percent. The Committee believes that the proposal for a 3 percent gray area recognizes "reasonable moisture loss" on a nationwide basis.



**Committee Recommendation:** Adopt a 3 percent gray area for dry pet food and amend Table 3-3, Boundaries of the Gray Area for Different Size Packages of Flour Packages, to include and define dry pet food in NIST Handbook 133, Appendix B. - Tables.

**Table 3-3. Boundaries of the Gray Area for  
Different Sizes of Flour and Dry Pet Food\* Packages**

The retail or wholesale lot is in the gray area if:			
Column 1	Column 2	Column 3	Column 4
the labeled weight is:**	the average package error is minus and is between zero and 3% of label weight:	and any individual package error is minus and is between the MAV and	MAV + 3%
2 lb	-0.06 lb	-0.07 lb	-0.13 lb
5 lb	-0.15 lb	-0.14 lb	-0.29 lb
10 lb	-0.30 lb	-0.22 lb	-0.52 lb
20 lb	-0.60 lb	-0.31 lb	-0.91 lb
25 lb	-0.75 lb	-0.37 lb	-1.12 lb
50 lb	-1.50 lb	-0.50 lb	-2.00 lb
100 lb	-3.00 lb	-2.00 lb	-5.00 lb
*Dry pet foods are defined as those packaged in paperboard boxes and kraft paper bags that have a moisture content of 13 percent or less at the time of pack. Moisture content information is declared in the nutrition and ingredient statement on the package.			
**If a package size is not listed, apply 3 percent to the labeled net weight			

### Gray Areas are Not Tolerances

The gray area approach is not intended for use as a legal tolerance for packages. The purpose of the gray area concept is to establish a mechanism to define "reasonable" moisture loss for products. The moisture loss studies provide information about the level of moisture loss that may occur in the course of good distribution practice. This information guides packers and weights and measures officials alike in recognizing the amount of moisture loss that can occur. When the average error of an inspection lot, or any individual package error, falls in the gray area, additional steps are necessary to determine if the lot is short due to moisture loss or under-packing. For dry pet foods, this means that formal action may be taken against any lot found more than 3 percent underweight. If a lot falls in the gray area, samples of the products must be tested for "as found" moisture content in accordance with recognized laboratory test methods. The "as found" moisture content is then compared to the "time-of-pack" moisture provided by the packer. If the underweight error is greater than the difference between the two values, the lot is subject to formal action. Access to laboratory services for moisture testing is vital to the effective enforcement of net weight requirements on products subject to moisture loss. State and local weights and measures jurisdictions needing assistance can contact the Office of Weights and Measures for further information on moisture laboratory equipment and procedures.

For the gray area system to work, packers must code their packages, maintain quantity control records, and employ recognized test methods, including reliable moisture tests to determine product moisture values at the time of pack. The integrity of this system can be maintained only through an ongoing "quality" system to maintain uniform test methods and accurate intercomparison results. As part of its review of the PFI proposal, the Committee coordinated a laboratory intercomparison to determine if the moisture determinations made at the point-of-pack by industry were consistent with those made by State moisture laboratories. The first intercomparison was conducted prior to the

Interim Meeting; initial results indicated that it was possible to reach the required level of agreement between laboratories ( $\pm 0.2\%$ ). A detailed test method was developed and tested in a second intercomparison with excellent results. In the second intercomparison, variations between laboratories dropped to 0.1 percent, down from the 0.3 to 0.5 percent variations found in the first comparison. A third intercomparison among industry laboratories showed good results. Work will continue on the development of detailed laboratory procedures to improve sample preparation and further increase agreement of test results. The modified test methods will be evaluated and additional laboratory intercomparisons conducted in the future.

The Committee will continue to study other issues as it continues its work on the gray area concept. For example, the Committee learned during recent studies that many different types of moisture determination devices are used on packaging lines to determine "time-of-pack" moisture for most dry pet foods and other products. These devices are normally calibrated using an air- or vacuum-oven test, but do not usually provide "identical" results. This issue has raised concern that the moisture values provided to States by packers may not be accurate. Additional review and study is needed to resolve this complex issue. The Committee recognizes the significance of this issue because it can have an impact on other gray area studies currently underway for pasta and rice.

#### **The Gray Area Approach -- A Tool to Determine Reasonable Moisture Loss**

The Committee continues to support the concept of the "gray area" approach to recognize "reasonable" moisture loss from products despite its shortcomings, and less than total acceptance and support from weights and measures officials and industry alike. The gray area concept is the only practical system available to weights and measures officials and industry at this time. The alternatives for testing packages of products which lose or gain moisture at retail outlets are somewhat limited. Officials would have to (1) stop testing products, (2) establish arbitrary moisture allowances, or (3) ignore legal requirements which state that moisture loss must be recognized. The Committee cannot support any of these alternatives. The Committee is aware of an overwhelming need to review the current approach to net contents inspection practiced in the U.S. so that the current national system based on NIST Handbook 133 can be enhanced and its acceptance expanded. The Committee believes that this need is recognized by industry and officials alike, and that the potential impact of the Federal preemptions under the Nutrition Labeling and Education Act, the need for harmonization with other countries, and, most of all, the need to provide equity in the marketplace in a future of reduced resources are but a few of the justifications for this review. The Committee will consider these issues in its deliberations at the 1993 Interim Meeting and seek the participation of consumers, industry, Federal agencies, and weights and measures officials at all levels in its work to: identify problem areas, develop proposals, and carryout their implementation.

#### **240-4 I Moisture Loss for Pasta**

**Background:** See Item 240-5 in the Report of the 75th NCWM, 1990, page 107, and Item 240-4 in the Report of the 76th NCWM, 1991, page 219, for background. The first phase of an laboratory intercomparison study was conducted prior to the Interim Meeting. The initial results indicated that it is possible to reach the required level of agreement between the laboratories. Additional work has been initiated to develop a detailed oven-test procedure which would help improve the agreement of test results. The modified test methods will be evaluated and a second interlaboratory comparison conducted before a nationwide field test is initiated to determine the scope of a gray area. The Committee will continue to work closely with the members of the National Pasta Association and cooperating State laboratories on this project.

#### **240-5 I Moisture Loss for Rice**

**Background:** This was 240-7 in the Report of the 76th NCWM, 1991, pages 221-222. The Rice Millers Association (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. An interlaboratory comparison was conducted to determine if moisture contents reported by RMA members at the time of pack are equivalent to moisture contents as determined by weights and measures laboratories and the Federal Grain Inspection Service (FGIS). The results of the first study indicated a significant difference in results among laboratories. Work is underway with the RMA, the FGIS, and participating

State laboratories to evaluate existing test methods and work towards a method that would provide acceptable results. Additional laboratory intercomparisons will be conducted and further work on the gray area for rice continued.

## **240-6 W Polyethylene/Test Methods for Bags**

(This item was withdrawn.)

See Item 240-7 in the Report of the 75th NCWM, 1990, page 108, for background on this item. The Committee is withdrawing this item because no interest in the issue was expressed by industry or the NCWM.

## **240-7 I MAV's for Polyethylene Bags**

**Background:** This was Item 240-5A in the Report of the 76th NCWM, 1991, page 219. At the Interim Meeting, the Committee reviewed the results of a study by the Flexible Packaging Association (FPA). The study was initiated by FPA after it notified the Committee prior to the 76th Annual Meeting that it was collecting further information on bags less than 1 mil thick. The purpose of this study was to determine if existing measurement equipment is suitable for thicknesses under 1 mil (0.001 in) and if the MAVs specified in NIST Handbook 133 are appropriate. As of the Interim Meeting, the Committee had received information from only one manufacturer, First Brands Corporation of East Hartford, Connecticut. At the Interim Meeting, James Funderburk of First Brands and Sean Murphy of the Flexible Packaging Association made presentations to the Committee requesting that it consider: (1) recommending an increase in MAVs for polyethylene bag thickness to 7 percent from the present 4 percent, adopted in 1989, and (2) amending the test procedures in NIST Handbook 133 to require thickness measurements to be taken diagonally across a bag instead of along the edges of the bag's length and width. The proposed change in the test procedure is considered necessary to recognize the changes in bag thickness that occur during the extrusion process. Copies of the proposal are available from the Office of Weights and Measures. The Committee considered the information and decided to present the proposals for comment by industry and the weights and measures community. The Committee will reconsider this issue in its future work if more information and support on the issue are forthcoming from members of the polyethylene industry and weights and measures.

## **240-8 I Aerosol Products -- Testing Procedure for Foam and Nonfoam**

**Background:** See Item 240-6 in the Report of the 76th NCWM, 1991, pages 220-222, for a discussion of this item. At the Interim Meeting, the Committee reviewed this issue and decided that further studies should be conducted to determine if the test allowances for foam aerosol products (Table 3-2) in NIST Handbook 133 should be retained. This decision was supported by a manufacturer of aerosol products and the Chemical Specialties Manufacturers Association (CSMA). The Committee will ask the CSMA to participate in these studies and seek industry participation in the review of the current foam allowances for aerosol products. The Committee encourages jurisdictions to use the proposed test procedure to collect data on aerosol and non-aerosol containers so that the results can be used to assist the NCWM in its evaluation of the proposal. Copies of the test procedure are available from the Office of Weights and Measures.

## **240-9 VC 5.3.3. Baler Twine**

(This item was adopted as part of the consent calendar.)

**Background:** The gravimetric test procedure proposed for verifying length declarations of baler twine is similar to the procedure described in NIST Handbook 133 Section 5.3, for Packages Labeled by Linear or Square (Area) Measure. The proposed test procedure provides specific sampling and measurement instructions; it also describes optional equipment that can be used to simplify the inspection procedure. The proposed procedure has been used extensively during survey inspections by the Canada Legal Metrology Branch and is based on test procedures recommended by the International Organization for Standardization.

**Committee Recommendation:** Adopt the test procedure for baler twine that is presented in Appendix B.

## **240-10 I Gray Areas for Meat and Poultry Products**

**Background:** In 1990, the U.S. Department of Agriculture (USDA) requested that the NCWM develop five new gray areas for certain poultry, beef, and pork products. At the Interim Meeting, the Committee initiated a plan to proceed in this effort in cooperation with USDA, the American Meat Institute, and State and local jurisdictions that would be asked to participate. The National Broiler Council and the American Meat Institute were asked to solicit volunteers from their membership and submit recommendations on the test protocols to be used in the studies of these products. The Committee has received proposals for test protocols from industry and is soliciting comments from other interested parties. The Committee plans to have formal protocols established by the end of September so that field studies can begin in Fall of 1992. The Committee will report on the status of this work at the Interim Meeting in January 1993. Parties interested in participating in these studies should contact the Committee's Technical Advisor at the Office of Weights and Measures. At the Annual Meeting, the Committee received a request from the USDA Food Safety and Inspection Service to add dry salami and other meat or poultry products that lose moisture to the atmosphere to the list of product categories to be studied for the development of gray areas.

The Committee would like to point out that this product category, like the one for "ice-packed poultry," involves all jurisdictions, not just those that use "wet tare." Jurisdictions identified as using "wet tare" will be asked to participate in studies related to gray areas for "wet tare" determinations. All States will be asked to participate in the studies for the other gray areas. The Committee has identified the following jurisdictions as using "wet tare" in net weight testing as of June 4, 1992:

**Wet Tare Jurisdictions** -- Arizona, California, Michigan, New Jersey, Oregon, Washington, and the City of Chicago

The Committee is planning to initiate studies this fall in several of the following categories listed in this item.

- Ice-packed bulk poultry
- Cured pork products (hams, shoulders, and loins)
- Cured beef products (corned beef, corned beef brisket, and tongues)
- Raw meat products (chopped beef, ground beef, hamburger, and beef patties)
- Ham patties, chopped ham, pressed ham, and similar products
- Dry salami and other meat or poultry products that lose moisture to the atmosphere

## **240-11 I SI Metric Amendments to NIST 133**

**Background:** At the Interim Meeting, the Committee began a study to determine how NIST Handbook 133 should be amended in order to bring it into conformance with several new Federal requirements. The first issue relates to amending Handbook 133 so that primary units of measurement are in the International System of Units (SI). Last year, Dr. John Lyons, NIST Director and NCWM President, directed that NIST publications use SI units. Inch-pound units may also be used, but quantities must be stated in SI units first. The Committee intends to make the SI conversion of NIST Handbook 133 its top priority in 1993 and will concentrate its efforts on that publication so that Uniform Packaging and Labeling, Method of Sale of Commodities, and Unit Pricing Regulations are available to the States before the SI changes to the Federal Fair Packaging and Labeling Act take effect on February 14, 1994. (See Item 210-1.) The Committee intends to make the SI conversion of Handbook 133 its top priority in 1994 along with several issues on the agenda that should be addressed before a complete revision of the handbook is published. Included among the difficult issues currently under consideration are proposed changes to the sampling plans (Item



240-1) and proposed gray areas for seven additional commodities, including rice, pasta, and several meat and poultry products.

## 240-12 I Section 3.18. Meat and Poultry from Federally-Inspected Plants

**Background:** This issue relates to adoption of NIST Handbook 133 by the U.S. Department of Agriculture, Food Safety and Inspection Service (FSIS). To ensure the successful implementation of NIST Handbook 133, FSIS requested that State and local jurisdictions contact its regional offices for information relating to Federally inspected meat and poultry products and to make arrangements to conduct package inspections on packages at meat and poultry plants. This would serve three purposes: (1) allow regional offices to establish working relationships with State and local weights and measures officials, (2) allow for regional office coordination of in-plant inspections with FSIS personnel responsible for the plant, and (3) provide for greater cooperation between FSIS and the jurisdiction in resolving any problems that may be identified with meat and poultry package weights. The Committee believes that the effectiveness of State and local inspections will be enhanced through close interagency cooperation. The Committee proposes to revise the existing section to clarify the communication procedures so that weights and measures officials direct all inquiries and requests for USDA cooperation and action through the appropriate regional office. The Committee also proposes to add the following paragraph to Section 3.18. At the 77th Annual Meeting, several weights and measures officials expressed concern that this requirement may be used to restrict their access to meat and poultry plants for the purpose of testing packages. The Committee carried this issue over as an informational item for further study and clarification. The Committee intends to review the wording of Section 3.18. to ensure consideration of the concerns expressed by weights and measures officials at the Annual Meeting, and clear statement of the intent of the proposal, namely, to foster closer cooperation with USDA.

**Committee Recommendation:** Add the following paragraph to Section 3.18.1. Background for Administrator and Inspector and to 3.18.3. Procedure, at the end of paragraph (h.) (2) Test Packages and Scales at the Packaging Plant.

*To provide for greater cooperation between USDA/FSIS and State and local jurisdictions, on-site visits to meat and poultry plants to conduct inspections of packaged products should be coordinated with the USDA Regional Office having jurisdiction over the plant. The USDA Regional Office should be contacted in advance of the inspection visit so that FSIS personnel responsible for the plant can be notified. Inspection results should be shared with FSIS personnel in the plant and the regional office.*

## 240-13 VC 2.3.1. The Inspection Lot of Standard Pack Packages

(This item was adopted as part of the consent calendar.)

**Background:** This issue relates to Subparagraph 2.3.1.(c) concerning inspection lots at the point-of-pack. It was listed under Item 250-3 in the Interim Meeting Agenda. As currently written, this paragraph includes a reference to "on-line" testing and specifies that an inspection lot must consist of the same manufacturer's lot code, and that the lot size should not exceed one uninterrupted production run. The U.S. Department of Agriculture requested that Section 2.3.1.(c) be amended to recognize that manufacturers and packers use a variety of lot coding plans depending on the product, its shelf life, or other production factors. For example, some packers change lot codes every hour, or several times during continuous production runs. USDA suggested that the recommended limitation of maximum lot size to no more than "one uninterrupted production run" be revised so that inspection lots could be defined according to the circumstances at each plant. USDA also requested that references to "on-line" testing be deleted because the inspection process at the point-of-pack could include packages stored in holding areas or other locations in the plant. The Committee recommends the following revision to Section 2.3.1.(c). This recommendation will provide inspectors with the maximum flexibility they need to conduct point-of-pack inspections that reflect the individual practices of manufacturers and meat and poultry packers. If this item is adopted, reference to "on-line" testing will also be removed from 2.3.2.(c) The Inspection Lot of Random Packages.

Committee Recommendation: Revise Section 2.3.1.(c) with the following:

c. When the location of test is ~~on-line~~ at a packing plant: The inspection lot should ~~must~~ consist of packages with the same manufacturer's lot code ~~or be from a single shift's production run, and should not exceed~~ Inspection lots may represent as little as 1 hour's uninterrupted production run. As small as one hour's production may be convenient for sampling purposes. The inspector determines inspection lot size, which may be smaller or larger than the production lot defined by the packer.

## 250 Other Items

### 250-1 W Industry Standards or Practices and Weights and Measures Requirements

**Background:** This was Item 250-4 in the Interim Meeting Agenda. This item is withdrawn because the Committee believes that existing requirements of the WML, MSCR, PLR, NIST Handbook 44, and NIST Handbook 133 provide adequate controls over the practices described in this item. At the Interim Meeting, the Committee considered how to resolve violations that occur when a firm or industry uses illegal measurement practices or "special tolerances" that are contrary to weights and measures requirements. These violations usually surface when a jurisdiction investigates a complaint against an industry or business that has not been subject to routine inspection by weights and measures. Quite often the use of illegal practices grows because firms do not seek information on legal requirements from weights and measures offices. Instead, they turn to other businesses to see "how they do it." In many cases, the procedures used by the "model" firm do not meet legal requirements. In other cases, unacceptable practices or tolerances are taken from a voluntary industry standard issued by a trade or industry organization and developed without consideration of legal requirements.

Three types of violations occur:

- Commodities or manufactured products are sold in wholesale and retail markets using inconsistent rounding and measurement practices, or inaccurate charts or tables. Sales of glass and galvanized steel sheets are two examples. In many cases, sellers round length and width measurements up to the next higher even or whole unit, or quote average dimensions for products. In many cases, the products are not manufactured to meet the average requirement. Some sellers use nominal or estimated thickness declarations on products, often found to be erroneous.
- Sales of reinforcing steel for concrete construction (rebar) and other iron and steel products use "bookweights." In many cases the "bookweight" is less than the actual weight of the product. Firms using this method do not use weighing devices to determine weights. Other examples include the use of "book dimensions" to sell rebar and other iron and steel products that are found to be incorrect when shipments are inspected.
- Sales of packaged products, such as construction materials (cement, sand etc.) and other products, are filled or manufactured to the "industry" tolerances listed in test methods or standards issued by industry and trade groups.

In the first two type examples, the nonuniform measurement practices began long before calculators, computers, and modern measurement technologies were available. In many instances, an industry retains unacceptable practices because they are simpler and it is less expensive to continue their use than to change. Many firms buy truck scales (in the case of rebar sales) or better measurement equipment because they recognize that accurate weights and measures are required by law and are beneficial to their business. Unfortunately, other firms argue for retention of out-of-date practices on the basis that their employees are not capable of performing accurate measurements or computations using commonplace measuring devices and calculators. Obviously, the Committee does not consider this a valid justification for continued use of illegal practices.

Many illegal practices persist because, consumers tend to accept the represented quantities as accurate, not having the equipment nor expertise to make quantity determinations. However, buyers sometimes check the quantity or dimensions of products and find shortages which are reported to weights and measures officials. Serious violations frequently occur not just at one place of business, but throughout an industry. It is then difficult for a single jurisdiction to deal comfortably with these trade practices alone, especially in the case of interstate commerce or widespread use by other firms across the country. The matter may go unresolved because administrators feel that it is beyond the resources of the jurisdiction to bring the practices under control. The Committee believes that the NCWM should address the issues with a single voice and work with affected industries to resolve unacceptable practices on a national basis, but also believes that adequate enforcement tools are already available.

Specifically, the Committee believes that Sections 14 and 15, Misrepresentation of Quantity and Pricing, of the WML provide adequate legal controls to eliminate the unlawful practices described in the first two type examples and whenever inaccurate measurement practices are found. These require firms to provide accurate quantity information on the products they sell. Firms which use inaccurate measurement practices or measurement devices and which present quantity information that tends to mislead or deceive buyers operate in violation of these provisions. The Committee believes that, where the need has been recognized, specific "legal" variations have been, or can be, included in the Uniform Packaging and Labeling and Method of Sale of Commodities Regulations or in NIST Handbook 133. In the third example, the answer is straightforward: packaged commodities must meet the requirements of the WML when tested according to the procedures set forth in NIST Handbook 133. Tolerances prescribed in industry standards or publications do not apply unless they have been adopted or referenced as legal requirements, do not apply. The Committee urges jurisdictions to address violations such as those described in this item utilizing existing legal requirements and to seek NCWM assistance on issues of national significance.

The Committee recognizes that this issue is further complicated by the fact that dozens of industry and trade organizations, both nationally and internationally, are developing voluntary standards and recommendations that are not always consistent with weights and measures laws. The Committee will continue to work with industry and trade associations to provide input on industry standard development and seek their involvement in the work of the NCWM on issues of mutual concern.

B. Bloch, California, Chairman

F. Clem, Columbus, Ohio

T. Geiler, Barnstable, Massachusetts

S. Rhoades, Indiana

L. Straub, Maryland

G. Vinet, Legal Metrology Branch, Canada, Technical Advisor

K. Butcher, NIST, Technical Advisor

## Committee on Laws and Regulations

## Appendix A

### Home Food Service Plan Sales

#### 1.13. Home Food Service Plan Sales

##### 1.13.1. Definitions.

As used in this section, the following words and phrases shall have the following meanings:

a. **Home Food Service Plan.** "Home food service plan" means the offering for sale to a consumer, in the consumers home, any food item, or food item in combination with any nonfood item and/or services, whether or not a membership fee or similar charge is involved.

b. **Seller.** "Seller" means any person, partnership, corporation or association, however organized, engaged in the sale of a home food service plan.

c. **Buyer.** "Buyer" means both the actual and prospective purchaser, but does not include persons purchasing for resale.

d. **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.

e. **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.

f. **Nonfood Item.** "Nonfood 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 does not include food items and durable consumer goods such as appliances.

g. **Item Price.** "Item Price" means the price of a food or nonfood item sold as part of a home food service plan, computed to the nearest tenth of 1 cent when less than 1 dollar, and to the nearest cent when 1 dollar or more. The item price, exclusive of any service charge(s), shall be expressed in terms of the price per unit of weight, measure, or count set forth in the "Uniform Unit Pricing Regulation" in the current edition

of National Institute of Standards and Technology Handbook 130.

h. **Service Charge.** "Service charge" means the total price for any additional features, services, and processing associated with the purchase of a home food service plan, whether stated in terms of membership fees or otherwise.

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.

#### 1.13.2. 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, address, and telephone number of the Seller and the name and address of the Buyer;

(ii) The date of the contract;

(iii) The price of the food and nonfood items of the home food service plan;

(iv) The service charge or the price of any service charges associated with the home food service plan;

(v) The total price of the home food service plan including the price of the food and nonfood items, and the price of any service charge; and

(vi) 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 in the written agreement, the following disclosures are required to be given to the Buyer at the time of sale:

(i) A written list of all food and nonfood items to be sold, which shall include:

(1) The identity of each item and, where applicable, the United States Department of Agriculture quality grade of the item, if so graded; the primal source; and the brand or trade name;

(2) The quantity of each item sold.

(3) The estimated serving size by net weight of each piece of 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

(4) The net weight, measure, or count of all other food and nonfood items offered for sale;

(ii) A current item price list stating in dollars and cents the price per kilogram or pound or other appropriate unit of measure, and the total sale price of each item to be delivered. This price list shall clearly and conspicuously make reference to the fact of whether there are additional costs disclosed in the written agreement relating to any "service charges" associated with the purchase of the home food service plan;

(iii) If a membership is sold, a written statement of all terms, conditions, benefits, and privileges applicable to the membership.

(iv) If a service charge is included, a written statement specifically identifying the service(s) provided and the price(s) charged for them.

#### At the Time of Delivery --

a. The Seller shall provide a receipt, for signature by the Buyer, disclosing the following information:

(i) 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 net weight of each food item delivered shall be within the limit specified in § 1.13.2b(i)(3); and

(ii) The item price and total sales price of each food and nonfood 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.

#### 1.13.3. Advertisement of Home Food Service Plans --

Any advertisement of a home food service plan which discloses item pricing information in accordance with the provisions of this section shall set forth, in a clear and conspicuous manner, whether there are any service charges or other additional costs associated with the purchase of the home food service plan.

## Appendix B

### Baler Twine Test Procedure for Length

#### 5.3.3. Baler Twine - Test Procedure for Length

##### 5.3.3.1. Equipment

- Measuring tapes as recommended in § 5.3.1. Determine measurements of length to the nearest division of the appropriate tape or rule.

- A hand-held calibrated straight-face spring scale of at least 5-kg (10 lb) capacity or a cordage testing device (similar to the one illustrated in Figures 1 and 2) that applies the specified tension to the twine being measured. When measuring twine samples or total roll length, apply 5 kg (10 lb) of tension to the twine. Accurate measurement requires the application of tension to the ends of the twine before measurement in order to straighten the product.

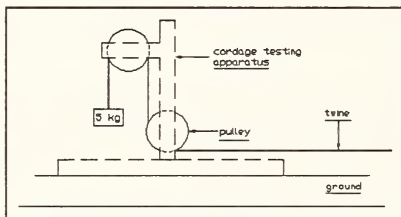


Figure 5 Cordage Test Device

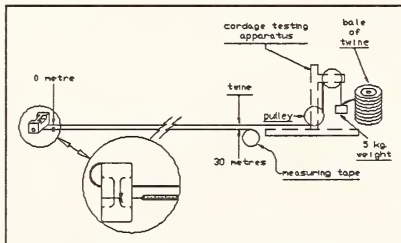


Figure 6 Cordage Test Device in Use

- Scale with 0.1 gram - (0.0002 lb) increments for weighing twine samples. The recommended minimum load for weighing samples is 20 d.

- Scale as recommended in 3.1. for weighing bales and rolls of twine.

##### 5.3.3.2. Procedure

When the term "box" is used, this refers to spaces on the Standard Package Report Form (Page A-1). The term "item" refers to spaces on the Baler Twine Worksheet (Page A-16).

1. Determine the inspection lot; fill out a Standard Package Report Form (Page A-1). A separate report form and baler twine worksheet should be filled out for each lot.

2. Select packages for tare samples. Determine gross weights of tare sample lot and record in item 1. Open the tare samples, determine the tare weight, and record in item 2. Compute the average tare weight and enter this value in item 2a and box 13.

3. Procedure for obtaining twine samples - select, at random, four balls of twine from the packages that were opened for tare. From each of the four balls of twine:

- a. Measure and discard the first 10 meters (33 ft) of twine from each roll.

- b. Take two 30-meter (100 ft) lengths of twine from inside each roll.

- c. Weigh and record the weight of each piece separately and enter the values in item 3. Compare the weight values to determine the variability of the samples. If the individual weights of the twine samples vary by more than the amount specified in Table 4.3., one of the following steps should be taken if the lot is found to be short:

- Determine the actual length of the lightest-weight roll found in the lightest-weight package of the lot to confirm that the weight shortages reflect the shortages in the length of the rolls or;

- Determine the average weight-per-unit of measure by taking 10 30-meter (100 ft) lengths from inside the lightest weight package and use this value to recalculate its length and determine lot compliance.

d. Weigh all of the sample lengths together and enter the total value in item 4. Determine the total length of the samples (800 meters or feet, unless more than 8 sample-lengths were taken) and record the value in item 5. Compute the average weight-per-unit-of-length by dividing the total weight (item 4) by the total length of the pieces (item 5).

4. Determine the MAV for a package of twine (see item 7):

a. Determine total declared package length and enter this value in item 7a.

b. Multiply the MAV from Table 2-11 times the total package length to obtain the MAV for length. Enter this value in item 7b.

c. Multiply the weight per unit of length (item 6) times the MAV for length (7b) to obtain the MAV by weight. Enter this value in item 7c and box 3.

d. Convert the MAV to dimensionless units and record in box 4.

5. Calculate the nominal gross weight and record it in item 9 and box 14.

6. Compute the package errors for the tare sample on the worksheet and transfer these values to the cross-hatched area of the report form. Use the information obtained from the worksheet to conduct the lot inspection. Determine errors using the following formula:

Package error (weight) = (actual package gross weight) - (nominal gross weight).

### Baler Twine Worksheet

Packages	1	2	3	4
----------	---	---	---	---

1. Gross				
----------	--	--	--	--

2. Tare				
---------	--	--	--	--

2a. Average tare           . Record in box 13 of report form.

3. Weights of sample lengths of baler twine. Length of each piece         .

--	--	--	--

--	--	--	--

4. Determine the total weight of all sample pieces in 3           .

5. Determine the combined length of all sample pieces in 3           .

6. Compute the average weight per unit of length (divide 4 by 5)           .

7. Determine the MAV.

a. Compute total declared package length:           .

b. Compute the MAV for total package length. (MAV from table 2-11 x 7a)           .

c. Compute            the MAV (multiply 6 x 7b) for total package weight and enter it in box 3.

9. Compute the nominal gross weight for a package. (Enter in box 14).

Nominal gross weight                      = (multiply 6 x 7a) + Average Tare (2a).



## Report of the Specifications and Tolerances Committee

Charles H. Carroll, Chairman  
Director, Department of Weights and Measures  
Massachusetts

Reference  
Key Number

### 300 Introduction

This is the Final Report of the Specifications and Tolerances Committee for the 77th 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. Consent calendar items are marked with a "VC". Items marked with an "I" after the reference key number are information items. The items marked with a "W" were withdrawn by the Committee. Items marked with a "W" generally will be referred back to the regional weights and measures associations because they either need additional development, analysis, and input, or did not have sufficient support of the Committee to bring them before the NCWM. The number "320-22" was inadvertently omitted when the agenda items were numbered; therefore no item 320-22 appears in this report. New items were assigned the following numbers 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, 1992 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**.

Several items in the S&T report arose from a request to industry in the United States and Canada to identify device requirements representing "trade irritants" between the two nations. The differences were reviewed, and the OIML position was considered. The Committee determined that the "best" position was often the one that would be least disruptive in enforcement and manufacturing considering the cost and benefit of various alternatives. Thus, there was no attempt to promote one country's requirements over the other's. Canada is considering many items for changes to its weights and measures requirements to harmonize with U.S. requirements. The S&T Committee reviewed the items and the recommendations for harmonization appear throughout the report. Of the many proposed changes generated as a result of the U.S. and Canadian meetings, only those items identified as proposed changes to Handbook 44 appear in the report of the Specifications and Tolerances Committee.

Table A

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310-4 I	User-Programmable Software	199
<b>Scales Code</b>		
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320-7 VC	S.6.3. Marking Requirements; Format of Table S.6.3.a.	204
320-8 V	N.1.3.1. and N.1.3.3. Shift Test; Bench and Counter Scales and Equal-Arm Scales	206
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320-9B V	N.4. Editorial Changes: Definition	209
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322-1 VC	S.5.4. Accuracy Class .....	231
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**Table B  
Appendices**

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<b>Table C</b>					
<b>Voting Results</b>					
Reference Key No.	House of State Representatives		House of Delegates		Results
	Yes	No	Yes	No	
300 - Consent	45	0	57	0	Passed
320-8	43	2	53	1	Passed
320-8	3	42	7	47	Failed
320-9B	45	0	60	1	Passed
320-18 - Motion to debate amendment	39	3	47	6	Passed
320-18 - Motion to amend	39	3	49	5	Passed
320-18 - Motion to adopt item as amended	39	4	45	8	Passed
330-5	41	1	51	2	Passed
300 (Report in its entirety)	44	0	56	0	Passed



## **Details of All Items**

### **General Code**

#### **310-1 I G-S.8. Provision for Sealing; Audit Trails**

(This item was changed from a voting item to an information item at the Annual Meeting. The item is presented below as it was originally proposed as a voting item.)

The Committee recommendation is Attachment B of this item and gives the requirements for the minimum forms of audit trail. These requirements are intended to be incorporated in NCWM Publications 14 and 3. Due to the significance of this item and to emphasize its importance, the discussion and recommendations are included in the body of the report, rather than placed in an appendix to the report. For ease of reference, the next item in the Committee's report begins on page 198.

### **Discussion of Audit Trail Requirements**

## **Specifications and Tolerances Committee**

### **Acknowledgements**

The Specifications and Tolerances Committee expresses its appreciation to Canada's Legal Metrology Branch (LMB) and the NIST Office of Weights and Measures (OWM) for their extensive study and deliberations in developing the basic framework for the minimum forms of audit trail presented by the Specifications and Tolerances Committee. The Committee appreciates the valuable contributions from members of industry who assisted in the development of the audit trail concepts, expressed their concerns, provided technical advice, and provided explanations and insights that contributed greatly to the understanding of OWM, LMB, and the S&T Committee of audit trail issues and industry concerns. The careful review and constructive comments provided by the members of industry, particularly through the various Sectors of the Technical Committee on National Type Evaluation, were critical to the development of the audit trail specifications. Finally, the Committee appreciates the review and comments from weights and measures officials who expressed their concerns and suggested alternatives in the development of the final recommendations of the Specifications and Tolerances Committee.

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**Audit Trail Summary Paper**  
**Recommendations of the Specifications and Tolerances Committee**  
**for Adoption at the 77<sup>th</sup> (1992) National Conference on Weights and Measures**

**Introduction**

The appropriate form and use of audit trails as a method of security for a device is of great significance to the Specifications and Tolerances (S&T) Committee, device manufacturers, weights and measures officials, and device users. **The National Conference on Weights and Measures accepted audit trails as a form of device security in 1989 when General Code G-S.8. was amended; however, the forms of acceptable audit trails remains an issue.** The S&T Committee believes that it is critically important to define accurately the levels of security for different forms of audit trail and to establish the appropriate audit trail required as a minimum for each category of device in order to provide adequate safeguards against fraud, particularly when remote configuration of a device is possible. (Remote configuration is explained under "Critical Concepts for Audit Trails.") Device manufacturers need this information so that they can incorporate acceptable forms of audit trails into the design of equipment early in product development to minimize the cost associated with this feature. Weights and measures officials must understand the format and objectives of audit trails and how to use the information so that they can utilize the information to protect against fraudulent use of the device. Device users will benefit because the use of audit trails will expand capability to configure, use, and maintain (in the case of device adjustments) devices with the hopes that greater accuracy can be achieved. These points are expanded upon later in this paper.

The objective of this paper is to describe the requirements for audit trails as proposed by the S&T Committee. It addresses the most significant audit trail requirements and explains why they are being proposed. This paper is to inform weights and measures officials and device manufacturers of the requirements and promote a better understanding of the proposals. To permit interested parties to focus on the requirements for audit trails without the distraction of explanations, the complete set of requirements for audit trails is contained in Appendix B. The definitions of terms used in this paper are included in Appendix B.

*Audit Trails Exceed Objectives of Physical Security Seals*

It is essential to emphasize that the S&T Committee has concluded that the audit trail is more than a simple replacement for the physical security seal. The Committee has decided that **an audit trail, when used, shall provide more information than is available from the traditional physical security seal** (i.e., the lead and wire seal or the tamper-proof pressure-sensitive seal). The Committee believes that weights and measures officials, in addition to device manufacturers and users, should derive benefits from available advances in technology. Consequently, the Committee recommends formats for audit trails that provide greater security and consumer protection than is available using a physical security seal. By requiring at least the minimum forms of audit trails described in this paper, the Committee believes that this will establish a strong deterrent to the fraudulent use of a device that is equipped with a convenient means of device configuration, modification of parameters, and adjustment. If mechanical adjustments are the only type of sealable adjustments on a device, physical security seals are still adequate.

*Impact on Notification of Adjustment*

Several weights and measures jurisdictions require that they be notified when a physical security seal has been broken. The Committee wants to assure weights and measures officials that the procedures in place requiring notification of repairs or adjustments to devices do not have to be changed if audit trails are used. The same notification requirement for a broken physical security seal should also apply to device adjustments or changes to other sealable parameters as documented in an audit trail.

*Action Proposed for 1992*

The S&T Committee believes it important to present the definitive requirements for audit trails for adoption in 1992 at the 77<sup>th</sup> National Conference on Weights and Measures (NCWM) to permit the implementation of these requirements as soon as possible. Delaying adoption will probably result in more devices going through type



evaluation without the safeguards the Committee believes to be necessary for audit trails to serve as effective forms of sealing.

## Development of Audit Trail Requirements

### *History of Sealing and Security Seals*

Prior to 1979, lead and wire seals were the only form of security seal permitted, and only adjustments for performance requirements had to be sealed as specified in the specific codes of NIST Handbook 44. Performance requirements are defined as all tolerance requirements and, in the case of nonautomatic-indicating scales, sensitivity requirements. In other words, adjustments for accuracy and sensitivity had to be sealed. The Scales Code did not have a provision for sealing requirement until 1979. At that time, the requirement for sealing electronic adjustments took effect. The Liquid-Measuring Devices Code had a provision for sealing mechanical adjustments well before 1962. In 1979, the definition of security seal was changed to permit pressure sensitive seals to be used. In 1985, the General Code paragraph G-S.8. Provision for Sealing Electronic Adjustable Components was added to apply to all electronic adjustable components that affected performance requirements. G-S.8. was changed in 1989 to recognize audit trails as acceptable forms of security seals; however, the NCWM also expanded the scope of features to be sealed.

### *G-S.8. Provision for Sealing*

Three important points in the General Code paragraph G-S.8. (shown below) must be understood.

***G-S.8. Provision for Sealing Electronic Adjustable Components. - A device shall be designed with provision(s) for applying a security seal that must be broken, or for using other approved means of providing security (e.g., data change audit trail available at the time of inspection), before any change that affects the metrological integrity of the device can be made to any electronic mechanism.***  
***[Nonretroactive as of January 1, 1990.]***

1. The first point is that paragraph G-S.8. recognizes means of providing security other than a physical security seal. (See the definition for security seal.) The audit trail is given as one example of an alternative form of security.
2. Second, the alternative form of security must be an "approved means" of security. Not all forms of audit trail submitted by manufacturers may be deemed to be appropriate. Consequently, weights and measures officials must provide guidelines for the minimum forms of audit trail for devices with different methods of accessing the sealable parameters. In light of remote configuration capability, the original format of an audit trail suggested by the S&T Committee in 1989 is woefully inadequate.
3. The final point is that any adjustment (or selection of a feature) that affects the metrological integrity of the device must be sealed. Not only is it necessary to seal adjustments to performance requirements, but any electronic adjustment that affects the metrological integrity of the device must be sealed (see Appendix A).

### *Features to be Sealed*

The term "metrological integrity" was discussed extensively from 1989 through 1991. (See the S&T reports for details.) The guideline to determine which features are to be sealed was stated in the 1991 report of the S&T Committee. The report stated:

### **Sealing and Security Seals: History**

- Before 1979
  - Only lead and wire seals permitted
  - Only adjustments for performance requirements sealed
- 1979: Pressure sensitive security seals permitted in definition
- 1985: G-S.8. added; applied to all electronic adjustable components
- 1989: G-S.8. and Scales Code S.1.11. amended
  - Electronic audit trail recognized
  - Seal features and parameters affecting metrological integrity

**Figure 1. History of sealing requirements.**

"The guideline to determine those features, parameters, or 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."

#### *Philosophy for Features to be Sealed*

The philosophy to be used to make the judgments of which features are to be sealed were presented to the NCWM in 1991 and are stated in Appendix A. The decisions of which features must be sealed for a specific device will normally be made as part of the type evaluation of the device under the National Type Evaluation Program (NTEP). However, some jurisdictions do not require NTEP Certificates of Conformance, hence weights and measures officials in these jurisdictions should use these same criteria when inspecting devices that have not been submitted for type evaluation to determine which features must be sealed for a specific device.

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 philosophy for features to be sealed.

#### *Typical Features to be Sealed*

The Weighing and the Liquid-Measuring Sectors of the Technical Committee on National Type Evaluation were requested by the S&T Committee to develop lists of parameters or features that typically require sealing under the guideline for metrological integrity. Appendix A also reports the list of typical features to be sealed and examples of those not required to be sealed as recommended by the S&T Committee and adopted at the 1991 NCWM. Note that not all of the parameters or features must be sealed under all device designs; the need for sealing must be determined using the philosophies for features to be sealed.

#### **Need for the Audit Trail**

The trends in technology are to include more flexibility into devices. To address different requirements among States or among countries, it is much more cost effective to incorporate variable operating characteristics into software than to design variations into hardware. If several devices must perform essentially the same functions, it is often more efficient and cost effective to place the primary software program into a host computer and run the "satellite" devices with the software in the host computer. Temperature compensation at the loading rack is often accomplished through the on-site office computer; it can also be done through a host computer in another State. Desk-top computers are being incorporated into weighing or measuring device systems as indicating elements for scales, point-of-sale cash registers, service station consoles, and automatic-bulk-weighing-system controllers. More frequently, device users want to use the computer in the weighing or measuring system to perform accounting functions, inventory control, and various other tasks when not being used in the weighing or measuring operation. The S&T Committee is not aware of an effective way to physically seal a desk-top computer for its weights and measures capabilities while still permitting its use for other computer programs. The audit trail is believed to be an effective form of security for computers.

Device users want more convenient ways of changing the configuration of their scales or measuring systems. For example, service station owners want to be able to change the unit prices for different products on all gas pumps in the station from the service station console. Station owners may want to be able to change the octane blend settings for dispensers from the service station console; this is a capability commonly provided in consoles interfaced with blend dispensers. Some companies have expressed interest in being able to adjust the accuracy of scales from a central location rather than place the authority and responsibility to make adjustments in the control of employees (at the device site) who may not be qualified to make the adjustments. The suggestions have been to make these changes from the office computer system on site, although values may be changed by the computer at corporate headquarters.

Industry Objectives	Weights and Measures Objectives	User Objectives
<ul style="list-style-type: none"> <li>• Hardware methods of sealing restrict technology</li> <li>• Permit the use of electronic methods to seal a device</li> <li>• Additional alternative to the physical seal</li> <li>• Assist device owners in configuring multiple devices</li> </ul>	<ul style="list-style-type: none"> <li>• Alternative to the physical seal</li> <li>• Seal parameters beyond adjustments to performance requirements</li> <li>• Incorporate more safeguards than those provided by the physical seal</li> </ul>	<ul style="list-style-type: none"> <li>• Ease of configuring or adjusting multiple devices</li> <li>• Restricting configuration/adjustments to qualified employees</li> <li>• Remote configuration and adjustment of devices</li> </ul>

Figure 2. Objectives of recognizing electronic audit trails.

It is unreasonable for weights and measures officials to prevent device owners from taking advantage of available technology to make changes from a single device. Prohibiting devices from having this capability would restrict technology. Rather, weights and measures officials must develop ways to effectively control devices with this added capability without imposing unreasonable or excessive requirements. If device manufacturers choose to offer their customers the convenience of remote configuration capability, the industry must provide the safeguards needed to discourage the fraudulent use of remote configuration capability.

The action by weights and measure officials to expand the scope of features to be sealed has increased the demand for audit trails. Some of the features that are now required to be sealed (since 1989, but specifically defined in 1991) have routinely been adjusted from a source computer or a service station console. For example, octane blend settings for variable-blend dispensers are usually changed through the service station console; however, octane blend settings are required to be sealed under the concept of metrological integrity. Service station console manufacturers usually have incorporated a high level of security protection in their programming to restrict access to blend-setting adjustments to prevent unauthorized access to these parameters; however, these safeguards are not required by Handbook 44. Consequently, the level of security incorporated by the manufacturer is based upon each company's assessment of and adequate level of security. It is the Committee's position that safeguards for these features is best assured by specifying the minimum forms of audit trail needed for devices with different capabilities.

Although console manufacturers incorporate their own forms of security to discourage unauthorized access to selected parameters, once access to the sealable parameters is gained, it is usually easy to make changes to the octane blend settings without the changes being detectable by a customer. Adequate protection is achieved through the safeguards designed into the equipment, business integrity, and adequate weights and measures enforcement. Some manufacturers include event counters to provide evidence of changes to device owners and weights and measures officials; however, as explained later under the "Minimum Form of the Audit Trail," the Committee concluded that the event counters alone do not provide sufficient safeguards. The audit trail requirements have been developed to give manufacturers an alternative to the physical security seal, but the audit trail also gives weights and measures officials a more powerful tool to monitor changes to sealable parameters and detect unusual activity that may result from fraudulent manipulation of a device.

#### Benefits of Audit Trails

- Provides industry with an alternative to the physical security seal
- Audit trail provides more information than provided by physical security seal
- Device owner has audit trail to detect employee tampering
- Evidence to weights and measures of number, frequency, and types of changes
- Aid in detecting tampering; alerts inspector when investigation is necessary
- Deterrent to fraudulent manipulation of parameters

Figure 3. Some of the benefits of the audit trail.



## Critical Concepts of Audit Trails

### *Remote Configuration Capability*

Many devices are equipped with a capability that will be referred to in this paper as "remote configuration." A device has remote configuration capability if its operating features and characteristics are (a) selectable through a "set-up" or programming mode; and (b) can be accessed (through the use of a programmable password of at least four characters in length) and modified from a remote device (that is, through a device that is not permanently installed as part of the device). Many devices are put through a set-up procedure at the time of installation. (A programmable password is required to access the "set-up" or programming mode. See point 1 under "General Requirements for Metrological Audit Trails" in Appendix B.) For example, a digital indicating element for a scale must be configured for the type of application and weighing element to which it is interfaced. Specifically, the scale capacity, value of the scale division, range of the automatic zero-setting mechanism, and appropriate operating features must be selected at the time of installation, in addition to adjusting the scale for accuracy. To adjust a scale for accuracy, it is necessary to place weights on the load-receiving element; however, technology is available to adjust the scale and change configuration parameters from a remote location.

The existence of remote configuration capability preceded the adoption of audit trails into G-S.8, although the demand on the part of device owners to use the remote configuration capability has increased significantly since 1989. The expansion of the scope of features and parameters to be sealed has a major impact on the design of equipment with remote configuration capability. The concurrent development of audit trails and remote configuration capability makes the audit trail concept of critical importance to the design and operation of equipment. Consequently, there is intense interest on the part of industry as to the format of audit trails, the amount of information that is required to be retained, and how the information must be made available to weights and measures officials. The cost of the memory required to retain the audit trail information, the memory available in devices to accommodate audit trails, and accessing the information are all critical to this issue.

### *What is a Remote Device?*

It is crucial to define the criteria to be used to determine what constitutes a remote device in terms of remote configuration capability. If separate devices are required for a weighing or measuring device to function (i.e., to perform the measurement operation or compute the transaction information, such as quantity, unit price, and total price), then the separate component devices constitute a system, and the communication is not considered to be remote. For example, a scale comprised of an indicating element and a weighing/load-receiving element is considered to be a system. Similarly, a weight display, a separate electronics box housing the electronics normally contained in an indicating element, and a weighing element also comprise a system. A gasoline dispenser that requires a separate electronics package housed outside the dispenser to calculate price and return the information to the dispenser for display is considered a system. Communication among separate devices comprising a system, as just explained, are not considered to be remote devices with respect to remote configuration capability.

#### **Criteria Defining a System**

1. The device, component, or main element is essential to the measurement operation of the device or the display of transaction information.
2. The device, component, or main element is a permanent part of the device.

**Figure 4.** One of these two criteria must be satisfied for devices to be considered part of a system.

One example of separate devices that are not considered to be a single system is a service station console and gasoline dispensers capable of operating in a stand-alone mode, although a change in dispenser configuration may be needed to activate the stand-alone mode. Based upon its understanding of the interaction of service station consoles and gasoline dispensers, changing of sealable parameters from a service station console is considered to be remote configuration. Similarly, a scale system (e.g., separate indicating and weighing/load-receiving elements) and an interfacing computer that augments the basic scale features and operation (e.g., adds weigh-in/weigh-out capability) or performs only management functions are considered to be separate devices. If the scale may be configured through



the computer, that constitutes remote configuration (assuming that the computer is not performing functions necessary to display the weight information on the indicating element). However, if the computer is essential to the operation of the system, such as the automatic-bulk-weighing-system controller, then the controller is considered to be part of the system. Because the primary function of an automatic bulk-weighing system cannot be performed without the controller to open and close gates and initiate the process of weighing repeated drafts, it is considered part of the system even though it may be interfaced with a separate scale indicating element.

Some devices permit a hand-held unit to be plugged into the device to permit the entry of information through a keypad to configure the device. The S&T Committee considers this to be remote configuration because the hand-held unit is not a permanent part of the device. At first this may appear to be unduly restrictive; however, a hand-held plug-in unit may be a computer or tape device that enters an entire set of software into a device. The aspect of permanency of part of a device was selected as the basis for distinguishing remote configuration from the changing of parameters through the device itself. A keypad that is a permanent part of the device is not considered to be remote configuration.

### *Categories of Devices: Three Forms of Audit Trails*

What constitutes remote configuration is critical to specifying that devices required to have audit trails of a particular format. Three acceptable forms of audit trail have been established; the form of audit trail acceptable for a device depends upon the ability to adjust the device or change sealable parameters. The form that applies to a particular device depends upon the availability of remote configuration capability and, if so, whether or not there is virtually unrestricted access to the configuration or calibration parameters of the device. As used here, unrestricted access means that a physical security seal is not present, so that access to the sealable parameters is available from a remote device at any time at the request of an authorized operator subject to the operating status of the receiving device. "Unrestricted access" as used here disregards the security precautions manufacturers may (and usually do) include in the design of the device, because these protection features are not required by Handbook 44. Without specifying the minimum forms of acceptable safeguards, there is no assurance that safeguards will be provided.

Three categories of devices are listed below, with the category designation numbered to correspond to the capability and ease of changing sealable parameters from a remote device.

#### **Category 1.** A device that does not have remote configuration capability.

These devices may be sealed either with a physical security seal or an audit trail. If an audit trail is used, then the minimum form of audit trail must be provided. The minimum form of audit trail was developed with the objective of keeping the demands on memory as small as possible while still providing adequate safeguards to weights and measures to control fraudulent use of the device, thereby providing adequate consumer protection.

#### **Category 2.** If a device has remote configuration capability, but the activation of the remote configuration capability is through physical hardware (such as a switch) that can be sealed with a physical seal, then the minimum form of the audit trail shall be used in addition to the physical seal.

Because the event logger requires significant memory and many device manufacturers want to provide remote configuration capability for at least some of the sealable parameters, a "hybrid" form of audit trail was established. The restricted access to the hardware that inhibits and activates the remote configuration capability eliminates the need for the complete form of the event logger for this category.

#### **Category 3.** A device that allows virtually unrestricted access to configuration parameters or adjustments must have an event logger as its minimum form of the audit trail.

An event logger contains detailed information on the parameters that have been changed and documents the new parameter values. The event logger requires a significant amount of memory; however, it is anticipated that any device to which unrestricted access is given will be part of a sophisticated measurement process that will have considerable memory available. A centralized event logger may be used.

The following table summarizes some of the significant aspects to the three minimum forms of audit trails.

Categories of Device and Methods of Sealing	
Categories of Device	Method of Sealing
<b>Category 1:</b> Simple devices; no remote configuration capability	Seal by physical seal or the minimum form of the audit trail.
<b>Category 2:</b> Remote configuration capability, but access is controlled by physical hardware  <b>Note:</b> When in the remote configuration mode, the device shall not indicate or record (if equipped with a printer) as if it were in the normal operating mode. <del>The display shall be significantly different from the normal operating mode.</del> Flashing indications are not acceptable. Recorded indications shall clearly indicate that it is in the calibration mode.	The hardware enabling access for remote communication must be sealed using a physical seal. Additionally, the device receiving the parameters must have the minimum form of the audit trail.  The event counters must be easily accessible <del>through the device or information must be easily accessible</del> through another on-site device. The access to the audit trail may be inside a key-locked panel on gas pumps where the panel must be removed for sealing the meter.
<b>Category 3:</b> Remote configuration capability; access may be unrestricted or controlled through a software switch (e.g., password)	An event logger is required in device; this must include an event counter (000 to 999), parameter ID, date and time, and new value. (Note: Does <u>not</u> require 1000 changes to be stored for each parameter.) A centralized audit trail may be used. A printed copy of the information must be available through the device or through another on-site device for most installations.

The second category of device specifies that, when the device is in the remote configuration mode, there must be a clear and continuous indication to that effect. The objective is that the scale shall not be (erroneously) sealed with the remote communication capability operational. The clear and continuous indication is intended to reduce this possibility. A "clear and continuous indication" that the device is in the remote configuration mode must be of such a nature that it discourages the use of the device for normal transactions when in this mode. This may be a partial obscuring of the numbers, an alternating display message, or some other significant characteristic. The lighting of an annunciator is not sufficient. If values can be printed when in the configuration mode, the system shall record a message to indicate that the system is in the configuration mode. Manufacturers may want to display decipherable information because the scale will be in this mode of display when it is tested and the indicated weight values may be needed for reference when adjusting the scale.

### Minimum Form of the Audit Trail

The minimum form of the audit trail shall consist of:

1. two event counters; one for configuration parameters and one for the calibration parameters (000 to 999 for each counter);
2. memory to retain and display (or print) a minimum of 10 values per calibration parameter (e.g., multiple calibration points) for device adjustments (but not configuration parameters) with the corresponding value of the event counter for each adjustment; and
3. in the case of retail motor-fuel dispensers, memory to retain and display (or print) a minimum of 10 values of blend settings per blend for each dispenser with the corresponding value of the event counter for the change of the setting. See the examples at the end of Appendix B for illustrations of these points.

The amount of memory required is 10 times the number of calibration parameters and blend settings per blend meter. For example, if a device has two adjustment points over its weighing or measuring range, sufficient memory is required to store 20 values. The largest number of values or parameters (records) required by weights and measures to be retained in memory is 1000. A device manufacturer may choose to retain more than 1000 records in the audit trail.

The purpose of the two event counters is that once the device has been configured after installation, the configuration parameters should rarely require any change. (Octane blend settings are considered as configuration parameters since they are not expected to change very often.) This approach segregates the changes to the configuration parameters from the calibration parameters for accuracy so that the type of changes to sealable parameters can be assessed. In this way, calibration parameters, which are expected as part of normal maintenance, are kept separate from configuration changes, which should occur only rarely after installation.

The S&T Committee concluded that event counters alone do not provide adequate safeguards against fraudulent use of the adjustments. Keyboard entry of calibration factors permits the entry of the exact value of a previous setting. This capability may facilitate fraudulent action by making it easier for the device operator to change the calibration factor and return to the exact value at a later time when a weights and measures inspection is anticipated. At least 10 values for each electronic calibration parameter shall be retained to provide a limited record of adjustment values. Each electronic adjustment parameter requires adequate memory. For example, if a dispenser has six meters, each of which has one electronic adjustment setting, there must be memory to retain 60 electronic adjustment values. Before the event logger memory capacity is filled, the manufacturer may use the memory to retain more than 10 changes to individual parameters, but when the memory is filled, the audit trail must retain at least the last 10 values for each sealable parameter. These values can be reviewed to assess the stability of the device and to detect if the adjustments are being used fraudulently. For example, a record of adjustments showing a pattern of a 10 percent increase in the calibration factor followed by a 10 percent decrease in the calibration factor may indicate fraudulent use of the device. The record of values may suggest to the weights and measures official (and the device owner) that someone is fraudulently manipulating the device. If the device user attempts to hide the fraudulent manipulation of adjustment factors by entering a series of calibration factors to obscure the record, the entry of 9 additional calibration entries would be documented by the event counter. The large number of documented changes would indicate the possibility of fraud. This documentation should discourage the device user from taking advantage of the easy access to use the adjustments and parameters in a fraudulent manner.

The octane blend settings for a retail motor-fuel dispenser are considered to be configuration parameters because they should not change very often. However, because octane blend settings can be manipulated in a fraudulent manner, the same documentation argument is applied to these settings with the same logic presented in the previous paragraph. Since the foundation for this proposal was developed in cooperation with the Legal Metrology Branch in Canada, it should be noted that Canada does not require that octane blend settings be sealed since these settings are not addressed in their regulations; however, Canada does not object to including the blend settings in the sealable parameters. Consequently, there will not be a conflict in the regulations concerning the design of equipment with respect to audit trails.

## Event Loggers

The event logger is the minimum form of the audit trail for Category III devices (those that have unrestricted remote access to the configuration and adjustment parameters). The event logger shall contain the following information:

Event counter	Date and time	Parameter ID	New value
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This information shall be automatically entered into the event logger by the device. The event logger provides a detailed record of the adjustments that have been made. The event counter must have a capacity of at least 000 to 999; it is recommended that manufacturers make this counter non-resettable. A limit of 1000 events is proposed to place a maximum limit of the amount of memory that will be required for an event logger. This 1000-event capacity is for all sealable parameters combined, not 1000 events for each sealable parameter.



It is expected that weighing and measuring systems designed to have unrestricted access to remote configuration will also have time clocks and substantial memory as part of the systems. Consequently, the date and time at which changes are made to sealable parameters are required to give weights and measures officials additional information to assess the changes that have been made to the device. The parameter identification (including the device identification for centralized event loggers) and new values are also to be retained in the event logger so that the weights and measures official (or the device owner) can review the changes that have been made. It has been suggested that an identification code of the person making the changes (e.g., his or her initials) be kept in the event logger. This suggestion is not included in the proposal because the entry of the individual identification would be a manual keyboard entry and easily falsified. This would also require more device memory, which would increase the cost of the event logger.

### Event Logger

- Required on systems with remote configuration with unrestricted access
- Must provide event counter, time, date, ID of parameter changed, new value for parameter
- Hard copy printout must be available on site upon demand from the system (some exceptions apply)
- Need to retain 10 entries per sealable parameter
- Not required to retain more than 1000 events in logger

Figure 5. Minimum characteristics of an event logger.

Since an event logger will contain a considerable amount of information, a hard-copy print-out of the contents of the event logger shall be available. Limited exceptions are provided for devices with centralized audit trails, but the capability of printing a hard copy is strongly recommended. (See the section titled "Centralized Event Logger.") This hard copy of the event logger must be available upon demand from the device or an associated device on the site of the device installation. The hard copy can then be taken by the weights and measures official to be studied without disrupting the business activities where the device is installed. The hard copy will also serve as a file record regarding the history of the adjustments or changes made to the device.

The amount of memory needed for the event logger is a major concern to industry since it will affect the cost of the device. Many device manufacturers may want to provide unrestricted remote configuration capability, but may have only a few parameters to be addressed remotely. Requiring the event logger to retain 1000 events in this case seems excessive. In an effort to limit the amount of memory required, the Committee proposes that an event logger be required to retain a minimum of 10 entries for each sealable parameter, with a maximum limit of 1000 events for all parameters combined. Thus a device with only five sealable parameters will require memory to retain only 50 parameter values in memory, but the event counter would still be required to count a minimum of 1000 entries. The event counter will indicate the number of changes since the last inspection and will provide the necessary information to determine if and how many records were deleted from the event logger as new information replaces old information.

### Centralized Event Logger

Remote configuration will most frequently be used when several devices are interfaced with a host computer or other host device. The most common system in weights and measures utilizing a host system to communicate with multiple devices is probably the service station console interfaced with several retail motor-fuel dispensers. Such installations have been a major subject of discussion in the process of developing the audit trail concepts.

Many electronic retail motor-fuel dispensers can now be configured to operate either as stand-alone devices or interfaced with service station consoles. Retail motor-fuel dispensers will likely be equipped eventually with electronic calibration factors in the same way that electronic wholesale (loading rack) meters are designed. The electronic calibration factors may in time be entered through the service station console, rather than through the dispenser. Many electronic variable-blend dispensers are already designed so that the blend ratios can be entered through the service station console, hence all dispensers interfaced with the console can receive the updated blend settings as the status of use of the device permits. Companies have inquired if they may use a host computer to update calibration values in several scales that are interfaced with a computer rather than input the information manually through each



scale. It is likely that the demand for remote configuration will increase in the future in an effort to increase efficiency in business operations.

The S&T Committee has received numerous comments that the amount of memory required to maintain an event logger in each retail motor-fuel dispenser might be excessive and costly, and would require time clocks incorporated into each dispenser. In an effort to mitigate the costs, the Committee will permit a centralized event logger to be used when several "satellite" devices are interfaced with a host device, such as a service station console. Since the host device (e.g., service station console) is expected to have more memory storage, will often have a time clock as a standard feature, and will often be equipped with a printer to generate a hard copy of the contents of the event logger, a centralized event logger will not be as great a burden to manufacturers (and, consequently, should have a lesser effect on the cost of the devices) than if each individual device is required to have its own event logger. However, several criteria must be satisfied if a centralized event logger is to be used.

### Centralized Event Logger

- Changes through the device shall be sent to and retained in the centralized event logger.
- It shall not be possible to circumvent the event logger.
- If the device can operate independently, the minimum form of the audit trail is required for the stand-alone operation.
- A hard copy of the event logger contents must be available for networks (some exceptions apply).

Figure 6. Conditions to be satisfied for a centralized event logger.

1. If electronic parameters monitored by the event logger are changed at the device, rather than through the device containing the centralized audit trail, the changes shall be transferred to and maintained in the centralized audit trail. It shall not be possible to circumvent the unit containing the audit trail. For example, if the audit trail unit is disconnected or inhibited, the attached network devices shall be inoperable and impossible to adjust electronically when in the network configuration. Mechanical adjustments are not expected to be monitored by the event logger since there probably will not be an electrical connection from the mechanical adjustment to the event logger. Sealable mechanical adjustments should be secured by a physical security seal.
2. If the same values for change to a parameter (e.g., the blend ratios for blend dispensers) are sent from the host device to several satellite devices, this shall be represented as one event in the logger. If changes are made to individual devices rather than to all attached devices, the event logger must identify both the parameter and the device that was changed. Identification may be by individual devices, groups of devices, or designated as all devices.
3. If a device can be installed in a stand-alone operation, it must have the minimum form of audit trail for the stand-alone mode.
4. A system shall be capable of providing a hard copy of the event logger for any network consisting of the host device and four or more satellite devices. In the case of retail motor-fuel stations, a printer is required for stations with:
  - a. four or more dispensers; or
  - b. more than 15 products, where each blend in each dispenser is considered one product, although other dispensers may duplicate the same blends. (For example, three dispensers with five blends of gasoline each would not be required to have a printer.)

The printer requirement will be a user requirement, not a device specification. The concern here is that some consoles used primarily in small service stations do not incorporate printers. Consequently, the small station will not be required to have a printer.

If a printer is not required to provide a hard copy of the contents of the event logger due to the small number of devices in the network, there must be a convenient way for the audit trail to be reviewed while the system is

operating in the normal mode for business. The weights and measures official does not want to shut down the operation of the business while reviewing the contents of the event logger.

If a centralized audit trail is used for a large number of devices on a network, the capacity of 1000 events may not be sufficient. For example, the host device containing the centralized audit trail may have 200 satellite devices attached to it, e.g., a service station computer interfaced with 200 retail motor-fuel blend dispensers. The host device may need memory in excess of 1000 events to store adequate information for the many devices attached to it. One possibility is to specify the capacity of an event logger as 10 entries per electronic sealable parameter per device monitored by the centralized audit trail. Before the event logger memory capacity is filled, the manufacturer may use the memory to retain more than 10 changes to individual parameters, but when the memory is filled, the event logger must retain at least the last 10 entries for each sealable parameter. This would be consistent with the concept presented earlier to reduce the required memory capacity below 1000 events, which was expressed as 10 times the number of electronic sealable parameters for the device. The S&T Committee requests suggestions of how to establish a limit when a large number of devices are attached to a centralized audit trail.

### Physically-Sealable Access to Remote Configuration Combined with the Audit Trail

Many manufacturers have objected to the amount of memory required to maintain an event logger. They have indicated that many devices with limited amounts of memory are being designed to accept device adjustments and parameter settings through remote configuration. The comment that the requirements for event loggers are unreasonable has been stated repeatedly.

The Committee wishes to emphasize the relationship between the remote configuration capability and the requirement for an approved audit trail as a form of security. Stand-alone devices without remote configuration capability are not required to have an audit trail; in this case, G-S.8. merely recognizes that an audit trail is an acceptable method of providing security. If a manufacturer chooses to use the audit trail for a stand-alone device and the device does not have remote configuration capability, then the minimum form of the audit trail is required and sufficient. If a device has remote configuration capability, then additional safeguards for security are needed, i.e., more appropriate forms of the audit trail are required.

The Committee discussed the industry concerns and agreed to provide an alternative that would reduce the amount of memory required for devices with limited memory when combined with remote configuration capability. The weights and measures concern is still to have adequate safeguards to discourage the fraudulent use of the device. The Committee is therefore proposing the "hybrid" version of device security by requiring both a physical seal and the minimum form of the audit trail when a device is equipped with remote configuration capability. (This is device category II.)

For this type of system, the physical seal on the hardware that restricts access to the hardware that activates and deactivates the remote configuration mode must be located in the device receiving the adjustment or configuration information. However, the Committee does not believe that the physical seal alone is adequate protection against the potential for fraudulent use. If a device is not sealed or if the physical seal is broken, the device operator has essentially unrestricted access to the adjustment and configuration parameters. Under these circumstances, when remote configuration capability is present, the minimum form of the audit trail will indicate possible fraudulent use of the device.

### Service Considerations Regarding the Audit Trail

The repair of a device may occasionally result in the loss of audit trail information. A replaced circuit board may contain the microprocessor storing the audit trail information. Whenever possible, the service technician should record the old and new values in the event counters and record that information on the notice of repair sent to the weights and measures authority (if such notice is required) or record it on the service report left with the device owner. This information can then be referenced by the weights and measures official at the time of the next inspection. In the worst case, this information will not be recorded. Then, during the next inspection of the device, the weights and measures official will detect an inconsistency in the values in the event counters and those values

recorded on the last inspection report. This will alert the official to an unusual circumstance that can be further investigated during the inspection.

These service problems must be anticipated and accepted as part of the maintenance of equipment. Weights and measures officials must simply do their best to track changes in the audit trail information based upon their own inspection records.

## Battery Back-Up

Because the audit trail information is critical to maintaining the security of a device, the audit trail information shall not be lost when the device loses power. The Committee recommends that devices be equipped with battery back-up capability to retain the audit trail information for at least 60 days. The objective is to prevent someone from deleting audit trail information by simply disconnecting power to the device. The Committee originally considered a longer time for battery life, but the 60-day limit appears to be consistent with the battery life frequently provided with devices.

## Comparison of the Physical Seal and the Audit Trail

### *Physical Seal as a Deterrent*

A lead and wire seal does not prevent adjustment of a device. Comments received by the Committee indicate that many weights and measures officials view the physical security seal as a deterrent to the owner's tampering with the device. While this may be a consequence of physically sealing a device, the Committee points out that few, if any, jurisdictions view the breaking of a security seal as a prohibited act. Weights and measures regulations may require notification when a security seal is broken, but the act of breaking the seal is not a violation of law. On the contrary, device owners have the responsibility to maintain devices in an accurate and correct condition (G-UR.4.1.), hence regular adjustment of a device should be encouraged. Nevertheless, many weights and measures officials view the audit trail as being inadequate to deter fraudulent use of the device.

The Committee had similar concerns, although primarily because the remote configuration capability is becoming more common. As a result, the Committee concluded that an audit trail consisting of event counters only does not provide sufficient safeguards against fraud. For this reason the Committee insists that the minimum form of the audit trail include an abbreviated form of the event logger by retaining in the audit trail the electronic adjustment values and the blend setting values. In this way, the existence of a record of the values will provide more information to the enforcement official (and the device owner) to assess adjustments and will serve as a deterrent in the same way as the physical seal.

### *Information Available From the Audit Trail*

In reality, an audit trail consisting only of event counters provides more information than the physical security seal. A broken security seal only indicates that someone has had access to the sealable parameters; it does not indicate whether or not any changes were made. If a security seal has been broken, the device user can make changes to adjustments or the other sealable parameters; the frequency and numbers of change would not be detectable. The event counters in audit trails indicates how many times changes have been made.

### Physical Seal Compared to Audit Trail

- Physical seal
  - Broken seal indicates access to the sealed features or adjustments
  - Viewed as a deterrent
- Audit trail
  - Indicates if changes were made to adjustments or configuration parameters
  - Indicates the number of times changes were made
  - Retains the last 10 values of electronic adjustments or octane blend settings
  - The record of changes serves as a deterrent

Figure 7. Comparison of the benefits of the physical seal and the audit trail.



The S&T Committee was concerned that the ease and exact reentry of electronic calibration values can be used to "hide" fraudulent adjustments on a device. It is not unusual that the arrival of a weights and measures official in a town or city is communicated among businesses before the official completes local inspections. If a business is intent on using electronic adjustments fraudulently, the device owner may break the security seal after a weights and measures inspection, alter the electronic adjustment value. Forewarning of inspection would later give the device owner enough time to change the electronic adjustment factor back to its original setting. The device owner could claim that the security seal had been broken by accident, and the weights and measures official would have no basis on which to question the story. If the device is equipped with the minimum form of the audit trail, comparison of the current value in the event counter with the value recorded during the last inspection indicates the number of device adjustments since that last inspection. Furthermore, the calibration values retained in memory could be reviewed to discern a suspicious pattern in the data. Based upon this information, future investigations or enforcement action might be needed.

As described earlier, the event logger provides even more information to assess the adjustments that have been made to a device.

### Access to the Audit Trail Information

The Certificate of Conformance issued under the NTEP program reports when a device has an audit trail as a form of device security. The Certificate of Conformance describes the form of the audit trail and how to access the information. Industry has been encouraged to standardize the methods of accessing the audit trail. While this goal is desirable, uniformity of access is unlikely to be achieved. At a minimum, individual manufacturers are encouraged to develop standardized means of access to the audit trail for their line of devices. The methods of accessing audit trails will differ among types of devices.

Access to the audit trail information for the purpose of viewing or printing the contents must be "convenient" for the enforcement official. Accessing the audit trail information for review shall be separate from the calibration or set-up mode in which parameters are changed so there is no possibility for the weights and measures official to change or corrupt the device configuration or the contents of the audit trail (i.e., the access for review is in the read-only format).

The ideal situation from a weights and measures perspective is for a device to have a specially marked key that can be pressed to display and/or print the audit trail contents. The marking of the key would indicate that the device is equipped with an audit trail and the method of accessing the information would be obvious from the marking on the key.

This approach has significant disadvantages for gasoline pump manufacturers. Since many retail motor-fuel dispensers are operated by many different people (i.e., individual customers in self-service stations), the ease of operating the dispenser without superfluous keys unrelated to the transaction is extremely important. Consequently, access to the audit trail information may be through another device in the total system or, in the case of individual dispensers, the key or button to display or print the audit trail may be behind the dispenser panel, which must be removed to view the physical security seal that should be present on a mechanical meter calibrator.

The audit trail information may be in a centralized location in a system consisting of devices on a network. Access to the audit trail information may be through the supervisor's mode of operation on a service station console or point-of-sale system. It is expected that manufacturers will develop a variety of methods to present and access the audit trail information based upon the design limitations of devices and the controls available on the device. During the

Access to Audit Trail
<ul style="list-style-type: none"><li>• Existence of audit trail stated in the NTEP Certificate of Conformance</li><li>• Viewing or printing contents must be "convenient"</li><li>• Hard copy of the event logger must be available (some exceptions permitted)</li><li>• Accessing may require assistance</li></ul>

**Figure 8.** Information regarding the existence of an audit trail and accessing the information.



NTEP evaluation, the format of the audit trail will be assessed and acceptable formats explained in the NTEP Certificates of Conformance.

## Conclusions

Electronic audit trails are available for use by device manufacturers as an alternative to the physical security seal; however, the audit trail, if used, must satisfy the minimum forms given in the audit trail specification paper. If a device has remote configuration capability, one of the forms of the audit trail is required as a minimum level of security. The audit trail must provide significantly more information than is available from a physical security seal in order to provide adequate safeguards against fraudulent use of the device. This is of particular concern with expanded use of remote configuration capability of devices. The physical seal was considered to be an adequate form of security when all adjustments had to be input through individual devices and were not subject to frequent changes. The ease of access and change of parameter values through electronic adjustment and remote configuration has prompted the S&T Committee to specify more comprehensive minimum forms of the audit trail for different categories of devices, depending upon the manner and ease with which the sealable parameters can be accessed and changed. The audit trail should be very useful to business owners who want to ensure that employees do not tamper with or manipulate the devices to the detriment of the business and in violation of laws and regulations.

The S&T Committee believes that it is important to provide more definitive criteria now to standardize audit trails as much as possible. Inevitably, additional details for the implementation of these audit trail specifications will have to be resolved as new issues arise during product development and type evaluation.

The S&T Committee presents the audit trail specifications for adoption as the best compromise it could develop in response to the changes in technology and device design, yet still provide the required tools for weights and measures official to protect against fraud. The Committee strongly recommends the adoption of the audit trail requirements at the 1992 Annual Meeting of the National Conference on Weights and Measures.

## Attachment A

### Philosophy for Sealing Typical Features to be Sealed

#### *Principles for Determining Features to be Sealed*

- 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 the unit prices on gasoline dispensers and maintaining unit prices in price look-up codes stored in memory, are not sealable parameters and shall not 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 these 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 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.

#### *Typical Features and Parameters to be Sealed*

Scale Features and Parameters	
Typical Scale Features to be Sealed	Typical Scale Features and Parameters Not Required to be Sealed
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	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

Liquid-Measuring Device Features and Parameters	
Typical Features or Parameters to Be Sealed	Typical Features or Parameters Not Required to Be Sealed
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) 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.	Analog-to-digital converters Quantity division value (display resolution) Double pulse counting Communications

The following provides examples of configuration and calibration parameters that are to be sealed. The examples are provided for guidance and are not intended to cover all possible parameters.

**Calibration Parameters:** Calibration parameters are those parameters whose values are expected to change as a result of accuracy adjustments.

1. Measuring element adjustments where linearity corrections are used, e.g., flow rate 1 and meter factor 1, flow rate 2 and meter factor 2, etc.
2. Mass flow meter adjustments for zero adjustments (not simply setting the display to zero) and span settings.

**Configuration Parameters:** Configuration parameters are those parameters whose values are expected to be entered once only and not changed after all initial installation settings have been made.

1. Octane or other blend setting ratios (optional in Canada at this time)
2. Temperature, pressure, density, and other sensor settings for zero, span, and offset values
3. Measurement units (in Canada, only if not displayed or printed on the primary register)

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4. Temperature compensation table, liquid coefficient of expansion, or compressibility factors or tables
5. Liquid density setting (in Canada, only if not displayed or printed on the primary register) and allowable liquid density input range
6. Vapor pressures of liquids if used in calculations to establish the quantity
7. Meter or sensor temperature compensation factors
8. False or missing pulse limits for dual pulse systems (Canada only)
9. On/off status of automatic temperature, pressure, or density correction
10. Automatic or manual data input for sensors
11. Dual pulse checking feature status on or off
12. Flow control settings (optional in Canada)
13. Filtering constants

## Attachment B

### Requirements for Metrological Audit Trails

#### Scope

This discussion lists the requirements for the acceptable forms of metrological audit trail that are recommended by the Specifications and Tolerances (S&T) Committee as acceptable security for commercial weighing and measuring devices. The S&T Committee has reviewed various draft proposals as part of its objective to further define the minimum forms of metrological audit trail that would be acceptable under the General Code paragraph G-S.8. Provisions for Sealing Electronic Adjustment Components.

A major concern of this review has been the remote configuration capability of commercial weighing and measuring devices; this aspect was a major consideration in developing the Committee's final recommendations. Weights and measures officials are concerned that the use of such new features might lead to increased fraudulent use of devices unless new, more appropriate means of sealing are also implemented.

The following specifications establish requirements that the S&T Committee deemed necessary and are recommended for adoption by the National Conference on Weights and Measures. These requirements are intended to be incorporated in NCWM Publications 14 and 3.

#### Definitions

The following definitions apply to the discussion of metrological audit trails.

**Access code.** A sequence of alphanumeric characters (minimum length of 4 characters) namely a password, that must be input to a device to gain access to sealable adjustments.

**Adjustment mode.** An operational mode of a device which enables the user to make adjustments to sealable parameters, including changes to configuration parameters.

**Adjustment.** A change in the value of any of a device's calibration parameters or sealable configuration parameters.



**Audit trail.** A electronic count and information record of the changes to the values of the calibration or configuration parameters of a device. The term addresses all forms of audit trail described in this paper.

**Calibration parameter.** Any adjustable parameter that can affect measurement or performance accuracy and, due to its nature, needs to be updated on an ongoing basis to maintain device accuracy, e.g., span adjustments, linearization factors, and coarse zero adjustments.

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

**Enabling/inhibiting sealable hardware.** Physically sealable hardware, such as a two-position switch, located on the remotely configurable device, that enables and inhibits the capability to receive adjustment values or changes to sealable configuration parameters from a remote device.

**Event.** An action in which one or more changes are made to configuration parameters, or adjustments are made to one value (or values for a set of values) for a calibration parameter (e.g., adjustments for a set of calibration factors to linearize device output), while in the adjustment mode. If no adjustment is made, then there is no event. In the case of a centralized audit trail, the same values for the same parameter sent to multiple devices shall be considered to be the same event. In the case of a centralized event logger, the event logger must identify both the device and the parameter that was changed.

**Event counter.** A part of the audit trail whose contents is a count representing the number of events that have occurred.

**Event logger.** A form of the audit trail that contains a series of event records, each record containing an event number and additional specified data pertaining to the adjustment that was made.

**Physical Seal.** A physical means, such as lead and wire, used to seal a device to detect access to those adjustable features that are required to be sealed.

**Read-only access.** A type of access to electronically stored data in the read-only mode whereby the data are displayed but no changes can be made to the information.

**Remote configuration capability.** The ability to adjust a primary device or change its sealable configurable parameters from or through some other device that is not itself necessary to the operation of the primary device or is not a permanent part of that device.

**Remote device.** A device that (1) is not required for the measurement operation of the primary device or computing the transaction information in one or more of the available operating modes for commercial measurements or (2) is not a permanent part of the primary device. In the context of this paper, a remote device has the ability to adjust another device or change its sealable configurable parameters.

**Remotely configurable device.** Any weighing or measuring device with remote configuration capability that permits sealable configuration or calibration parameter values to be deleted, appended to, modified, or substituted in whole or in part by downloading over any type of communications link from another device, such as a geographically local or remote console or computer, whether or not the secondary apparatus is part of the network connecting the devices.

**Seal.** As a verb, to seal a device is to make a device secure so that access to adjustments and other sealable parameters will be detectable.

**Sealable parameters.** Calibration and configuration parameters that are required to be sealed.

**Unrestricted access to sealable parameters.** Unrestricted access means that a physical security seal is not present, so that access to the sealable parameters is available from a remote device at any time at the request of an authorized operator subject to the operating status of the receiving device.

### **Categories of Device: Three Forms of Audit Trail**

Three forms of the audit trail have been established; the form of audit trail acceptable for a device is dependent upon the capability to adjust the device or change sealable parameters. The form that applies to a particular device depends upon the availability of remote configuration capability and, if so, whether or not there is virtually unrestricted access to the configuration or calibration parameters of the device. Three categories of device are listed below, with the category designation numbered to correspond to the capability and ease of changing sealable parameters from a remote device.

**Category 1.** A device that does not have remote configuration capability.

These devices may be sealed with either a physical security seal or an audit trail. If an audit trail is used, then the minimum form of audit trail must be provided (see next page). The minimum form of audit trail was developed with the objective of keeping the demands on memory as small as possible while still providing adequate safeguards to weights and measures to control fraudulent use of the device, thereby providing adequate consumer protection.

**Category 2.** If a device has remote configuration capability, but the activation of the remote configuration capability is through physical hardware (such as a switch) that can be sealed with a physical seal, then the minimum form of the audit trail may be used in addition to the physical seal.

Because the event logger (see category 3 below) requires significant memory and many device manufacturers want to provide remote configuration capability for at least some of the sealable parameters, a "hybrid" form of audit trail was established. Restricted access to the hardware inhibiting and activating the remote configuration capability eliminates the need for the event logger as the form of audit trail for this category of device.

The second category of device specifies that, when the device is in the remote configuration mode, there must be a clear and continuous indication to that effect. The objective is that the scale shall not be (erroneously) sealed with the remote communication capability operational. The clear and continuous indication is intended to reduce this possibility. A "clear and continuous indication" that the device is in the remote configuration mode must be of such a nature that it discourages the use of the device for normal transactions when in this mode. This may be a partial obscuring of the numbers, an alternating display message, or some other obvious indication. The lighting of an annunciator is not sufficient. If values can be printed when in the configuration mode, the system shall record a message to indicate that the system is in the configuration mode. Manufacturers may want to display decipherable information because the scale will be in this mode of display when it is tested and the indicated weight values may be needed for reference when adjusting the scale.

**Category 3.** A device that allows virtually unrestricted access to configuration parameters or calibration parameters must have an event logger as its minimum form of the audit trail.

An event logger contains detailed information on the parameters that have been changed and documents the new parameter values. An event logger requires a significant amount of memory; however, it is anticipated that any device to which unrestricted access is given, will be part of sophisticated measurement process that will have considerable memory available. A centralized audit trail may be used, but additional criteria apply.

The following table summarizes some of the significant aspects to the three minimum forms of audit trails.

Categories of Device and Methods of Sealing	
Categories of Device	Method of Sealing
<b>Category 1:</b> Simple devices; no remote configuration capability	Seal by physical seal or the minimum form of the audit trail.
<b>Category 2:</b> Remote configuration capability, but access is controlled by physical hardware  <b>Note:</b> When in the remote configuration mode, the device shall not indicate or record (if equipped with a printer) as if it were in the normal operating mode. The display shall be significantly different from the normal operating mode. Flashing indications are not acceptable. Recorded indications shall clearly indicate that it is in the calibration mode.	<p>The hardware enabling access for remote communication must be sealed using a physical seal. Additionally, the device receiving the parameters must have the minimum form of the audit trail.</p> <p>The event counters must be easily accessible through the device or information must be easily accessible through another on-site device. The access to the audit trail may be inside a key-locked panel on gas pumps where the panel must be removed for sealing the meter.</p>
<b>Category 3:</b> Remote configuration capability; access may be unrestricted or controlled through a software switch (e.g., password)	<p>An event logger is required in device; must include an event counter (000 to 999), parameter ID, date and time, and new value. (Note: Does <u>not</u> require 1000 changes to be stored for each parameter.) A centralized audit trail may be used. A printed copy of the information must be available through the device or through another on-site device for most installations.</p>

### Minimum Form of the Audit Trail

The minimum form of the audit trail shall consist of:

1. two event counters; one for configuration parameters and one for the adjustment parameters (000 to 999 for each counter);
2. memory to retain and display (or print) a minimum of 10 sets of values (e.g., multiple calibration points) for device calibration parameters (but not configuration parameters) with the associated event count corresponding to the calibration value; and
3. in the case of retail motor-fuel dispensers, memory to retain and display (or print) a minimum of 10 sets of values of blend settings per blend for each dispenser with the associated event count corresponding to the change of the setting.

The maximum number of values or parameters that must be retained in memory is 1000. (This limit may not apply to centralized event loggers. See the section titled "Centralized Event Loggers" for details.)

The octane blend settings for a retail motor-fuel dispenser are considered to be configuration parameters, but the last ten sets of values for a device shall be retained in conjunction with the event counter to serve as part of the audit trail.

### Event Loggers: Acceptable Form of Audit Trail for Category 3 Devices

1. The event logger is the minimum form of audit trail for Category 3 devices (those that have unrestricted remote access to the configuration or calibration parameters.) The event logger shall contain the following information:

Event counter	Date and time	Parameter ID	New value
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2. This information shall be automatically entered into the event logger by the device. In the case of centralized event loggers, the parameter identification shall include the device identification to which the event applies. Additional relevant information is permitted, e.g., the identification of the person who made the adjustment or the old value of the parameter that was changed.
3. The date and time shall be presented in understandable format. The date shall include month, day, and year. The time shall include the hour and minutes.
4. Except as specified under point 4 for the centralized audit trail (see below), a hard-copy print-out of the contents of the event logger shall be available upon demand from the device or an associated device on the site of the device installation. The display or printing of the event logger contents shall exclude other information, such as transaction data, operator inventory records, shift totals, etc.
5. An event logger shall retain a minimum of 10 entries for each sealable parameter; it is not required to retain more than 1000 events for all parameters combined. This limit applies to devices for which the event logger is dedicated to a single device (See the section titled "Centralized Event Loggers").

### Centralized Event Logger

Remote configuration will be used most frequently when several devices are interfaced with a host computer or other host device. A centralized event logger may be used when several "satellite" devices are interfaced with a host device, such as a service station console. The following criteria must be satisfied if a centralized event logger is to be used:

1. If electronic parameters monitored by the event logger are changed at the device, rather than through the device containing the centralized audit trail, the changes shall be transferred to and maintained in the centralized audit trail. It shall not be possible to circumvent the unit containing the audit trail. For example, if the audit trail unit is disconnected or inhibited, the attached network devices shall be inoperable and impossible to adjust electronically when in the network configuration. Mechanical adjustments are not expected to be monitored by the event logger since there will probably not be an electrical connection from the mechanical adjustment to the event logger. Sealable mechanical adjustments should be secured by a physical security seal.
2. If the same values for change to a parameter (e.g., the blend ratios for blend dispensers) are sent from the host device to several satellite devices, this shall be represented as one event in the logger. If changes are made to individual devices rather than to all attached devices, the event logger shall identify both the parameter and the device that was changed. Identification may be by individual devices, groups of devices, or designated as all devices.
3. If a device can be installed in a stand-alone operation, it must have the minimum form of audit trail when installed in the stand-alone mode.
4. A system shall be capable of providing, upon demand, a hard copy of the event logger for any network consisting of the host device and four or more satellite devices. In the case of retail motor-fuel stations, a printer is required for stations with:
  - a. four or more dispensers; or
  - b. more than 15 products, where each blend in each dispenser is considered one product, although other dispensers may duplicate the same blends. (For example, three dispensers with five blends of gasoline each would not be required to have a printer.)

The printer requirement will be a user requirement, not a device specification. The concern is that some consoles used primarily in small service stations do not incorporate printers. Consequently, the small station having less equipment or products as defined in 4a and 4b will not be required to have a printer.

If a printer is not required to provide a hard copy of the contents of the event logger due to the small number of devices in the network, there must be a convenient way for the audit trail to be reviewed while the system is



operating in the normal mode for business in order not to inhibit or disrupt the operation of the business while reviewing the contents of the event logger.

5. If a centralized audit trail is used for a large number of devices on a network, the logger capacity of 1000 events may not be sufficient. **The S&T Committee requests suggestions of how to establish a limit when a large number of devices are attached to a centralized audit trail.**

## General Requirements for Metrological Audit Trails

Physical security seals are acceptable for sealing devices that do not have remote configuration capability. When an audit trail is the form of security, minimum forms of audit trail are specified for different categories of devices. The following general requirements for metrological audit trails must be satisfied as part of all three minimum forms of audit trail.

1. Access to the adjustment mode shall require the use of a programmable access code (password) consisting of at least four characters.
2. The adjustment mode shall address only sealable parameters in order to avoid entering the adjustment mode to access non-sealable parameters that must be routinely changed as part of the normal use of the device. Since the audit trail requirements are intended to satisfy the weights and measures requirements of the U.S. and Canada, any parameters required to be sealed in one country, but not the other, may be included in the adjustment mode and still comply with this requirement. Manufacturers should consult with the weights and measures authority to discuss those parameters that may be questionable as to whether or not the parameter must be sealed. Manufacturers may choose to incorporate the capability to set a software "switch" that determines whether or not a parameter is sealable. If this is done, then the software switches (that determine whether or not a parameter is sealable) shall be sealable.
3. When a remotely configurable device is in the remote configuration mode, that is, capable of receiving changes to sealable parameters, the device shall either:
  - a. not indicate or record (if equipped with a printer); or
  - b. provide a clear and continuous indication that it is in remote configuration mode. Any printed ticket or receipt shall include a message with each ticket or receipt that the device is in the calibration mode.

A "clear and continuous indication" that the device is in the remote configuration mode must be of such a nature that it discourages the use of the device for normal transactions when in this mode. This may be a partial obscuring of the numbers, an alternating display message, or some other obvious indication. The lighting of an annunciator is not sufficient. If values can be printed when in the configuration mode, the system shall record a message to indicate that the system in the configuration mode.

4. An event counter shall have a capacity of at least 1000 values (e.g., 000 to 999).
  - a. The event counter shall increment only when a change is made to at least one sealable parameter during an event (during the time when in the adjustment mode).
  - b. The event counter shall increment once whenever a change is made to a sealable parameter whose new value must be retained in the audit trail, e.g., electronic calibration factors or blend values for retail motor-fuel dispensers.
  - c. The event counter for the other configuration parameters shall increment only once for each event regardless of the number of changes made to sealable configuration parameters whose values are not required to be retained in memory.
  - d. In the case of the event logger, the event counter will increment once for each change to a sealable parameter since each new value must be retained in the event logger.
5. When the storage memory of the event logger has been filled to capacity, any new event shall cause the oldest event to be deleted. When adjustment factors or blend settings are retained, the last 10 sets of values for each of these sealable parameters shall be retained along with the corresponding value from the event counter, with the oldest record being deleted when a new set of values must be retained. The event counter shall continue

to increment for the other sealable parameters for which values are not required to be retained in the audit trail. The event counter provides the necessary information to indicate the number of records that have been overwritten in the event logger as new information overwrites the old records. See the examples at the end of this discussion.

6. The audit trail data shall be:
  - a. stored in non-volatile memory and shall be retained for at least 60 days if power is removed from the device; and
  - b. protected from unauthorized erasure, substitution, or modification.
7. Access to the audit trail information for the purpose of viewing or printing the contents must be "convenient" for the enforcement official.
  - a. Accessing the audit trail information for review shall be separate from the calibration mode so there is no possibility for the weights and measures official to change or corrupt the device configuration or the contents of the audit trail.
  - b. Accessing the audit trail information shall not affect the normal operation of a device before or after accessing the information.
  - c. A key (for a panel lock) may be required to gain access to the means to view the contents of the audit trail. Access may be through the supervisor's mode of operation of the device.
  - d. Accessing the audit trail information shall not require the removal of any additional parts other than normal requirements to inspect the integrity of a physical seal.
  - e. If a standardized method is not used to access the audit trail information, instructions for accessing the audit trail information shall be permanently marked on the device.
8. The displayed or printed form of the audit trail information shall be readily interpretable by the inspector.
9. The audit trail information shall be displayed or printed in order from the most recent event to the oldest event. If a device is not capable of displaying all the information for a single event on one line or at one time, the information shall be displayed in blocks of information which are readily understandable.

### Examples of Audit Trail Format and Replacement of Data

Three examples of the information contained in audit trails are provided below. These examples are not intended to specify the format in which audit trail information must appear; rather, they only illustrate the information to be contained in audit trails to promote a better understanding of the requirements and how information, namely parameter values, are to be replaced in the correct operation of the audit trails. Device manufacturers may develop their own formats, which will be evaluated when the devices are submitted for type evaluation. The explanatory comments are not part of the audit trails, but are provided to explain the example.

**Example 1 (Category 1 Device):** This exemplifies how the information in the adjustment event counter might appear in the minimum form of the audit trail for a Category 1 device with two-point calibration. The device does not have remote configuration capability. This device could be a scale or a meter with electronic calibration factors. The adjustments reflect adjustments at half and full capacity for a scale or at half and full flow rate for a meter. A separate event counter for adjustments is not required since it is incorporated in the record with the adjustment values shown below.

Configuration Event Counter 015

Event Counter and Parameter Values for Electronic Calibration Adjustments

Count of Event	Calibration Value at One-Half Capacity	Count of Event	Calibration Value at Capacity	Explanatory Comments
082	10.553	083	10.638	Most recent adjustment
080	10.546	081	10.602	
077	10.605	079	10.625	
073	10.631	079	10.640	
069	10.648	076	10.655	Adjustments were not made at half capacity every time adjustments were made at capacity.
067	10.781	075	10.699	
065	10.792	074	10.731	
		072	10.767	
		071	10.782	
		070	10.844	Deleted from memory
		068	10.851	
		066	10.866	Deleted from memory

**Example 2 (Category 2 Device):** This exemplifies a blend dispenser which has a sealable switch to restrict access from a remote device (i.e., the service station console). The adjustment table illustrates a single electronic adjustment over the measuring range; dispensers with mechanical meter calibrators are sealed with a lead and wire seal and would not have an electronic audit trail for mechanical adjustments. The dispenser is assumed to offer a total of five products, of which only three have programmable blend settings. The highest and lowest octane products are considered fixed at 100 percent, consequently, no information is required in the audit trail for the highest and lowest octane products. The example illustrates the blend setting values in the table at the bottom of the page. One configuration adjustment was made after the last blend adjustment, which is why the configuration count value is higher than the last count retained with the blend setting values. Only three changes to blend settings are illustrated since blend settings will not likely change very often. Space remains in the audit trail to retain additional changes to the blend settings.

Event Counter and Parameter Values for Electronic Calibration Adjustments

Configuration Event Counter	Event Counter and Parameter Values for Electronic Calibration Adjustments		Explanatory Comments
	Count of Event	Calibration Value	
015	158	35.553	Most recent adjustment
	154	35.546	Second last adjustment
	156	35.549	
	155	35.605	
	154	35.613	
	158	35.631	
	152	35.648	
	151	35.657	
	150	35.662	
	149	35.774	Last entry retained
	148	35.781	Deleted from memory

Record of Blend Settings for the Blend Configuration Parameter

Count of Event	Blend 1	Blend 2	Blend 3	Explanatory Comments
011	20/80	50/50	80/20	Most recent blend change and current settings.
013	40/60	50/50	40/60	No other configuration parameters changed between two changes to blend settings.
011	20/80	50/50	80/20	Original blend settings. One change to configuration parameters after this blend setting was made.
				The remaining space in the records for the blend settings is unused and available to retain future changes to blend settings. Even if 10 changes are made to configuration parameters other than blend settings, the blend setting information will be retained; it is not to be deleted until at least 10 blend settings have been made.



**Example 3 (Category 3 Device):** This illustrates an event logger for a scale. The authorized operator can change parameters from a remote device. All sealable parameters must have the values recorded in the logger.

Event Counter	Date	Time	Parameter Identification	New Value	Explanatory Comments
322	3/12/92	09:00	span	46.838	Span adjustment.
321	3/12/92	08:59	AZSM	1	Zero tracking range set to 1 division.
320	12/22/91	13:33	Samples ave	16	Samples per update set to 16.
319	12/22/91	13:33	span	42.838	Span adjustment.
318	12/22/91	13:32	AZSM	3	Change in the zero tracking range.
317	8/17/91	14:14	AZSM	1	Zero tracking set to 1 division.
317	8/17/91	14:08	span	46.838	Span adjustment.
316	8/17/91	14:03	Samples ave	4	Samples per update set to 4.
315	8/17/91	13:55	zero	520	Coarse zero (dead load) is 520 lb.
314	8/17/91	13:33	AZSM	0	Zero tracking turned off.
313	3/6/91	10:25	span	46.231	Span adjustment.
.	.	.	.	.	Records of activity between 004 and 313 would fall here but are not described in this example.
.	.	.	.	.	
.	.	.	.	.	
.	.	.	.	.	
004	5/3/87	9:59	span	48.527	Span adjustment.
003	5/3/87	9:53	zero	486	Coarse zero set to 486 lb.
002	5/3/87	9:41	d	1	Scale division set to 1 lb.
001	5/3/87	9:41	cap	2000	Capacity set to 2000 lb.
					Available memory space for additional entries in the event logger.
.	.	.	.	.	
.	.	.	.	.	
.	.	.	.	.	

### 310-2                      W                      Safety Considerations in the Design, Inspection, and Use of Equipment

(This item was withdrawn.)

The Task Force on Safety developed and recommended changes to Handbook 44 to address safety aspects of the design, inspection, installation, maintenance, and use of equipment for commercial transactions. The Committee concluded that safety requirements should not be placed in Handbook 44 because weights and measures officials are not experts in safety regulations and requirements; consequently, they can not reasonably be expected to ascertain whether devices are installed, maintained, or operated in a safe manner. The safety requirements of equipment are the responsibilities of other agencies. However, weights and measures officials should always be alert to hazards, use appropriate safety procedures (such as those specified by the manufacturer and the company using the weighing or measuring device), follow all safety guidelines and policies specified for their jurisdiction, and report apparent safety violations or hazards to the proper authorities.

The following additions were suggested by the Task Force on Safety for adoption into the General Code and are included here for the record.

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.

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 if 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.

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., with respect to 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.

### 310-3                      I                      G-UR.4.1. Maintenance of Equipment; Guidelines

The S&T Committee has been requested to develop guidelines to assist in determining if equipment is "maintained in the proper operating condition." The Committee received enforcement policies from three States: North Carolina, Maryland, and the Commonwealth of Virginia.

The policies reviewed by the Committee will be combined into a single document to facilitate review by weights and measures officials and industry. The combined information will be sent to the Scale Manufacturers Association and the Gasoline Pump Manufacturers Association. Other interested parties can obtain copies from the NIST Office of Weights and Measures.

Generally, the regional associations have not assigned high priority to the development of a policy on maintenance of equipment. Unless the Committee receives additional input that this item is a priority need of the regions, Committee work on this item will be discontinued on the assumption that the States are comfortable in applying their own guidelines and interpretations.

### 310-4 I User-Programmable Software

User-programmable software permits modification of a basic software package to meet individual needs. For several years, manufacturers of point-of-sale systems have provided customers with basic software packages that are often modified by the user (usually a supermarket chain) to meet individual needs. All aspects of the programs are accessible to the user. Since the user can modify any part of the programs, a type evaluation on the basic software package is of questionable benefit. One possible approach is not to evaluate the basic software package since it is intended to be modified by the user, but to require each user who modifies the software to submit the package for type evaluation. However, it may still be necessary to evaluate the basic package since some users may not modify the software. If the software isolates the functions falling under weights and measures authority so that it can not be modified, then the evaluation of the basic package will not be affected by user modifications to the remaining portion of the software. Another approach is to require the system to provide an indication upon demand as to whether or not the software has been modified from the basic package provided by the software developer. The frequent modification of software by manufacturers makes the type evaluation of each update unrealistic. Canada's Legal Metrology Branch (LMB) is also currently addressing these issues.

To adequately check modified software in field installations requires more extensive testing by weights and measures officials during field inspections of these systems with, more detailed instructions in the Examination Procedure Outline (EPO) for testing the system. This concept is applicable to other types of device that have a variety of options and operational parameters selectable at the time of installation. It may be necessary to develop more extensive EPOs to promote an adequate check of selectable parameters during the initial inspection of a new device after installation.

The Office of Weights and Measures (OWM) will continue its work with the LMB to explore the many issues associated with the type evaluation, use, and modifications of software packages for commercial weighing and measurement applications. Once the concerns of weights and measures officials have been explored and a better understanding obtained of the needs and constraints of industry, further input from industry will be requested to develop specific recommendations for various types of software packages.

### Scales Code

#### 320-1 VC S.1.1.1. Zero Indication; Digital Indicating Elements

(This item was adopted as part of the consent calendar.)

**Recommendation:** To eliminate a conflict in the design requirements for the United States and Canada, and to more closely align the Scales Code requirement for the center-of-zero indication with the requirements of the International Organization of Legal Metrology (OIML), the Committee recommends the following nonretroactive change to S.1.1.1.

##### S.1.1.1. Digital Indicating Elements. -

(a) A digital zero indication shall represent a balance condition that is within plus or minus one-half the value of the scale division.

~~(b) An auxiliary or supplemental "center-of-zero" indicator shall define a zero balance condition to  $\pm 1/4$  of a scale division or less. A digital indicating device shall either automatically maintain a "center-of-zero" condition to  $\pm 1/4$  scale division or less, or have an auxiliary or supplemental "center-of-zero" indicator that defines a zero balance condition to  $\pm 1/4$  of a scale division or less.~~

~~[Nonretroactive as of January 1, 1993.]~~

**Discussion:** The Office of Weights and Measures and the Legal Metrology Branch in Canada asked industry for information to identify differences in U.S. and Canadian requirements for weighing and measuring devices falling under weights and measures authority. The difference in the zero indications was identified as a conflict that requires different device designs for the United States and Canada. The S&T Committee reviewed the OIML requirements and recommends the modification to S.1.1.1. that it believes to be consistent with them.

This change requires that when a system has an automatic-zero-setting mechanism (AZSM), the AZSM must maintain the center-of-zero condition to  $\pm 0.25e$ , where  $e$  is the verification scale division; however, if the center-of-zero condition is maintained by AZSM, then a center-of-zero indication is not required. No limit has been placed on the speed of operation of the AZSM since a restriction is not considered to be necessary; equipment installed in the United States usually operates faster than specified in the OIML recommendation. The interpretation of "maintaining a zero-balance condition" means the zero balance condition is maintained within  $\pm 0.25e$ .

In response to this proposal, a question was raised regarding the applicability of nonretroactive requirements to leased equipment. This situation is not considered different from current operations for many seasonal businesses that lease scales. The policy of applying nonretroactive requirements to leased equipment is left to individual States. Many jurisdictions apparently apply nonretroactive requirements on the basis of the date the equipment was installed for the first time within a State; they do not require equipment to comply with nonretroactive requirements that took effect after the first installation even if the equipment was removed from service and then returned to service at a later date. It is the responsibility of the owner of the equipment to document the date of initial installation within a State and to encourage the States to accept such leased equipment at a later date without being subject to nonretroactive requirements that became effective after the date the equipment was first installed. When a commercial device crosses State lines, each jurisdiction has the authority to require the device to comply with all requirements in effect at the time it enters the jurisdiction.

## 320-2 VC S.1.7. Capacity Indication, Weight Ranges, and Unit Weights

(This item was adopted as part of the consent calendar.)

**Recommendation:** The Committee recommends that the maximum over-capacity indication for electronic computing scales be limited to 9 scale divisions. The Committee recommends amending S.1.7. to read:

**S.1.7. Capacity Indication, Weight Ranges, and Unit Weights.** - An indicating or recording element shall not display nor record any values when the gross platform load (not counting the initial dead load that has been canceled by an initial zero-setting device) is in excess of:

(a) scale capacity plus 9 scale divisions for electronic computing scales (excluding postal scales and weight classifiers); or\*

(b) 105 percent of the capacity of the system for all other scales.

The total value of weight ranges and of unit weights in effect or in place at any time shall automatically be accounted for on the reading face and on any recorded representation.

This requirement does not apply to: (1) single-revolution dial scales, (2) multi-revolution dial scales not equipped with unit weights, (3) scales equipped with two or more weighbeams, nor (4) devices that indicate mathematically-derived totalized values.

[\*Nonretroactive as of January 1, 1993.]

**Discussion:** This recommendation would eliminate a difference in U.S. and Canadian requirements identified by industry. The current text in S.1.7. permits all scales to indicate (and record if so designed or equipped) weight values for gross platform loads up to and including 105 percent of the scale capacity before an overcapacity indication is required. Although manufacturers can design electronic computing scales to have an overcapacity indication at not more than 9 divisions above the nominal scale capacity and satisfy the requirements of both countries, it is proposed



that the limit for electronic computing scales be changed in Handbook 44 to remove the inconsistency between U.S. and Canadian requirements.

This proposed change is limited to electronic computing scales because both countries permit other scales to indicate to 105 percent of capacity. The limited change to S.1.7. minimizes the scope of the change on U.S. manufacturers.

Postal scales and weight classifiers, which are excluded from this requirement, should be readily identifiable during field inspections. Both weight classifiers and digital postal scales indicating in pounds and ounces must be identified for their special applications by a statement that is conspicuously marked on both the operator's and customer's side of the display. (See Scales Code paragraph S.1.2.1., Tables S.6.3.a. and S.6.3.b. note 13, and the definition of "weight classifier.") Normal round-off scales that are used as shipping scales are identified by the device application, consequently, correctly applying the exclusion to these scales should not be a particularly difficult problem.

### 320-3                      V                      S.1.12. Manual Gross Weight Entries; UR.3.9. Use of Manual Gross Weight Entries

(This item was adopted.)

**Recommendation:** To specify the appropriate applications for manual gross weight entries, to define the appropriate operation of this feature, and to identify recorded values that are the result of manual gross weight entries, the Committee recommends adding the following specification and user requirement.

*S.1.12. Manual Gross Weight Entries. - A device shall accept an entry of a manual gross weight value only when the scale is empty at gross load zero and the scale indication is at zero in the gross weight display mode. Recorded manual weight entries, except those on labels generated for packages of standard weights, shall identify the weight value as a manual weight entry by one of the following terms: "Manual Weight," "Manual Wt" or "MAN WT." The use of a symbol to identify multiple manual weight entries on a single document is permitted provided that the symbol is defined on the same page on which the manual weight entries appear and the definition of the symbol is automatically printed by the recording element as part of the document.*

*[Nonretroactive as of January 1, 1993.]*

**UR.3.9. Use of Manual Gross Weight Entries. -** Manual gross weight entries are permitted for use in the following applications only: (1) in point-of-sale systems interfaced with scales when credit is being given for a weighed item; (2) when a device or system is generating labels for standard weight packages; (3) when postal scales or weight classifiers are generating manifests for packages to be picked up at a later time; and (4) on livestock scale systems that generate weight tickets to correct erroneous tickets.

**Discussion:** Manually entered gross weight values were discussed in Item 320-1 of the 1991 S&T report. The recommended changes are consistent with the Committee's position in 1991; however, the Committee added the application of devices or systems that are often used in supermarkets to generate labels for standard weight packages.

The Committee believes that the use of manual gross weight entries must be carefully controlled due to the great potential for fraud and abuse. It should be noted that the Committee is requiring specific terms to define manual weight entries to standardize the description of the entries. Past experience has shown that the failure to standardize terminology or abbreviations gives rise to a variety of descriptive symbols, not all of which adequately define the values as manual entries. Additionally, the terms to identify manual weight entries are required only on recorded representations (excluding labels for standard weight packages), i.e., the terms are not required on weight displays. Manual gross weight entries are permitted only at gross-load zero when the scale is in the gross weight display mode. The Committee concluded that, for direct sales, restricting manual weight entries to when the load-receiving element is empty provides adequate information to the customer of the action taking place, thereby providing protection against a fraudulent action. (See General Code paragraph G-UR.3.3.) If a consumer is not observing the weighing operation, the display of a message about manual weight entry taking place does not aid in protecting the consumer.

Additionally, a symbol may be used to identify multiple manual weight entries provided that the symbol is defined on the same page of the weight ticket where the symbol appears and the definition of the symbol is printed automatically by the recording element as part of the weight document.

The Committee also recommends that the criteria in its 1991 report for the operation of livestock scales with the manual gross weight entry feature be included in the digital scales checklist in NCWM Publication 14. The criteria are:

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 void.
- c. A conspicuous message indicating that the weight has been corrected must be printed on the ticket using one of the following terms: "Manual Wt," "Manual Weight," or "MAN WT." Abbreviations such as "M," "keyed" or "MW" are not acceptable.

#### 320-4 I S.2.1.1. Zero-Load Adjustment; General

(This item was changed from a voting item to an information item at the Annual Meeting. The item is presented below as it was originally proposed as a voting item.)

**Recommendation:** The Committee recommends that the maximum range on an external zero-setting mechanism be limited to 4 percent of the capacity of the scale. This recommended change is nonretroactive. The Committee recommends that S.2.1.1. be amended to read:

S.2.1.1. General. - A scale shall be equipped with means by which the zero-load balance may be adjusted. The maximum range of the zero-setting mechanism (exclusive of any initial zero-setting mechanism) shall not exceed 4 percent of the rated capacity of the scale.\* Any loose material used for this purpose shall be enclosed so that it cannot shift in position and alter the balance condition of the scale.  
[\*Nonretroactive and effective January 1, 1993]

**Discussion:** This recommendation would eliminate a difference in U.S. and Canadian requirements identified by industry. This change would also address the situation where a device owner uses the zero adjustment feature as a tare feature. Unfortunately, a number of businesses purchase scales without tare features although the tare feature is needed as part of the normal use of the scale. If a tare feature is needed, then suitability of equipment dictates using a scale equipped with tare capability. The use of the zero adjustment for tare is inappropriate: the wrong scale for the application was bought (and sold).

The Committee recommends that the range on the zero-setting mechanism be limited to 4 percent of the scale capacity, which should be sufficient to adjust for changes in zero during the normal use of the scale. The zero-setting mechanism addressed here is the mechanism designed and used to adjust zero during the normal use of the scale (sometimes call the "fine" zero adjustment mechanism). This limitation does not apply to coarse zero adjustments or the initial zero-setting mechanism used to compensate for large changes in dead load (often used in the set-up of the scale). For example, the electronic coarse zero adjustment, which has been identified as a parameter to be sealed, may be used to offset large changes in the dead load of a scale. Similarly, the initial zero-setting mechanism may be used to correct for significant changes in dead load. In the case of mechanical scales, the 4-percent restriction would not limit changes to any butt weights or changes to the weight of the counterpoise weight hanger to compensate for changes in the dead load. All of these zero-adjustment mechanisms permit the scale to retain the full weighing range of the scale.

However, the 4-percent restriction applies to all forms of the zero-setting mechanism, including the manual, semi-automatic, and automatic zero-setting mechanisms described in the Handbook 44 definitions. Furthermore, this applies to the common zero-adjustment mechanisms on mechanical scales as well as to the externally-operable zero-adjustment mechanisms on digital-indicating scales.

Both OIML and Canada limit the range of the zero-setting mechanism to 4 percent of the scale capacity. The objective is to prevent the zero mechanism from being used as a tare mechanism when the application of the device requires a tare feature under suitability of equipment. It has been suggested that this limitation is not necessary in the United States because the zero-setting mechanism does not alter the maximum weighing capacity of the device. Although Handbook 44 currently permits zeroing any load to the capacity of the scale, the maximum gross load that can be placed on a scale may not exceed 105 percent of scale capacity. Under Handbook 44, if a load in excess of the overcapacity range (limited to 5 percent of the scale capacity) is zeroed by other than the initial zero-setting mechanism, then the weighing range of the scale is reduced accordingly.

The Committee believes that this limitation on the range of zero will not be a problem with the proper use of a scale. If the zero of a scale varies by more than 4 percent without a significant change in the dead load, this implies that something is wrong with the operation or use of the scale.

Prior to the Annual Meeting, the Committee received requests to provide exemptions to the 4 percent zero range for livestock scales and for class I and II scales. Since one objective of this change is to harmonize this requirement with Canada, the Committee decided to make this an information item rather than provide exemptions that would defeat the objective of having a consistent requirement.

### 320-5 I S.2.3. Tare; Automatic Clearing of Tare

This item is one of several on the S&T agenda to eliminate differences in U.S. and Canadian requirements that were identified by industry. Canada requires electronic computing scales to automatically clear tare following a transaction, but the United States does not. When a scale is used in the prepackaging mode, Canada permits a tare to be retained in scale memory.

The S&T Committee wanted to propose that tare be automatically cleared after a transaction, but with an exemption for scales that are set and used with a constant single tare. The Committee discussed other possible exemptions without reaching a consensus. Since additional exemptions would preclude harmonization with Canada, the Committee is not recommending any changes at this time, rather than make a change that does not achieve harmonization. The comments submitted to the Committee will be studied by OWM and LMB for further consideration.

### 320-6 VC S.6.3. Marking Requirements; Capacity by Division

(This item was adopted as part of the consent calendar.)

**Recommendation:** The Committee recommends that Tables S.6.3.a. and S.6.3.b. (note 3) be interpreted to permit the required capacity and scale division markings to be presented as part of the scale display (e.g., displayed on a video terminal or in a liquid crystal display), rather than be physically marked on the device. As part of the current language in the tables and this interpretation, the capacity by division statement must be adjacent to the weight display and continuously displayed when in the weighing mode. However, if the weighing mode of the scale permits different menus for selecting operations to be displayed, the weight information and capacity by division statement must be continuously displayed if this display is the customer's only display. These requirements apply to all of the weighing modes that may be selected for commercial transactions. The statement does not have to be displayed when the indicating element operates in modes other than the weighing mode. This does not require a change to Handbook 44. This interpretation will be included in NCWM Publication 14 and NCWM Publication 3.

**Discussion:** The current interpretation of the marking requirement is that the capacity by scale division and the weight unit must be physically marked on the device to be visible at all times, whether or not the device is turned on.

Adoption of this recommended interpretation would permit the capacity by scale division statement to be visible only when the weight display is turned on.

The statement that the capacity by scale division is not required to be displayed when in modes other the weighing mode refers to situations where the scale is in the supervisor's mode and manager functions are being performed. Similarly, if the indicating element for the scale is a computer monitor, then, when the computer is running software other than the scale software, the weight display and capacity statement are not required to be indicated.

Although the Committee has had similar requests to permit scale model and serial numbers to be part of the display, the Committee is not making any changes regarding the marking of the serial number or model number. Further study of the impact of such an action is needed before action is considered. Consequently, the display of software serial numbers and model numbers does not replace the required physical markings, and the Committee does not plan to explore this point further at this time.

### 320-7 VC S.6.3. Marking Requirements; Format of Table S.6.3.a.

(This item was adopted as part of the consent calendar.)

**Recommendation:** To clarify the application of the marking requirements, revise Table S.6.3.a. as shown on the next page, amending notes 8, 9, 12, and 17, and adding new notes 18 and 19, to read as follows:

8. *An indicating element not permanently attached to a weighing element shall be clearly and permanently marked with the accuracy Class of I, II, III, III L, or IIII, as appropriate, and the maximum number of scale divisions,  $n_{max}$ , for which the indicator complies with the applicable requirement. Indicating elements that qualify for use in both Class III and III L applications may be marked III/III L and shall be marked with the maximum number of scale divisions for which the device complies with the applicable requirements for each accuracy class. [Nonretroactive as of January 1, 1988.]*
9. *For vehicle, axle-load, and livestock scales only. The CLC shall be added to the load-receiving element of any such scale not previously marked at the time of modification. [Nonretroactive as of January 1, 1989.]*
12. *Required on the indicating element and the load-receiving element of vehicle, axle load, and livestock scales. Such marking shall be identified as "concentrated load capacity" or by the abbreviation "CLC".\**  
*[\*Nonretroactive as of January 1, 1989]*
17. *The accuracy Class of a device shall be marked on the device with the appropriate designation as I, II, III, III L, or IIII. [Nonretroactive as of January 1, 1986.]*
18. *The nominal capacity shall be conspicuously marked as follows:*
  - (a) *on any scale equipped with unit weights or weight ranges;*
  - (b) *on any scale with which counterpoise or equal-arm weights are intended to be used;*
  - (c) *on any automatic-indicating or recording scale so constructed that the capacity of the indicating or recording element, or elements is not immediately apparent;*
  - (d) *on any scale with a nominal capacity less than the sum of the reading elements; and*
  - (e) *on the load-receiving element (weighbridge) of vehicle, axle-load and livestock scales.\***[\*Nonretroactive as of January 1, 1989]*
19. *Nonretroactive as of January 1, 1988.*

**Discussion:** There has been some difficulty in interpreting the marking requirements in Table S.6.3.a. Specifically, there has been confusion over the application of the "Scale Without Indicating Element" column and the "Load-Receiving Element" column. In trying to clarify the intent of the requirements, the NCWM Education Committee



**Table S.6.3.a.**  
**Marking Requirements**

To Be Marked With	Weighing Equipment	Scale Single Enclosure Weighing, load-receiving, and indicating element in same housing	Indicating Element Separate Indicating element not permanently attached to weighing and load-receiving element	Scale Without Indicating Element Weighing and load-receiving element not permanently attached to indicating element	Load cell with CC (11)	Other equipment or device (10)
Manufacturer's ID (1)	x	x	x	x	x	x
Model Designation (1)	x	x	x	x	x	x
Serial Number and Prefix (2)	x	x	x	x	x	x (16)
Accuracy Class (17)	x	x (8)	x(19)	x		
Nominal Capacity (3)(18)	x	x	x			
Value of Scale Division, d(3)	x	x				
Value of "e" (4)	x	x				
Temperature Limits (5)	x	x	x	x		
Concentrated Load Capacity (12)		x	x (9)			
Special Application (13)	x	x	x			
Maximum Number of Scale Divisions ( $n_{max}$ ) (6)		x (8)	x(19)	x		
Minimum Verification Scale Division ( $e_{min}$ )			x(19)			
"S" or "M" (7)				x		
Direction of Loading (15)				x		
Minimum Dead Load				x		
Maximum Capacity				x		
Safe Load Limit				x		
Load Cell Verification Interval ( $v_{min}$ )				x		
Section Capacity (14)		x	x			

For applicable notes, see Table S.6.3.b.

(Added 1990)

found that the table in the 1991 and 1992 editions does not exactly track the requirements in the 1990 edition of Handbook 44 (the version before the table was added). The S&T Committee reported this fact when the table format was proposed in 1990. For example, Footnote 9 in the current table implies that all of the markings in the "Load-Receiving Element" column must be added at the time of modification to any scale not previously marked; however, in the 1990 edition of the Handbook, the only marking required to be added at the time of modification was the Concentrated Load Capacity (CLC) marking. In addition, some of the nonretroactive dates that appear in the 1990 edition were dropped from the 1991 table. The revised table and notes more closely follow the requirements stated in the 1990 edition of Handbook 44.

The load-receiving element of a scale is that portion of the scale designed to receive the load to be weighed and is often referred to as the platform, deck, hopper, or weighbridge. The weighing element supports the load-receiving element and transmits to an indicating element a signal or force resulting from the load. In a mechanical scale, the lever system is the weighing element and provides a large surface area for marking. In fully electronic scales, the combination of load cells and mounting assemblies comprise the weighing element, but the load cells are mechanically connected only through the weighbridge and the base structure supporting the load cells in the scale installation. The individual load cells do not provide a readily identifiable surface for the markings required on weighing elements.

In fully electronic vehicle scales, the load cells and the weighbridge (the load-receiving element) often appear to be a single entity, but comprise both the weighing element and the load-receiving element. It was not clear how the "weighing element" is to be marked separate from the load-receiving element. This single marking requirement for the weighing element and load-receiving element should eliminate the problem of confusion regarding which requirement should be applied.

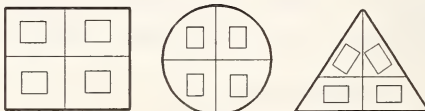
Note that dropping the column for marking the load-receiving element means that a vehicle scale weighing element and load-receiving element of vehicle, axle-load, and livestock scales require only one marking for the two elements. This single marking must be located as specified in S.6.2. In the case of pit-type fully electronic scales, this marking may be on the rim of the manhole opening, and will be visible only after the cover is removed. Manufacturers of vehicle, axle-load, and livestock weighing elements comprised of lever systems are encouraged to continue to mark the lever system weighing elements with the information required in the past for weighing elements.

### 320-8 V N.1.3.1. and N.1.3.3. Shift Test; Bench and Counter Scales and Equal-Arm Scales

(This item failed.)

**Recommendation:** The Committee recommends that N.1.3.1. be amended to specify that the shift test to be conducted using loads equal to one-third of scale capacity and to permit scale performance to be evaluated by conducting shift tests at any test loads up to one-third of the scale capacity. The loads are to be placed in the center of the loading areas as shown below. The revised test procedure also affects equal-arm scales since N.1.3.3. refers to N.1.3.1. for the position of the loads. No change is recommended to N.1.3.3. The following language is recommended for N.1.3.1.

**N.1.3.1. Bench or Counter Scales.** - A shift test shall be conducted with a ~~half-capacity~~ test load equal to one-third of scale capacity centered successively at four points equidistant between the center and the ~~front, left, back, and right~~ edges of the load-receiving element as illustrated below. Additional shift tests may be conducted at test loads less than one-third of the scale capacity.



**Discussion:** This recommendation would eliminate a difference in U.S. and Canadian requirements identified by industry. The recommended change will unify the shift test requirements for the United States, Canada, and OIML for bench and counter scales, and equal-arm balances. This change does not affect the shift test as it applies to any other scales. For example, vehicle scales will continue to be tested consistent with N.1.3.4. and floor scales will be tested using the procedures described in N.1.3.7.

This change in procedure is not expected to have a significant effect on the current design of scales, but it will eliminate differences in test procedures. The change in the specified test load from one-half scale capacity to one-third scale capacity is not particularly large. Since the change is limited to bench and counter scales and equal-arm balances, the effect on commercial devices is expected to be small. The change in the test pattern combined with the slight reduction in test load should permit this test procedure to be applied to existing commercial bench and counter scales without affecting their compliance with Handbook 44.

### 320-9A I N.4. Guidelines to Determine When Coupled-in-Motion Scale Systems Should be Tested "As Used"

The S&T Committee developed a list of general principles that apply to coupled-in-motion (CIM) weighing and a list of criteria for evaluating various aspects of the site and installation of CIM scale systems. These lists are based on the AREA Committee 34 report of Sub-Committee D-1-83, "Criteria for Location of Coupled-In-Motion Weighing Systems." Several railroads have performed tests to provide the Committee with data on CIM scale systems for liquids in tank cars and mixed merchandise trains; the criteria were applied to these installations on a trial basis. The reaction to the guidelines has been favorable. The Committee has not received any suggestions for modification at this time. See Item 320-7 in the 1991 S&T report for more information.

The Committee recommends that industry and weights and measures officials use these guidelines in their process of assessing whether or not a particular CIM scale system should be tested "as used." Knowledge, experience, and judgment are needed to make this decision because the number and extent of deviations from the guidelines before "as used" tests should be conducted have not yet been determined. The Committee requests the assistance of the Association of American Railroads, American Railway Engineering Association, Western Coal Transportation Association, and the Railroad Advisory Committee along with other interested parties to evaluate these guidelines and provide input regarding the proper application of the guidelines. The guidelines are provided below.

### Weighing Principles and Site Criteria for Coupled-In-Motion (CIM) Scales

The cost of conducting "as used" tests on coupled-in-motion scales is very high; therefore, the decision to conduct "as used" tests should not be made 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. The weighing principles and site criteria listed below should be used as guidelines for determining when to conduct an "as used" test. It should be kept in mind that the site criteria are for an ideal installation, and that actual installations may differ. The degree of difference will determine whether to conduct an "as used" test.

#### Weighing Principles

1. The site should permit the entire train that is to be weighed to move over the scale in a manner such that the effects of weight transfer from car to car will be minimized during the weighing process. The train should approach the scale at a constant speed and should move over the scale smoothly and steadily. The cars should not be bunched, and train handling should prevent excessive coupler interaction. Automatic air brakes and hand brakes on all cars should be fully released.
2. A periodic maintenance program for the track and scale should be established in writing, documented, and available for review. A high standard of maintenance is necessary to ensure that the approach and retreat, the ballasted track on either end of the device, and the load-receiving elements will be stable, so that adverse dynamic effects are minimized.

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3. The number of cars to be handled over the weighing device at a given time should not be affected by the grade or by any curvature of the tracks to an extent that weights do not meet the applicable tolerances.
4. There should be an adequate distance from any point where the train might be stopped to the CIM scale so that the train can start again without excessive coupler interaction and can attain the proper weighing speed before passing over the scale. If, for any reason, the train is stopped on the scale it should be possible to start again without excessive coupler interaction during the weighing process.
5. The grade conditions should be consistent throughout the train so as not to influence the weighing operation.
6. The track alignment approaching and leaving the scale should be satisfactory.
7. A curve has dynamic effects similar to an ascending grade on a straight track.
8. The performance of a bi-directional scale may depend on the direction in which the train is traveling. In the case of bi-directional weighing, the greater the difference in track profile in terms of the direction of travel, the greater the potential for differences in the weighing process.
9. The interactions among cars depends upon whether cars are pushed or pulled over the scale and may change the weighing performance of a weighing system.
10. Coupler tension should be kept to a minimum and not change significantly as the train passes over the scale.

### Site Evaluation Criteria

1. The site should permit the train to approach, be weighed, and exit the scale at a constant speed and to minimize coupler interaction over the full length of the train. This condition must be satisfied for both the minimum and maximum number of cars in the train or the group or cut of cars to be weighed. The greater the coupler interaction and changes in coupler interaction, the greater the potential for affecting the weighing process detrimentally.
2. A scale should not be located at the top of a grade or in the depression between grades wherein the coupler tension will detrimentally affect the cars being weighed.
3. A scale should be installed in straight track for a distance at least equal to 1/2 the length of the train on the approach, but preferably equal to the length of the entire train. Evaluation of a site must take into consideration whether the scale is to be used only for unit train weights or for individual car weights, since the latter use may require more stringent installation conditions to achieve the desired performance.
4. The train speed should be controlled without the use of automatic or manual brakes. Ideally, the throttle position should not have to be changed as the train passes over the scale. The more frequently the throttle position is changed, the greater the potential for affecting scale performance.
5. Scales used for single-direction weighing should be installed on a slight downgrade to utilize the effects of gravity to offset friction and to minimize coupler interaction.
6. The approach and exit rails should be level or consistent with the grade of the approach/exit trackage; there should be no "dips" or "rises" in the rails within the length of the train on either end of the scale. The closer fluctuations in the rail are to the scale, the greater the potential impact on the weighing process.
7. Ideally, the approach and exit rails should be level for bi-directional weighing for the length of train or cuts to be weighed.
8. The scale should not be located on a track where non-weighing trains pass over the scale rails. Means should be provided to prevent the weight of trains by-passing the scale from being transferred to the weighing element.



9. In the event of traffic from local operations, the site should permit a train in the process of weighing to finish weighing without stopping on the scale.
10. The scale location should not be adversely affected by weather conditions, e.g., high water and snow accumulation.
11. Curves and grades in the track should be kept to a minimum. Generally, the greater the curve and the steeper the grade, the more the weighing process will be adversely affected; however, curves and grades have compensating affects in some applications (see ref. Weighing Principles No. 7).

#### Test Requirements

1. A single-draft or 2-draft static scale should be readily accessible for use as a reference scale.
2. The test train should be inspected for defects prior to the start of weighing. Cars should be inspected for leaks, loose material, or any condition that could contribute to a change in weight.
3. The test should not be conducted or continued if rain, snow, or other unusual conditions alter or affect the weights of the cars beyond acceptable limits before the test is completed.
4. All cars should be uncoupled at least at one end, when determining their weight on the reference scale provided that there is no coupler interaction at the other end.
5. The cars should have a range of gross weights comparable to the weights of cars used in the normal operation of the scale.
6. A scale intended to be used bi-directionally must be tested in both directions.
7. The weighing performance of a device may depend on whether the train is pulled or pushed across the scale. The scale must be tested in the manner in which it is to be used, that is, if used by both pushing and pulling, the scale must be tested in both methods of operation.
8. Both ends of the weighing element's track should be spray-painted a bright color to permit ease in differentiating between the "live" rails and the approach rails during the reference weighing process.

#### **320-9B            V            N.4. Editorial Changes: Definition**

(This item was adopted.)

**Discussion:** It has been suggested that the terminology in the Scales Code to address coupled-in-motion (CIM) railway scales be changed slightly to reflect that the performance of these scales depends upon more than the scale itself. Performance may be affected by several factors, including track profile and track maintenance. To properly reflect the interaction of factors on the performance of a coupled-in-motion scale, it is recommended that the term "weighing system" be used to replace selected references to "scale." References to "scale" have been retained in places where the text refers to the scale installed in the weighing system. It has also been suggested that "railway track scale" be changed to "railroad weighing system." A definition for "coupled-in-motion weighing system" has been suggested.

The Committee is receptive to suggestions that facilitate the understanding of the requirements and test procedures for CIM weighing systems, consequently the Committee supports these proposed changes. Since most of these changes are editorial in nature, the Committee does not anticipate any adverse reaction. The item is presented as a voting item only because the definition must be adopted by the NCWM.

**Recommendation:** The Committee recommends that the following definition be added to Handbook 44.

coupled-in-motion railroad weighing system. A device and related installation characteristics consisting of (1) the associated approach trackage, (2) the scale (i.e., the weighing element, the load-receiving element, and the indicating element with its software), and (3) the exit trackage which permit the weighing of railroad cars coupled in motion.

Make the following editorial changes.

N.4. Coupled-in-Motion ~~Railway-Track Scales~~ Railroad Weighing Systems<sup>1</sup>

N.4.1. ~~Seales~~ Weighing Systems Used to Weigh Trains of Less Than 10 Cars.- These ~~seales~~ weighing systems shall be tested using a consecutive-car test train consisting of the number of cars weighed in the normal operation run over the ~~seale~~ weighing system a minimum of five times in each mode of operation following the final calibration.

N.4.2. ~~Seales~~ Weighing Systems Placed in Service Prior to January 1, 1991, and Used to Weigh Trains of 10 or More Cars.- The minimum test train shall be a consecutive-car test train of no less than 10 cars run over the scale a minimum of five times in each mode of operation following final calibration.

N.4.3. ~~Seales~~ Weighing Systems Placed in Service on or After January 1, 1991, and Used to Weigh Trains of 10 or More Cars.-

- (a) These ~~seales~~ weighing systems shall be tested using a consecutive-car test train of no less than 10 cars run over the scale a minimum of five times in each mode of operation following final calibration; or
- (b) if the official with statutory authority determines it necessary, the As Used Test Procedures outlined in N.4.3.1. shall be used.

N.4.3.1. As Used Test Procedures - A ~~seale~~ weighing system shall be tested in a manner that represents the normal method of operation and length(s) of trains normally weighed. The ~~seales~~ weighing systems may be tested using either:

- (1) a consecutive-car test train of a length typical of train(s) normally weighed; or
- (2) a distributed-car test train of a length typical of train(s) normally weighed.

However, a consecutive-car test train of a shorter length may be used provided that initial verification test results for the shorter consecutive-car test train agree with the test results for the distributed-car or full-length consecutive-car test train as specified in N.4.3.1.1.

The official with statutory authority shall be responsible for determining the minimum test train length to be used on subsequent tests.

N.4.3.1.1. Initial Verification.- Initial verification tests should be performed on any new ~~seale~~ weighing system and whenever either the track structure or the operating procedure changes. If a consecutive-car test train of length shorter than trains normally weighed is to be used for subsequent verification, the

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<sup>1</sup>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.

shorter consecutive-car test train results shall be compared to either a distributed-car or consecutive-car test train of length(s) typical of train(s) normally weighed.

The difference between the total train weight of the train(s) representing the normal method of operation and the shorter consecutive-car test train shall not exceed 0.15 percent. If the difference in test results exceeds 0.15 percent, the length of the shorter consecutive-car test train shall be increased until agreement within 0.15 percent is achieved.

#### N.4.3.1.3. Distributed Car Test Trains.-

- (a) The length of the train shall be typical of trains that are normally weighed.
- (b) The reference weight cars shall be split into three groups, each group consisting of 10 cars or 10 percent of the train length, whichever is less.
- (c) The test groups shall be placed near the front, around the middle, and near the end of the train.
- (d) Following the final adjustment, the distributed-car test train shall be run over the scale at least three times or shall produce 50 weight values, whichever is greater.
- (e) The scale weighing system shall be tested in each mode of operation.

#### N.4.3.1.4. Consecutive-Car Test Trains.-

- (a) A consecutive-car test train shall consist of at least 10 cars.
- (b) If the consecutive-car test train consists of between 10 and 20 cars, inclusive, it shall be run over the scale a minimum of five times in each mode of operation following the final calibration.
- (c) If the consecutive-car test train consists of more than 20 cars, it shall be run over the scale a minimum of three times in each mode of operation.

Change the reference in Table T.1.1. Tolerances for Unmarked Scales from "Railway track scales weighing in motion" to "Coupled-in-motion railroad weighing systems."

~~T.N.3.6. Coupled-In-Motion Weighing, Railway Track Scales~~ **Railroad Weighing Systems.** - Tolerances for the group of weight values appropriate to the application must satisfy the following conditions:

T.N.3.6.2. - If a scale weighing system is used to weigh trains of five or more cars, and if the individual car weights are used, any single weight value within the group must meet the following criteria:

- (a) no single error may exceed three times the static maintenance tolerance;

- (b) not more than 5 percent of the errors may exceed two times the static maintenance tolerance; and
- (c) not more than 35 percent of the errors may exceed the static maintenance tolerance.

T.N.3.6.4. - For a seale weighing system used to weigh trains of less than five cars, no single car weight within the group may exceed the static maintenance tolerance.

T.N.3.7. ~~Uncoupled-In-Motion Weighing, Railway Track Scales~~ Railroad Weighing Systems. - For any single weightment within a group of non-interactive (i.e., uncoupled) loads, the weightment error shall not exceed the static maintenance tolerance.

UR.5. ~~Railway Track Scales Weighing~~ Coupled-In-Motion Railroad Weighing Systems. - A coupled-in-motion seale weighing system placed in service on or after January 1, 1991, should be tested in the manner in which it is operated, with the locomotive either pushing or pulling the cars at the designed speed and in the proper direction. The cars used in the test train should represent the range of gross weights that will be used during the normal operation of the seale weighing system. Except as provided in N.4.2. and N.4.3.(a), normal operating procedures should be simulated as nearly as practical. Approach conditions for a train length in each direction of the scale site are more critical for a seale weighing system used for individual car weights than for a unit-train-weights-only facility, and should be considered prior to the installation. ~~of the coupled-in-motion weighing system.~~

## 320-10 I Notes; Procedures for Testing Uncoupled-in-Motion Railroad Weighing Systems

(This item was changed from a voting item to an information item at the Annual Meeting. The item is presented below as it was originally proposed as a voting item.)

**Recommendation:** The Committee recommends adding a new paragraph N.5. to describe the test procedure for uncoupled-in-motion railroad weighing systems and renumbering the current paragraph N.5. as N.6. A definition for uncoupled-in-motion railroad weighing is provided to correspond to the definition for coupled-in-motion weighing. The following language is recommended as the new paragraph N.5.

N.5. Uncoupled-in-Motion Railroad Weighing System. - An uncoupled-in-motion scale ~~shall~~ should be tested statically before being tested in motion by passing railroad reference weight cars over the scale. When an uncoupled-in-motion railroad weighing system is tested, the car speed and the direction of travel shall be the same as when the scale is in normal use. The minimum in-motion test shall be three reference weight cars passed over the scale three times. The cars shall be selected to cover the range of weights that are normally weighed on the system and to reflect the types of cars normally weighed.

uncoupled-in-motion railroad weighing system. A device and related installation characteristics consisting of (1) the associated approach trackage, (2) the scale (i.e., the weighing element, the load-receiving element, and the indicating element with its software), and (3) the exit trackage which permit the weighing of railroad cars uncoupled in motion.

**Discussion:** This item was discussed in Item 320-10 of the 1991 S&T Committee report. Representatives of the railroad industry reported that their experience had shown that the use of three reference weight cars provide sufficient information to evaluate the performance of an uncoupled-in-motion weighing system. The use of five cars, as originally suggested by the Committee, increases the costs of the test without providing significantly more useful information.

It was stated that it is not necessary to use three test cars in some cases, nor to pass the cars over the scale three times, to adequately determine the performance of the scale. This may be the case where the installation and repeatability of the test results are determined to be very good and the weight range of the cars weighed is relatively narrow. The Committee agrees that fewer tests may suffice in some cases, but for the purposes of standardizing the



test procedure and assuring that repeatability of performance is adequately characterized, the Committee recommends that the minimum test consist of at least three reference weight cars passed over the scale at least three times.

The issue was raised as to whether or not it is necessary that an uncoupled-in-motion scale be tested statically if it is not used as the reference scale to determine the weight of the reference cars used to test the uncoupled-in-motion weighing system. The Committee believes that there are distinct benefits to testing the uncoupled-in-motion scale statically, such as ensuring that the scale is accurate across the total length of the scale so that variables present in the use of the scale for dynamic weighing will not affect the accuracy of cars weighed. The Committee will study the issue of whether or not static scale tests should be required on all railroad in-motion weighing systems as part of its work to resolve other railroad issues. The Committee requests the advice and assistance of the railroad industries, users, and scale owners to help in the resolution of this issue.

Uncoupled-in-motion railroad scales are of three types: scales weighing in a single draft, those weighing in two drafts, and axle weighers. The industry practice has been to use three reference weight cars to test both single-draft scales and multi-draft scales. First, the uncoupled-in-motion scale must be tested statically, then the cars to be used as reference weight cars are weighed statically on the reference scale to establish their weight. If empty and loaded cars are weighed, three cars are selected for the test: one near the low end, one of intermediate weight, and one near the maximum load weighed on the weighing system. The cars used for the test must be assigned a reference weight value and meet the following criteria (taken from the AAR Scale Handbook):

1. The cars should have a range of gross weights similar to the weights of cars used in the normal operation of the scale.
2. 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 beyond acceptable limits before the motion test is completed.
3. 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.

### **320-11            I            Railroad Coupled-in-Motion Weighing of Individual Cars in Mixed-Merchandise Trains for Custody Transfer**

This is one of several railroad issues that have been on the S&T agenda for several years. It is critically important and of great economic significance to the railroad industry. The railroad industry has been working with the Committee to collect test data on coupled-in-motion weighing systems for both mixed merchandise trains and liquids in individual tank cars for custody transfer. The cooperation and assistance of the scale owners, the railroads, and the scale manufacturers has been outstanding. The Committee expresses its appreciation to the railroad industry for its leadership and excellent cooperation with the Committee in assessing these issues.

The ongoing scale tests to assist the Committee were completed in June 1992. The Committee is reviewing the final data and plans to present its recommendations on this issue for the Interim Meeting of the NCWM in January. The Committee plans to present its recommendations for a vote in 1993.

## **320-12            I            Railroad Coupled-in-Motion Weighing of Liquids in Individual Tank Cars for Custody Transfer**

This item is closely related to 320-11, but additional considerations apply when weighing liquids in tank cars. This issue has been on the agenda for several years and has been part of the study being conducted with the scale owners, the scale manufacturers, and the railroad industry. As stated in the previous item, the cooperation and assistance of the scale owners, the railroads, and the scale manufacturers has been outstanding. The Committee expresses its appreciation to the railroad industry for its leadership and excellent cooperation with the Committee in assessing these issues.

The ongoing scale tests to assist the Committee were completed in June 1992. The Committee is reviewing the final data and plans to present its recommendations on this issue for the Interim Meeting of the NCWM in January. The Committee plans to present its recommendations for a vote in 1993.

## **320-13            I            T.N.4.5. Time Dependence**

The Committee considered a proposal to adopt the OIML procedures and data analysis criteria for the time dependence (creep) test with the objective being to shorten the time required to conduct the creep test. This is one of several items identified by industry and on the S&T agenda to eliminate a difference in U.S. and Canadian requirements. The OIML procedures for load cells and scales permit a creep test to be conducted in as little as 30 minutes, provided that the scale performance is within acceptable limits. OIML permits conducting the full-length creep test if the scale performance is questionable after 30 minutes.

The Committee decided not to make any change at this time for several reasons. First, the OIML creep test for load cells is still specified as a 4-hour test, with a shorter test acceptable provided the load cell performance is acceptable. Consequently, adopting the OIML test would not necessarily shorten the time required for the creep test. Of greater impact is the fact that OIML has a 30-minute return-to-zero test after the scale or load cell has been under a near-capacity load for 30 minutes. The tolerance for the return-to-zero test is 0.5e. This is a much more stringent performance requirement than the creep test. While the creep test is conducted over a longer period of time, the Handbook 44 tolerance is considerably larger (one-half the absolute value of the applicable tolerance for class III L and the absolute value of the applicable tolerance for class III devices). Since the creep test specified in Handbook 44 is 1 hour, adopting a 30-minute test does not have significant benefit in terms of shortening the test.

Rather than propose a change in the test procedure at this time, the Committee believes consideration should be given to adopting a return-to-zero test for scales. This could be a substitute for the creep test since, based upon the tolerance, any scale or load cell that could pass the 30-minute return-to-zero test would probably also pass the 1-hour creep test. The Committee will consider proposing the return-to-zero test for adoption in the future. Comments are requested on this subject.

## **320-14            I            UR.1.X. Selection Requirements; Suitability of Equipment**

The suitability of scales for specific applications is a continuing problem for weights and measures officials, purchasers of scales, and sales representatives for scale manufacturers. The suitability of a scale depends upon the accuracy required for the application, the range of loads weighed over the scale, and the minimum load to be weighed on the scale. The required accuracy will determine the appropriate accuracy class of the scale that should be used. The range of loads weighed and the minimum load requirement will determine the scale capacity and division value appropriate for the application. The user requirements in the Scales Code specify the maximum division value appropriate for some applications and the minimum load that is acceptable for some commodities. The accuracy for certain types of scales, which often depends upon the application (e.g., wheel-load weighers, livestock scales, and grain hopper scales), is sometimes part of the Scales Code requirements.

The issue of suitability of equipment manifests itself in two forms. The first is for a business owner to identify his expected weighing needs, then purchase a scale suitable for the application. The first table of examples that follows illustrates the application of the S&T proposal to aid in purchasing a suitable device for a given application. The

second form of determining the suitability of equipment arises when a weights and measures official inspects installed devices and must determine if the installed scale is suitable for the application. The second table of examples presents the application of the proposed guidelines to scales already in use in a specific application. The difference in applying the formulae described below is that, for existing scales, the minimum net load is based upon the 20-divisions (20d) or 50-division (50d) minimum load that applies to class III and III L scales, respectively.

The subject of suitability of equipment was discussed in considerable detail in the 1991 S&T Final Report in Items 320-14A and 320-14B for scales (Items 330-8A and 330-8B for liquid-measuring devices). Last year the Committee proposed a table of values for different applications to aid in defining the suitability of scales. A frequent criticism was that the table was too specific and there were disagreements over individual values in the table. The Committee received a proposal from the Central Weights and Measures Association to express the suitability of scales requirements as formulae.

This proposal is not based upon the price of a commodity, but in many cases is indirectly related to the price since customers tend to purchase smaller quantities when the price increases. The proposal is to continue to use Table 7b for scales not marked with an accuracy class; for scales marked with an accuracy class, both criteria listed in the following table for each category of devices must be satisfied. It should be noted that weighing systems currently are characterized by customary units, as reflected in the following tables and discussion. However, Handbook 44 is undergoing revision to ensure SI usage as the primary form for all measurements.

For scales with capacities from 5 lb to 2500 lb, inclusive	$\frac{d}{\text{minimum net load}} \leq 5\%$	$\frac{d}{\text{average net load}} \leq 1\%$
For scales with capacities less than 5 lb and greater than 2500 lb	$\frac{d}{\text{minimum net load}} \leq 2\%$	$\frac{d}{\text{average net load}} \leq 0.2\%$

Rewriting the formulae as expressions for the scale division,  $d$ , gives the following representations.

For scales with capacities from 5 lb to 2500 lb, inclusive	$d \leq 5\% * (\text{minimum net load})$	$d \leq 1\% * (\text{average net load})$
For scales with capacities less than 5 lb and capacities greater than 2500 lb	$d \leq 2\% * (\text{minimum net load})$	$d \leq 0.2\% * (\text{average net load})$

The relationship for the average net load for scales with capacities less than 5 lb and capacities greater than 2500 lb was selected to be 0.2 percent to correspond to the minimum load requirement in UR.3.8. for livestock scales.

The process under this proposal for determining the average net weight for a scale application has been questioned. The Committee believes that the process of determining the average net load for a scale is not difficult; however, it does require some investigation on the part of the weights and measures official. For an existing installation, it is a matter of reviewing sales receipts, scale tickets, register tapes, or merely observing the weighing operation for a period of time. The length of time or the number of transactions to be considered is left to the discretion of the official or may be a policy of the jurisdiction. When a business owner requests advice about an appropriate scale division for an application, the business has the responsibility of providing the value to be used for the average net weight. The business owner generally has a good idea of the range of loads to be weighed and other expected net weights. If the inspector and the business owner disagree in their assessments of the average net load, the scale owner has the responsibility to provide documentation to support the average net weight claimed.

Examples illustrating the use of the formulae are given below. These examples target the purchasing of scales by assessing the anticipated needs based upon the minimum net load and the average net load expected for the application.

## Examples of Analysis Before Purchasing a Suitable Device

Device Application	Category of Scale Capacity	Typical Range of Loads	Minimum Net Load	Estimated Average Net Load	Calculated $d_{\max}$ for Minimum Net Load	Calculated $d_{\max}$ for Average Net Load	Maximum Value for $d^*$
POS scale	5 to 2500 lb	0.5 to 5 lb	0.5 lb	2 lb	0.025 lb	0.02 lb	0.02 lb
Delicatessen	5 to 2500 lb	0.25 to 3 lb	0.25 lb	1 lb	0.0125 lb	0.01 lb	0.01 lb
Specialty shop	5 to 2500 lb	0.1 lb to 1 lb	0.1 lb	0.5 lb	0.006 lb	0.005 lb	0.005 lb
Vehicle scale, grain elevator	> 2500 lb	10,000 to 80,000 lb	10,000 lb	40,000 lb	200 lb	80 lb	50 lb
Vehicle scale, feed mill	> 2500 lb	5,000 to 30,000 lb	5,000 lb	15,000 lb	100 lb	30 lb	20 lb
Hopper scale	> 2500 lb	2,000 to 15,000 lb	2,000 lb	9,500 lb	40 lb	19 lb	10 lb
Aluminum can recycling	5 to 2500 lb	25 to 300 lb	25 lb	70 lb	1.25 lb	0.7 lb	0.5 lb
Aluminum can recycling	5 to 2500 lb	3 to 30 lb	3 lb	5 lb	0.15 lb	0.05 lb	0.05 lb
Grain sample scale	< 5 lb	150 to 1000 g	150 g	250 g	3 g	0.5 g	0.5 g
Animal scale (hogs)	5 to 2500 lb	100 to 300 lb	100 lb	200 lb	5 lb	2 lb	2 lb
Monorail scale	5 to 2500 lb	100 to 300 lb	100 lb	180 lb	5 lb	1.8 lb	1 lb
Shipping scale <sup>1</sup>	5 to 2500 lb	1 to 200 lb	1 lb	20 lb	0.05 lb	0.2 lb	0.05 lb
Postal scale <sup>1</sup>	< 5 lb	1 oz to 1 lb	1 oz	16 oz	0.02 oz	0.032 oz	0.02 oz
*Scale divisions for most scales must be in decimal multiples or submultiples of 1, 2, or 5 (S.1.2).							
<sup>1</sup> These scales are <u>not</u> weight classifiers.							

Except for the examples of the shipping and postal scales, the limiting factor for the maximum value of the scale division for these examples is the average net load. This should be expected when a scale with sufficient resolution has been selected for the application and the range of loads is not excessive. This will also be true for scales routinely used to weigh very small loads in terms of the value of the scale divisions, since the number of small loads causes the average net load to be small. If a scale is used to weigh very small loads on a relatively infrequent basis, which is the case with the shipping and postal scales used primarily to weigh packages, then the maximum permitted value for the scale division is based upon the minimum load criterion.



When a weights and measures official must judge whether or not a scale is suitable for a particular application, the scale capacity and division for the installation have already been selected. It may be possible to change these two values for the scale, but the following examples illustrate the results of calculating the minimum net load for the application using the formulae provided earlier. The determination of the minimum load and the average load actually weighed is determined as described earlier in this discussion. When the example illustrates a device not suitable for the application, the condition that led to that conclusion is shaded.

**Examples to Determine if an Installed Scale is Suitable for the Application**

Device Application	Category of Scale Capacity	Value of d	Calculated Minimum Net Load Permitted	Calculated Average Net Load Permitted	Range of Actual Loads	Estimated Average Net Load	Is Device Suitable for Application?
POS scale	5 to 2500 lb	0.01 lb	0.20 lb	1.00 lb	0.5 to 5 lb	2 lb	Yes
Delicatessen	5 to 2500 lb	0.01 lb	0.20 lb	1.00 lb	0.25 to 3 lb	1 lb	Yes
Specialty shop	5 to 2500 lb	0.01 lb	0.20 lb	1.00 lb	0.1 lb to 1 lb	0.5 lb	No
Vehicle scale, grain elevator	> 2500 lb	50 lb	2,500 lb	25,000 lb	10,000 to 80,000 lb	40,000 lb	Yes
Vehicle scale, feed mill	> 2500 lb	20 lb	1,000 lb	10,000 lb	5,000 to 30,000 lb	15,000 lb	Yes
Hopper scale	> 2500 lb	20 lb	1,000 lb	10,000 lb	2,000 to 15,000 lb	9,500 lb	No
Aluminum can recycling	5 to 2500 lb	0.5 lb	10 lb	50 lb	25 to 300 lb	70 lb	Yes
Aluminum can recycling	5 to 2500 lb	0.25 lb	5 lb	25 lb	3 to 30 lb	5 lb	No
Grain sample scale	< 5 lb	0.5 g	25 g	250 g	150 to 1000 g	250 g	Yes
Animal scale (hogs)	5 to 2500 lb	2 lb	40 lb	200 lb	100 to 300 lb	200 lb	Yes
Monorail scale	5 to 2500 lb	1 lb	20 lb	100 lb	100 to 300 lb	180 lb	Yes
Shipping scale <sup>1</sup>	5 to 2500 lb	0.05 lb	1 lb	5 lb	1 to 200 lb	20 lb	Yes
Postal scale <sup>1</sup>	< 5 lb	0.1 oz	2 oz	10 oz	1 oz to 1 lb	16 oz	No

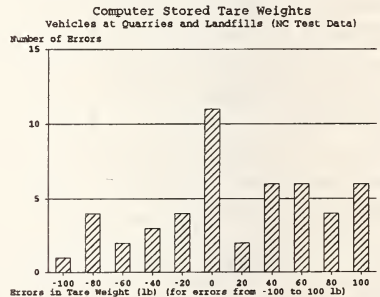
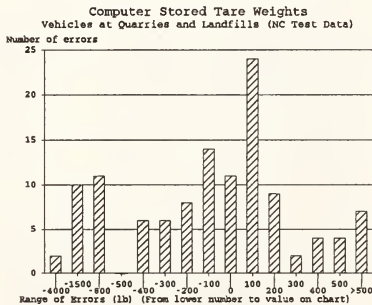
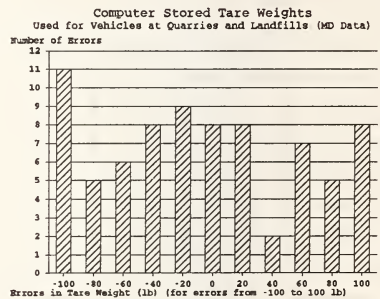
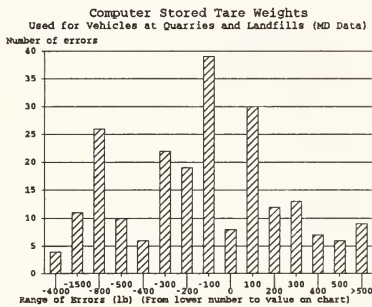
<sup>1</sup> These scales are not weight classifiers.

The Committee requests that industry and the regional weights and measures associations study this concept and determine if this approach is more acceptable to aid in assessing the suitability of equipment for an application. Comments on this proposal are requested so the Committee can continue to develop this subject.

### 320-15 I UR.1. Selection Requirements; Use of Stored Vehicle Tare Weights

**Discussion:** Several States permit vehicle tare weights to be stored in scale memory to eliminate the weighing of empty trucks and thus speed up the weighing operation. Depending upon the company, these tare weights may be updated daily, weekly, monthly, or on an irregular basis. Two States, Maryland and North Carolina, compared the stored weights for vehicles with the actual weight of the vehicles at 20 and 14 different companies, respectively. The errors ranged from -4020 lb to +4520 lb in Maryland and -2000 lb to +3400 lb in North Carolina. Plus errors mean the truck tare weights were greater than the values stored in memory; a negative error indicates the actual tare weight is less than the stored tare weight. In transactions where the product is sold over the scale, a negative error favors the seller. As indicated in the graphs, the errors have a negative bias.

Most of the empty trucks weighed between 20,000 and 35,000 lb. Histograms showing the distribution of errors are presented below. In general, the negative errors favored the firm that determines the net weight of the load on the truck (generally the seller of the commodity).



The graphs on the left show the total number of errors on the Y-axis plotted against the magnitude of the errors. (The bar over zero is the number of trucks that had zero error.) The graphs on the right show the distribution of errors between -100 lb and +100 lb to provide more detailed view of the distribution near zero error.

Stored tare weights are used to increase the efficiency of the weighing operation. It is questionable whether or not the use of stored tare weights is appropriate and, consequently, whether or not the feature should be permitted on

scales. The large errors in tare weights (and consequently in the net weight) are often far larger than the tolerance of approximately 0.2 percent that applies to vehicle scales.

To assist in the development of a solution, the Committee requests that States submit their policies regarding the use of stored tare weights and, if permitted, identify the applications where stored weights are permitted for use. Information is also requested on how frequently companies update the tare weights and how frequently, if ever, the stored tare weights are monitored by weights and measures officials. Recommendations of how to address the errors associated with this practice are requested along with supporting justification for the recommendation. The regional weights and measures associations are requested to discuss this problem to develop recommendations.

### 320-16 VC UR.1.4. Grain-Test Scales: Value of Scale Divisions

(This item was adopted as part of the consent calendar.)

**Discussion:** A grain-test scale is defined in Handbook 44 as "a scale adapted to weighing grain samples used in determining moisture content, dockage, weight per unit volume, etc." A variety of scales are currently being used to weigh grain samples and the dockage material. The value of some of these scale divisions is large relative to the quantity being weighed. For examples, the dockage material may be on the order of 3 to 5 g, but the scale division on some scales used for weighing dockage is 1 g. A 1-g division is inappropriate for weighing such small quantities.

After reviewing the practices of the USDA Federal Grain Inspection Service, the Committee believes that grain samples of 1000 g may be weighed to 1 g; loads of 500 g or less must be weighed to a resolution of at least 0.2 g. Since automatic ranging scales are available, this requirement should be interpreted to permit a scale to change its scale division at 500 g. For example, at the change-over point for the scale division, an automatic ranging scale may indicate division values as 499.6 g, 499.8 g, 500 g, 501 g, etc.

This user requirement does not prevent having a scale capacity in excess of 1000 g, nor does it prevent the use of scale divisions other than 0.2 g or 1 g, provided that the user requirements specified above are met. The values specified in UR.1.4. are maximum values for the scale divisions to weigh loads in the weight ranges represented.

**Recommendation:** The Committee recommends adding a new user requirement to specify the maximum value of the scale division for grain test scales. The following paragraph UR.1.4. is recommended for adoption.

**UR.1.4. Grain-Test Scales: Value of the Scale Divisions.** - The scale division for grain-test scales shall not exceed 0.2 g for loads through 500 g, and shall not exceed 1 g for loads above 500 g through 1000 g.

### 320-17 VC UR.1.1. Selection Requirements, General; Class IIII Devices

(This item was adopted as part of the consent calendar.)

**Recommendation:** The Committee recommends amending the text in Table 7a for Class IIII devices to read:

**Highway weight enforcement, Wheel-load weighers and portable axle-load weighers used for highway weight enforcement**

**Discussion:** With the current wording, it has been erroneously argued that the all highway-weight-enforcement scales are Class IIII, including permanently installed axle-load scales and full-length vehicle scales (single or multiple weighing elements). These permanently installed scales are Class III L scales. The erroneous interpretation that all scales used for highway weight enforcement are class IIII scales, has led to arguments that (1) applying Class III L tolerances to permanently installed vehicle and axle-load scales is overly restrictive, and (2) issuing tickets is inappropriate for weight overloads that are determined on permanently installed scales, but when the overloads fall within Class IIII tolerances. Since the permanently installed scales are class III L scales, they must meet class III L tolerances. Consequently, the smaller tolerance applicable to class III L scales provides the necessary accuracy to issue tickets for weight overloads that fall within the weight limits computed on the basis of class IIII tolerances.

Clearly, not all scales used for highway weight enforcement are Class III. The language must be changed to remove the apparent conflict in terminology and reduce the potential for misunderstanding.

### 320-18 V UR.3.7. Minimum Load on a Vehicle Scale

(This item was adopted.)

**Recommendation:** The Committee recommends that an exemption to the 50-division (50d) minimum load requirement be given for weighing scrap recyclable material on vehicle scales. A definition of the scrap materials for recycling subject to the exemption is included as the last sentence added to UR.3.7. This definition of scrap materials for recycling excludes nonferrous metals, such as aluminum and copper. The Committee recommends UR.3.7. be amended to read:

**UR.3.7. Minimum Load on a Vehicle Scale. - A vehicle scale shall not be used for weighing to weigh net loads smaller than:**

- (a) 10d when weighing scrap material for recycling;**
- (b) 50d for all other weighing.**

**As used in this paragraph, scrap materials for recycling shall be limited to ferrous metals, paper (including cardboard), textiles, plastic, and glass.**

**Discussion:** Most of the scrap brought to a recycling facility consists of large, bulky, heavy (with respect to manual handling), long, or awkwardly shaped scrap. Examples are aluminum siding and extrusions, motor blocks, and white goods (e.g., refrigerators and ovens). The value of much of the scrap material is often very low; however, due to the significantly higher value of copper and aluminum, the scrap material for recycling does not include nonferrous metals. Due to the difficulty of handling these items and the associated labor cost, these items are left on the vehicle on which they are brought to the scrap plant and weighed on a vehicle scale. The vehicle is unloaded, usually by means of a crane or forklift. This decreases the handling time and, consequently, labor cost, and reduces the exposure of customers and employees to materials-handling injury. Vehicle scales are critical to the scrap recycling industry.

To encourage recycling, efficient handling of material is critical to controlling costs. The cost of handling and weighing the scrap material in a manner that complies with the minimum load requirements will often exceed the profit associated with the product; consequently, the scrap will not be accepted by the scrap recycling company.

Although the Committee would like to retain the 50d recommended minimum load requirement for all class III L scales, the Committee believes that the value of the recycled material relative to the cost of handling the material must be considered. The Committee believes that if the NCWM does not provide the exemption for scrap recyclable material from the 50d minimum load on vehicle scales, the exceptions will be widespread at the State and local level. The Committee hopes that the industry will exercise good judgment and weigh the more expensive recyclable material, such as aluminum and copper, on scales with relatively small scale divisions to assure adequate resolution. The Committee urges the scrap recycling industry to establish an information and education effort for its members to promote the use of correct weighing practices. The Committee requests that the scrap recycling industry work with the State and local weights and measures officials to assure that good business practices are followed to avert abuse of this exemption.

### 320-19 VC Minimum Use Requirements for the Type Evaluation of Large-Capacity Scales

(This item was adopted as part of the consent calendar.)

**Discussion:** It is often difficult for a scale manufacturer to find a user to conduct the field permanence test for a type evaluation. Many purchasers of scales do not want to take the time and incur the disruption to business that may result from the extensive NTEP tests for permanence. Manufacturers have frequently asked to permit the installation of a scale at their plant and to conduct the permanence test on the scale that they use. There is concern that a scale



installed at a manufacturer's plant would not receive adequate use (and abuse) during the permanence test, as well as concern that some scales installed at users' sites do not receive adequate use during the permanence test.

To assure that a scale is used to an acceptable level, the NTEP Weighing Sector agreed upon the minimum use requirements specified below. If a scale does not receive the minimum number of weighing operations during the test period, the test time is extended until that minimum has been reached. Note that these minimum use requirements apply to scales installed at a manufacturer's plant or a user's site. Before selecting a site for the NTEP permanence test, the manufacturer should consider the amount of use a scale will receive to be sure that the minimum use criteria will be met.

**Recommendation:** For clarification of the field permanence test, the Committee recommends that the following minimum use criteria in NCWM Publication 14 for type evaluations conducted under NTEP when testing scales with capacities greater than 2000 lb, installed either at the manufacturer's plant or at a user's facility.

### Minimum Use Criteria for Scales with Capacities Greater than 2000 lb

- I. At least 300 weighing operations must be conducted on the scale during the field permanence test of the type evaluation. A log or printed tickets are required to show the date, time, and the loads weighed.
- II. The minimum time period of use is 20 days. If the 300 weighing operations have not been completed by that time, the time for the field permanence test shall be extended until at least 300 weighing operations have been completed. The second set of accuracy tests for the permanence evaluation shall be conducted 20 to 30 days after the initial set of accuracy tests provided that the minimum 300 weighing operations are completed prior to test.
- III. Count only those loads applied using a method representative of the intended use and in the following ranges.
  - A. For vehicle scales with capacities over 75,000 lb:
    - (1) 50 percent of the loads must be above 50,000 lb or 80 percent of the CLC, whichever is greater; and
    - (2) 100 percent of the loads must be above 20,000 lb or 50 percent of the CLC, whichever is greater.\*
  - B. For all other scales:
    - (1) 50 percent of the loads must be above 50 percent of scale capacity; and
    - (2) 100 percent of the loads must be above 20 percent of scale capacity.\*

\*The scale may be used to weigh other loads, but only these loads identified above are counted as part of the permanence test.

## 320-20 VC Vehicle On-Board Weighing Systems

(This item was adopted as part of the consent calendar.)

**Discussion:** Vehicle on-board weighing systems are being developed for a number of commercial applications. These include systems for curb-side weighing of recyclable and solid waste, systems to weigh liquid feeds and fertilizers, and lift-truck systems to weigh pallets of material. The number of applications being explored for use of vehicle on-board systems has led the Committee to propose additional requirements to address the new variables introduced to the measurement process by these systems. The S&T Committee uses the term "vehicle" to address all types of mobile weighing systems. For example, the proposed requirements apply to lift-truck scales addressed in Item 320-26.

The special out-of-level and shift test requirements are recommended since mobile systems are likely to be out of level when the weighing operation is performed. The shift test may be conducted simultaneously with the vehicle in an out-of-level condition. The vehicle may be placed in an out-of-level condition in any direction, and the test may be repeated with the weighing system sequentially positioned out-of-level in all directions. The limit of 3 degrees or 5

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percent is consistent with S.2.4. Level-Indicating Means. Since it is unrealistic to level these vehicles, the Committee believes it necessary for these devices to be equipped with an out-of-level sensor that will inhibit the operation of the weighing system if scale performance will not be within the tolerance limits. The design of some of the vehicle on-board weighing systems are such that off-center loads may occur at loads significantly larger than one-half of the scale capacity. A device must be accurate under the conditions of normal use; consequently, a shift test should be performed on the scale using a load that is typical of the normal conditions of use. For example, some lift-truck weighing systems transport barrels of product with the loads suspended from a chain at the end of the lift mechanism; therefore, accuracy tests should be performed with the loads suspended in this manner.

The Committee has received comments from one company indicating that they are close to achieving class III performance for a vehicle on-board weighing system for the curbside weighing of solid waste. The Committee was advised that an on-board system to weigh liquid fertilizer has passed type evaluation in Canada to an accuracy of 0.1 percent. As technology develops, more devices should be able to meet class III tolerances. The Committee believes that lift-truck scales should also meet class III tolerances because they are intended to be used in the same application as floor scales, which are class III devices.

Although the Committee is recommending specific performance requirements for vehicle on-board weighing systems, the Committee does not have enough experience with these systems to recommend design specifications that may be unique to these systems. The Committee believes that on-board weighing systems will have to be considered under General Code paragraph G-A.3. Special and Unclassified Equipment when the design of these scales are evaluated. The Committee had to make several decisions concerning a system under development to provide guidance to the manufacturer. These decisions are presented to exemplify the special considerations that must be given to facilitate the use of these systems.

The system described to the Committee was intended to weigh solid waste at the street curb and to determine the gross load and tare weight of the trash container as part of each weighing cycle. In this case, the Committee does not believe that a zero indication is necessary since any out-of-balance condition will be canceled in the process determining net weight. Fixed or stored tare weights for containers shall not be used. The Committee also concluded that a customer indication is not required since few customers are expected to be present at the time of trash collection. However, the scale shall be equipped with an indicating element as specified in G-S.5.1., although the system may only indicate in the net weight mode. The gross weight capacity by scale division for this particular scale shall be declared adjacent to the weight display, which for this scale will probably be 500 x 1 lb. The maximum net weight indication will be less than 500 lb assuming a non-zero tare. The scale shall not weigh loads in excess of gross capacity plus 5 percent. If the rated capacity of the scale exceeds the lift capacity of the system, the scale will be tested only to its used capacity (which is the limit of the lifting system on the vehicle). The gross and tare should be taken to the internal resolution of the scale because no indication of gross or tare weights are required. Therefore, the net load must be within class III tolerances. The system shall be designed to facilitate an accuracy test of the system by service companies and weights and measures officials.

**Recommendation:** Interest in developing on-board weighing systems continues. The Committee recommends adopting the following definition for vehicle on-board weighing systems.

**vehicle on-board weighing system.** A weighing system designed as an integral part of or attached to the frame, chassis, lifting mechanism, or bed of a vehicle or trailer.

The Committee recommends adopting the following requirements to ensure adequate performance of vehicle on-board weighing systems.

Add a new specification S.2.4.1. for out-of-level weighing and a new test note describing the shift test requirement for vehicle on-board weighing systems by adding a new paragraph N.1.3.7., renumber the current N.1.3.7. as N.1.3.8., and change the reference to N.1.3.7. in paragraph N.1.3.4. accordingly. The new S.2.4.1. and N.1.3.7. would read:

**S.2.4.1. Vehicle On-Board Weighing Systems.** - A vehicle on-board weighing system shall operate within tolerance when the weighing system is out of level up to 3 degrees or 5 percent. If the accuracy of the system is affected by out-of-level conditions normal to the use of the device, the system shall be equipped

with an out-of-level sensor that inhibits the weighing operation when the system is out of level to the extent that the accuracy limits are exceeded.

**N.1.3.7. Vehicle On-Board Weighing Systems.** - The shift test for a vehicle on-board weighing system shall be conducted in a manner consistent with its normal use. For systems that weigh as part of the lifting cycle, the center of gravity of the load may be shifted in the vertical direction as well as from side to side. In other cases, the center of gravity may be moved to the extremes of the load-receiving element using loads of a magnitude that reflect normal use (i.e., the load for the shift test may exceed one-half scale capacity), and may, in some cases, be equal to the capacity of the scale. The shift test may be conducted when the weighing system is out of level to the extent that the weighing system remains operational.

## 320-21 VC Separate Scales Code for Law-Enforcement Scales

(This item was adopted as part of the consent calendar.)

**Discussion:** Many comments have been received from law enforcement agencies and from weights and measures jurisdictions concerning the application of Handbook 44 to scales used for law enforcement. These comments indicate that the current format of the Scales Code may not clearly indicate which paragraphs apply to scales used for this purpose. One common misunderstanding is whether or not split-draft or multiple-draft weighing may be used to determine axle-load weights and vehicle gross weights for law enforcement purposes. Split-draft weighing is acceptable for law enforcement based upon requirements in Handbook 44, but not for commercial weighing. Another example is the application of tolerances to **permanently** installed scales used for law enforcement purposes. Permanently installed vehicle and axle-load scales used for law enforcement purposes must meet the specifications and tolerances for a Class III L scale, not the requirements for a Class IIII scale. Class IIII tolerances apply to **portable** wheel-load weighers and **portable** axle-load scales used for law enforcement purposes. See Item 320-17.)

One proposal to address this concern is to create a separate code for scales used for law enforcement purposes. Because highway-law-enforcement scales include full-length vehicle scales, permanently-installed axle-load scales, portable axle-load scales, and wheel-load weighers, most of the Scales Code paragraphs apply to one or more of these types of scales. The Scales Code currently contains approximately 178 separate paragraphs or subparagraphs. A separate code created for law enforcement scales would include over 100 paragraphs for highway law enforcement. The list of Scale Code requirements applicable to the various scales used in highway weight law enforcement are listed below.

### Application: A.2.

**Specifications:** S.1.1., S.1.1.1., S.1.2., S.1.2.1., S.1.3. (all paragraphs), S.1.4. (all paragraphs), S.1.5. (all paragraphs except S.1.5.5.), S.1.6. (all paragraphs), S.1.7., S.1.10., S.1.11., S.2.1.1., S.2.1.3., S.2.1.5., S.2.2., S.2.4., S.2.5., S.2.5.1., S.4.1., S.4.2., S.4.3., S.5.1., S.5.2., S.5.3., S.6.1., S.6.2., S.6.3.

**Notes:** N.1.1., N.1.2., N.1.2.1., N.1.2.2., N.1.3.4., N.1.4., N.1.5., N.1.5.1., N.1.6., N.1.7., N.1.9., N.2., N.3.

**Tolerances:** T.1.1., T.2.1., T.2.2., T.2.7.1., T.2.7.2., T.3.1., T.4., T.5., T.N.1.1., T.N.1.2., T.N.1.3., T.N.2.1., T.N.2.2., T.N.2.3., T.N.2.4., T.N.2.5., T.N.3.1., T.N.3.2., T.N.3.3., T.N.3.5., T.N.4. (all paragraphs), T.N.5., T.N.6. (all paragraphs), T.N.7.1., T.N.7.2., T.N.8. (all paragraphs), T.N.9.

**User Requirements:** UR.1., UR.1.1., UR.1.3., UR.2.1., UR.2.3., UR.2.4., UR.2.5., UR.2.6.1., UR.2.6.2., UR.3.1., UR.3.2., UR.3.4.1., UR.3.4.2., UR.3.7., UR.4.1., UR.4.2., UR.4.3.

The Committee concluded that a separate code in the current structure of the Handbook 44 format would not facilitate the use of the code for these scales. The Committee has prepared a "consolidated code" that organizes the specific requirements for these scales by subject and for each specific device that is used in highway weight law enforcement. This consolidated code is available on request from the Office of Weights and Measures and is for use

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as a field manual for highway-law-enforcement scales. The consolidated code will not be included in Handbook 44; it has been assembled purely as an aid to identify paragraphs in the Scales Code that are applicable to these devices.

**Recommendation:** To reduce the frequency of misinterpreting the application of UR.3.3. highway-law-enforcement scales, the Committee recommends the following note be added at the end of UR.3.3.

[Note: This paragraph does not apply to highway-law-enforcement scales and scales used for the collection of statistical data.]

**\*320-22 By inadvertent error, there is no Item numbered 320-22.**

### 320-23 VC Unattended Recycling Devices

(This item was adopted as part of the consent calendar.)

**Recommendation:** The Committee recommends that the Conference adopt an interpretation to remove the ambiguity of whether or not G-S.5.1. should apply to unattended recycling devices.

The Committee recommends that G-S.5.1. be applied to unattended recycling devices, thereby making a weight display mandatory for these systems. This action represents an interpretation of Handbook 44. Many devices that do not have weight displays are already installed and in service. Consequently, G-S.5.1. should not be applied retroactively to devices installed prior to January 1, 1993.

**Discussion:** The interpretation of whether or not unattended recycling devices must have a continuous weight display under G-S.5.1. varies among jurisdictions. Some jurisdictions have concluded that the payment of money for the recycled material, usually aluminum cans, is sufficient to satisfy G-S.5.1. Other jurisdictions maintain that a weight display is required to provide the customer with sufficient information to understand and verify the transaction to the extent possible. The Committee wants to end this debate by having the Conference take a position on this interpretation. The Committee believes that a required weight display will satisfy the needs of all jurisdictions, although it is likely that industry and weights and measures officials will continue to debate the issue. Nevertheless, the Committee recommends the adoption of its recommendation to make the weight display mandatory by applying G-S.5.1. to these devices. The following excerpt of the discussion from the Committee's 1991 report on this subject (Item 320-20) is included below for reference.

The Committee believes that if unattended recycling devices were required by weights and measures officials to have NTEP evaluations, significant improvement in the design of these 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 uniform 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 are:

#### 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 Inspection, Testing, and Sealing 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 1984 list.

### 320-24 I Unattended Vehicle Scales

**Discussion:** An increasing number of unattended vehicle scales are used for commercial transactions and for determining the axle loads of highway vehicles. Many jurisdictions are faced with applying current Handbook 44 requirements to these devices, but apply different requirements based upon their interpretations of Handbook 44. A uniform set of criteria to be applied nationally is desirable.

The S&T Committee listed in Item 320-19 of its 1991 report several requirements that it believed should apply to unattended vehicle scales. The task force formed by the Scale Manufacturers Association (SMA) to study this issue submitted its recommendations for criteria to apply to these scales. The Committee discussed the recommendations and concluded that paragraphs G-UR.3.3. and S.1.1. apply to unattended vehicle scales. The Committee also concluded that the definition of direct sale must be updated to recognize that an unattended scale may be used in transactions that constitute direct sales; however, in these cases the automated system represents the seller of a product or provider of a service. The Committee suggests the following change to the definition of direct sale be studied over the next year for possible adoption in 1993.

Direct sale. A sale in which both parties in the transaction are present when the quantity is being determined. An automated or user-operated weighing or measuring system is considered to represent the device owner/user in transactions involving an unattended device.[1.10]

The Committee believes the recommendations of the SMA task force require further study before the Committee develops final recommendations to the Conference. The recommendations of the SMA, those from the S&T Committee in 1991, and those in effect in Canada will be submitted to the regional weights and measures associations and to industry for discussion and further development.

### 320-25 I Criteria for Counting Scales

**Discussion:** Counting scales are widely used in noncommercial applications, such as taking inventory and filling packages. Device manufacturers are interested in providing counting features on scales used in commercial applications, although the use of the counting feature is generally not permitted in commercial transactions. Most States do not permit counting scales to be used commercially due to the absence of requirements in Handbook 44 to define their design and performance.

The accuracy of count obtained through a weighing process depends on several factors. These factors include:

1. the accuracy of the scale;
2. the variability in the weight of the individual items being weighed and the relationship of the variability of the weight of the individual items relative to the displayed scale division;
3. the number of items in the sample;
4. the weight of the sample relative to the size of the scale division; and
5. the internal resolution of the scale.

Some of these variables depend directly on the design and performance of the scale; others introduce variables independent of the scale that may affect the accuracy of the measurement. For example, if the weight of the individual items is quite uniform and variation is small relative to the value of the scale division, the accuracy of the count is limited by the accuracy of the scale. If the variation in weight of the individual items is large relative to the value of the scale division, the accuracy of the average weight of the items depends upon the size of the sample used to determine the average item weight, as well as the size of the load being counted, and the accuracy of the scale used. From statistics, the value for the average of a sample and the uncertainty associated with the average is expressed as: where  $\bar{X}_i$  = weight of the individual items;

$t$  = Student's t-value, which depends upon the number of items used to determine the average;

$s$  = standard deviation of the weight of individual items in the sample; and

$$\text{Sample Average, } \bar{X} = \frac{\sum_{i=1}^n X_i}{n} \pm \frac{ts}{\sqrt{n-1}}$$

$n$  = number of items in the sample.

Most scales designed with counting features are either class II or class III. The accuracy of count cannot be expected to be better than the accuracy of the scale. If a scale is used over a limited temperature range, greater accuracy in weighing and count can be achieved because the effect of temperature on scale performance is consequently reduced.

The internal resolution of the scale must be sufficiently good to permit the determination of the weight of individual items. If the scale has limited internal resolution relative to the weight of the item, the round-off of the weight of individual items can affect the accuracy of the count. The size of the sample can be increased to offset the limited internal resolution; a requirement for counting scales would then be needed to specify an adequate sample size based upon the internal resolution of the scale. Some manufacturers design safeguards into scales to assure that the sample size represents a programmed minimum to provide a reasonable level of accuracy for the average weight of an item based upon the internal resolution. However, high internal resolution is not enough to ensure accuracy of count. The tolerances for class II and III scales is related to the number and value of the scale divisions. If a scale is accurate to Handbook 44 requirements when using 5000 divisions, having an internal resolution of 100,000 does not improve the linearity or temperature dependence of the performance characteristics. More sophisticated engineering and software correction are often needed to improve performance.

Counting features are often based upon the internal resolution of the scale. If the Conference applies the same principles of T.N.1., specifically T.N.1.3. which relates the scale accuracy to the value of the displayed scale division and number of divisions, then the count feature should meet the same tolerances as the accuracy required for weighing. Count is determined by weighing the commodity; count is a variably defined unit of weight and the weight indication is simply called "count." This is analogous to the predefined units of weight, such as kilograms, pounds, and ounces. The weight unit for count is based upon the average weight of the individual items being weighed. The Conference must establish appropriate tolerances for the counting feature and logically justify these values relative to the tolerances applied to the scales. Why should it be necessary to weigh a commodity to greater accuracy than the accuracy permitted for count when the same device is used?

If the Conference does not want to treat count as another weight unit, then a separate set of tolerances for count must be established. One possible tolerance is the maximum allowable variation permitted in NIST Handbook 133, "Checking the Net Contents of Packaged Goods," for the accuracy of packages which are sold on the basis of count. The maximum allowable variation for packages as specified in NIST Handbook 133 is given below.

Table 2-10. MAV's for an individual package labeled by count.\*

Labeled count	Maximum allowable variation	Labeled count	Maximum allowable variation
Up to and including 17 <sup>b</sup>	0	466-540	11
18-50 <sup>b</sup>	1	541-625	12
51-83	2	626-725	13
84-116	3	726-815	14
117-150	4	816-900	15
151-200	5	901-990	16
201-240	6	991-1075	17
241-290	7	1076-1165	18

Labeled count	Maximum allowable variation	Labeled count	Maximum allowable variation
291-345	8	1166-1250	19
346-400	9	1251-1333	20
401-465	10	1334 and over	1.5% of labeled count rounded off to the nearest whole number
<sup>a</sup> Applies only to shortages in package count (that is, minus errors). <sup>b</sup> See Section 5.2. for sampling plans to be used with these package sizes [Reference is to Handbook 133]			

The accuracy of the count depends upon the variation of the weight of the individual items. This can dominate any claim to accuracy and greatly exceed the weighing error. The accuracy of the average weight of an item depends on the standard deviation of the weight of individual items and the number of items used in the sample to determine the average weight. To promote uniform accuracy (consistent uncertainty in the average weight for different items being counted), the standard deviation of the weight of individual items must be determined and the size of the sample adjusted accordingly to obtain an average weight with a given uncertainty. This requires that each item be weighed as the sample is increased. Unfortunately, this takes additional time, and few scales are thought to be designed to count in this manner. Users want the count process to be fast, but accuracy is sacrificed when the average weight of an item is not really known.

The variation in the weight of individual items and the accuracy of the average weight per item may justify permitting a larger tolerance to be applied to count. Unfortunately, it now becomes necessary to determine when a counting scale may be used to weigh items of varying individual weights. This is a matter of determining the suitability of equipment based upon the weight of the individual items, the variability in the weight of the individual items, the sample size, and the relationship of the item weight to the displayed and internal resolution of the scale. If these factors are not considered as part of the design and operation of a scale, then it becomes a matter of user judgment and weights and measures enforcement to ensure the proper use of each scale.

Test procedures are needed to determine the accuracy of counting features. The test for accuracy of count should include the variables discussed above, that is, an accuracy check of the scale, varying sample sizes, varying the weight of the individual items to be weighed, and selecting items to be counted that will be near the extremes of the types of commodities to be counted on counting scales. For example, significantly different results can be expected if the weighed objects are diodes, transistors, potentiometers, paper clips, napkins, other paper products, or plastic tableware. In some cases, the results may not be sufficiently accurate to be used as the basis for transactions.

Finally, one must address the manner in which information is displayed. The principle of tolerances for scales marked with an accuracy class is that the number of divisions and the size of the division reflect the accuracy of the scale. Should this principle apply to the display of the average weight for one item of a commodity? Should the scale be permitted to display the average item weight to any number of decimal places determined by the manufacturer, which may then imply more accuracy than actually exists?

Defining and agreeing upon design, operating, and performance criteria for counting scales is expected to be difficult. Due to the lack of appropriate criteria, counting scales and counting features have not been permitted by NTEP on devices intended for commercial applications. The Committee requests recommendations of how to address the issues associated with counting scales.

## 320-26 I Criteria for Lift-Truck Scales

**Discussion:** The criteria for lift-truck scales are discussed as part of Item 320-20 in this report. See Item 320-20 for details. A brief summary of the position of the S&T Committee is given below.



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The shift test for a lift-truck scale shall be conducted in a manner consistent with the typical range of loading. For a lift-truck system, a load equal to the scale capacity may be placed at the extremes of the platform of the lift mechanism when the vehicle is level and also when out of level if the out-of-level sensor permits operation. The system shall be accurate when out of level to at least 3 degrees or 5 percent. The scale shall have a level sensor that inhibits the weighing operation when the system is out of level beyond the accuracy limits for the scale.

These scales are often incorporated into forklift trucks and used to weigh pallets of commodities. The weights may be used to determine freight charges, and some businesses may want to use the weights for the custody transfer of the commodity. The Committee was asked to establish a separate and larger tolerance for these scales when determining freight charges, but the Committee concluded that these scales shall be class III. Floor scales are usually used to weigh pallet loads for the determination of freight charges. There is not enough justification to give lift-truck scales class III tolerances when floor scales are a ready alternative for these applications.

### 320-27 I Criteria for Automatic Checkweighers

**Discussion:** Checkweighers are weighing systems used in packaging processes to check whether packages conform accurately to the standards established for the packaging process. The checkweighers may be the only weighing device in the packaging process. The Committee believes that automatic checkweighers are noncommercial devices under G-A.1., and consequently would not be inspected under current weights and measures authority. However, FSIS regulations provide for the inspection by weights and measures officials of automatic checkweighers in FSIS-inspected plants. This situation provides weights and measures officials with the opportunity to expand the scope of their influence. Since some weights and measures jurisdictions charge fees to inspect devices that are not commercial devices, participation in these inspection programs could expand budgets and resources of weights and measures programs.

The S&T Committee referred this item to the Executive Committee to consider the NCWM's establishment of a task force to develop criteria and test procedures for automatic checkweighing scales. By mail ballot, the Executive Committee decided to request the Technical Committee on National Type Evaluation to establish such a task force. The OIML Pre-Draft for automatic checkweighers could be used as the basis for developing criteria; however, the Committee has been advised that there is significant disagreement at the international level on the criteria and test procedures for automatic checkweighers. The S&T Committee is not recommending that criteria for automatic checkweighers be included in Handbook 44 because they are not considered commercial devices under Handbook 44. Instead, the Committee recommends that criteria be developed to assist FSIS and to provide criteria and test procedures that can be used by weights and measures jurisdictions that want to provide the inspection services required for FSIS-inspected plants. It is emphasized that the inspection of these scales would be conducted under the authority of FSIS, not under State law or Handbook 44. This is an excellent opportunity for weights and measures officials to apply their expertise to aid federal agencies and device users, thereby promoting increased accuracy in the packaging of commodities and uniformity in the requirements applied to these devices.

### 320-28 I USDA FSIS Rules Adopting Handbooks 133 and 44

**Discussion:** The USDA FSIS rules adopting Handbook 133 for package inspection in FSIS-inspected plants and requiring the scales used in these plants to determine net weight to meet Handbook 44 requirements took effect on March 2, 1992. These regulations are being implemented; companies and inspectors are responding to meet the new regulations effectively. Weights and measures officials are encouraged to participate in this process to promote the use and adoption of NCWM criteria.

### 320-29 W S.1.1. Zero Indication; Emergency Action Item

(This item was withdrawn.)

(The Executive Committee requested that the S&T Committee withdraw this item. The S&T Committee withdrew before presentation to the Conference members during the voting session.)



The NTEP Board of Governors requested that the Specifications and Tolerances Committee address as an emergency item whether or not digital electronic scales other than point-of-sale systems should be permitted to have zero indications that are not digital zero indications, provided that the zero indication is defined on the indicating element. The Specifications and Tolerances Committee unanimously agreed that the voting members of the Conference should have the opportunity to address all of the alternatives identified in the memorandum describing this issue. The Committee makes no recommendation regarding the issue. If the voting members vote to discuss this issue, the Committee plans to present each proposal in order until one is accepted or until all have been rejected.

If the voting members vote to discuss this issue, the information contained here in the addendum sheets and in the memorandum on this issue will become part of the S&T Committee report, as will the results of any votes on the issue. If there is not a unanimous vote to discuss this issue, it cannot be brought before the Conference and only the information in the addendum sheets for this item, but not the memorandum, will appear in the report of the S&T Committee to document the decision of the Conference on this item.

If the issue is not discussed, then based upon the decision made as a result of the NTEP appeal process, digital indicating scales that monitor the zero balance condition when "asleep" or displaying a zero indication other than a digital indication (as chosen by the device manufacturer):

1. will not be required to display a digital zero indication when the device is at zero balance and the scale is ready to weigh provided the zero indication is defined on the indicating element of the device; and
2. a zero indication will not be required before a weight is displayed as part of a weighing operation.

If the Conference agrees to discuss this emergency item, the following three alternatives will be presented in sequence for a vote as described above.

**Proposal 1:** This proposed change will permit all devices falling under the Scales Code to indicate a zero-balance condition by other than the continuous digital zero balance indication as defined by General Code paragraph G-S.5.2.2. Digital Indication and Representation. The proposal is to move part (c) of S.1.1. to S.1.1.1. Digital Indicating Elements and amend S.1.1.1. as shown below.

#### S.1.1. Zero Indication.

- (a) On a scale equipped with indicating or recording elements, provision shall be made to either indicate or record a zero-balance condition.
- (b) On an automatic-indicating scale or balance indicator, provision shall be made to indicate or record an out-of-balance condition on both sides of zero.
- ~~(c) On point-of-sale systems, a zero-balance condition may be indicated by other than a continuous digital zero indication, provided that an effective automatic means is provided to inhibit a weighing operation when the scale is in an out-of-balance condition.~~  
(Added 1987)

##### S.1.1.1. Digital Indicating Elements.

- (a) A digital zero indication shall represent a balance condition that is within plus or minus one-half the value of the scale division. An auxiliary or supplemental "center of zero" indicator shall define a zero-balance condition to  $\pm 1/4$  of a scale division or less.
- (b) On point-of-sale systems, a zero-balance condition may be indicated by other than a continuous digital zero indication, provided that an effective automatic means is provided to inhibit a weighing operation when the scale is in an out-of-balance condition.

- (c) For all devices other than point-of-sale systems, a zero-balance condition or a center of zero-balance indication may be indicated by other than a continuous digital zero indication provided that the method of indication is defined on the device and that an out-of-zero-balance condition returns the display to the digital weight indication.

Proposal 2: This proposed change will explicitly require all scales falling under the Scales Code (except point-of-sale systems) to indicate a continuous digital zero indication whenever the scale is operational and at a zero-balance condition. This proposal, coupled with the type evaluation requirements for S.1.7. Capacity Indication and G-S.2. Facilitation of Fraud related to power interruptions, essentially requires a scale to indicate its zero-balance condition prior to initiating a weighing operation. The proposal is to add a new part (d) to S.1.1. to read:

**S.1.1. Zero Indication.**

- (a) On a scale equipped with indicating or recording elements, provision shall be made to either indicate or record a zero-balance condition.
- (b) On an automatic-indicating scale or balance indicator, provision shall be made to indicate or record an out-of-balance condition on both sides of zero.
- (c) On point-of-sale systems, a zero-balance condition may be indicated by other than a continuous digital zero indication, provided that an effective automatic means is provided to inhibit a weighing operation when the scale is in an out-of-balance condition.  
(Added 1987)
- (d) All digital-indicating weighing systems other than point-of-sale systems shall continuously display a digital zero indication whenever the device is operational and at a zero-balance condition.

Proposal 3: This proposal would permit battery-powered scales and digital computing scales to indicate a zero-balance condition by other than a continuous digital zero-balance indication whenever the scale is operational and at the zero-balance condition. This proposal would require all other weighing systems (excluding point-of-sales systems, battery-powered scales, and digital computing scales) to display the zero-balance condition as a continuous digital zero indication.

**S.1.1. Zero Indication.**

- (a) On a scale equipped with indicating or recording elements, provision shall be made to either indicate or record a zero-balance condition.
- (b) On an automatic-indicating scale or balance indicator, provision shall be made to indicate or record an out-of-balance condition on both sides of zero.
- (c) On point-of-sale systems, a zero-balance condition may be indicated by other than a continuous digital zero indication, provided that an effective automatic means is provided to inhibit a weighing operation when the scale is in an out-of-balance condition.  
(Added 1987)
- (d) All battery-powered scales and digital-indicating computing scales may indicate a zero-balance condition or a center-of-zero-balance indication by means other than a continuous digital zero indication provided that the method of indication is defined on the device and that an out-of-zero-balance condition causes the display to revert to its weight indication.
- (e) All digital-indicating weighing systems, other than point of sale systems, battery-powered scales, and digital-indicating computing scales, shall continuously display a digital zero indication whenever the device is operational and at a zero-balance condition.

## Belt-Conveyor Scale Systems

### 321-1            I            Testing and the Type Evaluation of Belt-Conveyor Scale Systems

**Discussion:** The Belt-Conveyor Scale Sector of the Technical Committee on National Type Evaluation has established criteria and test procedures for the type evaluation of belt-conveyor scales. The criteria and test procedures are being included in NCWM Publication 14, which contains the type evaluation criteria for all devices for which NTEP has criteria. One belt-conveyor scale has completed the NTEP type evaluation process and received an NTEP Certificate of Conformance. A second scale is near the end of the type evaluation process. Several small problems were revealed in the data sheets and the test procedures as a result of these initial evaluations. These issues are expected to be resolved when the Belt-Conveyor Scale Sector meets in June 1992. A copy of the criteria and test procedures are available from the Office of Weights and Measures on request.

## Automatic Bulk Weighing Systems

### 322-1            VC            S.5.4. Accuracy Class

(This item was adopted as part of the consent calendar.)

**Discussion:** The Automatic Bulk Weighing Systems Code does not include definitions or parameters for class III and III L, and the tolerances are not based upon Class III or III L. A reference to the Scales Code to provide the parameters for Class III and III L scales will provide the defining criteria needed for the Automatic Bulk Weighing Systems Code.

Automatic bulk weighing systems for grain are required to be Class III scales, but the tolerance is specified as 1 pound per 1000 pounds of test load. The tolerance is not related to the scale division, which is the basic premise in the Scales Code. Since grain scales must be Class III, they must use Class III load cells. Class III load cells typically have 3000 or 5000 divisions; they do not have enough scale divisions to provide the scale capacities by division values that are generally used in the industry, e.g., scales with capacities of 15,000 to 20,000 lb<sup>2</sup> with 2-lb scale divisions. However, if 5-lb divisions were used on 15,000- and 20,000-lb capacity scales, then load cells with 3000 and 4000 divisions could be used for these scales.

The Committee concluded that the best resolution to this conflict is to lower the number of divisions permitted for automatic bulk weighing systems used for grain to 2000 as reflected in the recommended change to UR.1.1. This will make a significant number of Class III load cells available for use in these systems. The 4000-division restriction currently in UR.1.1. prevents 3000-division load cells from being used in these scales.

The Committee is considering changing the tolerances specified in paragraphs T.3.2. and T.3.3. to the tolerances for Class III and III L from the Scales Code. However, to provide adequate review of this change, the Committee recommends that industry and regional weights and measures associations study the impact of this change to the tolerances and provide the Committee with input which would help the Committee to decide whether or not the tolerances should be changed in 1993.

**Recommendation:** The Committee recommends amending S.5.4. to read:

#### S.5.4. Accuracy Class. -

- (a) *All systems used to weigh grain shall be marked Class III\*.*

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<sup>2</sup>Operating bulk weighing systems are currently characterized by customary units. However, Handbook 44 is undergoing revision to ensure SI usage as the primary form for all measurements.

(b) All other systems for other than grain shall be marked either Class III or III L\*.

(\*See Section 2.20 Scales Code for the parameters for these accuracy classes for scales. The specific requirements for automatic bulk weighing systems applies to these devices when there is a conflict between the Scales Code and the Automatic Bulk Weighing Systems Code.

[Nonretroactive as of January 1, 1986.]

The Committee recommends deleting the table that is part of UR.1.1. and amend UR.1.1. to read:

*UR.1.1. For Systems used to Weigh Grain. - The number of scale divisions of a weighing system shall not be less than ~~4 000~~ 2 000 nor greater than 10 000 divisions. ~~for a system with a capacity greater than 10 000 pounds, and not less than 2 000 nor greater than 10 000 for a system with a capacity equal to or less than 10 000 pounds.~~*

*[Nonretroactive and enforceable as of January 1, 1984.]*

### Liquid-Measuring Devices

#### 330-1 VC S.1.6.5.4. Selection of Unit Price

(This item was adopted as part of the consent calendar.)

**Discussion:** The first two changes to S.1.6.5.4. are to clarify that the unit price may be selected at any time prior to the start of a delivery. The unit price may be selected after the "pump handle" (or equivalent control feature) has been turned to the "on" position to prepare for the delivery; however, the unit price cannot be changed after the delivery has been initiated, that is, after a non-zero quantity is displayed on the dispenser. Because any change to the unit price has always been prohibited after a delivery has been started (G-S.2. Facilitation of Fraud), this change is retroactive. The last sentence to be added to S.1.6.5.4. ensures that the customer has adequate time to review the total price displayed on a dispenser to verify the information after payment has been made. The minimum time to display the total price and quantity after the delivery is completed was selected to be 5 minutes to agree with the Canadian requirement. The system can override the 5-minute limit if the next customer initiates the next transaction at the dispenser.

The objective of these changes is to reduce the potential for fraud by preventing the loss of transaction information before the customer has an adequate opportunity to check the indications on a dispenser. This is critical in the event of a dispute, in which case the values displayed on the dispenser are the basis for the transaction. However, the dispenser information for a transaction may still be "lost" if the next customer initiates the next transaction. Although this recommendation does not prevent the loss of the information from the last transaction in all cases, it will reduce the potential for fraud by delaying the clearing of transaction information in most cases.

It is emphasized that, based upon the last sentence recommended to be added to S.1.6.5.4., the total price and quantity (but not the unit price) must be retained for at least 5 minutes or until the next transaction is initiated by a customer. The unit price displayed on a dispenser during a delivery may revert to a base unit price immediately after the completion of a transaction, which is defined as the point in the transaction where the delivery has been terminated and payment has been settled. The payment may be automatic if the delivery is for a prepaid amount. If the sale is prepaid, the delivery is considered terminated after the "pump handle" is in the off position or after the nozzle has been returned to the designed hanging position. This will allow the customer adequate time to observe that the prepaid amount has been reached. If the delivery stops short or overruns a prepaid amount, settling the payment means that money is either refunded or collected from the customer and the transaction is "cashed out" by the console operator.

In the case of invoice billing systems, such as card-lock or key-lock systems which compute the total sales price, it is not considered appropriate for the displayed unit price to revert to the base unit price immediately following a transaction. Since a receipt for the transaction may not be available, the customer must be allowed an adequate period of time following the delivery to record the transaction information. All information for a transaction, including the transaction unit price, must be displayed for at least 5 minutes following the completion of the delivery



or the until a customer initiates the next transaction. This 5-minute period is based upon the recommended change to S.1.6.5.4. as stated above, which will supersede the time period currently specified in the type evaluation criteria in NCWM Publication 14.

**Recommendation:** To clarify the appropriate operation for unit price selection, the Committee recommends amending S.1.6.5.4. to read:

*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 prior to delivery using controls on the device or other user-activated controls. A system shall not permit a change to the unit price during delivery of product.*  
*[Effective and nonretroactive as of January 1, 1991]*

The Committee recommends adoption of a new paragraph S.1.6.5.5. that specifies the display of the delivered quantity and total sales price (but not the unit price) following a delivery as follows:

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

### 330-2 I T.2.4. Tolerances for Meters Measuring Automotive Fluids

**Discussion:** The issues associated with the tolerances of meters measuring automotive fluids were discussed in Item 330-7 in the 1991 S&T Committee report. The OIML and Canadian tolerances were compared and a tolerance proposal was made as a basis for further study. The comments from a major manufacturer of these meters has indicated that further study of the test procedures and the capability of meters to measure the different automotive fluids is necessary before a recommendation can be made to adopt tolerances into Handbook 44 for meters measuring relatively small quantities of automotive fluids. Consequently, the Committee recommends that the tolerances proposed in 1991 continue to be studied and comments submitted to the Committee for consideration and possible action in 1993.

### 330-3 I Pulse Checking for Measuring Systems

**Discussion:** The Office of Weights and Measures and the Legal Metrology Branch in Canada requested information from industry to identify differences in U.S. and Canadian requirements for weighing and measuring devices falling under weights and measures authority. For example, Canada requires a feedback system to check the transmission of pulses from an electronic pulser on a meter to determine whether or not the pulse signals are correctly received by the microprocessor that converts these pulses into digital quantity representations. Without this type of feedback system, incorrect transmissions will probably not be detected until the problem becomes so great that the delivered quantity is in error to the extent that a meter test reflects the pulser errors or the systems fails to operate. The pulse checking capability is based upon OIML requirements.

The Committee is considering recommending a checking system for pulse transmissions. At the Interim Meeting comments were made in opposition to the proposal on the agenda because the proposal was design specific. The Committee is considering recommending a performance requirement, but requests advice and input from industry on the best approach to assure accurate pulse transmissions. The Committee requests that recommendations be submitted to both the S&T Committee and the regional weights and measures associations to promote the development of this issue.

330-4

VC

### T.2.3.3. Automatic Temperature Compensating Systems; Accuracy of the Temperature Sensor

(This item was adopted as part of the consent calendar.)

**Discussion:** This proposal would more closely align the U.S. and Canadian requirements for this equipment and tighten the performance requirement for electronic temperature compensating systems. This requirement would apply to all electronic devices based upon the original effective date of January 1, 1988, for the nonretroactive requirement because (1) it is a performance requirement, (2) electronic systems can be adjusted to meet the tighter tolerance, and (3) there are fewer variables that affect electronic temperature compensating systems.

The Canadian tolerance on an electronic temperature sensor is 0.5 °C for acceptance tolerance and 1.0 °C for maintenance tolerances. The OIML tolerance for temperature sensors ranges from 0.3 °C to 1.0 °C depending on the class of meter being tested; a tolerance of 0.5 °C is applied to devices such as retail motor-fuel dispensers, loading-rack meters, milk meters, and other meters used to dispense low viscosity liquids. Paragraph T.2.3.3. states the tolerance for the temperature sensor as a performance requirement. Performance is measured as the difference between the meter results of the temperature compensated and uncompensated tests. The proposed changes are consistent with a tolerance of 0.5 °C on the temperature sensor.

The trend within the petroleum industry is to use loop provers, compact provers, and master meters to increase the efficiency of testing meters. The benefits of using these types of reference standards are that tests are performed as part of the normal delivery process and these devices eliminate the need to return product to storage.

The Committee has received comments stating of the performance tolerance in T.2.3.3. as a percentage of the test draft is not appropriate when small volume provers are used. It has been suggested that in these cases the tolerance for the automatic temperature compensator should be addressed by establishing a tolerance for the temperature probes. This tolerance would be based upon 1 °C (2 °F) for mechanical automatic temperature compensators and 0.5 °C (1 °F) for electronic temperature probes. Resolving problems such as how to test mechanical compensators to a temperature tolerance could not be adequately addressed at this time. Consequently, the Committee recommends that this issue be addressed by the regional weights and measures associations over the next year to develop appropriate recommendations. Until tolerances and test procedures for temperature probes are adequately developed, the Committee proposes that the performance tolerance specified below be adopted for automatic temperature compensating systems.

**Recommendation:** The Committee recommends maintaining the current tolerance for automatic temperature compensating systems as the tolerance for mechanical temperature compensators and adopting a tighter tolerance for electronic temperature compensating systems to agree with the Canadian and OIML requirements. The Committee recommends amending T.2.3.3. to read:

*T.2.3.3. 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:*

- (a) 0.2 percent of the test draft for mechanical automatic temperature compensating systems; and*
- (b) 0.1 percent of the test draft for electronic automatic temperature compensating systems.*

*The results of each test shall be within the applicable acceptance or maintenance tolerance.  
[Nonretroactive as of January 1, 1988.]*

A similar requirement is proposed for the Liquefied Petroleum Gas and Anhydrous Ammonia Liquid-Measuring Devices (LPG and NH<sub>3</sub>) Code. See Item 332-3, which was added as a result of the discussions at the Interim Meeting.

## 330-5 V T.X. Repeatability Tolerance

(This item was adopted.)

**Discussion:** This proposal would eliminate a difference between U.S. and Canadian requirements identified by industry, and would specify performance requirements for the repeatability of tests conducted at approximately the same flow rate under similar test conditions. The changes recommended in this item are for three codes: the Liquid-Measuring Devices Code, the Vehicle-Tank Meter Code, and the Liquefied Petroleum Gas and Anhydrous Ammonia Liquid-Measuring Devices Code. Except for the tolerances for retail devices, the recommended tolerances are consistent with the OIML performance requirements for repeatability.

To perform within Handbook 44 tolerances, a device must be able to repeat its performance for a set of tests under similar conditions at any one time (i.e., repeated tests in a short time at the same flow rate on the same product under constant temperature conditions) to a range significantly smaller than the specified tolerance. The distribution of errors at a single flow rate must be less than the tolerance band to accommodate the nonlinearity of meter performance, to recognize the fact that variation in the results of tests conducted during a short period of time will be smaller than the overall repeatability of the meter, and to allow the meter some range within which its performance may change as a result of wear and still remain within tolerance.

The correct application of meter tolerances requires that each meter comply with the applicable tolerance for the test draft and perform within the repeatability tolerance. The repeatability tolerance does not permit individual test results to exceed the applicable acceptance, maintenance, or special test tolerances. The addition of the repeatability tolerance does not mandate that multiple tests be conducted; however, if multiple tests are run under similar conditions at approximately the same flow rate, the repeatability tolerance applies.

The tolerance for retail motor-fuel dispensers is larger than for the other devices in terms of the applicable tolerance criteria because it is not clear to the Committee if the repeatability of the test process and the readability of the test measures by field inspectors are sufficient to determine compliance to 40 percent of the applicable tolerances. The Committee reviewed repeatability data provided by one of its members. The results indicated that retail motor-fuel dispensers should repeat better than 6 in<sup>3</sup> (which was the Committee recommendation following the Interim Meeting). Consequently, the Committee recommends that the repeatability tolerance be set at 40 percent of the absolute value of the maintenance tolerance.

**Recommendation:** The Committee recommends adding repeatability tolerances to (1) the Liquid-Measuring Devices (LMD) Code for retail devices (except slow-flow meters) and wholesale devices, (2) the Vehicle-Tank Meter Code, and (3) the Liquefied Petroleum Gas and Anhydrous Ammonia Liquid-Measuring Devices Code. These tolerances are to be applied retroactively. The Committee recommends the following changes to the specified codes.

**Liquid Measuring Devices Code:** Add a new paragraph T.2.1.3. for retail devices (except slow-flow meters) to read:

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

Renumber the current paragraph T.2.3.3. for the automatic temperature compensator on wholesale devices to be T.2.3.4. and add a new paragraph T.2.3.3. to read:

**T.2.3.3. Repeatability.** - When multiple tests are conducted at approximately the same flow rate, the range of the test results for the flow rate shall not exceed 40 percent of the applicable tolerance. This tolerance does not apply to the test of the automatic temperature compensating system.

**Vehicle-Tank Meters Code:** Add a new paragraph T.4., that applies to all vehicle-tank meters, to read:

**T.4. Repeatability.** - When multiple tests are conducted at approximately the same flow rate, the range of the test results for the flow rate shall not exceed 40 percent of the applicable tolerance.

**Liquefied Petroleum Gas and Anhydrous Ammonia Liquid-Measuring Devices Code:** Renumber the current paragraph T.3. to be T.4. and add a new paragraph T.3. to read:

**T.3. Repeatability.** - When multiple tests are conducted at approximately the same flow rate, the range of the test results for the flow rate shall not exceed 40 percent of the applicable tolerance. This tolerance does not apply to the test of the automatic temperature compensating system.

## **330-6 I UR.1.X. Selection Requirements; Suitability of Equipment**

**Discussion:** Suitability of equipment was discussed extensively in the 1991 report of the S&T Committee. Items 330-8A and 330-8B in the 1991 report addressed liquid-measuring devices. Please see these items for details.

The Committee continues to believe that a better definition of suitability of equipment is necessary, especially when devices falling under different codes of Handbook 44 are used for the same application. As stated in the 1991 report, the objectives of establishing suitability of equipment criteria are to:

1. ensure 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 that they may 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;
5. facilitate the use of different types of equipment in different applications where the equipment accuracy and performance meets the needs of the application; and
6. promote fair competition among device manufacturers by requiring that all types of devices used in the same application have reasonably consistent tolerances.

Obviously, many devices may comply with the design and performance 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 division, 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.

Based upon comments and further review of the issues, the Committee has modified the tables it presented in its 1991 report. At this time the Committee has concluded that the tables will be provided as guidelines, i.e., the Committee does not plan to propose that the table be added to Handbook 44. This approach leaves the problems associated with the definitions of retail and wholesale devices unresolved, as well as the use of the terms in various codes to specify the application of requirements to particular devices.

The Committee recommends that the following table be studied for possible use in determining the suitability of equipment for particular applications. Readers are referred to Item 330-8B in the 1991 report of the Committee for discussions of various aspects of the following table. The column headed "Accuracy Required (Marking on Meter)" would be used and this marking required if a device manufacturer wants to cross the lines of a code that states a larger tolerance for the device, but the manufacturer wants to use the device in an application where higher accuracy is required. A marking requirement for a given accuracy would require a change to Handbook 44. More definitive criteria are needed if the concept of suitability as addressed in this column is to be implemented.



## Suitability of Equipment Criteria for Liquid-Measuring Devices

Application or Commodity		Deliveries	Maximum Division Value (d <sub>max</sub> )	Accuracy Required (Marking on Meter)	Largest Value Allowed for the Minimum Measured Quantity (MMQ)	Tolerance for the MMQ <sup>1</sup>
		Minimum				
Motor Fuel	Analog	100d	0.01 L 0.01 gal*	0.5%	5 L 1 gal	1.0%
		100d	1.0 L 0.1 gal	0.3%	50 L 10 gal	0.6%
	Digital	100d	0.01 L 0.01 gal	0.5%	5 L 1.0 gal	1.0%
			0.1 L 0.1 gal	0.3%	50 L 10 gal	0.60%
	LPG	100d	0.01 L 0.01 gal	1.0%	10 L 2 gal	2.0%
			0.1 L 0.1 gal		50 L 10 gal	
Home Heating Oil		100d	0.1 L 0.1 gal	0.3%	50 L 10 gal	0.6%
NH3 and LPG Other Than Motor Fuel		100d	0.1 L 0.1 gal	1.0%	50 L 10 gal	2.0%
			1.0 L 1.0 gal		500 L 100 gal	
Agri-Chemical Liquids		100d	0.1 L 0.1 gal	1.0%	50 L 10 gal	1.0%
			1.0 L 1.0 gal		500 L 100 gal	
Milk and other Food Products		100d	0.1 L 0.1 gal	0.3%	50 L 10 gal	0.6%
		100d	1.0 L 1.0 gal		500 L 100 gal	
Cryogenic Liquids		100d	1.0 L 0.1 gal	2.5%	50 L 10 gal	5%
			10 L 1 gal		500 L 100 gal	

Application or Commodity	Deliveries	Maximum Division Value (d <sub>max</sub> )	Accuracy Required (Marking on Meter)	Largest Value Allowed for the Minimum Measured Quantity (MMQ)	Tolerance for the MMQ <sup>1</sup>
	Minimum				
All Other Metering Applications	100d	1.0 L 1 gal	0.3%	500 L 100 gal	0.6%
		0.1 L 0.1 gal		50 L 10 gal	
		0.01 L 0.01 gal	0.5%	5 L 1.0 gal	1.0%
		0.001 L 0.001 gal	1.0%	0.5 L 0.1 gal	2.0%
1. The value listed below times the MMQ applies from 1 MMQ to 2 MMQ. The normal tolerance applies for any other deliveries. Tolerances apply to tests done at all temperatures, pressures, and flow rates as well as for all liquids specified by the manufacturer. <i>*Nonretroactive in terms of new models of devices for measuring motor fuels.</i>					

330-7

VC

**UR.3.2. Unit Price and Product Identity**

(This item was adopted as part of the consent calendar.)

**Discussion:** Some stations post various unit prices for the same product as adjustments to the posted price for different methods of payment or levels of service, rather than stating the actual unit price in dollars per liter or gallon. It is the view of the Committee that the term "unit price" means the price per unit of volume (either liters or gallons), and does not include a price expressed as a discount from some other posted unit price. The objective of this change is to require all prices for products and the form of service or payment to be declared as the price per unit of volume. The exemption given to fleet sales and other price contract sales that is currently included in S.1.6.5.(a) has been added to UR.3.2. to reduce the potential for misinterpretation.

**Recommendation:** To clearly indicate that service stations must post unit prices as the price per liter or the price per gallon, the Committee recommends adoption of the following definition of unit price and amending UR.3.2.(a)(1) to read:

**Unit Price. The price at which the product is being sold and expressed in whole units of measurement.**

**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 ...

To be consistent with the exception for fleet sales and other price contract sales, a change must also be made to paragraph UR.3.3. The Committee recommends that part (a) of UR.3.3. be amended to include the same exclusions. The Committee concluded that part (b) does not have to be changed because the exemption to computing the sales price is given in part (a). The Committee recommends that part (a) of UR.3.3. be amended to read:

## UR.3.3. Computing Device. -

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

## 330-8 W UR.3.3. Computing Device; Customer Controls for Selecting Unit Price

(This item was withdrawn.)

**Discussion:** The Committee received a proposal intended to inform device owners and operators more clearly that new equipment (installed after January 1, 1990) must be used only for those transactions for which it can compute the total sales price; that is, if a device was installed in a multi-tier pricing application after January 1, 1990, then the device must be able to compute the total price based upon each of the unit prices at which the product is offered for sale. The Committee concluded that the amendment as proposed would preclude service stations from designating dispenser islands or individual dispensers to a particular type of service or method of payment (e.g., cash or credit, full or self service). The Committee continues to support the option to designate dispensers or islands for a particular type of service or method of payment to permit stations to utilize multi-tier pricing when the dispensers compute at only one unit price.

The Committee believes that the objective of the proposal has already been met. Paragraphs S.1.6.4. and S.1.6.5. already require on a nonretroactive basis (1) the calculation of the total price based upon the unit prices for all products sold through the dispensers, and (2) the unit price must be selected through customer controls. These specifications apply to devices placed into commercial use (i.e., installed) after January 1, 1991. Paragraph UR.3.3.(a) was amended to give weights and measures officials the tools to control the use of single unit price dispensers that were installed prior to January 1, 1990, but placed into multi-tier pricing service after January 1, 1990. Consequently, the Committee has withdrawn this item.

## 330-9 I Blending at the Loading Rack for Wholesale Transactions; Adjustments for Changes in Product Volume

**Discussion:** The API (American Petroleum Institute) Publication 4261, "A Technical Assessment of Their Application as Fuels and Fuel Components" reports that when gasoline and alcohol are blended, the final product volume is greater than the sum of the volumes of the components. The reported changes in volume range from zero to approximately 0.2 percent for blends consisting of 20 percent methanol or ethanol. Some companies have expressed interest in charging the customers for the total volume of the blended product, although only the component products are measured at the loading rack. A paper published by the American Chemical Society entitled "Densities and Excess Molar Volumes of Methyl tert-Butyl Ether and Ethyl tert-Butyl Ether with Hydrocarbons from 255.4 to 333.2 K" by Adisak Jangkamolkulchai, Gregory C. Allred, and William R. Parrish of Phillips Petroleum Company, reported that when gasoline is mixed with the ethers that may be used in motor fuels, the volume of the final blended product is smaller than the sum of the component parts. This latter study concluded that the differences are less than 0.05 percent and can be ignored for up to 15 percent by volume of these ethers in the mixtures studied.

It has been suggested that the factor to be used to adjust for changes in volume be determined empirically based upon an accuracy test of the meter for the product components and the blended product. The Committee is not convinced that there is sufficient technical data resulting from research to provide unquestioned validity for the values associated with the changes in volume due to the chemical mixing of gasoline and other blending compounds. Consequently, the Committee has concluded that adjustments for changes in volume due to blending shall not be made by mathematical calculation. The Committee will continue to study this issue and requests additional comments.

### 330-10 I Combine the LMD and VTM Codes

**Discussion:** It has been proposed that the Liquid-Measuring Devices (LMD) and the Vehicle-Tank Meter (VTM) Code be combined because meters typically used as vehicle-tank meters are used in both retail and wholesale applications and other stationary device applications. A significant number of meters typically used as VTMs are used in high-volume retail fuel dispensers. Consistent specifications and performance requirements are needed. It may be necessary to modify requirements for the resetting mechanism and the interlock to apply to VTMs when used in the typical VTM application. Additionally, the differentiation between retail and wholesale must be resolved so that appropriate tolerances are applied for normal and special tests.

The Committee favors combining the codes. A draft of the proposed combined code will be developed and sent to industry and the regional weights and measures associations for review and development.

### 330-11 I Permanence Tests for the Type Evaluation of Liquid-Measuring Devices

**Discussion:** Canada, which has an excellent liquid-meter test facility, advocates doing the permanence (endurance) test for type evaluation in a government laboratory whenever possible, rather than by field test. The Committee agrees that laboratory evaluation is a viable alternative to conducting the field permanence test required as part of NTEP evaluations. NTEP could conceivably arrange for Canada's Legal Metrology Branch to perform the permanence tests for NTEP. The OIML recognizes laboratory testing as acceptable for type evaluation endurance tests. Realizing that not all liquid meters can be tested in the laboratory, the following order of preference is suggested for conducting the endurance test:

1. A government laboratory shall be used, whenever possible.
2. If the government laboratory is unable to conduct the test:
  - a. a field test is acceptable; or
  - b. a manufacturer's laboratory with appropriate facilities is acceptable.

The minimum volume of product delivered during a laboratory permanence test of metering devices shall be the equivalent of 100 hours of operation at the maximum rated flow rate for the meter. This is consistent with the OIML position.

The Committee believes that the proposed permanence test procedures have merit, but chooses to wait until after the Measuring Sector of the Technical Committee on National Type Evaluation has had the opportunity to review the above proposal. The Committee recognizes that additional language must be developed for Publication 14 to define the term "appropriate facilities." If the Measuring Sector agrees to support the proposal, implementation may be accomplished through the NTEP process without the need for further NCWM action.

### Vehicle-Tank Meter Code

See Item 330-5 for the recommended repeatability tolerance for multiple tests on a meter.

### 331-1 VC N.4.1. Normal Tests

(This item was adopted as part of the consent calendar.)

**Discussion:** In 1991 the NCWM adopted an amendment to the LMD Code defining the flow rates to which the normal test tolerances applied. See Item 330-6 in the 1991 S&T Committee report. The discussions of the Measuring Sector of the Technical Committee on National Type Evaluation included VTMs and the example given in the 1991 S&T Committee report was for a VTM. The change made to the LMD Code should also have been made to the VTM Code. Consequently, an amendment to the VTM Code paragraph is recommended. To provide background information, the following text is based on, and the example is taken from, the 1991 report.



The rated maximum flow rate for a meter is the maximum flow rate for which the manufacturer designed the device. The maximum discharge rate is the maximum flow rate achieved by a meter in an actual installation and is often less than the rated maximum flow rate established by the manufacturer. The maximum discharge rate 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.<sup>3</sup>

The Measuring Sector discussed this issue. The members 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 installed that has a maximum flow rate less than 60 percent of the rated maximum flow rate is not a suitable installation for the purposes of type evaluation.

A sample computation of 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

$$\text{Lowest normal test flow rate} = \frac{\text{Maximum discharge rate} + \text{Minimum rated flow rate}}{2}$$

$$\text{Lowest normal test flow rate} = \frac{80 + 20}{2} = 50 \text{ gpm}$$

**Recommendation:** To clarify the application of the tolerances for the normal tests, the Committee recommends amending N.4.1. as follows:

**N.4.1. Normal Tests.** - The "normal" test of a measuring system shall be made at the maximum discharge rate that may be anticipated under the conditions of the 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.

### Liquefied Petroleum Gas and Anhydrous Ammonia Liquid-Measuring Devices

See Item 330-5 for the recommended repeatability tolerance for multiple tests on a meter.

#### 332-1 VC T.2. Tolerance Values

(This item was adopted as part of the consent calendar.)

**Recommendation:** The Committee recommends changing the acceptance and maintenance tolerances to agree with the OIML tolerances and to equalize the tolerances for overregistration and underregistration. The Committee recommends amending T.2. to read:

**T.2. Tolerance Values.-** The maintenance and acceptance tolerances for normal and special tests shall be:

<sup>3</sup>Currently operating bulk weighing systems are characterized by customary units. However, Handbook 44 is undergoing revision to ensure SI usage as the primary form for all measurements.

## Specifications and Tolerances Committee

	Under- registration	Over- registration
Normal tests		
Acceptance	<del>0.75%</del> 0.6%	<del>0.5%</del> 0.6%
Maintenance	<del>1.5%</del> 1.0%	1.0%
Special tests		
Acceptance and Maintenance	<del>1.5%</del> 1.0%	1.0%

**Discussion:** A change in tolerances was originally proposed to harmonize with Canada, but the Committee was encouraged at the Interim Meeting to adopt the OIML tolerances. Since Canada is willing to consider revising their tolerances to the OIML tolerances, the Committee recommends adopting the OIML tolerances.

The Committee also believes that the smaller tolerances can be achieved and maintained with current technology and regular maintenance and testing. Better accuracy is always encouraged by weights and measures officials. Although the acceptance tolerances are not changed significantly, the proposed tolerances are structured symmetrically around zero error.

It is important to remember that the tolerance for mass flow meters stated in the Tentative Mass Flow Meters Code is 0.5 percent for this same application. This change in tolerance structure would also facilitate uniform tolerance categories for devices if the proposal for suitability of equipment guidelines for metering devices continues to develop.

If the tolerance changes are adopted, the table will be revised to appear in Handbook 44 in the following format.

	Acceptance Tolerance	Maintenance Tolerance
Normal Tests	0.6%	1.0%
Special Tests	1.0%	1.0%

### 332-2 VC UR.2.6. Ticket Printer; Customer Ticket

(This item was adopted as part of the consent calendar.)

**Discussion:** The Committee believes that customers need a delivery ticket at the time of product delivery to document the transaction. The delivery ticket is the only assurance that customers receive sufficient information to evaluate accuracy of deliveries and invoices. At least one company "combines" the quantities of individual deliveries to customers having multiple storage tanks, without providing information to these customers regarding individual quantities delivered to each tank. In other cases, customers do not receive delivery tickets for even a single delivery; consequently, there is no record other than the company's copy of a bill to check the delivery. Other companies that have in the past routinely left delivery tickets after a delivery are now discontinuing the practice, but bill customers based upon an electronic file that is transferred from the meter to the company's office computer.

The Committee recommends that delivery tickets be required for deliveries of LP Gas and anhydrous ammonia. This requirement will apply to deliveries of both products since the code applies to meters used for both products. This change is proposed to become effective in January 1993 and to become retroactive in January 1994.

The Committee plans to propose an equivalent change to the VTM Code in 1993 and asks industry and weights and measures official to review this possible change and forward their comments to the Committee.

**Recommendation:** The Committee recommends adding a new UR.2.6. to read:

*UR.2.6. Ticket Printer; Customer Ticket. - Vehicle-mounted metering systems shall be equipped with a ticket printer. The ticket printer shall be used for all sales; a copy of the ticket issued by the device shall be left with the customer at the time of delivery.*

*[Nonretroactive as of January 1, 1993. To become retroactive as of January 1, 1994.]*

### 332-3 VC T.3. Automatic Temperature-Compensating Systems

(This item was adopted as part of the consent calendar.)

**Discussion:** See Item 330-4 for background. This item was added as a result of the discussions at the Interim Meeting. It is consistent with the recommendation made in Item 330-4 for the Liquid-Measuring Devices Code. The tolerance specified for LP Gas is based upon the coefficient of cubical expansion for LP Gas and is consistent with the temperature range used for the LMD Code requirement.

**Recommendation:** The Committee recommends amending 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:

(a) 0.5 percent of the test draft for mechanical automatic temperature compensating systems; and

(b) 0.25 percent of the test draft for electronic automatic temperature compensating systems.

The results of each test shall be within the applicable acceptance or maintenance tolerance.

### Tentative Code - Mass Flow Meters

#### 337-1A I S.1.2.2. Mass Measurement

(This item was changed from a voting item to an information item at the Annual Meeting. The item is presented below as it was originally proposed as a voting item.)

**Recommendation:** The Committee has serious reservations about permitting and requiring mass flow meters to indicate in units of true mass. The Committee believes that true mass indications in mass units will be confusing to customers purchasing products through mass flow meters, especially when they try to relate the values to what they may obtain from scales. Since scales essentially indicate in apparent mass versus  $8.0 \text{ g/cm}^3$ , the Committee tends to believe mass flow meters should also be required to indicate in apparent mass units.

The Committee recommends that the issue of the indication of mass flow meters in terms of true or apparent mass continue to be studied over the next year. Since the Committee has concluded that the Mass Flow Meter Code should remain tentative for another year, there is no urgency to make the change to S.1.2.2. that would require the distinction of units of mass from units of true mass. If the review by weights and measures officials over the next year results in the conclusion that true mass units are judged to be the most appropriate for mass flow meters measuring most products, then the Committee plans to recommend the changes indicated in the proposed S.1.2.2. shown below for reference.

**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 "kg mass" or "lb mass," or with the statement "Product quantity is based upon (true) mass" or another similar suitable statement.

## Specifications and Tolerances Committee

The issue of deciding the appropriate units for natural gas used as a motor fuel provided additional incentive for the Committee to delay a decision on S.1.2.2. The Committee wants to coordinate its proposals with those of the Laws and Regulations Committee to assure a consistent approach to determine the appropriate measurement units for natural gas used as a motor fuel. The Committee has chosen to express its current position on this issue by creating a new information item 337-1B to discuss this issue.

**Discussion:** Sales of compressed natural gas (CNG) as a motor fuel are increasing. Mass flow meters are frequently used to measure CNG as a motor fuel; however, other types of devices are also used to measure CNG. Establishing an appropriate unit of measurement for CNG or any other product measured through a mass flow meter is important to provide standardization and a uniform basis for price comparison. The Committee believes that products measured through a mass flow meter should have quantities indicated in mass units since mass is being measured.

The Committee is aware that businesses are interested in selling CNG in units other than mass units, for example, "equivalent gallons of gasoline" or standard cubic feet. The Committee believes that consumers would be better served if all sales of CNG were in the same unit of measurement. The Committee strongly opposes the term "equivalent gallons of gasoline" because it is not aware that a standard exists or that all gasoline has the same energy content.

Paragraph S.1.2.1. from the Mass Flow Meter Code is shown below to emphasize the position, both nationally and internationally (based upon OIML recommendation), that mass flow meters must register quantities in mass units. All jurisdictions are encouraged to promote the use of mass units for CNG and other products measured through mass flow meters.

**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.

The issue of the method of sale for CNG is referred to the L&R Committee, which is requested to specify the method of sale of CNG to be in mass units.

The S&T Committee recommends the amendment to S.1.2.2. to standardize the terminology for units of mass used with mass flow meters. Because mass flow meters are permitted to indicate in mass units rather than apparent mass units (as is indicated on scales), consumers will be confused. Although the additional description of kilograms and pounds as "kg mass" and "lb mass" will not convey the significance of the measurement unit to the customer, it provides a minimum statement that may alert the customer that the indication differs from the weight indication on a scale. See Appendix B in the 1991 S&T report for more information.

### 337-1B                      I                      S.1.2.1. Units of Measurement; Natural Gas Used as a Motor Fuel

**Discussion:** The Committee heard three presentations espousing different positions regarding the proper measurement units for natural gas when used as a motor fuel. Two of the presentations support indicating the quantity of natural gas in terms of equivalent gallons of gasoline or equivalent gallons of diesel fuel. Because the number of BTUs per gallon of gasoline and diesel fuel vary with the product offered for sale, there is not a standard BTU content for these products. The Committee concluded that the proposed units of "equivalent gallon of gasoline" or "equivalent gallon of diesel fuel" (hereafter referred to as simply "equivalent gallon" in the generic sense) is not a legal measurement unit. The Committee believes the primary unit of measurement for the sale of compressed natural gas must be a legal unit of measurement. Consequently, a computing device dispensing compressed natural gas must have its primary indication in a legal unit of measure, the unit price must be indicated as dollars per legal unit of measure, and the total price must be based upon these two values.

The Committee was requested to recommend a change to S.1.2.1. to permit the use of supplementary quantity indications on the dispenser for compressed natural gas to facilitate the public acceptance of the product and to provide a basis for customer comparison to other fuels used as a motor fuel, specifically, gasoline, diesel fuel, propane, and natural gas. This information is also intended to provide consumers with some basis to make a value comparison between the types of products offered as a motor fuel. The "unit of measurement" requested as the basis for making this value comparison is the "equivalent gallon."



The Committee was also encouraged to recognize the primary legal unit of measurement to be energy units, since that is what the consumer ultimately is buying and which was suggested as the most meaningful measurement unit for natural gas. The energy units would be megajoules in SI units and therms in the inch-pound system.

The Committee believes that the proposals to indicate in energy units deserves serious consideration along with permitting the quantity of natural gas to be indicated in "equivalent gallons" to aid in consumer acceptance of the product and for the purposes of value comparison. The Committee's position is that devices would be permitted to indicate in supplementary units of measurement, including "equivalent gallons" by using a dual display dispenser, but the Committee is opposed to allowing compressed natural gas dispensers to indicate in a single unit of "equivalent gallon." The Committee believes the supplementary indication must be clearly identified as a supplementary unit for information purposes only to make clear that the "equivalent gallon" indication is not a legal measurement unit. (If the supplementary unit is a scientifically defined legal standard unit of measurement as accepted by the National Institute of Standards and Technology, then the statement describing the supplementary unit of measurement would not be required.) However, the Committee believes that the conversion factor to convert from the legal unit of measure to "equivalent gallon" or other supplementary units must be standardized to be meaningful. The values suggested as the basis for conversion are 1.14 therms per gallon of gasoline and 1.32 therms per gallon of diesel fuel. (One therm is equal to 100,000 BTUs.)

The Committee emphasizes that these are not exact conversions because the number of BTUs per gallon of gasoline or diesel fuel can vary by approximately  $\pm 10$  percent from these numbers. Additionally, the number of BTUs per kilogram, pound, cubic meter, or cubic foot also varies by a significant amount. Comments from the Natural Gas Vehicle Coalition have indicated that they are interested and willing to mark the conversion factor that they would use to convert from natural gas to the "equivalent gallon" on the device to reflect the actual BTU content as determined by their measurement processes that are required by State Public Utility Commissions to keep careful control of their product composition.

The Committee is giving serious consideration to the proposal submitted by the Natural Gas Vehicle Coalition, with the understanding that their long term objective is to require the primary legal unit of measurement to be in energy units. The Committee includes their recommendation in its report to facilitate its study by industry and weights and measures officials. Their proposed changes to the Mass Flow Meter Code, as modified by the Committee, are indicated below.

**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. For the sale of natural gas in vapor form as a motor fuel, supplemental indications in other appropriate units are permitted. Such units include therms, equivalent gallons of gasoline or diesel fuel, or standard cubic feet. Supplemental indications shall be identified as being for information purposes only.

Add the following User Requirement.

**UR.2. Supplemental Measurement Indications.** - If supplemental measurement indications are provided as specified under S.1.2.1., an appropriate conversion factor shall be posted on the face of the device.

### 337-2 VC S.3.5. Provision for Sealing; Zero Adjustment Mechanism

(This item was adopted as part of the consent calendar.)

**Discussion:** An adjustment to zero on a mass flow meter has the same effect as a span adjustment in terms of its effect on the measurement. Because changes to the zero adjustment mechanism can affect the measurement result of a transaction, it is necessary to provide an approved means of security to prevent changes from being made to this mechanism. The existing Paragraph S.3.5. does not specifically require that provisions be made to prevent these changes. This paragraph should be changed to clearly specify that the zero adjustment mechanism on mass flow meters must be sealable.

**Recommendation:** The Committee recommends that S.3.5. of the Mass Flow Meters Code be amended to specify clearly that the zero adjustment mechanism on mass flow meters must be sealable:

**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 on any device that affects the measurement result cannot be made without breaking the security seal. Provision shall be made for the zero adjustment mechanism to meet this requirement.

**337-3                      VC                      UR.2. Low-Flow Cut-Off Valve**

(This item was adopted as part of the consent calendar.)

**Discussion:** Some mass flow meters are programmed to activate a low-flow cut-off valve that prevents the meter from registering when product flow is very low. Since the meter is required to perform accurately over the entire range of specified flow rates, there appears to be no need for the value for the low-flow cut-off valve to be lower than the minimum flow rate specified by the manufacturer. Consequently, this user requirement is recommended for adoption.

**Recommendation:** The Committee recommends adding the following user requirement.

**UR.2. Low-Flow Cut-off Valve.** If a metering system is equipped with a programmable or adjustable "low-flow cut-off" feature:

- (a) the low-flow cut-off value shall not be set at flow rates lower than the minimum operating flow rate specified by the manufacturer on the meter; and
- (b) the system shall be equipped with flow control valves which prevent the flow of product and stop the indicator from registering product flow whenever the product flow rate is less than the low-flow cut-off value.

**337-4                      I                      T.2. Tolerances for Liquid-Measuring Devices; T.5. Type Evaluation Examinations**

(This item was changed from a voting item to an information item at the Annual Meeting. The item is presented below as it was originally proposed as a voting item.)

**Discussion:** OIML has changed the tolerance for liquids through mass flow meters to be 0.5 percent for both acceptance and maintenance tolerance. The tolerances specified in the Mass Flow Meters Code should be changed to be consistent with the OIML International Recommendation (IR) for Direct Mass Flow Measuring Systems for Quantities of Liquid.

Unlike the OIML Recommendation, the Mass Flow Meters Code does not currently specify a unique tolerance for tests performed during type evaluation examinations. Consideration should be given to specifying tolerances to be applied during type evaluation consistent with those recommended by OIML, namely  $\pm 0.3\%$  of the measured quantity under the following conditions:

- with any one liquid within the range of liquids,
- at any one liquid temperature and pressure within their respective ranges, and
- at all flow rates within the range of flow rates.

Since the Committee is proposing the deletion of the marking of the temperature range in Item 337-6, the Committee specifies the liquid temperature and pressure as the operating temperature and pressures.

**Recommendation:** The Committee recommends amending the acceptance tolerance for mass flow meters to agree with the OIML tolerance. This establishes the acceptance and maintenance tolerances to be 0.5 percent of the measured quantity. However, the OIML recommendation specifies a smaller tolerance for the type evaluation of mass

flow meters if the evaluation is done using a single product within the range of liquids that can be measured. Further review of this issue has caused the Committee to reconsider whether or not the tolerance should be increased. The Committee offers the following for further study over the next year.

**T.2. Tolerances for Liquid-Measuring Devices.** - The maintenance and acceptance tolerance shall be 0.5 percent of the measured quantity. ~~The acceptance tolerance shall be 0.3 percent of the measured quantity.~~

**T.5. Type Evaluation Examinations for Liquid-Measuring Devices.** - For type evaluation examinations, the tolerance values shall be 0.3 percent. This tolerance shall apply under the following conditions:

- (a) with any one liquid within the range of liquids,
- (b) at any one liquid temperature and pressure within ~~their respective ranges~~ the operating range of the meter, and
- (c) at all flow rates within the range of flow rates.

### 337-5 VC T.4. Tolerances for Multiple Tests

(This item was adopted as part of the consent calendar.)

**Discussion:** The OIML International Working Group for the IR on Direct Mass Flow Measuring Systems for Quantities of Liquids changed the tolerance for multiple tests in 1990 to 0.2 percent. This change was not transferred correctly into the Mass Flow Meters code for Handbook 44, hence Paragraph T.4., Tolerances for Multiple Tests, should be changed in part (a) to be consistent with OIML recommendations.

The Committee proposes increasing the repeatability tolerance for vapor by a factor of three relative to the measurement of liquids because (1) the mass of vapor measured in tests is much smaller than the mass of the tank used as the tare container; (2) vapor is more difficult to measure through a mass flow meter due to its low density; and (3) due to the larger tolerance permitted for vapor measurement, the repeatability tolerance for vapor measurement is approximately proportional to the accuracy tolerance for liquid relative to the accuracy tolerance for liquid measurement.

**Recommendation:** The Committee recommends T.4. be amended to read:

**T.4. ~~Tolerance for Multiple Tests: Repeatability.~~** - When multiple tests are conducted at approximately the same flow rate, the range of the test results for the flow rate shall not exceed:

- (a) ~~20~~ 0.2 percent of the measured quantity ~~for liquid measurement; and~~
- (b) 0.6 percent of the measured quantity for vapor measurement.

### 337-6 I Tentative Status of the Code

(This item was changed from a voting item to an information item at the Annual Meeting.)

Based upon the comments received and the issues raised, the Committee recommends that the Mass Flow Meters Code remain a tentative code. The Committee appreciates the study that has been given this code over the past year. The Committee recommends that the tolerances, the requirements for accuracy over a temperature range, and the units for natural gas in the vapor state used as a motor fuel be extensively studied over the next year in the hope of making the Mass Flow Meter Code a permanent code.

## Taximeters

### 354-1 I UR.3.1. Units for Rate Increments

**Discussion:** The Taximeter Code requires that rates be stated and conspicuously displayed in the cab, but does not provide for uniformity in units of distance. Modern electronic taximeters are capable of computing at a multitude of rates. Both the amount and distance of registration units can be changed without restriction. This has led to a proliferation of distance rates which are confusing to customers. Some examples of rates currently in use are listed below.

\$2.00 first 5/37 mile then \$.25 each 5/37 mile  
\$2.00 first 1/15 mile then \$.25 each 1/15 mile  
\$2.00 first 1/7 mile then \$.25 each 1/7 mile  
\$2.00 first 1/9 mile then \$.25 each 1/9 mile

The above rate schedules inhibit value comparison and are not "readily understandable by the ordinary passenger" as required by UR.3. The Committee considered the following addition to the code.

UR.3.1. Units for Rate Increments. The display of a taximeter shall be programmed to increment in uniform whole cent values, at 0.1 kilometer (or 0.1 mile) intervals for distance, and at uniform whole multiples of the second for time.

The Committee did not have sufficient time to evaluate this issue; consequently, the Committee requests additional information and input before making a recommendation.

## Other Items

### 360-1 I SI Units in NIST Handbook 44

**Discussion:** To promote and facilitate the change to the International System of Units (SI) and consistent with federal policy, a list of changes has been prepared to describe how SI units will be included in Handbook 44 with every inch-pound reference. The listing is too extensive to be included in the agenda, but the changes are available from the Office of Weights and Measures.

The vast majority of devices used when selling to or buying from the general public indicate quantities in inch-pound units. During the transition to SI units, references to inch-pound units are made where demanded by the nature of the devices and their applications. The 1993 edition of Handbook 44 will list SI units first whenever both SI and inch-pound units appear.

### 360-2 I Volume Measurements for Shipping Charges; "Dimensional Weights"

**Discussion:** It is common practice in the package delivery business to charge based upon the weight or volume of the package. Automated systems have been developed to measure the volume of packages for the purpose of establishing the freight charges. The Committee agrees with the proposal that Handbook 44 criteria be developed for these volume-measuring systems. A number of countries have completed type evaluations on a number of devices and have accepted these devices for commercial use.

The Committee requests that companies submit their recommendations for specifications and performance requirements for these volume-measuring systems.

Volume measurements are commonly used in the shipping industry to establish freight charges by converting the volume into a corresponding weight category. The dimensions of an object to be shipped are converted into a "weight"



using a "dimensional weight conversion factor." The S&T Committee discourages the use of the term "dimensional weights" that has been associated with this billing practice, since the "weight" is used only to translate the volume into a freight charge, which could be established purely on the basis of volume. The conversion factor is used to determine whether the shipping charge will be based upon the weight or the volume of the package.

The use of a volume-to-weight conversion factor enables freight companies to charge for the allocation of resources and capacity expended to ship a particular package. This practice is used to determine shipping charges for objects with low weight, but high volume (low density). For example, assume that a 60 cm x 60 cm x 60 cm box contains a small, light-weight object. The box may weigh only a few kilograms, but occupy the same *space* as would a box of similar size containing a much heavier object (high density). If freight companies specify the shipping costs based only on weight, rather than utilize the volume occupied by a package, then the volume concerns of the transporting company are not addressed. Low density packages take up more space than more dense material of the same weight, but do not provide as much revenue as heavier packages of the same volume. The companies have developed volume-to-weight conversion factors to equate the resources required to ship both high density and low density packages.

For example, a box to be shipped is found to have the following measurements:

Length = 25 cm; Width = 30 cm; Height = 45 cm

The *volume* of the box in cubic inches =  $(25 \times 30 \times 45) = 33,750 \text{ cm}^3$

The Committee was advised that the International Air Transport Association recognizes a dimensional weight conversion factor of  $6000 \text{ cm}^3 = 1 \text{ kg}$  ( $166 \text{ in}^3 = 1 \text{ lb}$ ) for international air-freight shipments. Using this conversion factor in the example above, the "*weight*" used to determine the freight charge corresponding to the volume of the box is determined as follows:

$$33,750 \text{ cm}^3 \times (1 \text{ kg}/6000 \text{ cm}^3) = 5.625 \text{ kg}$$

There are devices that can automatically determine the dimensions (i.e., the length, width, and height) of an object to be shipped. These devices use the dimensions along with a specified dimensional weight conversion factor to determine the dimensional weight of the object. Since a monetary charge is calculated based on these measurements, these are commercial devices and are subject to regulation by weights and measures officials. Consequently, specifications, tolerances, and testing procedures must be developed for these devices.

When developing criteria for these devices, the following should be considered:

- **Accuracy:** The current shipping industry tolerance is 1 centimeter for each length measurement. The transportation industry does not require an accuracy better than 1 centimeter because most goods are transported in containers whose package shape is not rigidly fixed (e.g., a cardboard box will change shape depending on the side on which it is resting). Is this an appropriate tolerance? What repeatability requirements should apply?
- **Suitability and Use:** For which applications are these devices suitable? Are there applications other than the shipping industry in which the devices can be used? If so, are there other requirements which must be considered?
- **Environmental Factors:** These devices may be used in a wide variety of environmental conditions such as extreme cold or heat, humidity, dust, and electromagnetic interference. How is the accuracy of these devices affected (if at all) by these extremes? Are there ways to evaluate the capability of the device to perform properly under these conditions?
- **Determining the volume of irregularly-shaped goods:** How can the volume be determined for irregularly shaped goods such as mufflers and tailpipes? Can general guidelines be developed for determining the volume of these goods? What testing procedures should be used to verify the capability of the device to handle irregularly-shaped goods?

- **Information provided to the customer:** Is there a minimal amount of information that must be provided to the customer concerning the determination of shipping charges? For example, is a printed receipt required? How will the customer be informed that the weight used in the determination of the shipping charge is based upon volume? At what dimension and/or weight is a package subject to charges based on volume rather than the weight of the package?

### 360-3 I Liquid Carbon-Dioxide Meters Code

**Discussion:** The original draft of the Liquid Carbon-Dioxide Meters Code published in 1987 was based upon the California proposal. The State of California has updated its proposed code, which is the basis for the draft code contained in Appendix B. The draft code is included in the Appendix for study and comment. The Committee requests comments to guide the development of this code over the next year.

### 360-4 I Publication Format of Handbook 44

**Discussion:** Various forms of publication are being considered by OWM, e.g., publishing each code separately, publishing the General Code and Scales Code and the General Code and LMD Code as combined sections, or some combination of packages. Publication of Handbook 44 in separate sections is being considered so that the entire book does not have to be reprinted each year. This issue will be of increased importance if one or more of the proposed new additional codes are developed and adopted. The responses from regional weights and measures associations have been mixed. No decision has been made on the format of Handbook 44 for future publications; the alternatives are still being studied.

### 360-5 VC NTEP Sectors for Grain Measurement Equipment

(This item was adopted as part of the consent calendar.)

**Discussion:** The NCWM has formed two new Sectors under the Technical Committee for National Type Evaluation: one is addressing grain moisture meters, and the other protein analyzers. The Sectors are developing type evaluation criteria and test procedures for these devices. The Sectors are to develop specifications, tolerances, and test procedures and submit proposed changes to Handbook 44 as appropriate. The Sectors met for the first time in December 1991 and have recommended two changes to the Grain Moisture Meters Code.

The first change is to delete the definition for "reference method" from the definitions in Handbook 44 and include an updated statement for the reference method in N.1.1. The second change is to reference the field testing procedures outlined in Chapter 5 of the USDA FGIS Equipment Handbook in paragraph T.3. This latter change is needed because the 0.15 lb/bu tolerance applies only to Hard Red Winter Wheat and is an average of nine measurements. These nine measurements are from five measurements at three weight levels using three samples and disregarding the high and low readings at each weight level.

**Recommendation:** The Committee recommends that the definition for "reference method" be deleted. The Committee recommends that paragraphs N.1.1. and T.3. be amended as follows.

**N.1.1. Transfer Standards.<sup>1</sup>** - Official grain samples shall be used as the official transfer standards with moisture content values assigned by the reference methods. The reference methods shall be the oven drying methods as specified in by the USDA FGIS. Moisture Handbook, Chapter 4, dated September 15, 1986, or the most current USDA method. Tolerances shall be applied to the average of at least three measurements on each official grain sample. Official grain samples shall be clean and naturally moist, but not tempered (i.e., water not added).

**T.3. For Test Weight Per Bushel Indications or Recorded Representations.** - The maintenance and acceptance tolerances on test weight per bushel indications or recorded representations shall be 0.193 kg/hL or 0.15 pound per bushel. The test methods used shall be those specified in by the USDA FGIS. Equipment Handbook, Chapter 5, dated September 15, 1986, or the most current USDA method.

## 360-6 I OIML Report

The following information was provided by Mr. O. K. Warnlof, Standards Management Program, NIST, to report on OIML activities of significant importance to the National Conference on Weights and Measures.

**Discussion:** The OIML schedule of activities for 1991/1992 has been extremely heavy and is expected to continue for the next several years, due primarily to "EC92". U.S. industry is in a unique position in that, through OIML participation, it can influence EC Council Directives. The cooperation and interest of the members of NCWM is appreciated and continued participation is encouraged. The following is an outline of the activities of OIML work affecting the responsibilities of the S & T Committee since the 76th NCWM, 1991. The outline highlights the work of each Reporting Secretariat (RS) and the present situation with respect to the documents within its purview.

The following is a list of the acronyms used:

OIML	International Organization of Legal Metrology
BIML	International Bureau of Legal Metrology
CIML	International Committee of Legal Metrology
PS	Pilot Secretariat
RS	Reporting Secretariat
IWG	International Working Group
NWG	National Working Group
IR	International Recommendation
ID	International Document
PD	Pre-draft

## OIML WORK PROGRAM - 1991/1992

PS5D "Dynamic Measurement of Liquids"

## RS1 "Meters With Measuring Chambers or Turbines"

- 3rd PD Combined IR to be circulated by RS, 6-7/91 - Received 7/18/91
- 3rd PD Combined IR circulated to NWG 7/23/91 - Comments to RS by 10/7/91
- Meeting of IWG - 10/28-31/91, Paris.
- U.S. comments on comments of other members of the IWG to Co RS's by 12/91 - Comments sent 11/26/91.
- 4th PD Combined IR due in early spring 1992.
- 4th PD received and circulated 6/10/92 to NWG for comment by 8/14.

## RS3 "Water Meters"

- Meeting of IWG on 2nd PD Revision R49 "Water Meters" scheduled for late 1991.
- Meeting not held and no further information available.

## RS5 "Data for the Calculation of Quantities of Liquids"

- Revision R63 "Petroleum Measurement Tables" - Memo to IWG 5/11/92 to revise by including reference to ISO 91-2 "Petroleum Measurement Tables - Part 2: Tables based on a reference of 20 °C, published 11/15/91.
- Response due 7/3/92.
- Responses received: yes-9, comments-1.

## RS6 "Electronic Devices"

- Draft IR "Electronic Measuring Assemblies for Liquids Other than Water Fitted with Volume Meters" accepted by RS & PS (U.S.voted "no") - 1/1/90.
- Draft IR will not be published as an IR but will be used as a reference document for the RS's.

## Specifications and Tolerances Committee

### RS7 "Methods & Devices for Verification" & RS9 "Vortex Meters"

- Meeting of IWG - 11/25-27/91, Tokyo, Japan on the following documents:
  - (a) 2nd PD "Test Procedures, Gas Pumps"
  - (b) 2nd PD "Pipe Provers"
  - (c) 1st PD "Vortex Meters"

No report received as yet.

### RS10 "Direct Mass Flow Meters"

- Results of Meeting of IWG - 5/13-15/91, NWML, U.K. - 1st Draft IR "Direct Mass Flow Measuring Systems for Quantities of Liquids."
- Ballot for vote on 1st Draft IR circulated to PS IWG 6/12/91. Response due - 9/27/91.
- Results of vote: 7-yes, 1-no(Australia), 2-abstain, 4-no response.
- U.S. response to comments received with Ballot completed and Draft IR edited and sent to BIML for circulation to CIML for vote - 11/13/91.
- Received from BIML for U.S. CIML vote - 1/3/92 - Response by 6/15/92.
- CIML response as of 6/23/92: yes-20, no-1 (Canada), abstain-2 (Algeria & France); Comments from 8 countries & 1 RS (Terminology).
- U.S. response to comments & edited IR sent to BIML on 7/17/92 for action by the 9th OIML Conference in 11/92.
- Pattern Evaluation Report Forms completed & circulated to IWG 7/31/92 for response by 10/30/92.

### PS5S "Static Measurement of Liquids"

#### RS12 "Static Direct Mass Measurement of Quantities of Liquids"

- Meeting of IWG on 2nd PD IR "Direct Static Mass Measuring Instruments for Quantities of Liquids" - 5/16-17/91, NWML, Teddington U.K.
- Meeting Results - 3rd PD due fall, 1991.
- Meeting results and 3rd PD received 2/14/92 for response by 4/27/92.
- U.S. comments on 3rd PD sent to RS - 5/3/92.

### PS6 "Measurement of Gas"

#### RS4 "Measurement of Hydrocarbon Gases Distributed by Pipe-Line"

- 2nd PD 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 10/10/89.

Note: No further update has been received.

### PS7 "Measurement of Mass"

#### RS2 "General Problems. Electronic Devices"

- U.S. response to comments received from IWG on Draft Revision R74 "Electronic Weighing Instruments" and Re-vote request to IWG - 5/8/91. Response due 8/16/91  
Response: PS- 5-yes, 1-no, 2-abstain, RS- 9-yes, 1-no, 2-abstain. Retain definitions of durability, durability error, and significant durability error.
- U.S. response to comments developed, IR edited and sent to BIML for circulation to CIML for vote - 12/10/91.
- Draft Revision received from BIML for U.S. CIML vote 1/3/92 - Response by 6/15/92.



- CIML response as of 6/23/92: yes-20, no-2 (France & Switzerland), abstain-2 (Austria & Belgium). Comments were received from 9 countries, 1 RS (Terminology), and 1 Liaison Int'l. Institution (IEC).
- U.S. response to comments and edited IR sent to BIML on 7/17/92 for 9th OIML Conference vote in 11/92.

#### **RS4 "Non-Automatic Weighing Instruments"**

- R76 "Nonautomatic Weighing Instruments Part 1 Metrological and Technical Requirements - Tests" adopted. NWG notified.
- R76, Part 2 - Pattern Evaluation Report received 7/1/92 and circulated for comment by 9/30/92.

#### **RS5 "Automatic Weighing Instruments"**

- IWG Meeting held 5/20-24/91, NWML, U.K. - to discuss succeeding Draft Documents.
- Results of IWG meeting:
  - 1st Draft Revision R50 "Belt Weighers" Accepted. Received from RS on 2/10/92 for circulation to the IWG of PS7 for vote.
  - 4th PD Rev. R61 "Gravimetric Filling Instruments" to be circulated by fall 1991. Received on 12/17/91
  - 2nd PD Rev. R51 "Catchweighers" to be circulated by fall, 1991. Received on 1/22/92
- IWG Special Meeting - 2/92, NWML, U.K. - to discuss Draft Documents Rev. R61 & R51.
- Draft IR's "Totalizing Hopper Weighers" and "Automatic Rail Weighbridges" editing completed and sent to IWG and BIML for circulation to CIML for vote - 11/27/91.
- Received from BIML for U.S. CIML vote 1/3/92 - Response by 6/15/92.
- 3rd PD Rev R51 "Catchweighers" & 5th PD Rev R61 "Gravimetries" received from RS on 6/3/92 for comment by 8/25/92. Circulated for comment to special NWG PS7/RS5 for comment by 8/7/92.
- CIML response on "Automatic Rail Weighbridges" as of 6/23/92: yes-19, no-2 (China & Russia), abstain-3 (Belgium, France, & Poland). Comments received from 9 countries & 1 RS (Terminology).
- RS response to comments & edited IR sent to BIML for 9th OIML Conference vote in 11/92.
- CIML response on "Totalizing Hopper Weighers" as of 6/23/92: yes-21, no-0, abstain - 1 (Poland). Comments received from 7 countries & 1 RS (Terminology).
- RS response to comments & edited IR sent to BIML for 9th OIML Conference vote In 11/92
- PS7 IWG (11) response on D Rev R50 "Beltweighers" due 7/10/92. Responses received: yes-9, no response-2 (Germany & Russia). Comments were received from 7 countries.

#### **RS8 "Load Cells"**

- Test procedures and report forms for Revised R60 "Metrological Regulation for Load Cells" needed for Certificate System.
- Draft Report Forms in computer to be completed by 03/92.
- Report Forms circulated to IWG on 4/2/92 for comment & vote by 7/3/92.
- Response as of 7/1/92: yes-12, no-2, (Australia & Belgium) abstain-1 (Belgium). Comments were received from 10 countries.

#### **PS8 "Weights"**

- Revised Draft IR including all requirements for weights accepted by CIML.

#### **PS 7 - Status and Work Plan**

- PS Work Plan and Status report circulated to IWG PS7 and all PS7/RS's for comment with a request for response by 6/30/92.
- Responses received from 11 countries and 1 Liaison Int'l Institution (CECIP) as of 7/92.

#### **Short Reports were given on the following:**

- "OIML Certificate System for Measuring Instruments"

## Specifications and Tolerances Committee

- First Draft ID "Quality Assurance as Applied for Initial Verification of Measuring Instruments"
- "ISO 9000"
- "EC'92"
- The activities of CIML including the revision of the "OIML Working Method," changes in the BIML staff, and the planned "Format for an OIML IR."

C. Carroll, Massachusetts, Chairman

J. Jeffries, Florida

G. Shefcheck, Oregon

R. Suiter, Nebraska

R. Marceau, Canada, Technical Advisor

H. Oppermann, NIST, Technical Advisor

## Committee on Specifications and Tolerances

## Appendix A

### Draft Carbon Dioxide Liquid-Measuring Devices Code

This draft code updates the draft code originally proposed by California Division of Measurement Standards which appeared in the 1987 S&T report. The changes made to the version originally presented to the Committee and notations of these changes are in *italic type* for reference. Comments have been received concerning the requirements in the original and current proposals; these comments are also presented in *italic type* along with the year in which the comment was made.

The S&T Committee requests comments assessing both the code requirements and the comments that have been received.

*\*Note: One significant difference between the 1987 version and the current proposal concerns the units of measurement that are permitted. The current proposal no longer permits volume units; measurements must be made in terms of mass units, specifically kilograms (or pounds) (or decimal subdivisions or multiples thereof). Among the reasons for this change are:*

- (1) The most frequent method of sale appears to be based on mass units. Limiting the permitted unit of measurement to the method most frequently encountered will facilitate value comparison by the purchaser and encourage fair business competition.*
- (2) Since these devices are tested gravimetrically, restricting quantity indications to weight units facilitates testing.*

*Notations indicate where unit changes have been made.*

Comments from members of industry have raised concerns that industry representatives have not adequately reviewed the previous draft code. Weights and measures officials are encouraged to send this draft code to manufacturers of liquid carbon dioxide and to companies that deliver the product to users. A thorough review of the draft code by experts in industry is essential before the code is presented to the NCWM for adoption. The following paragraph from the 1991 report of the Committee is included for reference.

The Committee has questioned the need for a separate code since many of the requirements for cryogenic meters and liquid carbon dioxide meters are the same. The Committee has been advised that businesses and officials 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 specialized facilities and personnel to work with CO<sub>2</sub> or cryogenic liquids; the same equipment and personnel do not handle both products.

#### A. Application.

in which the amount dispensed does not affect customer charges.

A.1. This code applies to carbon dioxide liquid measuring devices used for the measurement of liquid carbon dioxide.

A.3. See also General Code Requirements.

A.2. This code does not apply to devices used solely for dispensing a product in connection with operations

## S. Specifications.

### S.1. Design of indicating and recording elements and recorded representations.

#### S.1.1. Primary elements.

**S.1.1.1. General.** A device shall be equipped with a primary indicating element and may also be equipped with a primary recording element.

**S.1.1.2. Units.** A device shall indicate and record, if equipped to record, its deliveries in terms of kilograms or pounds; or decimal subdivisions or multiples thereof.

[*Note: The 1987 version included a reference to "liters or gallons of liquid"; this reference to units of liquid measurement has been removed in the current proposal.*]

[*\*1988: The units of  $\text{ft}^3$  and  $\text{in}^3$  are used in Canada and should be permitted. Software conversion is done by knowing the specific components in the liquid.*]

**S.1.1.3. Value of Smallest Unit.** The value of the smallest unit of indicated delivery and recorded delivery, if the device is equipped to record, shall not exceed the equivalent of:

(a) for small delivery devices:

- (1) one kilogram, or
- (2) one pound.

(b) for large delivery devices:

- (1) ten kilograms, or
- (2) ten pounds.

[*\*Note: The 1987 version included a reference to "one liter" and "one-tenth gallon" as permitted values of the smallest unit; these references to units of liquid measurement have been deleted in the current proposal.*]

[*\*1989: The code should be flexible enough to accommodate any unit of measurement; there should be no limitation simply because units of measure differ from one country to another.*]

[*\*1988: The code appears to be currently written for positive displacement meters; however, turbine meters are also used for measuring liquid  $\text{CO}_2$*

*Consideration should also be given to permitting the use of an orifice meter for these applications.]*

**S.1.1.4. Advancement of Indicating and Recording Elements.** Primary indicating and recording elements shall be susceptible of advancement only by the normal operation of the device. However, a device may be cleared by advancing its elements to zero, but only if:

- (a) the advancing movement, once started, cannot be stopped until zero is reached, or
- (b) in the case of indicating elements only, such elements are automatically obscured until the elements reach the correct zero position.

**S.1.1.5. Return to Zero.** Primary indicating and recording elements shall be readily returnable to a definite zero indication. Means shall be provided to prevent the return of primary indicating elements and of primary recording elements beyond their correct zero position.

[*\*1988: The return to zero should not apply to turbine meters, but only to positive displacement meters. Turbine meters may have a ticket printer or totalizer and they need an accumulative total as a basis for determining the quantity. This requirement, as currently written, may limit technology.*]

#### S.1.2. Graduations.

**S.1.2.1. Length.** Graduations shall be so varied in length that they may be conveniently read.

**S.1.2.2. Width.** In any series of graduations, the width of a graduation shall in no case be greater than the width of the clear interval between graduations. The width of main graduations shall be not more than 50 percent greater than the width of subordinate graduations. Graduations shall in no case be less than 0.020 centimeter (0.008 inch) in width.

**S.1.2.3. Clear Interval Between Graduations.** The clear interval shall be not less than 0.102 centimeter (0.04 inch). If the graduations are not parallel, the measurement shall be made:

- (a) along the line of relative movement between the graduations at the end of the indicator, or
- (b) if the indicator is continuous, at the point of widest separation of the graduations.

(See also S.1.3.6.)



### S.1.3. Indicators.

**S.1.3.1. Symmetry.** The index of an indicator shall be of the same shape as the graduations at least throughout that portion of its length associated with the graduation.

**S.1.3.2. Length.** The index of an indicator shall reach to the finest graduations with which it is used, unless the indicator and the graduations are in the same plane, in which case the distance between the end of the indicator and the ends of the graduations, measured along the line of the graduations, shall be not more than 0.102 centimeter (0.04 inch).

**S.1.3.3. Width.** The width of the index of the indicator in relation to the series of graduations with which it is used shall be not greater than

- (a) the width of the widest graduation, and
- (b) the width of the minimum clear interval between graduations.

When the index of an indicator extends along the entire length of a graduation, that portion of the index of the indicator that may be brought into coincidence with the graduation shall be of the same width throughout the length of the index that coincides with the graduation.

**S.1.3.4. Clearance.** The clearance between the index of an indicator and the graduations shall in no case be more than 0.152 centimeter (0.06 inch).

**S.1.3.5. Parallax.** Parallax effects shall be reduced to the practicable minimum.

**S.1.3.6. Travel of Indicator.** If the most sensitive element of the primary indicating element utilizes an indicator and graduations, the relative movement of these parts corresponding to the smallest indicated value shall be no less than 0.508 centimeter (0.20 inch).

### S.1.4. Computing-Type Devices.

**S.1.4.1. Printed Ticket.** Any printed ticket issued by a device of the computing type on which there is printed the total computed price shall have printed clearly thereon also the total quantity of the delivery and the price per unit.

**S.1.4.2. Money-Value Computations.** Money-value computations shall be of the full-computing type in which the money value at a single unit price, or at each of a series of unit prices, shall be computed for every

delivery within either the range of measurement of the device or the range of the computing elements, whichever is less. Value graduations shall be supplied and shall be accurately positioned.

The total price shall be computed on the basis of the quantity indicated when the value of the smallest division indicated is equal to or less than the value specified in S.1.1.3.

**S.1.4.3. Money Values, Mathematical Agreement.** Any digital money-value indication and any recorded money value on a computing-type device shall be in mathematical agreement with its associated quantity indication or representation to within one cent of money value.

## S.2. Design of Measuring Elements

*[\*1989: Suggest the code address CO<sub>2</sub> measurement in the liquid phase region "only."]*

**S.2.1. Vapor Elimination.** A measuring system shall be equipped with an effective vapor eliminator or other effective means to prevent the measurement of vapor that will cause errors in excess of the applicable tolerances.

**S.2.2. Reverse Flow Measurement.** Effective means, automatic in operation, shall be installed to prevent reverse flow measurement.

*[\*Note: Previously called "Directional Flow Valve." Reference to a "valve or valves" has been deleted and the position of installation (e.g., in or adjacent to the measuring device) is no longer specified.]*

**S.2.3. Maintenance of Liquid State.** A device shall be so designed that the product being measured will remain in a liquid state during passage through the device.

*[\*1988: Suggest using the word "system" instead of "device" because there may be factors in the rest of the system that affect whether or not product is maintained a liquid state. This change should be made throughout the code.]*

*[\*1989: It may be difficult for the weights and measures official to determine that a device complies with this requirement simply by visually inspecting the device. Testing of the device to verify that measurement is correct is the only way to determine that the system is maintaining the product in a liquid state.]*

**S.2.4. Automatic Temperature or Density Compensation.** A volumetric device shall be equipped with automatic means for adjusting the indication and registration of the measured quantity of the product to the quantity of the measurement in terms of kilograms or pounds.

*[\*Note: This paragraph previously referenced correction of volume to 2°F; the reference to volume has been removed. The paragraph was previously indicated as "Nonretroactive as of 1/1/93."]*

*[\*1988 & 1989: In response to the previous reference to 2 °F, comments were made that the reference to 2° F is acceptable for retail, however, there may be contracts that list a pressure base as the reference for the transaction. Recommend saying "2° F or an agreed upon pressure base." If two parties agree to buy and sell based on a given temperature or pressure base, this wording would not limit, restrict, or produce inaccurate measurement.]*

**S.2.5. Provision for Sealing.** Adequate provision shall be made for applying security seals in such a manner that no adjustment or interchange may be made of:

- (a) any measurement element,
- (b) any adjustable element for controlling delivery rate when such rate tends to affect the accuracy of deliveries, and
- (c) any automatic temperature or density compensating system.

Any adjusting mechanism shall be readily accessible for purposes of affixing a security seal.

**S.2.6. 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.

*[\*Note: S.2.6. is a new paragraph]*

**S.3. Design of Discharge Lines and Discharge Line Valves**

**S.3.1. Diversion of Measured Liquid.** No means shall be provided by which any measured liquid can be diverted from the measuring chamber of the device or the discharge line therefrom, except that a manually controlled outlet that may be opened for purging or draining the measuring system shall be permitted.

Effective means shall be provided to prevent the passage of liquid through any such outlet during normal operation of the device and to indicate clearly and L unmistakably when the valve controls are so set as to permit passage of liquid through such outlet.

**S.3.2. Discharge Hose.** The discharge hose of a measuring system shall be of a wet hose type with a shut-off valve at its outlet end.

**S.4. Marking Requirements.**

**S.4.1. Limitation of Use.** If a measuring system is intended to measure accurately only liquids having particular properties, or to measure accurately only under specific installation or operating conditions, or to measure accurately only when used in conjunction with specific accessory equipment, these limitations shall be clearly and permanently marked on the device.

**S.4.2. Discharge Rates.** A meter shall be marked to show its designed maximum and minimum discharge rates. The marked minimum discharge rate shall not exceed 20 percent of the maximum discharge rate.

*[\*Note: Reference has been added since the 1987 version to specify the relationship of the marked minimum to the marked maximum discharge rates.]*

**S.4.3. Temperature or Density Compensation.** If a device is equipped with an automatic temperature or density compensator, the primary indicating elements, recording elements, and recorded representations shall be clearly and conspicuously marked to show that the quantity delivered has been adjusted to the conditions specified in S.2.4.

*[\*1988 & 1989: Suggest using the term "compensating system" instead of "compensator" so that the code will not limit means by which the system can compensate for temperature. Some systems may not have a compensator, rather they will have a temperature compensating system. This is especially true for the newer electronic systems.]*

**S.5. Level Condition, On-Board Weighing Systems.** Provision shall be made for automatically inhibiting the delivery of liquid carbon dioxide when the vehicle is out of level beyond the limit required for the performance to be within the applicable tolerances.

*[\*Note: The current S.5. was numbered as S.6. in the 1987 version.]*

[\*Note: The paragraph in the 1987 version numbered S.5., Temperature Determination, has been deleted. The previous S.5. required means to enable the determination of the temperature of the liquid at specific locations in the system.]

## N. Notes.

**N.1. Test Liquid.** The test liquid shall be carbon dioxide in a compressed liquid state.

[\*Note: The language in this paragraph was changed from "A meter shall be tested with the liquid to be commercially measured."]

**N.2. Vaporization and Volume Change.** Care shall be exercised to reduce vaporization and volume changes to a minimum. When testing by weight, the weigh tank and transfer systems shall be pre-cooled to liquid temperature prior to the start of the test to avoid the venting of vapor from the vessel being weighed.

## N.3. Test Drafts.

**N.3.1. Gravimetric Test.** Weight test drafts shall be equal to at least the amount delivered by the device in two minutes at its maximum discharge rate.

**N.3.2. Transfer Standard Test.** When comparing a meter with a calibrated transfer standard, the test draft shall be equal to at least the amount delivered by the device in two minutes at its maximum discharge rate.

[\*Note: Previously stated that the test draft must also be not less than 50 gallons. The reference to uncompensated volumetric meters has been deleted.]

**N.3.3. Volumetric Prover Test Drafts.** Test drafts should be equal to at least the amount delivered in one minute at its normal discharge rate.

[\*1988: This paragraph does not make reference to a mechanical displacement prover which could also be used, e.g., a loop prover. One of the advantages of a loop prover offers over the volumetric prover is that the temperature and pressure for the test is the same as the actual meter reading.]

[\*1989: Newer, solid state electronic systems require more advanced prover systems than the volumetric prover. Suggest working with API to explore alternative testing equipment and procedures.]

## N.4. Testing Procedures.

[\*Note: This paragraph was numbered N.5. in the 1987 version.]

[\*1988: The flow rate should be fixed on volumetric devices. If the flow rate changes, so will the slippage factor for product going through the meter. Since the rate and pressure are normally fixed in actual use, the test should be performed at the rate at which the system is normally operating. Simply testing at the maximum flow rate may not be the flow rate of actual use.]

**N.4.1. Normal Tests.** The "normal" test of a device shall be made at the maximum discharge rate that may be anticipated under the conditions of installation.

**N.4.2. Special Tests.** Any test except as set forth in N.4.1. of this Article, shall be considered a special test. Tests shall be conducted, if possible, to evaluate any special elements or accessories attached to or associated with the device. A device shall be tested at a minimum discharge rate of:

- (a) not less than the minimum rated capacity or 20 percent of the maximum rated discharge rate of the device, whichever is less, or

[\*Note: Part (a) of this paragraph previously specified "50 percent of the installation maximum" instead of the "20 percent of the maximum rated discharge rate..." that is currently specified.]

- (b) the lowest discharge rate practicable under the conditions of installation.

"Special" tests may be conducted to develop any characteristics of the device anticipated under the conditions of installation as circumstances require.

[\*Note: This paragraph previously specified "Special tests may be conducted to develop any characteristics of the device not normally anticipated..." ]

**N.4.3. Density.** Temperature and pressure of the metered test liquid shall be measured during the test for the determination of density or volume correction when applicable. Table 1, contained in this code, shall apply.

[\*Note: This paragraph was numbered N.4. in the 1987 version.]

**N.4.4. Automatic Temperature or Density Compensation.** If a device is equipped with an automatic temperature or density compensator, the compensator shall be tested by comparing the quantity indicated or recorded by the device (with the compensator connected and operating) with the actual delivered quantity. Table 1, contained in this code, shall apply.

[\*Note: This paragraph was numbered N.7. in the 1987 version.]

[\*1988: If measuring density and inferring mass from that measurement, then the density should be corrected for temperature.]

[\*Note: The paragraph numbered N.6., Temperature Compensation, in the 1987 version has been deleted.]

## **T. Tolerances.**

### **T.1. Application.**

**T.1.1. To Underregistration and to Overregistration.** The tolerances hereinafter prescribed shall be applied to errors of underregistration and errors of overregistration.

### **T.2. Tolerance Values.**

**T.2.1. On Normal Tests.** The maintenance tolerance on "normal" tests shall be two and one-half percent (2-1/2%) of the indicated quantity. The acceptance tolerances shall be one and one-half percent (1-1/2%) of the indicated quantity.

**T.2.2. On Special Tests.** The maintenance and acceptance tolerance on "special" tests shall be two and one-half percent (2-1/2%) of the indicated quantity.

[\*1988: The industry needs to use a tighter tolerance; however, the tolerance specified in this paragraph is appropriate for enforcement purposes.]

**T.3. On Tests Using Transfer Standards.** To the basic tolerance values that would otherwise be applied, there shall be added an amount equal to two times the standard deviation of the applicable transfer standard when compared to a basic reference standard.

## **UR. User Requirements.**

### **UR.1. Installation Requirements.**

**UR.1.1. Discharge Rate.** A device shall be so installed that the actual maximum discharge rate will not exceed the rated maximum discharge rate. If necessary, means for flow regulation shall be incorporated in the installation.

**UR.1.2. Length of Discharge Hose.** The discharge hose shall be of such a length and design as to keep vaporization of the liquid to a minimum.

**UR.1.3. Maintenance of Liquid State.** A device shall be so installed and operated that the product being measured shall remain in the liquid state during passage through the meter.

### **UR.2. Use Requirements.**

**UR.2.1. Return of Indicating and Recording Elements to Zero.** The primary indicating elements (visual) and the primary recording elements shall be returned to zero immediately before each delivery.

[\*1988: Turbine meters do not always have a return to zero. They should not be required to meet this requirement.]

**UR.2.2. Condition of Discharge System.** The discharge hose up to the valve at the end of the discharge hose, shall be completely filled and pre-cooled to liquid temperatures before a "zero" condition is established prior to the start of a commercial delivery. Means shall be provided to fill the discharge hose with liquid prior to the start of a delivery.

[\*Note: Added the phrase "...shall be completely filled..." and the sentence "Means shall be provided to fill the discharge hose...."]

**UR.2.3. Vapor Equalization Line.** A vapor equalization line shall not be used during a metered delivery unless the quantity of vapor displaced from the buyer's tank to the seller's tank is deducted from the metered quantity. Table 1, contained in this code, shall apply.

[\*Note: Referred to as "Vapor Return Line" in the 1987 version.]

### **UR.2.4. Temperature or Density Compensation.**

**UR.2.4.1. Use of Automatic Temperature or Density Compensators.** Devices equipped with an automatic temperature or density compensator shall have the compensator connected, operable, and in use at all



times. Such automatic temperature or density compensator may not be removed.

**UR.2.4.2. Tickets or Invoices.** Any written invoice or printed ticket based on a reading of a device that is equipped with an automatic temperature or density compensator shall have shown thereon that the quantity delivered has been temperature or density compensated.

**UR.2.5. Ticket in Printing Device.** A ticket shall not be inserted into a device equipped with a ticket printer until immediately before a delivery is begun, and in no case shall a ticket be in the device when the vehicle is in motion while on a public street, highway, or thoroughfare.

**UR.2.6. Method of Sale.** All quantity determinations shall be made by means of an approved and sealed weighing or measuring device. All sales shall be stated in kilograms or pounds.

*[\*Note: Restricts sales to units of apparent mass; no longer permits volume units.]*

*[\*Comment: Suggest adding "UR.2.7. Temperature Compensated Sale. All sales of liquid carbon dioxide shall be by weight or by liquid volume at 2 degrees Fahrenheit. Table 1 shall apply."]*

*[\*Note: Paragraph numbered UR.2.6.3., Printed Ticket, in the 1987 version has been deleted. S.2.6.3. specified the information required on ticket printed by a computing device.]*

## Definitions of Terms.

The terms defined here have a special and technical meaning when used in the Code for Carbon Dioxide Liquid-Measuring Devices.

**automatic temperature or density compensation.** The use of integrated or ancillary equipment to obtain, from the output of a volumetric meter, an equivalent mass indication.

*[\*Note: The reference to volume indications has been deleted.]*

**carbon dioxide liquid measuring device.** A system including a mechanism or machine of (a) the meter or mass-flow type, or (b) a weighing type of device mounted on a vehicle designed to measure and deliver liquid carbon dioxide. Means may be provided to

indicate automatically, for one of a series of unit prices, the total money value of the quantity measured.

*[\*1988 comment: Suggest adding the words "inferred or direct mass-flow type" as part of (a) to recognize other kinds of measuring devices.]*

**large-delivery devices.** Devices used primarily for single deliveries greater than 500 kilograms or 1,000 pounds.

*[\*Note: The limits were lowered from 2,000 pounds or 2,000 kilograms. The references to liter and gallon measurement have been deleted.]*

*[\*Note: The definition for "liquid volume correction factor" has been deleted.]*

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

*[\*Note: The definition for "mass flow meter" has been added.]*

**small-delivery device.** Any device other than a large-delivery device.

**transfer standard.** A measurement system designed for use in proving and testing carbon dioxide liquid-measuring devices.

**vapor equalization credit.** The quantity deducted from the metered quantity of liquid carbon dioxide when a vapor equalizing line is used to facilitate the transfer of liquid during a metered delivery.

*[\*Note: The definition for "vapor equalization credit" has been added.]*

**vapor equalization line.** A hose or pipe connected from the vapor space of the sellers tank to the vapor space of the buyers tank that is used to equalize the pressure during a delivery.

*[\*Note: The definition for "vapor equalization credit" has been added.]*

**wet-hose type.** A type of device in which it is intended that the discharge hose be completely filled prior to each commercial delivery.

TABLE 1<sup>1</sup>

Temperature °F	Pressure		Liquid Density		Vapor Density		Vapor Displacement %
	PSIA	PSIG	lb/gal	(lb-oz)/gal	lb/cu	lb/gal	
-30.00	177.89	163.19	9.127	9 - 2.0	1.989	0.286	2.9
-24.75	178.75	164.05	9.122	9 - 2.0	1.999	0.287	2.9
-29.50	179.62	164.92	9.117	9 - 1.9	2.008	0.268	2.9
-29.25	180.49	165.79	9.113	9 - 1.8	2.018	0.276	3.0
-27.00	181.36	166.67	9.108	9 - 1.7	2.028	0.291	3.0
-28.75	182.24	167.54	9.103	9 - 1.7	2.038	0.272	3.0
-28.50	183.12	168.42	9.098	9 - 1.6	2.048	0.294	3.0
-28.25	184.00	169.31	9.094	9 - 1.5	2.058	0.276	3.0
-28.00	184.89	170.19	9.089	9 - 1.4	2.067	0.276	3.0
-27.75	195.78	171.08	9.084	9 - 1.4	2.077	0.291	3.1
-24.50	186.67	171.98	9.080	9 - 1.3	2.087	0.279	3.1
-27.25	187.57	172.87	9.075	9 - 1.2	2.098	0.280	3.1
-27.00	188.47	173.77	9.070	9 - 1.1	2.108	0.282	3.1
-28.75	189.37	174.67	9.065	9 - 1.0	2.118	0.283	3.1
-26.50	190.28	175.58	9.061	9 - 1.0	2.128	0.284	3.1
-26.25	191.18	176.49	9.056	9 - 0.9	2.138	0.286	3.1
-28.00	192.10	177.40	9.051	9 - 0.8	2.148	0.287	3.2
-25.75	193.01	178.32	9.046	9 - 0.8	2.159	0.287	3.2
-25.50	193.93	179.23	9.041	9 - 0.7	2.169	0.290	3.2
-26.25	194.85	180.16	9.037	9 - 0.8	2.179	0.291	3.2
-25.00	195.78	181.08	9.032	9 - 0.5	2.190	0.294	3.2
-24.75	196.70	182.01	9.027	9 - 0.4	2.200	0.294	3.3
-24.50	197.64	182.94	9.022	9 - 0.4	2.211	0.296	3.1
-24.25	198.57	183.87	9.017	9 - 0.3	2.221	0.297	3.3
-24.00	199.51	184.81	9.013	9 - 0.2	2.232	0.291	3.3
-23.75	200.45	185.75	9.008	9 - 0.4	2.243	0.300	3.1
-23.50	201.39	186.70	9.003	9 - 0.3	2.253	0.301	3.3
-23.25	202.34	187.64	8.998	8 - 16.0	2.264	0.303	3.1
-23.00	203.29	188.60	8.993	8 - 15.9	2.275	0.304	3.4
-22.75	204.25	189.55	8.989	8 - 15.8	2.286	0.306	3.4
-22.50	205.20	190.51	8.984	8 - 15.7	2.296	0.307	3.4
-22.25	206.16	191.47	8.979	8 - 15.7	2.307	0.308	3.4

<sup>1</sup> The proposed Table 1 includes inch-pound units of measurement because this is based upon the California draft code. A metric version of Table 1 must be developed prior to including the proposed code in Handbook 44.

Temperature °F	Pressure		Liquid Density		Vapor Density		Vapor Displacement %
	PSIA	PSIG	lb/gal	(lb-oz)/gal	lb/cu	lb/gal	
-22.00	207.13	192.43	8.974	8 - 15.6	2.318	0.319	3.5
-21.75	208.09	193.40	8.969	8 - 15.5	2.329	0.311	3.5
-21.50	209.06	194.37	8.964	8 - 15.4	2.340	0.319	3.5
-21.25	210.04	195.34	8.959	8 - 15.4	2.351	0.319	3.5
-21.00	211.02	196.32	8.955	8 - 15.4	2.362	0.316	3.5
-20.75	212.00	197.30	8.950	8 - 15.2	2.374	0.317	3.5
-20.50	212.98	198.28	8.935	8 - 15.1	2.385	0.319	3.6
-20.25	213.97	199.27	8.940	8 - 15.0	2.396	0.320	3.6
-20.00	214.96	200.26	8.935	8 - 15.0	2.407	0.322	3.6
-19.75	215.95	201.26	8.940	8 - 14.9	2.419	0.323	3.6
-19.50	216.95	202.25	8.925	8 - 14.8	2.430	0.325	3.6
-19.25	217.95	203.25	8.920	8 - 14.7	2.441	0.328	3.7
-19.00	218.95	204.26	8.915	8 - 14.6	2.453	0.328	3.7
-18.75	219.96	205.27	8.911	8 - 14.6	2.464	0.329	3.7
-18.50	220.97	206.28	8.906	8 - 14.5	2.476	0.330	3.7
-18.25	221.99	207.29	8.901	8 - 14.4	2.488	0.333	3.7
-18.00	223.01	208.31	8.896	8 - 14.3	2.499	0.334	3.8
-17.75	224.03	209.33	8.891	8 - 14.3	2.511	0.336	3.8
-17.50	225.05	210.36	8.886	8 - 14.2	2.523	0.337	3.8
-17.25	226.08	211.38	8.881	8 - 14.1	2.534	0.339	3.8
-17.00	227.11	212.42	8.876	8 - 14.0	2.546	0.340	3.8
-16.75	228.15	213.45	8.871	8 - 13.9	2.558	0.342	3.9
-16.50	229.18	214.49	8.866	8 - 13.8	2.570	0.344	3.9
-16.25	230.23	215.53	8.861	8 - 13.8	2.582	0.345	3.9
-16.00	231.27	216.58	8.856	8 - 13.7	2.594	0.347	3.9
-15.75	232.32	217.62	8.851	8 - 13.6	2.606	0.348	3.9
-15.50	233.37	218.68	8.846	8 - 13.5	2.618	0.350	4.0
-15.25	234.43	219.73	8.841	8 - 13.4	2.630	0.352	4.0
-15.00	235.49	220.79	8.836	8 - 13.3	2.643	0.354	4.0
-14.75	236.55	221.86	8.831	8 - 13.2	2.655	0.355	4.0
-14.50	237.62	222.92	8.826	8 - 13.1	2.667	0.357	4.0
-14.25	238.69	223.99	8.821	8 - 13.1	2.680	0.358	4.1
-14.00	239.76	225.07	8.816	8 - 13.1	2.692	0.360	4.1
-13.75	240.84	226.14	8.811	8 - 13.0	2.704	0.362	4.1
-13.50	241.92	227.22	8.806	8 - 12.9	2.717	0.363	4.1
-13.25	243.00	228.31	8.801	8 - 12.8	2.729	0.365	4.1



## Specifications and Tolerances Committee

Temperature °F	Pressure		Liquid Density		Vapor Density		Vapor Displacement %
	PSIA	PSIG	lb/gal	(lb-oz)/gal	lb/cu	lb/gal	
-13.00	244.09	229.39	8.796	8 - 10.7	2.742	0.357	4.2
-12.75	245.18	230.49	8.791	8 - 10.7	2.755	0.368	4.2
-12.50	246.28	231.58	8.786	8 - 12.5	2.767	0.370	4.2
-12.25	247.37	232.68	8.791	8 - 12.5	2.780	0.372	4.2
-12.00	248.48	233.78	8.776	8 - 12.0	2.793	0.373	4.3
-11.75	249.58	234.89	8.791	8 - 12.3	2.806	0.375	4.3
-11.50	250.69	236.00	8.755	8 - 12.2	2.819	0.377	4.3
-11.25	251.80	237.11	8.760	8 - 12.2	2.832	0.375	4.3
-11.00	252.92	238.22	8.755	8 - 12.1	2.845	0.387	4.3
-10.75	254.04	239.34	8.755	8 - 12.0	2.858	0.382	4.4
-10.50	255.16	240.47	8.745	8 - 11.8	2.871	0.384	4.4
-10.25	256.29	241.60	8.740	8 - 11.8	2.884	0.386	4.4
-10.00	257.42	242.73	8.745	8 - 11.8	2.897	0.387	4.4
- 9.75	258.56	243.86	8.740	8 - 11.7	2.911	0.387	4.5
- 9.50	259.70	245.00	8.725	8 - 11.6	2.924	0.391	4.5
- 9.25	260.84	246.14	8.719	8 - 11.5	2.937	0.393	4.5
- 9.00	261.98	247.29	8.719	8 - 11.4	2.951	0.394	4.5
- 8.75	263.13	248.44	8.709	8 - 11.3	2.964	0.398	4.5
- 8.50	264.29	249.59	8.704	8 - 11.3	2.978	0.398	4.6
- 8.25	265.44	250.75	8.699	8 - 11.3	2.991	0.400	4.6
- 8.00	266.60	251.91	8.694	8 - 11.1	3.005	0.402	4.6
- 7.75	267.77	253.07	8.688	8 - 10.0	3.019	0.404	4.6
- 7.50	268.93	254.24	8.683	8 - 10.8	3.032	0.405	4.8
- 7.25	270.11	255.41	8.678	8 - 10.8	3.046	0.407	4.8
- 7.00	271.28	256.59	8.678	8 - 10.8	3.060	0.409	4.8
- 6.75	272.46	257.76	8.688	8 - 10.7	3.074	0.411	4.9
- 6.50	273.64	258.95	8.662	8 - 10.5	3.088	0.413	4.8
- 6.25	274.83	260.13	8.657	8 - 10.8	3.102	0.415	4.8
- 6.00	276.02	261.32	8.652	8 - 10.8	3.116	0.417	4.8
- 5.75	277.21	262.52	8.647	8 - 10.3	3.130	0.418	4.8
- 5.50	278.41	263.72	8.641	8 - 10.8	3.144	0.420	4.9
- 5.25	279.61	264.92	8.636	8 - 10.8	3.159	0.422	4.9
- 5.00	280.82	266.12	8.631	8 - 10.1	3.173	0.424	4.9
- 4.75	282.03	267.33	8.626	8 - 10.0	3.187	0.426	4.9
- 4.50	283.24	268.55	8.620	8 - 9.9	3.202	0.428	5.0
- 4.25	284.46	269.76	8.615	8 - 9.8	3.216	0.430	5.0



Temperature °F	Pressure		Liquid Density		Vapor Density		Vapor Displacement %
	PSIA	PSIG	lb/gal	(lb-oz)/gal	lb/cu	lb/gal	
- 4.00	285.68	270.98	8.610	8 - 9.9	3.231	0.432	5.0
- 3.75	286.90	272.21	8.604	8 - 9.7	3.245	0.434	5.0
- 3.50	288.13	273.44	8.599	8 - 9.6	3.260	0.436	5.0
- 3.25	289.37	274.67	8.594	8 - 9.5	3.275	0.438	5.4
- 3.00	290.60	275.91	8.589	8 - 9.4	3.289	0.440	5.0
- 2.75	291.84	277.15	8.583	8 - 9.3	3.304	0.442	5.4
- 2.50	293.09	278.39	8.578	8 - 9.2	3.319	0.444	5.2
- 2.25	294.33	279.64	8.573	8 - 9.2	3.334	0.446	5.2
- 2.00	295.58	280.89	8.567	8 - 9.1	3.349	0.448	5.2
- 1.75	296.84	282.14	8.562	8 - 9.0	3.364	0.450	5.3
- 1.50	298.10	283.40	8.556	8 - 8.9	3.379	0.452	5.0
- 1.25	299.36	284.67	8.551	8 - 8.7	3.395	0.454	5.3
- 1.00	300.63	285.93	8.546	8 - 8.7	3.410	0.456	5.3
- 0.75	301.90	287.21	8.540	8 - 8.6	3.425	0.458	5.4
- 0.50	303.18	288.48	8.535	8 - 8.6	3.440	0.460	5.4
- 0.25	304.46	289.76	8.530	8 - 8.5	3.456	0.462	5.4
0.00	305.74	291.74	8.524	8 - 8.7	3.471	0.464	5.4
0.25	307.03	292.33	8.519	8 - 8.3	3.487	0.466	5.6
0.50	308.32	293.62	8.513	8 - 8.2	3.503	0.468	5.6
1.75	309.61	294.92	8.508	8 - 8.1	3.518	0.470	5.6
1.00	310.91	296.21	8.562	8 - 8.0	3.534	0.492	5.6
1.25	312.21	297.52	8.497	8 - 8.0	3.550	0.475	5.6
1.50	313.52	298.82	8.491	8 - 7.9	3.566	0.477	5.6
1.75	314.83	300.13	8.486	8 - 7.8	3.582	0.479	5.6
2.00	316.15	301.45	8.480	8 - 7.7	3.598	0.481	5.7
2.25	317.46	302.77	8.475	8 - 7.6	3.614	0.483	5.7
1.50	318.79	304.09	8.469	8 - 7.8	3.630	0.485	5.4
2.75	320.11	305.42	8.464	8 - 7.4	3.646	0.487	5.8
0.00	321.45	306.75	8.458	8 - 9.3	3.662	0.490	5.6
- 3.25	322.78	308.08	8.453	8 - 7.2	3.679	0.492	5.6
3.50	324.12	309.42	8.447	8 - 7.2	3.695	0.494	5.8
3.75	325.46	310.77	8.442	8 - 7.4	3.712	0.496	5.9
4.00	326.81	312.11	8.436	8 - 7.0	3.728	0.498	5.9
4.25	328.16	313.46	8.431	8 - 6.9	3.745	0.501	5.9
4.50	329.52	314.82	8.425	8 - 6.8	3.761	0.503	6.0
4.75	330.88	316.18	8.420	8 - 6.7	3.778	0.505	6.0

Temperature °F	Pressure		Liquid Density		Vapor Density		Vapor Displacement %
	PSIA	PSIG	lb/gal	(lb-oz)/gal	lb/cu	lb/gal	
6.00	332.24	317.54	8.414	8 - 6.5	3.795	0.567	6.6
5.25	333.61	318.91	8.408	8 - 6.5	3.812	0.510	6.1
5.50	334.98	320.28	8.408	8 - 6.3	3.829	0.512	6.1
6.75	336.35	321.66	8.397	8 - 6.3	3.846	0	6.1
6.00	337.73	323.04	8.392	8 - 6.3	3.863	0.516	6.2
9.25	339.12	324.42	8.386	8 - 6.0	3.880	0.516	6.2
6.50	340.51	325.81	8.380	8 - 6.1	3.897	0.521	6.2
6.75	341.90	327.20	8.375	8 - 6.0	3.915	0.523	6.2
7.00	343.30	328.60	8.369	8 - 5.9	3.932	0.528	6.8
9.25	344.70	330.00	8.363	8 - 5.8	3.949	0.528	6.8
7.50	346.10	331.41	8.358	8 - 5.7	3.967	0.530	6.8
7.75	347.51	332.82	8.352	8 - 5.6	3.984	0.533	6.4
6.00	348.92	334.23	8.346	8 - 5.5	4.002	0.545	6.4
9.25	350.34	335.65	8.341	8 - 5.4	4.020	0.537	6.4
8.50	351.76	337.07	8.335	8 - 5.7	4.038	0.540	6.5
8.75	353.19	338.49	8.329	8 - 5.3	4.055	0.542	6.5
6.00	354.62	339.92	8.323	8 - 5.2	4.073	0.545	6.5
9.25	356.06	341.36	8.318	8 - 5.1	4.091	0.537	6.8
9.50	357.49	342.80	8.312	8 - 5.0	4.110	0.549	6.6
6.75	358.94	344.24	8.306	8 - 4.0	4.128	0.552	6.5
10.00	360.38	345.69	8.300	8 - 4.3	4.146	0.559	6.7
10.25	361.84	347.14	8.295	8 - 4.7	4.164	0.557	6.7
10.50	363.29	348.60	8.289	8 - 4.6	4.183	0.559	6.7
10.75	364.75	350.06	8.283	8 - 4.6	4.201	0.582	6.8
11.00	366.22	351.52	8.277	8 - 4.3	4.220	0.564	6.8
11.25	367.68	352.99	8.271	8 - 4.3	4.238	0.567	6.8
10.50	369.16	354.46	8.266	8 - 4.2	4.257	0.567	6.6
11.75	370.64	355.94	8.289	8 - 4.2	4.276	0.572	6.9
12.00	372.12	357.42	8.254	8 - 4.1	4.295	0.574	7.0
10.25	373.60	358.91	8.248	8 - 4.0	4.314	0.577	7.0
12.50	375.09	360.40	8.242	8 - 3.9	4.333	0.579	7.0
12.75	376.59	361.89	8.236	8 - 3.8	4.352	0.582	7.1
13.00	378.09	363.39	8.230	8 - 3.7	4.371	0.584	7.1
13.25	379.59	364.89	8.224	8 - 3.6	4.390	0.587	7.1
13.50	381.10	366.40	8.219	8 - 3.5	4.410	0.589	7.2
13.75	382.61	367.91	8.213	8 - 3.4	4.429	0.592	7.2

Temperature °F	Pressure		Liquid Density		Vapor Density		Vapor Displacement %
	PSIA	PSIG	lb/gal	(lb-oz)/gal	lb/cu	lb/gal	
14.00	384.13	369.43	8.207	8 - 3.3	4.449	0.595	7.2
14.25	385.65	370.95	8.201	8 - 3.2	4.468	0.597	7.3
14.50	387.17	372.48	8.195	8 - 3.1	4.488	0.600	7.3
14.75	388.70	374.01	8.189	8 - 3.0	4.508	0.603	7.4
15.00	390.24	375.54	8.183	8 - 2.9	4.527	0.605	7.4
15.25	391.78	377.08	8.177	8 - 2.8	4.547	0.608	7.4
15.50	393.32	378.62	8.171	8 - 2.7	4.567	0.611	7.5
15.75	394.87	380.17	8.165	8 - 2.6	4.587	0.613	7.5
16.00	396.42	381.72	8.159	8 - 2.5	4.608	0.616	7.5
16.25	397.98	383.28	8.153	8 - 2.4	4.628	0.619	7.6
16.50	399.54	384.84	8.147	8 - 2.3	4.648	0.621	7.6
16.75	401.10	386.41	8.141	8 - 2.2	4.669	0.624	7.7
17.00	402.67	387.98	8.134	8 - 2.2	4.689	0.627	7.7
17.25	404.25	389.55	8.128	8 - 2.1	4.710	0.630	7.7
17.50	405.82	391.13	8.122	8 - 2.0	4.731	0.632	7.8
17.75	407.41	392.71	8.116	8 - 1.9	4.751	0.635	7.8
18.00	409.00	394.30	8.110	8 - 1.8	4.772	0.638	7.9
18.25	410.59	395.89	8.104	8 - 1.7	4.793	0.641	7.9
18.50	412.19	397.49	8.098	8 - 1.6	4.814	0.644	7.9
18.75	413.79	399.09	8.092	8 - 1.5	4.835	0.646	8.0
19.00	415.39	400.70	8.085	8 - 1.4	4.857	0.649	8.0
19.25	417.00	402.31	8.079	8 - 1.3	4.878	0.652	8.1
19.50	418.62	403.92	8.073	8 - 1.2	4.900	0.655	8.1
19.75	420.24	405.54	8.067	8 - 1.1	4.921	0.658	8.2
20.00	421.86	407.17	8.061	8 - 1.0	4.943	0.661	8.2





## Final Report of the Committee on Education, Administration, and Consumer Affairs

Maxwell H. Gray, Chairman  
Chief, Bureau of Weights and Measures  
Florida

Reference  
Key Number

### 400 Introduction

This is the Final Report of the Committee on Education, Administration, and Consumer Affairs for the 77th Annual Meeting of the National Conference on Weights and Measures. The Report consists of the Interim Report offered in 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. Items 402-8A and 402-8B were voting items (V); all other items in the report were informational (I) and required no formal action by the membership. Item 402-8A was adopted by a vote of 48 yea, 0 nay in the House of State Representatives and a vote of 59 yea, 0 nay in the House of Delegates. Item 402-8B was adopted by a vote of 44 yea, 0 nay in the House of State Representatives and a vote of 59 yea, 0 nay in the House of Delegates. The membership adopted the report in its entirety by a vote of 43 yea, 0 nay in the House of State Representatives and a vote of 60 yea, 0 nay in the House of Delegates.

**Table A**  
**Index to Reference Key Items**

Reference Key No.		Title of Item	Page
401	I	Regional Weights and Measures Activities .....	270
402		National Training Program (NTP) .....	271
402-1	I	NTP Status Report .....	271
402-2	I	Certification Program Implementation .....	271
402-3	I	Registry Summary .....	273
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402-5	I	Module Revisions .....	274
402-6	I	Changes in IACET Membership Categories .....	274
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402-8A	V	Certification of NTP Instructors - Voluntary Program .....	276
402-8B	V	Certification of NTP Instructors - Trainers List .....	277
402-9	I	Weights and Measures Administration Module .....	277
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**Table A (Continued)**

Reference Key No.		Title of Item	Page
403	I	Above-Ground Storage Tanks .....	280
404	I	Safety .....	280
405	I	Enforcement Actions .....	281
406	I	Metric Conversion .....	281

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.	NTP Certification Summary	402-2	283
B.	NTP Registry Summary of Activity	402-3	286
C.	Trainer Certification Criteria - Central W&M Association	402-8A	293
D.	Trainer Certification Criteria - Education Committee	402-8A&B	294

**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 Committee on Education, Administration, and Consumer Affairs to the 34th Annual Technical Conference of the Western Weights and Measures Association (WWMA) (September 1991).
2. The final report of the Committee on Education, Administration, and Consumer Affairs to the 46th Annual Conference of the Southern Weights and Measures Association (October 1991).

3. The interim report of the Committee on Education, Administration, and Consumer Affairs to the Central Weights and Measures Association (October 1991).
4. The final report of the Committee on Education, Administration, and Consumer Affairs to the 20th Annual Conference of the Northeastern Weights and Measures Association (May 1992).
5. The final report of the Committee on Education, Administration, and Consumer Affairs to the Central Weights and Measures Association (May 1992).

In addition, the Committee received survey data from the Central Weights and Measures Association's Education Committee on issues related to the development of the module on weights and measures administration and the development of certification criteria for a trainer certification program. These materials were considered in the discussions of these issues (see Items 402-8A and 405). The Committee would like to thank all of the regional associations for their input.

## 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, 1992, was as follows:

	Grant 1* <u>NB83NAHA4003</u>	Grant 2 <u>70NANB8H0869</u>
Net outlays to date:	\$513,432.49	\$ 37,323.23
Total unliquidated obligations: (money committed to contractors)	1,756.51	38,743.49
Total outlays & unliquidated obligations:	515,189.00	76,066.72
Total grant funds authorized:	515,189.00	180,000.00
Unobligated balance of funds: (money available for future module development)	00.00	103,933.28
Total funds available for future module development (grants 1 & 2):	\$103,933.28	

\*The Committee plans to close out this grant in 1992.

The current status of work accomplished or in progress under grants 1 and 2 is given in Table C on the next page.

### 402-2 I Certification Program Implementation

To get feedback on the NTP Certification Program, the Education Committee asked participants to answer a series of questions in conjunction with the submittal of the 1991 Certification Program annual reports. One set of questions was sent to those jurisdictions that had obtained certification for at least some of their officials, and a different set of questions was sent to jurisdictions that had not yet submitted any requests for certification. The purpose of the questions was to identify actions that the Conference might take to improve or facilitate the certification process. At the time of the Interim Meeting, some jurisdictions had not submitted their responses; therefore, only preliminary findings were available to the Committee. A summary of the responses received from the 35 States that completed

**Table C**  
**Grant Accomplishments Status Report**  
 (As of 6/30/92)

<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	The Committee completed its review of the second draft of the revision of Module 4. The Contractor is preparing the final copy of the revision.
5	Vehicle and Axle-Load Scales	Copies of the revision of this module were mailed to the States and to purchasers of the module in March 1992.
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	This module is scheduled to be given to a contractor within the next 6 months.
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 & Measures Admin. I	Training Solutions Incorporated has been selected to develop this module, which is an introduction to weights and measures regulation in the United States.
23	Weights & Measures Admin. II	The Committee has contracted with Dr. Charles Greene of Verde Ventures to complete the development of this module.
24	Introduction to Handbook 44	Project completed.
27	Electronic Weighing and Measuring Systems	Project completed.



the Certification Program Comments Form was reviewed at the Annual Meeting. Among the findings were:

1. A majority of those responding said that they had not obtained certification for all of their staff members who had taken modules for which certification was available.
2. The primary reasons given for not obtaining certification for all eligible staff members were: lack of time to devote to certification activities (14 States), lack of funds to pay for supervisors to go into the field to certify inspectors (9 States), and lack of qualified staff to evaluate inspectors (7 States).
3. A majority of those responding indicated that they would be interested in taking advantage of an NCWM-sponsored program to help States certify their inspectors, but only if they did not have to pay the expenses of the certifier.
4. Most of those responding indicated that the certification program was beneficial to their organization, and no State indicated that it would like to withdraw from the Certification Program.

The Committee will continue to explore ways in which the Conference might assist the States in certifying their inspectors.

Each year, new States are added to the list of those that have applied for certification of their inspectors. 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 is experienced in the area covered by the module, must be evaluated at least once in the field after the module class and must 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.

A summary of current participation in the NTP Certification Program is provided in Appendix A.

#### **402-3 I Registry Summary**

The NTP Registry serves as a permanent record of NCWM courses or NIST Office of Weights and Measures (OWM) metrology courses successfully completed and Continuing Education Units (CEUs) earned under the NTP. A summary of information in the Registry is found in Appendix B.

#### **402-4 I Training for Trainers**

The status of the NCWM's professional development programs for weights and measures trainers is given below.

##### **Videotape Training-the-Trainer Program**

In 1989, the Committee purchased a comprehensive videotape/text program on Training the Trainer from Industrial Training Corporation. This program, consisting of 14 half-hour tapes and accompanying student workbooks, is available for loan to NCWM members for in-house training programs. As of June 30, 1992, 13 groups had used the tapes to train a total of 69 individuals; three additional groups are scheduled to use the tapes to train a total of 26 additional individuals between July 1, 1992, and February 17, 1993. At the 1992 Interim Meeting, the Committee was informed that the Conference's supply of workbooks was getting low. Due to the positive reaction to the training program, the Committee decided to ask the Executive Committee for funds to buy additional workbooks in 1992 to enable the NCWM to meet projected requests for the program through 1993. The Executive Committee approved the Committee's request. Jurisdictions are invited to reserve the program either for one of the remaining time slots in 1992 or for 1993.

##### **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 one or

more train-the-trainer courses. As of June 30, 1992, the Northeastern, Western, Southern, and Central Weights and Measures Associations had used the funds to sponsor six training sessions in which a total of 63 individuals from 38 States and 1 industry representative participated. In addition, the Southern Weights and Measures Association had requested funds for an additional training session. The deadline for requests for funds for trainer training was December 31, 1991; at that time, all of the regional groups except the Central had either spent their allotted funds or had requested the remainder of their funds for trainer training. The Education Committee asked the Executive Committee for a 1-year extension of the deadline to permit the Central Weights and Measures Association time to plan a second training session and thereby use the funds remaining from the \$2,500 set aside for trainer training in the region. The Executive Committee approved this request.

The Committee was pleased to learn that several regional groups were making funds available to their members to help defray the costs of sending a participant to the trainer training sessions. This indicates a strong commitment on their part to enhancing the quality of training.

#### **Resources for Trainers**

The NCWM has been collecting resources to assist trainers in developing or improving training. These resources currently include a videotape library on various weights and measures subjects, catalogs and directories listing resources for trainers, and workbooks on how to develop and administer a training program. Anyone interested in these materials should contact the Education Committee's Technical Advisor.

### **402-5 I Module Revisions**

The first revision of NCWM Training Module 20, Vehicle-Tank Meters, was completed and mailed to the States and module purchasers in December 1991. The first revision of Module 5, Vehicle and Axle-Load Scales, was also completed in December 1991. Revisions of Module 4, Medium-Capacity Scales, and Module 21, Liquefied Petroleum Gas Liquid-Measuring Devices, are underway, and a revision of Module 2, Retail Computing Scales - Electronic, is also scheduled for initiation in 1992. At the Interim Meeting, Paul Peterson of the U.S. Department of Agriculture Packers and Stockyards Administration volunteered to initiate a revision of Module 7, Livestock and Animal Scales. In addition, the Committee reviewed a proposal from Charles Greene of Verde Ventures to assist in the updating of training modules. The Committee is evaluating its revision schedule to determine how it might most effectively use Dr. Greene's services.

**Committee Recommendation:** The Education Committee will withdraw Module 6, Meat Beams and Monorail Scales, as of January 1, 1993. This action is based on the following: 1) The module needs revision and the Committee feels that it would not be worthwhile to put resources into the revision at this time because 2) the module is not being used -- only one Module 6 class has been given since the module was published in 1987, and 3) questions have been raised about whether weights and measures offices view the majority of these devices as commercial devices that fall under their jurisdiction. In addition, Paul Peterson of the U.S. Department of Agriculture's Packers and Stockyards Administration (P&S) has informed the Committee that P&S will continue to provide training on the inspection and testing of meat beams and monorail scales if Module 6 is withdrawn. Any objections to the withdrawal of Module 6, should be sent to the Committee by November 1, 1992, the deadline for items to be considered at the 1993 Interim Meetings.

A summary of the revision status of all published NCWM training modules is shown in Table D (see next page).

### **402-6 I Changes in IACET Membership Categories**

The NCWM currently has an individual membership in the International Association For Continuing Education and Training (IACET). IACET is a nonprofit federation of education and training organizations and individuals devoted to the constructive and consistent use of the Continuing Education Unit (CEU) and to improvement of the quality and effectiveness of continuing education, training, and development. The NCWM awards CEUs to individuals who successfully complete NCWM training modules.

**Table D**  
**Module Revision Status**  
 (As of 6/30/92)

<u>Module</u>	<u>Date of Pub</u>	<u>Date of Last Rev</u>	<u>Rev Stat*</u>	<u>Comments</u>
27	1/28/85	10/86	N	
1	11/20/85	11/86	R	This module will be combined with Module 2.
10	11/29/85	9/90	N	
2	2/26/86	9/89	R	Tina Butcher of OWM will be revising this module.
8	7/14/86	9/90	N	
5	10/17/86	12/91	N	The first revision of this module was completed in December 1991; it was distributed in March 1992.
20	10/31/86	12/91	N	The first revision was completed and mailed to State Directors, purchasers, and Training List volunteers in December 1991.
6	4/3/87		W	
7	5/27/87		U	Paul Peterson, USDA's Packers & Stockyards Admin., has completed the first draft of the first revision of this module.
21	8/5/87		U	Richard Whipple of OWM is revising this module.
4	6/22/88		U	Chris Dadian, a subcontractor of Industrial Training Corporation, is revising this module.
24	5/18/89	8/90	U	Joan Mindte of OWM is revising this module.
22	6/8/90		N	
19	7/18/90		N	

\*Key to module revision status abbreviations: N = No revision planned in 1992, U = Revision is underway, R = Revision is planned for 1992, W = Plan to withdraw

IACET recently established two new membership categories: "CEU User" and "Certified Provider of Continuing Education Programs." An organization that meets the CEU User membership criteria and agrees to adhere to the CEU Criteria published by IACET may apply to become a "CEU User." The application fee for this category is \$275, and the dues are \$500 a year. The main benefit to NCWM of this type of membership would be permission to use the CEU copyrighted logo and approval statement on promotional materials. Organizations that want to be recognized as "Certified Providers of Continuing Education Programs" must submit an application, undergo a site visit, and sign an agreement to adhere to the Certification Criteria and participate in ongoing monitoring. The cost of applying is \$150 to \$250 (depending on whether one or two site visits are needed), and the annual dues for this category are \$650 per year; the main benefit of this category is national recognition as a certified provider of training. After considering the costs and benefits of changing to one of the new categories, the Committee decided that it would not be advantageous to change membership categories at this time.

#### 402-7 I Module 4 Revision

In June 1992, the Committee completed its review of the second draft of the revision of Module 4, Medium-Capacity Scales. This major revision, which is being developed by Industrial Training Corporation, will make the module compatible with the 1992 edition of Handbook 44. The visual aids included in the Instructor's Manual also will be updated.

#### 402-8A V Certification of NTP Instructors - Voluntary Program

(This item was adopted.)

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 from the regional weights and measures groups on the need for such a program. To assist the regions in the discussion of a certification program, the Education Committee developed criteria that might be used as the basis for certifying instructors and published them in its report to the 76th NCWM (see item 402-10 in that report). The Committee asked for an evaluation of the proposed criteria and for comments on how the certification program should be structured; for example, should it be a voluntary program (trainers would not have to be certified in order for participants in courses based on NCWM training modules to receive CEUs and NCWM certification) or a mandatory program (trainers would have to be certified if jurisdictions wanted to obtain CEUs and NCWM Certification for their officials participating in module classes)? Input received from the regions can be summarized as follows:

Region	Type of Program Preferred	Comments
Western	Mandatory	Recommends that the NCWM be the only certifying agency and endorses the criteria as set forth by the Education Committee.
Central	Voluntary	Recommends that more stringent certification criteria be established (see Appendix C). The NCWM should certify instructors. Standards should exist to approve noncertified instructors.
Southern	Rejected a proposal for a mandatory program	
Northeastern	Voluntary	Supports the recommendations of the NCWM Education Committee.



After reviewing the comments from the regional groups, the Education Committee decided to go forward with a voluntary instructor certification program based on the criteria it published in its report to the 76th NCWM. (See Appendix D of that report.) The Committee felt that the changes to the Committee's criteria recommended by the Central Weights and Measures Association (CWMA) were too stringent at this stage in the development of the National Training Program. At the NCWM's 77th Annual Meeting, the criteria were modified in order to respond to some of the concerns expressed by CWMA.

The Committee was asked whether instructors would have to be certified in each module or whether certification would be general in nature. The Committee decided to recommend that certification be general in nature and apply to the teaching of all modules.

**Committee Recommendation:** It is recommended that the NCWM establish a voluntary certification program for instructors based on the criteria given in Appendix D of this report. Instructors who meet the criteria should be given a certificate signed by the Conference Chairman and the Executive Secretary stating that they are recognized as being qualified to teach NCWM training modules.

#### **402-8B      V      Certification of NTP Instructors - Trainers List**

(This item was adopted.)

The Committee also discussed the application of the certification program to the NCWM Trainers List, which consists of experienced trainers who have volunteered to assist jurisdictions in delivering NCWM training module courses. The consensus of the group was that it should be mandatory for anyone appearing on the Trainers List to meet the proposed certification criteria. The Committee felt that all of the individuals currently on the list would have no trouble in meeting the criteria and would probably welcome the additional recognition of NCWM certification; therefore, it decided to recommend that individuals on the Trainers List be required to meet the criteria listed in Appendix D and that those instructors who are currently on the list should be given a reasonable period of time to demonstrate that they meet the criteria.

**Committee Recommendation:** It is recommended that the NCWM require that anyone appearing on the Trainers List published by the Conference meet the criteria given in Appendix D of this report and that individuals currently on the list be given one year from the date of adoption of this item to submit materials to verify their compliance with the criteria in order to remain on the list.

(It should be noted that it would not be necessary to adopt item 402-8A in order to adopt item 402-8B.)

#### **402-9      I      Weights and Measures Administration Module**

The Committee agreed to accept a proposal from Charles Greene of Verde Ventures to develop the remaining portions of Part II of the Weights and Measures Administration Module, which is in the form of an administrative manual intended for weights and measures administrators and supervisors. The Committee also agreed to go forward with negotiations to develop Part I of the module, which will contain background and history on weights and measures regulation in the United States; this part of the module is intended for use by all weights and measures officials. In May 1992, negotiations were completed for the development of Parts I and II of the Administrative Manual; Part I will be developed by Dr. James Hanlin of Training Solutions Incorporated, and Part II will be developed by Dr. Charles Greene of Verde Ventures.

#### **402-10      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 the implementation of the National Training Program. The Committee requested that funds be included

in the Conference's 1992 budget for purchasing additional workbooks for the Training the Trainer program that the NCWM purchased from Industrial Training Corporation (see Item 402-4). The Committee also asked that the deadline for submitting requests for funds for trainer training be extended until December 31, 1992 (see Item 402-4). Both requests were granted by the Executive Committee.

#### **402-11 I Distribution of Module Examinations**

The NCWM currently distributes each of its new or revised training modules to all State weights and measures directors. Each module includes an instructor's manual that contains module quizzes and examinations and answer sheets. The Conference also makes copies of the modules available for sale to the public; as a result, anyone may purchase an instructor's manual and have access to the module quizzes and examinations and the accompanying answer sheets. Concerns were raised that the policy of making examinations available to any purchaser could affect the integrity of the training program; consequently, in the future, examinations and answer sheets will be sent only to State directors and will not be included in modules sold to the public. It will be possible, however, for purchasers of the modules to obtain copies of the examinations if they submit a request for these materials to the NCWM. Such requests must be in writing and must explain how the purchaser plans to use the examinations. The NCWM reserves the right to refuse to make examinations available to purchasers if they cannot establish that the examinations are needed for the presentation of training programs.

States are asked to safeguard the module examinations as follows:

1. Keep examinations and answer sheets in a locked cabinet or file drawer, if possible, or in a secure office.
2. Do not let students keep their completed examinations; after you have reviewed the answers with the students, collect the examinations and keep them in student training files that are stored in a secure cabinet or office. These files should be made available to students for review under supervision.

#### **402-12 I Use of Handbooks During Module Examinations**

The following proposal was submitted to the Committee:

Most of the training modules have final exams in which the instructions for administering the exams permit no outside materials. In actual work, an inspector would have access to the applicable handbook.

If the module is administered to a real beginner (the stated purpose for the modules), that beginner must memorize text, jargon, and other material if he or she does not have access to it during the exam. Since the modules are intended for beginning inspectors, it is recommended that use of the applicable handbook be permitted in the final exams.

The NCWM policy on the use of handbooks during training module examinations has been to consider each module on a case by case basis and make a determination after considering the objectives and complexity of the module. The current practice concerning the use of handbooks in each of the published modules is shown in Table E.

**Table E**  
**Use of Handbooks**  
**During Training Module Exams**

<u>Module</u>	<u>Use of Handbook permitted</u>	<u>Comments</u>
1	No	Tables 5 and 6 from the Scales Code in H-44 are provided to students during the exam.
2	Yes	Use of H-44 and EPO permitted when completing tolerance worksheets.
4	Yes	Use of H-44 and EPO permitted when completing tolerance worksheets.
5	Yes	In the new revision, use of H-44 is permitted during the final exam.
6	No	Tables 5 and 6 from the Scales Code in H-44 are provided to students during the exam.
7	Yes	Use of H-44 and EPO permitted when completing tolerance worksheets.
8	No	Excerpts from the Liquid-Measuring Devices Code of H-44 are provided to students during the exam.
10	Yes	Use of the Field Manual and Handbook 133 are permitted during the exam.
19	No	Petroleum measurement tables from API are provided to the students when they complete the Test Report portion of the exam.
20	No	Exam was designed to be taken without any reference materials.
21	No	A series of API tables is provided to students during the exam.
22	Yes	Students may use Handbook 130 and a table of common equivalents when completing Part II of the exam.
24	Yes	The purpose of this Module is to teach the student how to use Handbook 44; therefore, use of the Handbook during the exam is necessary.
27	No	Exam was designed to be taken without any reference materials.

After consideration of a number of issues, including the impact of the proposal on the writing of module examinations and objectives and on the motivation of individuals taking module courses, the Committee decided that a global policy change does not appear to be a practical course of action at this time. The Committee plans to continue to look at modules on a case by case basis as they are revised to determine if any changes should be made to the policy on the use of handbooks during the module examination. It is requested that trainers who have experienced problems in giving examinations in which the use of handbooks is not permitted provide a written account of those problems to the Committee.

In the course of its discussions, the Committee learned that the proposal to permit the use of handbooks during examinations was made because of problems that arose during a class on Module 22, Commodity Regulations. The Committee agreed that this is a complex module; consequently, there may be some justification for permitting the use of NIST Handbook 130 during the entire examination rather than just during the second part. The Committee plans to conduct a test to evaluate the impact of permitting the use of Handbook 130 during the entire examination. The Committee will ask the Office of Weights and Measures to conduct this test during the next scheduled Module 22 class. After evaluating the results of the test, the Committee will decide on a course of action.

#### 403 I Above-Ground Storage Tanks

This item, which was referred to the Education Committee by the Specifications and Tolerances Committee, pertains to safety and other problems experienced by weights and measures officials when having to return fuels drawn for test purposes to above-ground storage tanks; for example, the danger to weights and measures officials who must climb slippery vertical stairs carrying a 5-gallon measure to return product to storage; possible damage to expensive, precision test measures in the course of being carried up and down tank stairs; and exposure of officials to insect infestations in cases where tanks are contained in steel tubs that collect rainwater and snowmelt.

Due to environmental and insurance concerns, the number of above-ground storage tanks is expected to increase significantly in the next decade; therefore, weights and measures officials could face increasing risks. The Education Committee plans to work with the Liaison Committee to determine if there are existing Occupational Safety and Health Administration or Environmental Protection Agency requirements for these storage tanks. Jurisdictions are asked to check with their local Fire Marshal's Office to determine if they have requirements and, if so, provide this information to the Committee. The Committee would also like to know how weights and measures jurisdictions have been handling problems with above-ground storage tanks; for example, have they been requiring tank owners to provide assistance to weights and measures officials?

After the Interim Meeting, Charles A. Gardner (Suffolk County, NY) was appointed NCWM Safety Liaison. (See Item 404.) Mr. Gardner's first assignment in his new position was to look into the problems that have been identified with above-ground storage tanks and seek possible solutions. At the Annual Meeting, Mr. Gardner briefed the Committee on his progress to date. He indicated that he had sent letters to over 40 organizations connected with the petroleum industry asking for comments and suggestions. He would like anyone with input on this subject to contact him; he especially would like to hear from jurisdictions that have solved the problem of returning product to above-ground tanks.

#### 404 I Safety

In response to a recommendation from the NCWM Task Force on Safety, the Committee asked the NCWM Executive Committee to appoint a Subcommittee on Safety that would report to the Education Committee and serve as the focal point in the Conference for safety concerns. The Executive Committee initially asked the Education Committee to serve as the safety focal point, but later, after the Interim Meeting, appointed Charles Gardner, former Chairman of the Task Force on Safety, to serve as NCWM Safety Liaison, reporting to the Education Committee. (See Item 101-5 in the Executive Committee Report.)

NCWM members are encouraged to submit information on safety problems to Mr. Gardner. In particular, he would like to receive information regarding on-the-job injuries related to weights and measures activities. Information provided should include a description of the nature of the incident and probable causes; names of the organizations or individuals involved do not have to be supplied.

The Committee has revised NCWM Publication 12, Examination Procedure Outlines for Weighing and Measuring Devices, to include the safety considerations introduction, safety notes, and glossary of safety key phrases developed by the Task Force on Safety. Copies have been distributed to all State weights and measures offices. Administrators, inspectors, and others concerned with the testing of weights and measures devices or supervision of individuals who do such testing are encouraged to read and act on the safety recommendations in Publication 12.

In response to another recommendation of the Safety Task Force, the Committee plans to review the training modules when they are being developed or revised, to determine if information on safety should be added. Suggestions regarding specific information to incorporate in any of the modules would be appreciated.



## 405 I Enforcement Actions

During discussions on the development of the Weights and Measures Administration Module, the Committee identified differences in the enforcement actions that States take when they find a commercial weighing or measuring device that does not meet all applicable requirements. Such terms as "rejected," "rejected for repair," and "condemned" have different meanings in different jurisdictions. In addition, current guidelines with regard to enforcement action (such as those in the Fundamental Considerations Appendix in Handbook 44) treat all requirements equally; however, a question has been raised about whether this is appropriate. For example, should failure to meet all marking requirements result in the same enforcement action as failure to maintain the accuracy of a device?

At the Interim Meeting, the Education Committee reviewed materials provided by several States on enforcement actions and responses to a survey conducted by the Central Weights and Measures Association on enforcement terms used by their members. It was found that there is little uniformity; in addition, it appeared that many jurisdictions do not have written definitions for the enforcement terms they use.

At the present time, the Committee does not have enough information concerning the meanings of the various enforcement terms to recommend standard definitions. It is evident, however, that references to enforcement actions in NIST Handbook 130, Uniform Laws and Regulations, and NIST Handbook 44, Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices, do not reflect current practices. The Committee is considering recommending changes in wording in the Handbooks to the appropriate NCWM Standing Committees for the purpose of recognizing these practices.

For example, the Uniform Weights and Measures Law in Handbook 130 (Section 12. Powers and Duties of the Director) states that the Director of Weights and Measures shall "Approve for use, and may mark, such weights and measures as are found to be correct, and shall reject and mark as rejected such weights and measures as are found to be incorrect." Some States may reject a device that is accurate but does not meet a specification requirement in Handbook 44; however, they may not mark it as rejected so that the business may continue to use the device for a specified period of time during which the problem must be corrected. Because this practice is not recognized in the Uniform Weights and Measures Law, at least one State weights and measures program has had problems with auditors who claimed that it should mark all rejected devices as rejected. Changing the wording in Handbook 130 so that it permits more flexibility (e.g., "...shall reject and may mark as rejected") might be the solution to such a problem. Other examples can be found in Handbook 44 in Sections 6 and 7 of Appendix A, Fundamental Considerations Associated with the Enforcement of Handbook 44 Codes.

It is recommended that all jurisdictions have up-to-date written definitions or policy statements that address the enforcement actions that they may take. States that have such definitions or policy statements are asked to provide copies to the Education Committee.

## 406 I Metric Conversion

NIST policies regarding the use of metric units in NIST publications were reviewed and several options were discussed for including more information on metric units in the training modules. The Committee decided that, starting immediately, paragraphs in Handbook 44 that have been revised to include metric units will be incorporated in new modules as they are developed and in published modules as they are revised. Where appropriate, the Committee also plans to add examples in metric units to the modules and to include a section on the use of metric units in the introductory chapters of the modules.

At the 76th NCWM in 1991, the Specifications and Tolerances Committee announced that Appendix B, Units and Systems of Weights and Measures: Their Origin, Development, and Present Status, would be omitted from the 1992 Edition of NIST Handbook 44 because extensive revision was needed to update the appendix regarding the International System of Units (SI) and a new NIST publication on SI was in progress that could replace Appendix B as a source of information on units of measurement. The Education Committee felt that Appendix B was a valuable source of information for new weights and measures officials and, consequently, asked the S&T

## Education Committee

Committee's Technical Advisor, Henry Oppermann, if the Appendix could be retained in the Handbook until such time as it could be revised. In response to the Committee's request, Mr. Oppermann made a special effort to revise Appendix B. The Committee thanks Mr. Oppermann for making it possible to keep the appendix in Handbook 44.

M. Gray, Florida, Chairman

B. DeSalvo, Ohio (replacing Michelle Phillips, City of Indianapolis, IN)

J. Harnett, Orange County, California

R. Kalentkowski, Connecticut

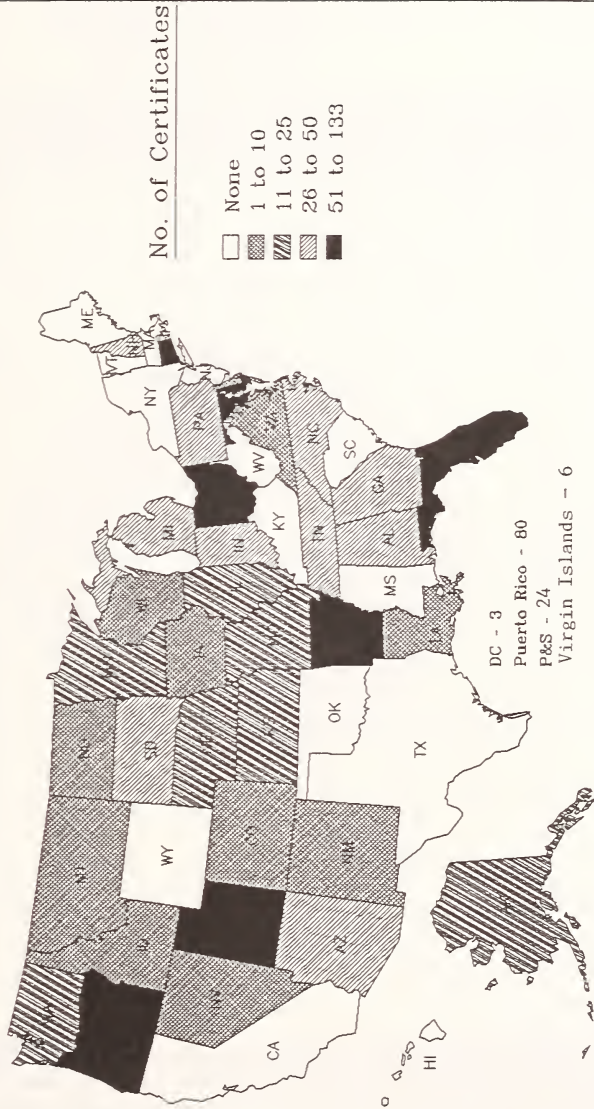
J. Koenig, NIST, Technical Advisor

**Committee on Education, Administration, and  
Consumer Affairs**

Appendix A

# National Training Program Number of Certificates Issued

(As of 6/30/92)



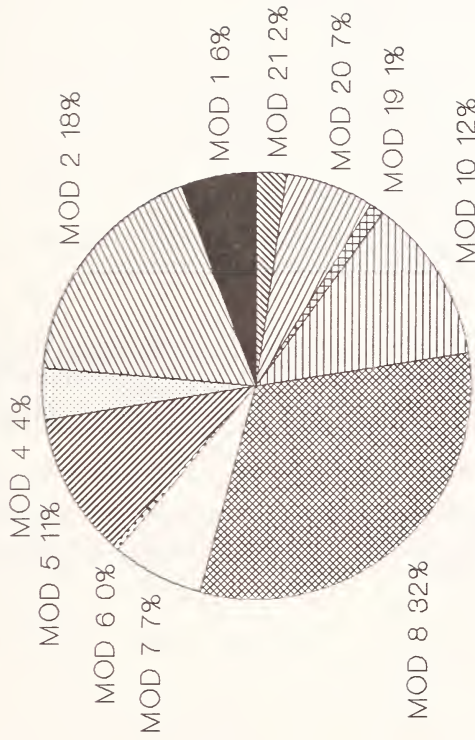
**Appendix A**  
**Certification Summary**  
(As of June 30, 1992)

State	Total No. of Certif.	Total No. of People	Module Number										
			1	2	4	5	6	7	8	10	19	20	21
AL	44	22		15	12			4	13				
AK	11	10				1			10				
AZ	28	28		28									
AR	132	43	20	20		10		8	42	12		17	3
CO	7	7						7					
CT	64	22		15	19	2			2	15	6	3	2
DE	5	5								5			
DC	3	3							3				
FL	95	77	6	8	3	7		2	43	12	8	6	
GA	29	24				8		4	17				
IA	1	1						1					
ID	9	9							9				
IL	17	17		8		9							
IN	30	30				30							
KS	21	9	7	7		4			1	2			
LA	8	8						8		1			
MD	61	35							28			33	
MI	42	14				9		12				14	7
MN	15	15							15				
MO	24	23							5	19			
MT	7	7						7					
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	90	48		27		8		5	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	75	17	16	16	2	11		4	13	12			1
VI	6	6				6							
VA	2	2											2
WA	21	16		5					16				
WI	4	4											4
Other													
P&S*	24	18				1	5	18					
Totals	1,214	711	71	218	48	132	5	86	387	152	14	81	27

\* Packers and Stockyards Administration



# Module Certification (Percentage of Total)



Data as of 6/30/92

## Appendix B

**NATIONAL TRAINING PROGRAM REGISTRY  
SUMMARY OF ACTIVITY  
(As of June 30, 1992)**

**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																
State	Module Number														Totals	
	1	2	4	5	6	7	8	10	19	20	21	22	24	27		
AL		15	12	4		4	20							26	81	
AK		7		1			10	8							26	
AZ		27				6	17			25	1				76	
AR	20	20		10		8	42	12		17	3	13			145	
CA						1									1	
CO						9	1	1							11	
CT		22	20	2			22	18	12	6	2	26			130	
DE			1					5							6	
DC	4	4					3		1						12	
FL	13	24	15	13		10	49	25	8	8			40	41	246	
GA			11	8		4	17								7	
HI								14							4	
ID		9		39			10				10	10		8	86	
IL		8	1	9			7	2				1			28	
IN		43	46	42			56					27	48	48	310	
IA				17		3	4					2			26	
KS	9	10	14	5		2	17	32		2			3	8	102	
KY	8	8	1	5			19								41	
LA						8		1							9	
ME			3	9			14			2				4	32	
MD						6	28		4	33		4	6		81	
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		2	1			17	
MS			2	3		3									8	

Individuals Trained - By Module														
State	Module Number													
	1	2	4	5	6	7	8	10	19	20	21	22	24	27
MO			13				32	27					60	22
MT			5			7	6				1			8
NE		17	4	13	14		15	18			2	15	17	27
NV		1		1			2				1		5	1
NH	6	5	7	2			7			8				6
NJ		21	21				108			109				147
NM		12				13	15	25			2			
NY		74						92			9			
NC						2	18	19				16		
ND							3		3		3			12
OH		40	47	44	4	8	54	26			9	12	46	58
OK			2				5	22					17	2
OR	18	17		8			12	16	1		16	12	17	16
PA	34	69	51				63	45			1	19	27	82
PR		32					33	24					29	
RI		1		1						1				
SC		25				2	28							
SD			7	12		9	7	10			1	10		10
TN		27		6		6	32							5
TX		25				8	24				4		5	
UT	17	16		11		4	13	13			1		13	17
VT	5		3	2			11	1	1			2		5
VI				6										
VA			24	16		5	17	38		25	4		7	43
WA	13	8		16			16				1	14	6	16
WV						3								
WI	56	53		13			34	16		26	10			65
WY			11				16				10		11	3
Other														
Associate Members							6	9	8					
FGIS*														13
P&S**				2	4	19								3
Totals	203	723	325	344	22	169	926	568	42	288	133	173	388	772
														5,076

\* Federal Grain Inspection Service

\*\* Packers and Stockyards Administration

**NATIONAL TRAINING PROGRAM REGISTRY  
SUMMARY OF METROLOGY SEMINAR ACTIVITY  
(As of June 30, 1992)**

Courses Listed in the Registry:

No. 201, Basic Metrology I

No. 202, Basic Metrology II

No. 203, Intermediate Metrology

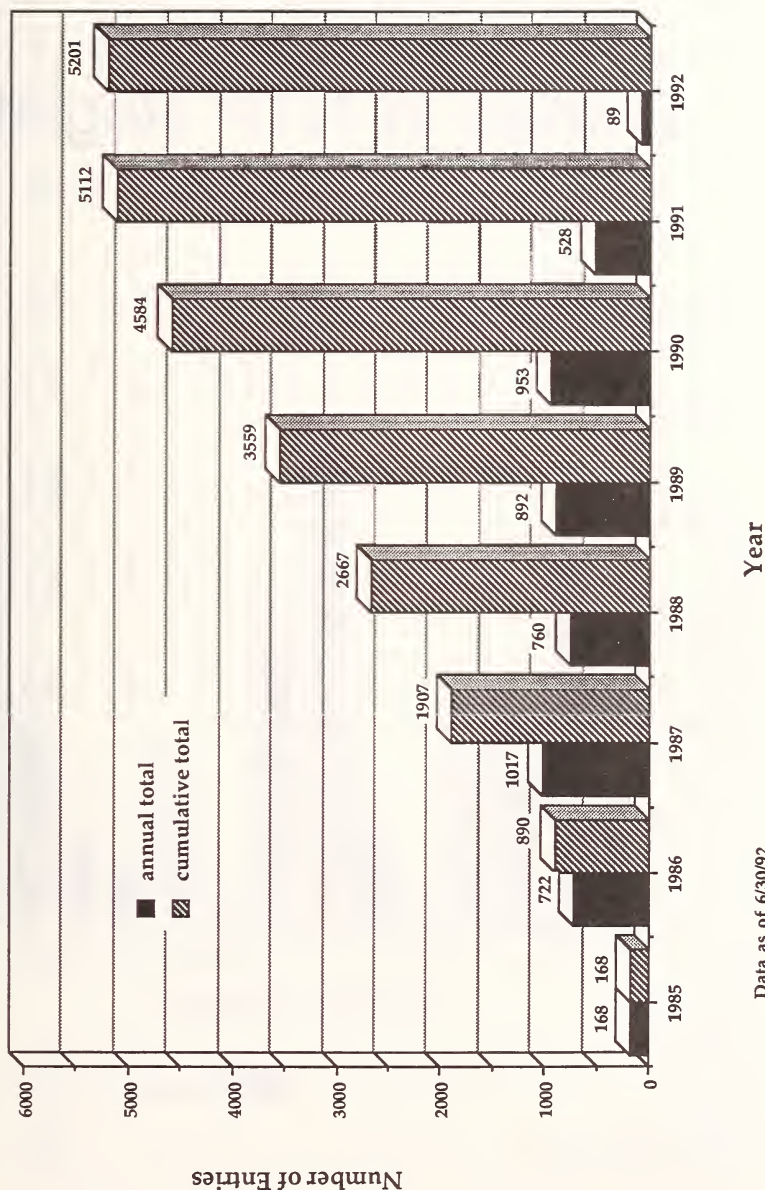
**Individuals Trained - By Course**

State	Course Number			Totals
	201	202	203	
AK			1	1
AZ	2	2	1	5
CO	2	2	1	5
CT			1	1
DE			1	1
FL	3	3		6
GA	1	1		2
HI	1	1		2
ID	1	1	1	3
IL	3	3	1	7
IN			1	1
KS	1	1	1	3
KY	2	2		4
ME	2	2		4
MD	5	5	6	16
MA	1	1		2
MI	1	1	2	4
MS			1	1
MO	1	1	1	3
NV	1	1		2
NY	1	1		2
NC	5	5	2	12
ND	1	1		2
PA			1	1
PR	1	1	11	13
RI	1	3		4
TX	3	3	1	7
VA	2	2	2	6
WV	1	1		2
WI			2	2
Other				
Canada			1	1
<b>Totals</b>	<b>42</b>	<b>44</b>	<b>39</b>	<b>125</b>

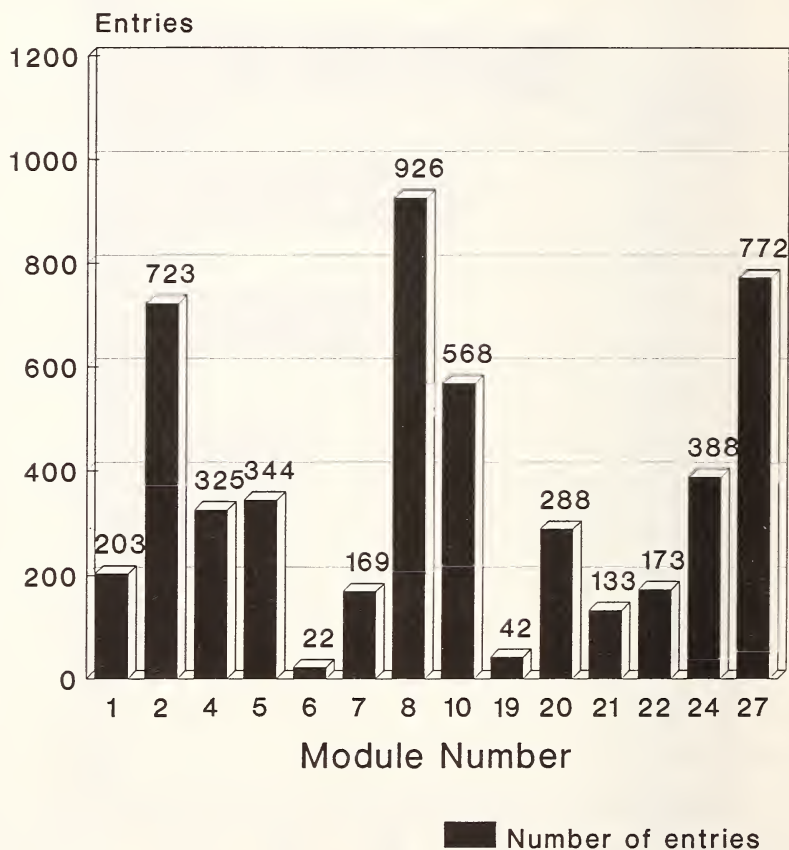


# Growth of NTP Registry (Annual and Cumulative Data)

Education Committee



## Entries in NTP Registry By Module



Data as of 6/30/92

**Continuing Education Units (CEUs) Awarded  
By the National Conference on Weights and Measures  
(As of June 30, 1992)**

Module Number	CEUs*	No. of Partic.	1985 Total	1986 Total	1987 Total	1988 Total	1989 Total	1990 Total	1991 Total	1992 Total	Grand Total
1	3.10	202	-	306.90	77.50	117.80	99.20	24.80	-	3.10	629.30
2	3.10**	714	-	65.10	857.90	759.50	173.60	244.90	31.00	27.90	2,159.90
4	3.10	325	-	-	-	492.90	198.40	170.50	145.70	-	1,007.50
5	3.10	338	-	-	96.10	133.30	381.30	217.00	220.10	18.60	1,066.40
6	3.10	22	-	-	12.40	-	-	55.80	-	-	68.20
7	3.10	148	-	-	12.40	-	248.00	117.80	80.60	65.10	523.90
8	2.80	913	-	288.40	856.80	260.40	739.20	299.60	112.00	36.40	2,592.80
10	2.80	559	75.60	372.40	302.40	128.80	417.20	120.40	148.40	25.20	1,590.40
19	3.50	31	-	-	-	-	-	59.50	49.00	38.50	147.00
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	172	-	-	-	-	-	230.30	191.10	2.45	423.85
24	1.50	382	-	-	-	-	15.00	402.00	156.00	9.00	582.00
27	1.10	770	155.10	402.60	165.00	66.00	36.30	22.00	-	2.20	849.20
Totals		4,997	230.70	1,435.40	2,642.30	2,197.40	2,564.40	2,355.90	1,257.80	228.45	12,912.35

\*\*One Module 2 class with 74 participants was given only 2.00 CEU's.

\* One CEU is equivalent to 10 contact hours of participation in an organized continuing education experience under responsible sponsorship, capable direction, and qualified instruction.

**Continuing Education Units (CEUs) Awarded  
By the National Conference on Weights and Measures  
For Attendance at OWM Metrology Seminars  
(As of June 30, 1992)**

<u>Course No.*</u>	<u>CEUs**</u>	<u>No. of Partic.</u>	<u>1990 Total</u>	<u>1991 Total</u>	<u>1992 Total</u>	<u>Grand Totals</u>
201	3.60	42	97.2	54.0		151.2
202	3.50	44	101.5	52.5		154.0
203	3.10	39	49.6	40.3	31.00	120.9
	<b>Totals</b>	<b>125</b>	<b>248.3</b>	<b>146.8</b>	<b>31.00</b>	<b>426.10</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 C**

### **CWMA Proposed Trainer Certification Criteria**

#### **Technical Experience**

At least 5 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**

1. 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.
2. At least 3 years' experience as a full- or part-time teacher.
3. At least 1 year, full- or part-time, training experience in the area covered by the module topic.

#### **Demonstration of Teaching Skills**

1. Submittal of a satisfactory lesson plan for one chapter of the NCWM module.
2. Submittal of satisfactory course evaluations from the module class.
3. Submittal of letter of recommendation from Supervisor.
4. Submittal of videotape with one 2-minute and one 5-minute presentation.
  - 2-minute presentation topic of trainer's choice
  - 5-minute presentation on actual classroom instruction of module

**NOTE:** Technical Experience, Training Experience, and the 2-minute presentation will generally be evaluated only once. Demonstration of Teaching Skills will be required for each module.

## **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**

1. 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, and
2. At least 3 years' experience as a full- or part-time teacher/instructor/trainer, and
3. At least one National Training Program (NTP) module presented in a classroom situation in accordance with NTP requirements.

#### **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 letter of recommendation from Supervisor.

#### **Demonstration of Knowledge of NCWM National Training Program**

Score of 80 percent or better on an NCWM examination that tests knowledge of the requirements of the National Training Program.

## Final Report of the Committee on Liaison

Aves D. Thompson, Chairman  
Chief, Division of Measurement Standards  
Alaska

Reference  
Key No.

### 500 Introduction

This is the final report of The Committee on Liaison for the 77th 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
<b>501</b>	<b>I</b>	
	<b>Federal Agency Activities</b> .....	296
501-1	I	
	Federal Grain Inspection Service (FGIS) .....	296
501-2	I	
	Packers and Stockyards Administration .....	297
501-3	I	
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<b>502</b>	<b>I</b>	
	<b>Public Liaison</b> .....	298
502-1	I	
	Consumer Information Pamphlet .....	298
502-2	I	
	National Coalition for Consumer Education (NCCE) .....	299
502-3	I	
	Environmental Labeling .....	299
<b>503</b>	<b>I</b>	
	<b>OIML Activities</b> .....	299
<b>504</b>	<b>I</b>	
	<b>OWM Status Report</b> .....	299
<b>505</b>	<b>I</b>	
	<b>Liaison with Regional Associations</b> .....	300
<b>506</b>	<b>I</b>	
	<b>Weights and Measures Week</b> .....	301

Table A (Continued)

Reference Key No.	Title of Item	Page
507 I	Liaison with Other NCWM Organizations and Committees . . . . .	301

## Details of all Items

## 501 I Federal Agency Activities

## 501-1 I Federal Grain Inspection Service (FGIS)

## Railroad Track Scale Testing

Mr. Richard Pforr (FGIS) reported the following activities for FGIS for 1991:

1. All in-service master scales (thirteen) were tested during the year except for the Union Pacific master scale at Laramie, Wyoming, which was scheduled for test in January 1992. The Norfolk Southern master scale at Charlotte, North Carolina, was tested and taken out of service. It will be retested when repairs are completed. The remaining master scales were tested and approved for the appropriate State weights and measures agencies. Test results were submitted to the Association of American Railroads (AAR), State weights and measures, and appropriate railroads.
2. Ninety tests were conducted on track scales used for FGIS official grain weighing.
3. Nineteen tests were performed on railroad-owned track scales, including one uncoupled-in-motion scale test. Twenty-three monitor and scale test cars were field-calibrated under our agreement with the AAR. Under this agreement, 26 railroad-owned test cars were calibrated at the FGIS master scale depot in Chicago, Illinois.
4. As an accommodation to other industries, FGIS continues to provide limited testing services on request if the tests can be performed during regular testing itineraries. Participation in the National Type Evaluation Program (NTEP) continues by performing prototype evaluation testing when it can be worked into regular itineraries. On request, calibration services are provided for Western Weighing and Inspection Bureau (WWIB) test cars.
5. FGIS expanded its calibration services at the master scale depot in Chicago to provide tolerance testing for 25 and 50-pound field standards. With the approval of the State of Illinois, FGIS offers this service to local scale service companies at the published hourly rate, thereby eliminating the need for industry to transport these weights to Springfield, Illinois, for testing.



6. With the approval of the AAR, FGIS has placed an order to build a third test car. Delivery was expected in February 1992. The car will be used on an itinerary that will primarily include Midwestern states. The design of the new test car will be similar to the two existing cars and will make use of an extra set (100,000 pounds) of "casket" weights that have been stored at the master scale depot for many years.
7. The Federal Grain Inspection Service is actively working within the Agency and the Department of Agriculture in implementing metrication requirements mandated by Congress.

## **501-2 I Packers and Stockyards Administration**

Mr. John T. Lacy, Chief, Scales and Weighing Branch, USDA Packers and Stockyards Administration (P&SA) provided an update on P&S activities for 1991.

The Agency lacks scales and weighing specialist in three of twelve regional offices. The inability to fill these positions due to manpower restrictions has somewhat hampered activity in those three offices. Personnel with minimal experience with scales and weighing, as well as having other responsibilities, are attempting to maintain scale records. It is not known when this staffing situation in those regional offices will change.

During Fiscal Year 1991, the Agency conducted two training schools on Module 7, Livestock and Animal Scales, and one on Module 6, Monorail and Meat Beam Scales. We are pleased to cooperate in the National Training Program and present the two modules as time and funds permit. To date, the Agency has conducted 10 such schools with 188 participants representing 26 State weights and measures jurisdictions. This effort has produced good results in the form of better tests of scales subject to Packers and Stockyards Administration jurisdiction and an increase in the percentage of inaccurate scales found in those jurisdictions that have attended the training schools. We view the National Training Program as perhaps the best opportunity to positively affect the accuracy and reliability of scales for which we have a regulatory responsibility.

## **501-3 I Federal Agency Interaction**

### **U.S. Postal Service (USPS)**

Mr. Ted Yaffe, USPS, provided the Committee with a report of USPS activities. Items reported last year were continued, and approximately 60,000 Integrated Retail Terminals have been deployed in all post offices with two or more customer windows.

Weighing and Rating Units were installed in more than 1,500 post office lobbies. The customer operates the unit to weigh mail by following instructions on a video screen to determine the correct postage, which can be purchased from a vending machine. One-ounce and 5-pound precision test weights have been delivered to these sites for daily calibration checks.

The USPS assisted in settling disputes for state and local weights and measures authorities. A national policy is being developed to handle complaints. Weights and measures inspectors can expect more cooperation from postal authorities when approached to check postal scales.

### **U.S. Metric Program**

Mr. Gary P. Carver (NIST) briefly described the Commerce Department's Metric Program, which is under the leadership of NIST.

## Liaison Committee

As designated lead agency, the Commerce Department has multiple roles in the U.S. transition to using the metric system. One Departmental responsibility is to provide guidance to the Federal agencies. Through the National Council on State Metrication, and in cooperation with the National Conference on Weights and Measures, the Department coordinates the efforts of state and local governments. Through liaison with trade associations, metric-advocacy organizations, and standards organizations, it encourages and assists business enterprises in their voluntary metric transition activities and provides information and publications to help the public to understand and use the metric system.

As required by legislation, the Commerce Department's primary focus is on procurements, grants, and business-related activities of the Federal agencies. The goal is to help all Federal agencies shift as quickly and as completely as possible to metric use. Specific models, guides, decision trees, and other metric-related products are valuable tools for governmental officials.

Cooperative activities with industry, especially with industrial trade, standards, and metric-advocacy organizations and associations, are also a focus, as are cooperative activities with the states. State governments and organizations increasingly request information and assistance and are initiating efforts to increase metric usage. It has become obvious to state governments that economic well-being requires that business enterprises within their states export to foreign markets. This, in turn, requires that these enterprises produce metric products.

Progress toward a metric United States is accelerating. The Federal Government is serious about leading the transition, and the Commerce Department is committed to carrying out its responsibilities as lead agency.

## 502 I Public Liaison

### Networking with Other Groups

The International Society of Weighing and Measurement (ISWM) hosted a meeting of trade and professional associations at the 76th Annual Meeting, July 1991. Representatives gave short reports about their goals, objectives, and membership. Participants were enthusiastic about the information exchanged and the opportunity for furthering mutual objectives. For example, several device-specific organizations expressed interest in exchanging views with device user groups and with device installation and repair groups. Those who attended the ISWM-hosted meeting at the Annual Meeting agreed to participate at a similar meeting if the Conference would conduct it at the Interim Meetings.

Several association and Federal agency representatives met with the Executive Committee and the Liaison Committee on January 15, 1992, to further explore mutual objectives and projects. (See Appendix A for their individual reports. Note the report from the American Paper Institute, on recycling and the report from the Federal Trade Commission on octane testing.)

## 502-1 I Consumer Information Pamphlet

The Committee reviewed comments received from the regional associations and others concerning the first draft of a weights and measures consumer information pamphlet prepared by the Liaison Committee. The Committee met with a representative of the Consumer Information Center of the General Services Administration to obtain estimates of cost and recommendations for content of the brochure. In addition to the preparation and print costs of \$18,000, the cost of a free-to-the-consumer pamphlet available in the CIC was estimated to be approximately \$25,000.

The Committee has recommended that a larger pamphlet (8-15 pages) be developed and be made available through the CIC at a cost of 50 cents to the consumer. The Committee will have sufficient copies printed to provide each state and local jurisdiction and industry with pamphlets for their use.

The National Coalition for Consumer Education (NCCE) has agreed to provide assistance in developing the pamphlet and having it reviewed by consumer panels for language and layout.

The Committee met during the Annual Meeting with Mrs. Carole Glade of the NCCE to review and comment on the third draft of the pamphlet. We are pleased with the significant progress in preparing this draft that has been made in the past month. The Committee will review the fourth draft within the next month. Availability of the pamphlet continues to be targeted for Weights and Measures Week 1993.

## **502-2 I National Coalition for Consumer Education (NCCE)**

Mrs. Carole Glade, Executive Director, NCCE, reported that the Coalition, headquartered in Chatham, New Jersey, is a non-profit organization that promotes and encourages consumer education in schools, communities and work places. To further this effort, the Coalition "...brings together leaders from business, government, education, media and consumer organizations to share resources in educating consumers all across America." The Coalition functions through a network of coordinators throughout the United States and internationally.

A current project of the Coalition related to educating the educators is the establishment of Institutes for Consumer Education that entail one-day teach-ins for educators focusing on consumer information subjects. Targeted educators include job counselors, teachers, government agency representatives, extension service personnel, nutritionists and other individuals having interests, information or resources to share in the area of consumer education.

## **502-3 I Environmental Labeling**

Mr. Michael Dershowitz from the Federal Trade Commission (FTC), Division of Advertising Practices, brought the Committee up to date on environmental labeling activities within the agency. Currently, 20 investigations are in progress. Three cases concerning ozone depleting chemicals and two concerning biodegradable claims have been completed, resulting in regulatory action.

Considerable interest has been exhibited by industry, consumers and regulatory bodies to have the Commission provide guidelines for nondeceptive environmental labeling. The FTC held public hearings in July 1991. A task group of agencies held similar hearings in November 1991. The task group was led by the Environmental Protection Agency (EPA) and included the FTC and the U.S. Office of Consumer Affairs. FTC Chairman Steiger has stated publicly that guidelines should be provided, but the Commission has not at this time decided if interpretive guidelines will be written or if the FTC will continue to provide guidance through the usual method of case-by-case investigations and enforcement.

## **503 I OIML Activities**

In a joint session with the Executive Committee, Dr. Samuel E. Chappell (NIST) described the OIML activities of interest to the NCWM. (See Executive Committee Item 101-17 for details of the presentation.)

## **504 I OWM Status Report**

In a joint session with the Executive Committee, Dr. Carroll Brickenkamp, Chief, OWM, reported on the status of the OWM in terms of staffing and program changes. Dr. Brickenkamp also provided an outline of OWM's 6-year work plan and invited comments from the Committees concerning OWM/NCWM interaction. (See Executive Committee Item 101-15 for details of the presentation.)

The Liaison Committee heard favorable comments concerning the "Director's Roundtable" event at Regional Weights and Measures Association meetings. The Liaison Committee feels that the roundtables are excellent forums for discussing issues of uniformity and issues of interaction between government and industry and encourages their continued and expanded use. The Committee urges each region to provide written comments to the Committee on those issues where the Liaison Committee can be of assistance.

#### Central Weights and Measures Association (CWMA)

The Central Weights and Measures Association interim meetings were held at the Embassy Suites Hotel in St. Louis, Missouri, October 20-23, 1991. A total of 42 Weights and Measures officials and industry representatives attended. Attendance was down by 20 attendees due to budgetary restrictions in both industry and government.

A training course was given using NTP Module 19, Loading-Rack Meters, February 17-21, 1992, in Bismarck, North Dakota. The Ohio Department of Agriculture Spring School was held in Reynoldsburg, Ohio, March 31-April 1, 1992.

A Train-the-Trainer seminar met April 21-23, 1992, in Sioux Falls, SD, and included five participants from Iowa, Nebraska, South Dakota, and Minnesota, and four from industry; Bill Braun and Tom Stabler of IWM were instructors.

The Central's Train-the-Trainer seminar was held May 1-3, 1992, in Topeka, Kansas, with 19 participants under the instruction of David Okerlund, a professional trainer. The CWMA annual meeting was held following this seminar May 3-7, 1992, with more than 60 in attendance. The annual meeting previously held in April, has been moved to May so that the NCWM annual agenda committee reports will be available.

The 1992 Interim Meeting is scheduled for October 26-28, 1992, in Bettendorf, Iowa, with the Annual Meeting scheduled for Minneapolis-St. Paul in May 1993. Bruce Adams (MN) is CWMA Chairman. A retiree's group from the Central is being explored by Bill Braun, with the first meeting planned for the CWMA annual meeting.

#### Northeastern Weights and Measures Association (NEWMA)

Mr. Bruce Martel (VT) reported that Berlin, Vermont, was the site of the NEWMA Annual Conference and Technical Program. Presentations were made on audit trails, suitability of equipment, quality management, safety, manual weight entries, and ready-to-eat foods. Vermont's Attorney General, Eliot Berg, spoke against the NCWM recommendation on home-food service sales; however, members of the association later voted to support the NCWM recommendation. Kathy Bolam, representing Bolam's Mobile Mart of Venice, Florida, spoke of her experiences as a motor fuel retailer. She asked NEWMA to request the NCWM to require temperature compensation from the jobber to retail marketer. Mary Kamm, Ben and Jerry's Ice Cream, gave a presentation on that company's approach to quality improvements in their manufacturing and service.

The NEWMA Specifications and Tolerances Committee recommended that the 300 loads to be counted in permanence testing for type evaluation of large-capacity scales (item 320-19 in the NCWM S&T report) be modified. The present recommendation for vehicle scales is that 50 percent of the axle loads be above 80 percent of the concentrated load capacity (CLC). They also recommended changing the requirement that 100 percent of the loads are above 20,000 pounds to a requirement that 100 percent of the axle loads be above 20 percent of the CLC.

The NEWMA Laws and Regulations Committee recommended that further work be done on item 232-4 on ready-to-eat foods and that this item be changed from voting to an information item.



The Interim Meeting will be held in Cromwell, Connecticut, in October 1992. The annual meeting will be held in New York City in May 1992.

Mr. George M. Dunsmore, Commissioner of Agriculture for the State of Vermont, addressed the Northeastern Weights and Measures Association May 13, 1992. In part, he stated "I believe no other group of public employees (Weights and Measures) has ever saved the American public so much money or so much peace of mind" further, "You must, through effective public relations, continually let the public know that you are its continuing advocate."

#### **Southern Weights and Measures Association (SWMA)**

SWMA would like to thank the Associate Membership Committee for the video camcorder and accessories presented at the last annual meeting in Lexington, Kentucky (October 6-10, 1991). This equipment is available for use by all SWMA states.

At the close of the SWMA meeting, Mr. Victor Page, Kentucky, presented each State with a history of the last 20 years of the SWMA. The work on this excellent book was completed by the Kentucky Department of Agriculture.

One Train-the-Trainer session was conducted in Raleigh, North Carolina, during April 1992, with 12 successful participants. Mr. Larry Hunter conducted the school. SWMA provided each state with \$200 in travel funds to send a staff member to the school. Mr. N. David Smith, North Carolina, coordinated this activity for the association.

The next annual meeting of the SWMA is scheduled for October 18-21, 1992, in Annapolis, Maryland. The Annapolis Ramada Inn room rates are \$67.50 per night for a single or double. Contact Mr. Louis Straub (410) 841-5790 for additional information.

#### **Western Weights and Measures Association (WWMA)**

Mr. George Shefcheck, 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 conducted by Mr. Thomas Stabler in Ontario, California on March 12-14, 1992.

The next WWMA annual meeting is scheduled for August 16-21, 1992, at the Outlaw Inn in Kalispell, Montana. For further information, contact Mr. Steve Meloy at (406) 444-1488.

### **506 I Weights and Measures Week**

Weights and measures jurisdictions are urged to ask their chief executives to proclaim March 1-7 as "Weights and Measures Week." Conference publication No. 7 provides many useful examples for promoting your organization in your area. The Committee will write to each state director to encourage active participation.

### **507 I Liaison with Other NCWM Organizations and Committees**

#### **Associate Membership Committee (AMC)**

A meeting of the Associate Membership Committee (AMC) was held on Monday, January 13, 1991, to discuss issues of interest to the membership. The meeting was attended by three AMC members plus eight others from industry, trade associations and government agencies.

### *National Weights and Measures Law*

The issue of proposing a National Weights and Measures law for Federal adoption was discussed. This issue arose from the Task Force Planning for the 21st Century for the purpose of achieving a higher degree of enforcement uniformity across regulatory jurisdictions. It was felt that industry would be able to propose and carry forward a national law because different requirements in different States makes difficult the trading across State boundaries. This is a problem for interstate commerce. The proposal was to view the Uniform Weights and Measures Law exactly as written now and published in Handbook 130 as applicable to adoption by the U.S. Congress. In this light, such a law would not entail Federal preemption. On the contrary, it would establish (and require) a State weights and measures authority; the regulations, such as Handbook 44, the Uniform Packaging and Labeling Regulation, and others contained in Handbook 130, would still be developed and voted upon by the State and local weights and measures representatives within the National Conference on Weights and Measures and the national law would adopt these regulations by reference. The difference would be that, if the Uniform Weights and Measures Law were a national law, every State would adopt changes to Handbook 44 or to the Uniform Packaging and Labeling Regulation fully and at exactly the same time. Advantages would accrue if every State were required to maintain a weights and measures department, and if the consensus standards development process of the Conference would remain the manner of revising and amending regulations. The criteria imposed for a State to adopt amendments to these national regulations for commerce within the borders of that State would have to be defined and specified. The Associate membership attending the meeting, along with representatives of the America Petroleum Institute (API), National Food Processors of America (NFPA), and Grocery Manufacturers of America (GMA), felt that the major concerns of package labeling and net content compliance were addressed in the newly enacted Nutrition Labeling and Education Act (NLEA), and that the remaining issues of enforcement uniformity were not of sufficient priority to devote further resources to the introduction of a National Weights and Measures Law. Unfortunately, representatives of device manufacturers were not present to provide their reactions.

### *Sharing Industry's Marketing and Public Relations Expertise*

Another request from the Task Force on Planning for the 21st century was for industry to share its marketing expertise with the Conference to aid in increasing the awareness and effectiveness of NCWM services and programs. Though willing to provide support, the majority of AMC and industry members present felt that the conference has many Government sources available for support and that these should be explored further before receiving help from industry. It was suggested that the Conference develop a specific marketing and public relations program and then ask industry for specific support.

### *Funding for the Joint AMC/Conference Outing*

A subcommittee chaired by Mr. Richard Davis, James River, and including Mr. Chris Gray, Procter and Gamble, and Mr. Dave Quinn, Fairbanks Scales, submitted a proposal to the Executive Committee to increase Associate Membership dues by \$15.00 to provide funds for support the Associate Member outing and to provide funds for other worthwhile causes over which the AMC would have discretion. Due to the effectiveness of the proposal, the Executive Committee agreed to the dues increase effective July 1, 1992. No additional solicitation for funds will be made by the AMC.

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

The Committee met with the members of the Task Force on Planning for the 21st Century to discuss how the Conference might be more effective in establishing liaison between the Conference and the many trade, industry, and consumer groups and Federal agencies whose activities are effected by the actions of the Conference.

It was generally agreed that liaison is an important Conference function with great potential for assisting the Conference committees in the development of rules and regulations for NCWM adoption. It was also agreed that such potential has not been sufficiently utilized.

## Liaison Committee

Several alternative approaches toward improving the liaison function were discussed both during the joint session and by the Liaison Committee itself. Suggestions for improving Liaison Activities were forwarded to the Task Force and to the Executive Committee.

Aves D. Thompson, Alaska, Chairman

C. Davis, Maine

R. Davis, James River Corp.

J. Lacy, USDA, Packers and Stockyards

L. Barrows, Missouri

K. Newell, NIST, Technical Advisor

## Committee on Liaison

## **Appendix A**

### **Association and Federal Agency Reports**

#### **American Paper Institute Progress Through Service**

Industries grow and prosper in proportion to their ability to serve society's needs. To serve successfully they must know -- often well in advance -- the impact of a myriad of factors at play in the world.

These factors involve economic forces, the behavior of markets and the implications of policies at all levels of government, both domestic and foreign. An industry must know not only how the play of these forces will affect its own raw materials, its own markets and its own operating conditions: It must also be able to put this information into a framework that includes the effects of competing and complementing industries.

API's staff gathers and compiles information both from within the industry and from without -- information as varied as the statistics of production and the opinions of government officials. With the advice of experts from many specialized fields, API analyzes, evaluates and translates this information into forms that have meaning for its members. Armed with this knowledge, companies are in a position to decide when they should legally and logically work together as an industry, or when the laws or their own self-interest require them to work individually to reach their desired objectives. When members work together, API provides the leadership so essential to attaining desired common goals.

The United States paper industry, which is served directly and indirectly by the API, has almost 6,000 establishments, is located in all 50 States and has nearly 700,000 employees who produce 12,000 different kinds of pulp, paper and paperboard products for countless thousands of uses. In overall terms, the 72,600,000 metric tons (80,000,000 tons) of annual U.S. production, together with 7,260,000 metric tons (8,000,000 tons) of net imports, translate into 298 kilograms (656 lb) of paper and paperboard consumption for each man, woman, and child in the country.

The American Paper Institute serves its 165 member-company manufacturers of 90 percent of the domestic pulp, paper and paperboard production which comprise one of America's ten largest manufacturing industries, an industry that is justifiably proud of its world-class competitor status.

Red Cavaney  
President, American Paper Institute  
260 Madison Ave.  
New York, NY 10016-2499  
212-340-0600

Provided below are additional items on the issue of recycling and recycled paper.



## Paper Recycling: A Primer

### Understanding Paper Recycling in Your Community

This year, the U.S. paper industry proudly celebrates 302 years of growth, leadership and innovation in the United States.

Since the U.S. paper industry was launched in a small mill outside Philadelphia, Pennsylvania, in 1690, it has remained committed to continuing a tradition of leadership in recycling. Between 1970 and 1989 alone, paper recovery in the United States more than doubled, rising from 11.3 million metric tons (12.5 million tons) in 1970 to 25 million metric tons (27.6 million tons) in 1989. Today, paper accounts for about 80 percent of all post-consumer material recovered in the United States for recycling.

In the years ahead, the U.S. paper industry is seeking to expand paper recycling even more. That is why it has announced a national goal to increase paper recovery -- for domestic recycling and export -- to 40 percent by the end of 1995.

This ambitious goal will require a 50 percent increase in the amount of paper recovered in this country for reuse. By the end of 1995, the paper industry estimates paper recovery will reach 40 million tons. And, importantly, to achieve this goal, more than 37 percent of all post-consumer paper and paperboard will need to be recovered before commingling with municipal solid waste (MSW).

While the U.S. paper industry is committed to realizing this goal, paper manufacturers cannot do it alone. Achieving greater paper recovery and reuse will require the participation of the millions of Americans who enjoy the many uses and benefits of paper.

Already, many communities across the country have made recycling a priority. Rapidly diminishing landfill space, rising disposal fees and heightened concern about the environment are a few reasons why towns and cities are turning to recycling to help better manage their municipal solid waste stream.

For its part, the U.S. paper industry is investing billions of dollars to retool and expand the recycling capacity of its paper mills. In 1989, U.S. mills producing pulp, paper, paperboard and related products relied on recovered waste paper for about a quarter of their raw material supply. Approximately 200 of the 600 U.S. paper mills depend almost entirely on waste paper for their raw material requirements; another 300 use between 10 percent and 35 percent waste paper.

#### *The U.S. Paper Industry's Commitment to Paper Recycling*

The U.S. paper industry is committed to recycling paper to the maximum extent technologically and economically feasible. The industry believes that cooperative efforts between the public and private sectors, each with its own respective needs and strengths, offer the greatest potential to maximize collection and utilization of waste paper in the United States.

As in the past, the U.S. paper industry pledges its support and assistance in working with public officials and policymakers to increase the effectiveness of paper recycling initiatives. Paper companies will continue to work with state, regional, county and local officials in developing collection systems that can keep pace with increasing domestic and foreign demand for recyclable paper. Joint government/industry programs can be designed to develop and meet common (and realistic) goals for expanding the utilization of recovered waste paper -- in both the short and long term. With thoughtful planning and adequate development of markets, the U.S. paper industry believes that sound paper recycling programs can be expanded to help provide much more effective management of the nation's waste stream.

Liaison Committee

For additional information, contact: Solid Waste Resource Center 1-800-878-8878  
American Paper Institute  
1250 Connecticut Avenue, N.W.  
Washington, D.C. 20036

December 31, 1991

RCRA Docket Information Center  
Office of Solid Waste (OS-305)  
U.S. Environmental Protection Agency (EPA)  
401 M Street, S.W.  
Washington, DC 20460

RE: Docket No. F-91-GPLP-FFFFF  
Guidance for the Use of the Terms "Recycled" and  
"Recyclable" and the Recycling Emblem in Environmental  
Marketing Claims

To Whom It May Concern:

The American Paper Institute (API) appreciates the opportunity to comment on EPA's proposed guidance on the use of terms in environmental marketing claims.

API is the national trade association of the U.S. pulp, paper and paperboard industry. The association's 165 member companies, which account for over 90 percent of the domestic manufacturing capacity of these products and for 90 percent of domestic recycled paper manufacturing capacity, have considerable interest in the environmental labeling issues currently being addressed by the EPA.

API believes federal guidance is absolutely essential to bring uniformity to, and ensure responsible use of, environmental claims in product marketing. Considerable confusion exists as to the appropriate content and context of such claims, and conflicting state standards are already imposing substantial barriers to efficient, economical interstate product marketing. At the federal level, inconsistent activities among individual agencies, which could result in conflicting guidelines and terminology, could cause additional confusion in this area. Therefore, API applauds the formation of the Interagency Task Force on Environmental Marketing Claims to provide a forum for the development of consistent federal guides.

EPA's proposed guidance provides a thoughtful and concise overview and represents a major step forward toward the resolution of this issue. API fully supports the goal set forth in EPA's notice to increase use of recycled materials and to increase recovery of materials for recycling to the fullest extent environmentally, technologically and economically feasible. API agrees that uniform, fair guidance will facilitate communication between marketers and consumers and will help achieve these goals.

Since the early 1970s, when the paper recycling symbols were created and subsequently used by API, this industry has been promoting standardization of recycled content and recyclable claims in an effort to accomplish these same objectives.

API recognizes the challenge facing EPA to create a set of general rules for diverse materials. The proposed definitions and guidelines affect simple materials differently than complex materials. API's comments will focus primarily on how these proposed guides will affect paper and paperboard products.

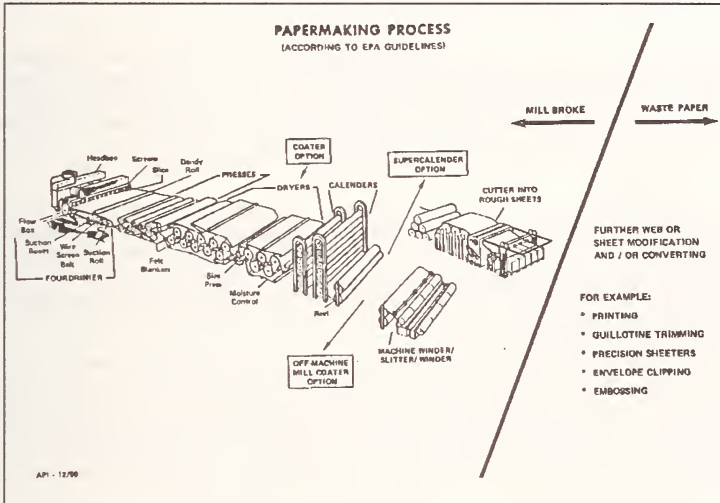
*Definitions*

EPA has requested comment on several definitions which are intended to serve as guidance to marketers and to help educate consumers. API strongly supports EPA's effort in the development of standardized definitions

to provide meaning to environmental terms used in product advertising and labeling. However, clarification of certain definitions is necessary. API's views and recommendations on specific terms follow.

◦ "Home Scrap"

In attempting to distinguish between discarded materials associated with the original manufacturing process and the incorporation of recovered materials into the manufacture of recycled products, EPA has introduced the term "home scrap." API believes that, for paper, the introduction of this new term will be unnecessarily confusing. Instead, API suggests that EPA continue to use the well-established term "mill broke." Mill broke is defined as "any paper waste generated in a paper mill prior to completion of the papermaking process. It is usually returned directly to the pulping process. Mill broke is excluded from the definition of 'recovered materials.'" To reduce uncertainty regarding the meaning of this term, a diagram is shown below which depicts the limits of the paper manufacturing process.



Whether the existing "mill broke" or the proposed "home scrap" definition is chosen by EPA, API believes clarification is needed as the definition applies to a paper manufacturing process using recovered material (either wholly or partially). As written, recovered material reused within the same manufacturing process would not appear to qualify as recovered material under the mill broke/home scrap exclusion. To provide clarity, API suggests the definition state that, to the extent a process uses recovered material, this exclusion does not apply to that material.

◦ "Post-Consumer Materials" and "Pre-Consumer Materials"

The industry does not support a distinction between sources of recovered fiber and believes such a distinction is counterproductive to the national goal of increased paper recycling. However, API regards the EPA definitions of these terms as generally consistent with other similar definitions currently in use. This issue is discussed fully in the following section on issues relating to recycled content claims.

o "Product"

API recommends that EPA clarify this definition as it applies to converting operations. Once paper is manufactured, the original paper manufacturing process is complete. Other processes that occur after the paper is manufactured, whether at the mill or away from the mill, are not part of an original manufacturing process for purposes of recycling paper or related marketing claims. Converting operations are defined as " 'processes' following the original manufacturing process, regardless of location."

Since packaging is considered a product under EPA's definition, it is unclear whether a converting operation is considered an original manufacturing process, although it is assumed that this is not the intent. If paper and paperboard converting operations are mistakenly considered to be original manufacturing processes, converting residues erroneously would not be considered recovered material. If, despite API's strong objection and serious concern regarding unnecessary confusion of an already complex subject, EPA chooses to introduce the new term "home scrap" in place of the current "mill broke" definition, clarification is required to make sure that such converting residues are excluded from the "home scrap" definition.

Additionally, for a complex material like paper, "product" is a term which should be applied in a narrow context. Generally the term "product" applies to a grade of paper or paperboard. A typical paper mill may produce numerous grades of paper and paperboard (products) that are differentiable from each other in such attributes as basis weight, thickness, color, shade, surface, etc. These products are not necessarily substitutable, thus claims about recyclability and recycled content may well be specific to a particular grade.

o "Recycled Content"

API proposes the following change and addition to EPA's proposed definition for this term: "The term 'recycled content' is determined by a relative comparison by weight of recovered fiber to total fiber in a given end product, *and excludes additives, coatings, inks, laminates and materials extruded on the paper and other fillers in that end product.*" This addition ensures that the calculation of recycled content is made on the basis of the pertinent raw material, (i.e. virgin and recycled fiber), and not on the basis of the extraneous weight of non-fibrous additives such as coatings, inks, laminates, fillers, etc.

API urges EPA to recognize an important distinction regarding recovered materials used in papermaking. For purposes of calculating "recycled" content, the paper industry counts only recovered paper material. While the paper industry's use of other recovered fibrous materials, such as wood, manufacturing and forest residues, is substantial (over 30 percent of the industry's primary fiber requirement) and contributes greatly to reducing disposal problems that would otherwise exist for these waste products, these materials historically have not been, and should not be, considered recycled materials for the purpose of determining the recycled content of paper and paperboard products.

o "Recycled Materials"

API agrees with EPA's inclusion of all recovered materials in this definition. As noted above, however, clarification of the "home scrap" exclusion as it relates to recycled materials, as well as the distinction between recovered paper materials and other recovered fibers, is necessary.

o "Recycling Rate"

Most often, recycling has been described by using two rates -- the recovery rate and the utilization rate. Recovery for reuse is an important measure of progress for diverting paper from the municipal solid waste stream. The U.S. paper industry uses the recovery rate and the utilization rate definitions developed by the United Nations Food and Agricultural Organization, and they read as follows:

"Recovery rate is the amount of waste paper collected for reuse as a percentage of apparent consumption of paper and paperboard."

"Utilization rate is the amount of waste paper used for paper and paperboard as a percentage of total paper and paperboard production."



With one modification, API recommends that these two internationally recognized and used terms and definitions be added to the EPA guidance. API strongly suggests that the term "waste paper" be replaced with the more accurate term "recovered paper." The industry seeks this clarification in order to distinguish between recovered, recyclable paper and solid waste, the latter of which requires disposal. Use of the term "recovered paper" is consistent with the definitions in Section 6002 of the Resource Conservation and Recovery Act (RCRA).

If EPA goes forward with a "recycling rate" definition, the paper industry recommends changing the definition for this term so it would read as follows: *"The term 'recycling rate' means the amount by weight of recovered product or material collected for reuse as a percentage of apparent consumption of that product or material."*

#### *Recycled Content Claims*

API strongly supports EPA's efforts to make "recycled content" claims more consistent and meaningful. Below are the paper industry's views on various options put forth regarding recycled content claims.

##### Option 1: Disclosure of Recycled Materials Content

API strongly supports this option, which would require disclosure of the percentage by weight of recovered fiber to total fiber in a given product or a minimum percentage contained within a broad range of products. This has been the disclosure method most commonly used for over 20 years in labeling recycled content paper and paperboard products. The paper industry believes there is evidence to indicate that many consumers are interested in the amount of recovered fiber in paper products and would consider this information in their purchasing decisions. Thus, API supports this voluntary approach to recycled content labeling.

##### Option 2: Minimum Content Standards

This option, which allows recycled content claims only when an EPA specified minimum content standard is achieved, is inferior to Option One for several reasons. The establishment of equitable product-by-product or material-by-material standards for competing products would be an enormous, if not impossible, task for the agency and would undoubtedly be confusing in the marketplace. A generic standard would also be extremely difficult to apply equitably to all competing or substitutable materials. In addition, no technical means exist to verify recycled content claims for paper and paperboard, for there is no known physical or chemical test method which will distinguish recycled fiber from virgin fiber in paper and paperboard products.

By establishing a minimum standard, the incentive to increase the amount of recovered material content in products beyond the set level would be lost. Also, if a minimum standard were established, some recycling activity might not be undertaken. For example, a facility unable to attain the full standard would have no incentive to incorporate any recycled content whatsoever in their products, even though some lesser amount of recycled content might have been feasible.

API does not believe that EPA's Guidelines for Federal Procurement are a suitable starting point for minimum content standards, given that the criteria and standards used in establishing those guidelines pertain strictly to government purchases. There is a large contrast between standards that apply to government purchases and the variety of standards that would be appropriate to the broader, private market-place.

##### o API Recommendation

API supports and strongly recommends the adoption of the EPA-preferred alternative. Option One provides the clarity that is absolutely essential in making recovered material content claims consistent, clear and understandable for both consumers and marketers.

#### *General Issues Relating To "Recycled Content" Claims*

##### o Pre- and Post-Consumer Materials

The paper industry believes that distinguishing among types of recovered paper based on their source (i.e., pre- and post-consumer paper) when defining recycled material is arbitrary, unjustified and counter-productive to the national goal of increased paper recycling. The distinction between pre- and post-consumer paper attempts to

delineate between sources of recovered paper, rather than the far more relevant quality and performance factors for the manufacturer, i.e., product characteristics and fiber type. Ultimately, of course, it is the manufacturer who must reformulate the mix of material in order to make products of acceptable quality and performance for the marketplace.

Classification of products into pre- and post-consumer categories is often not possible or verifiable. For example, by some definitions, a newspaper would become a post-consumer material only after it had been used by a "consumer" and then discarded or separated for recycling; it would be an "over-issue" or pre-consumer material if it had never been purchased and thus stayed at the newsstand prior to being recovered. To the manufacturer of recycled paper, however, both the pre- and post-consumer newspaper look the same and require the same preparation for reuse as a raw material.

In addition, API is aware of no public opinion research that suggests that consumers readily distinguish recovered paper based on its source. Therefore, to our knowledge, there is no factual basis to conclude that consumers equate "recycled" products with those made only from post-consumer material. This distinction creates confusion and adds complexity, both of which may actually work to the detriment of increased recycling.

Furthermore, as a policy matter, such a distinction will not lead to more recovery for recycling of post-consumer paper than would otherwise occur. Today, over 70 percent of the total paper recovered in the United States for recycling is what is considered post-consumer material. In 1995, that figure will increase to 75 percent as the industry achieves its goal to recover for domestic recycling and export -- 40 percent of all paper Americans consume. Most importantly, since 1988 and for the foreseeable future, over 90 percent of all the increased tonnage recovered will come from the post-consumer stream. The point is that (a) the vast majority of paper recovered for recycling today is post-consumer material, and (b) virtually the entire focus of expansion in all future recovery will be on the post-consumer stream.

Traditionally, recyclable paper has been classified into over 70 distinctly specific grades that define its quality and characteristics for subsequent reuse as a raw material. There are over 1,000 different types of paper products. Not all recycled materials are interchangeable. The end product, not the source of recovered fiber, will determine the types of recovered paper to be used as a raw material.

For these reasons, to maximize recycling and to reduce the amount of paper and paperboard entering the solid waste stream, the paper industry believes that policies should not distinguish between pre- and post-consumer recovered paper. Total recovered paper content is the best criterion for determining a recycled paper product as well as the most effective method to provide consumers with simple, understandable recycled content percentages.

o Calculation of Recycled Content

API supports calculation of recycled content for product grades on an annual basis -- adjusted for facility start-up or shut-down. An annual time-frame is applied to most calculations and measurements of solid waste and recycling. Shorter time-frames would be difficult to administer and impossible to communicate. As an adjunct to the adjusted annual calculation, EPA might consider the system which has been established as part of the New York State Recycling Emblem Regulation, which reads as follows:

"The weight of recycled materials used in any month shall be no less than eighty (80) percent of the average monthly recycled materials usage during the corresponding calendar year."

Establishment of this type of calculation system alleviates the potential problem of a manufacturer meeting its recycled content claim in only one month while marketing so called "recycled paper" the entire year.

As noted earlier, it is important that the calculations be determined by a relative comparison by weight of recovered fiber to total fiber in a given product, and exclude additives, coatings, inks, laminates and other fillers.

### *Options For Guidance For Recyclable Marketing Claims*

This area presents a difficult challenge to policymakers. While one goal is to provide truthfulness in marketing claims, another goal is to provide an incentive and encourage increased recovery of materials for recycling. Many consumers want to participate in recycling programs and, in order to do so, they need information on which materials can be recovered for recycling. Information on recyclability can be supplied by the product manufacturer. However, to provide information on the availability of recycling facilities on a community-by-community basis undermines the "uniform" guidelines that API believes are necessary to provide clarity to environmental marketing claims. As communities continue establishing recycling programs, it would be virtually impossible to identify every project that exists in the country. This represents a moving target and for the purposes of making recyclable marketing claims, puts an almost impossible burden on the manufacturer. Additionally, conflicting (regional, state or community) requirements present significant barriers to marketers who want to label products for national distribution.

API agrees with EPA that marketers making recyclable claims for products which are recycled at low rates create problems. Not only do these marketers receive benefits in the marketplace equal to the marketers whose products are recycled at higher rates, but consumers also become disillusioned as to the validity of recyclable claims.

#### **Option 2: Qualified Claims**

API agrees that claims of recyclability absent a significant recycling volume can be misleading; however, the industry also acknowledges the need to inform consumers of recyclability in order to achieve higher rates of recycling.

API believes that if some reasonable threshold of national recovery for a material category or individual product -- such as in the 25 to 33 percent range -- is attained, an unqualified "recyclable" claim should not be considered misleading. For those materials or products determined not to be generally recyclable, a "recyclable where facilities exist" label would inform consumers that the material is starting to be recycled and perhaps encourage new collection systems for the material.

#### **Option 3: Qualified Claims and Disclosure of National Recycling Rate (EPA's Preference)**

While API does not object to this concept, the industry does believe that disclosure of this kind of information is more appropriate for those marketers who are unable to meet an established threshold (as discussed under Option Two). In general, for highly recycled materials, such a burdensome disclosure statement, as required by this option, could deter marketers from labeling their products -- thus defeating the overall goal to increase recycling and recovery of materials.

#### **◦ API Recommendation**

The industry recommends that if some reasonable threshold of national recovery is attained, as outlined above, marketers should not be required to provide disclosure statements as put forth by EPA's proposed guidance. A disclosure statement would be appropriate for those materials or products not achieving the threshold.

### ***General Guidance***

#### **A. Use of Recycling Emblems**

API wholeheartedly agrees with EPA's goal in addressing the use of recycling emblems -- i.e., that they should be an adjunct to recycled and recyclable claims, "so that the emblem and surrounding message are viewed as a consistent claim providing necessary information." This has been the industry's philosophy and part of API guidance since the API emblem's inception.

#### **Option 1: Limit Use of Recycling Emblem to Certain Recycling Claims**

API believes the recycling emblem should be restricted from use in conjunction with environmental claims unrelated to the use of recycled content or recyclable materials. These uses defeat the purpose of the symbol.

Option 2: Use American Paper Institute Guidance

API strongly supports the continued use of the existing two-symbol framework and believes that the use of the paper recycling symbol for recycled content should be maintained as distinct from the recyclable symbol. The API symbol message is clear, brief and understandable, and consumers in overwhelming numbers support its use. By continuing to use the existing framework, EPA would achieve greater consumer understanding.

While API believes that the existing two-symbol framework should be maintained, we do not object to the adoption of more detailed guidance related to the conditions of symbol usage and accompanying terminology. Indeed, it could be useful in providing additional clarity to the consumer.

As mentioned briefly above, API adopted the recycling symbol - three connecting arrows that form a circle -- in the early 1970s. The two distinct symbols of three "chasing-arrows" each have broad, international recognition and are widely used and promoted as the identifying marker for recycled content and recyclable paper and paperboard products. The two symbols (see below) differ in that the chasing-arrows on a solid circle background have been used to identify recycled content paper products and the chasing-arrows without the solid circle background to identify recyclable paper products.

One of the distinguishing features of API's guidance is the need for a paper product to be made "entirely or predominantly" from recycled fiber (i.e., greater than 50 percent) in order to be able to use the recycled content emblem. This reflects the important "award" aspect of the emblem, given to those companies and products which have achieved a significant level of use of recycled fiber. While API strongly supports the right of a company to identify



## How to Use the Recycling Symbol to Achieve Environmental Awareness

These two symbols of recycling were designed to identify recycled and recyclable paper and paperboard products.

Both of these symbols are expressions of environmental concern, designed to reinforce each other. Together, they create awareness of the recycling process and its contribution to environmental quality.

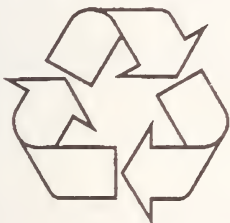
### Recycled



*Use the recycled symbol to identify:*

- packages and other products made entirely or predominately from recycled paper fibers.
- newspapers or other publications printed on recycled paper.
- the concept of recycling in publications, advertisements, or promotional material.
- organizations engaged in paper recycling.

### Recyclable



*Use the recyclable symbol to identify:*

- paper and paperboard products made from fibers which, after use, are suitable for recycling.

Paper Recycling Committee  
Recycled Paperboard Division  
American Paper Institute  
260 Madison Avenue, New York, NY 10016

the recycled content of its products, we also believe that the use of the recycling emblem must be limited to those products that have achieved a specified recycled content level. For example, boxboard and related paperboard products and packaging have traditionally been determined to be "recycled" if they contain 100 percent recycled content (i.e., recovered paper). To allow the paper recycling symbol to be used in conjunction with products containing only a minimum percentage of recycled material undermines the symbol's value and repudiates the 20 year history of its use in the marketplace.

We have no objection to other materials or products using the symbol to identify those products which are commonly understood to be "recycled" in their respective industries. To maintain consistency with paper industry guidance, however, API believes paper and paperboard products should not be permitted to use the "recycled" symbol unless those products are made entirely or predominantly from recycled fiber.

**Option 3: Clearly Label the Recycling Emblem**

By using the symbols in conjunction with appropriate terminology, API believes that the chances of consumer confusion are virtually eliminated. API supports clearly labeling the "recycled content" and "recyclable" emblems. As stated above, API believes that the use of the emblem to denote recycled content should be limited to those products which are commonly understood to be recycled in their respective businesses.

API disagrees with the use of one symbol instead of the two traditional symbols for the reasons discussed under Option Two above. The industry's 20-year history of use and education regarding the two different symbols provides API with the confidence that consumers can and do readily distinguish between the two versions. In fact, in an industry sponsored survey, four out of every ten consumers recognize the paper recycling symbol; of these, one out of three reported shopping for the symbol. For these reasons, API strongly recommends that the use of the paper recycling symbol (for recycled content) be maintained as distinct from the recyclable symbol.

◦ **API Recommendation**

API supports use of the recycling symbols as promoted by API for the past 20 years. API recommends that EPA guidance require clearly labeled emblems, as set forth in Option Three, as well as require use of the recycling symbol (for recycled content) be maintained as distinct from the recyclable symbol.

After two decades of successful effort to distinguish between the differing symbols, changing to one symbol will, in fact, add to consumer and symbol-user confusion. The chasing-arrows provide two widely recognized identification marks for recycled and recyclable paper products, and API strongly believes their historic use in the marketplace must be preserved.

*Separating Claims of Packaging and Product*

API fully supports clear differentiation between the product and the packaging when making recycled content and recyclability claims.

The American Paper Institute appreciates the opportunity to provide its views and comments to EPA on the appropriate use of the terms "recycled" and "recyclable" and the recycling emblem in environmental marketing claims. The U.S. paper industry welcomes EPA initiatives to further ensure that environmental claims are accurate and truthful. API encourages the agency to take any steps appropriate within its authority to help bring about sound, workable national guidelines in this area, and believes the recommendations set forth in these proposed guidelines represent an excellent first step toward that goal.

## The Association Of American Railroads

More than one hundred years ago - not long after the Civil War - it became apparent to American railroaders that they were going to need a way of working together to solve growing problems involving the width of track, standardization and interchange of equipment, accounting matters, and timetables.

Imagine, for example, traveling today and having more than 100 local time zones to contend with. That was the situation in this country as late as the 1880s. But along came the General Time Convention of Railway Managers, which worked toward consolidating all those time zones into the four national zones we have today. Back then they called it "Railroad Time."

Then there was the problem of gauge.

The Gauge is the width between the two rails. In 1971, more than 20 different gauges were in use in the United States - ranging from 2 feet to 6 feet. Moving passengers and freight was nothing short of chaotic. One railroad's locomotives, passenger cars and freight cars often wouldn't fit on another railroad's track.

Although there was no formal organization that accomplished it, the railroads informally agreed to a standard gauge of 4 feet 8 1/2 inches. Most American railroads had converted to it by 1887. Today, virtually all track in the United States, Canada and Mexico is the same gauge.

### The First Real Step

The first step toward formal organization in pursuit of mutual interest was taken in 1867, when the Master Car Builders Association was formed to conduct tests and experiments aimed at standardizing freight cars that traveled over at least two railroads.

Other groups soon began to emerge to deal with other areas: The Association of Railway Accounting Officers, the Association of Railway Car Service Officers, the Railway Treasury Officers Association, the General Time Convention, the Bureau of Railway Economics, the American Railway Association, the Association of Railway Executives, and - the group with the longest and most descriptive name of them all - the Bureau for the Safe Transportation of Explosives and Other Dangerous Articles.

The creation of these and other similar organizations was not the total solution; the various groups were located in different cities and their meetings were at conflicting times. So the coordination among them was not what it could have been - and needed to be.

It became apparent that all these groups, with their separate agendas, nevertheless had one common aim: a railroad industry with more cohesiveness among its different but interrelated parts.

### One Step Further

In 1933, Congress passed the Emergency Rail Transportation Act. The Act established a federal coordinator of transportation to deal with depression-era problems affecting railroads.

It didn't take long to recognize a major problem: In one of his first reports, Transportation Coordinator Joseph B. Eastman recommended that the railroads form a "more perfect union." He pointed out that the rail network comprised a large number of parts which are separately owned and managed, and "there is no effective centralization of authority over many matters of common interest. The situation is in some respects like that of the states prior to the adoption of the Constitution... (where) the bonds of union were loose and ineffective."

In October 1934, with the support of President Franklin D. Roosevelt, the Association of American Railroads (AAR) was established, bringing together the diverse groups that previously had operated separately. The AAR was an organization born out of necessity.

## Liaison Committee

As stated by the railroad executives involved in the Association's creation, its purpose is to "protect and advance the railroad industry under private ownership and management, to enable them better to handle their own affairs on a permanent basis."

### Today ...

Today, the AAR serves as the joint agency of its individual members in matters requiring cooperative handling to better enable the railroads to be an efficient, smooth-running, interlinked system.

The AAR's "joint agency" activities take place in such areas as operations, maintenance, safety, theoretical and applied research, economics, finance, accounting, communications, data system, legislative matters, and public affairs.

The AAR also represents the industry before congressional committees, regulatory and administrative forums, and the courts. In addition to representation, the Association is expected to provide leadership for the industry. One of its most important functions is providing staff, as well as continuity, for professional committees made up of executives of member railroads.

Among the AAR's 113 members are most of the major freight railroads in the United States. In addition, the principal railroads in Canada and Mexico, as well as Amtrak - the nation's only intercity passenger company - are special members of the Association and play active roles in many AAR activities.

The Operations and Maintenance Department (O&M) offers an affiliated Interchange Membership, which is intended to ensure support to regional and short line railroads, repair contractors, private car owners, and others who are directly involved in the interchange or repair of freight cars.

Finally, many non-North American railroads and some smaller U.S. railroads are associate members of the AAR, an arrangement that allows them limited participation in the Association's research and operations programs.

The Association's members dominate rail freight transportation in the United States, handling more than 90 percent of intercity rail freight.

The AAR's Board of Directors comprises the chief executive officers of 13 member railroads. Amtrak and a representative of the Canadian railroads have ex-officio seats on the Board. The other principal officers of the AAR, who are full-time employees, are elected annually by the Board.

The Association of American Railroads is headquartered at 50 F Street, NW Washington, DC 20001. The AAR also maintains the Transportation Test Center (TTC) near Pueblo, Colorado, and a Technical Center on the campus of the Illinois Institute of Technology in Chicago.

The seven departments of the AAR are Executive, Economics and Finance (E&F), Law, Legislative, Operations and Maintenance, Research and Test (R&T), and Information and Public Affairs (I&PA). In addition, there is RAILINC Corporation, AAR's data processing and communications subsidiary, which was established as a for-profit entity in 1982.

For further information, contact:

John J. Robinson, Association of American Railroads  
50 F Street NW  
Washington, DC 20001  
(202) 639-2204



## The Federal Trade Commission's Octane Rule Program

Title II of the Petroleum Marketing Practices Act ("PMPA") requires the FTC to promulgate a Rule that establishes standard procedures for determining, certifying and posting, by means of a label on the fuel dispenser, the octane rating of automotive gasoline intended for sale to consumers. Accordingly, the Commission's Octane Rule was promulgated on March 30, 1979, and became effective on June 1, 1979 (16 C.F.R. Part 306).

The Rule is designed to enable consumers to buy a gasoline with an octane rating that is high enough to prevent inefficient and harmful engine knock. It is also intended to help consumers avoid buying gasoline with an octane rating that is too high for their needs. The decline of this practice, known as "octane overbuying," can result in gasoline price savings to consumers, more efficient use of energy resources and lower levels of air pollution from automotive exhaust emissions.

The Rule requires automotive gasoline refiners to determine the octane rating of gasoline they sell, using a specified test procedure, and to certify the rating to their distributor/customers. Distributors must pass on the certifications they receive, and retailers must post black and yellow labels showing the octane rating of the gasoline they sell.

An April 1990 U.S. General Accounting Office ("GAO") Report indicated that octane mislabeling or cheating is occurring nationwide based on surveys showing deviations from the posted ratings in about 9 percent of the samples tested during 1979-1987. As a result of such mislabeling, GAO estimates that consumers could have paid about \$150 million for octane they didn't receive. The FTC is combatting octane cheating with a multi-faceted program, which includes the following:

- (1) Investigate on a case-by-case basis retailers and distributors where mislabeling is suspected.
- (2) Conduct a nationwide, law enforcement survey of gasoline distributors to determine whether they are complying with the Octane Rule's certification procedures.
- (3) Coordinate with State and local officials to identify and pursue mislabeling cases.
- (4) Prepare and disseminate consumer education materials concerning octane buying issues.
- (5) Support legislation to aid States in independently prosecuting octane cheaters.

The octane mislabeling problem is exacerbated by the fact that mislabeling is believed to occur primarily at the local, rather than national level. At the local level, there are about 11,000 distributors and 165,000 retail stations. Testing to identify mislabeling is expensive too, with individual test costs ranging from \$200 to \$250. Further assuming, as GAO does, that a relatively low percentage of the gasoline sold nationwide is mislabeled, random testing will not necessarily find those who are cheating. Consequently, widespread random testing at the Federal level is not cost efficient.

To combat the problem efficiently, the Commission's staff is developing working relationships with State and local officials on both individual matters as well as in conjunction with our nationwide survey of gasoline distributors. In addition to liaison with state Attorneys General offices, the staff is working with the National Conference on Weights and Measures to obtain the assistance of local weights and measures authorities, who often are best situated to detect or suggest where octane mislabeling is occurring.

At this time, we are interested in establishing additional, cooperative law enforcement efforts with state officials to identify, investigate and prosecute those responsible for octane cheating. To that end, I invite state officials interested in discussing the FTC's Octane Rule enforcement program and, possibly, in conducting joint investigations, to please contact me, Neil J. Blickman, at their earliest convenience. I can be reached at the following address and telephone number: Federal Trade Commission, Bureau of Consumer Protection, Division of Enforcement, S-4631, Washington, DC 20580, (202) 326-3038. In conclusion, I wish to thank the National Conference for its assistance and support of the FTC's Octane Rule program.

## Food Marketing Institute

The Food Marketing Institute (FMI) is a nonprofit association that operates on behalf of its 1,500 members -- grocery retailers and wholesalers and their customers in the United States and around the world. FMI's domestic member companies operate approximately 19,000 retail food stores with a combined annual sales volume of \$180 billion, which is more than half of all grocery sales in the United States. FMI's retail membership is composed of large multi-store chains, small regional firms and independent supermarkets. Its international membership includes 250 members from 60 countries.

FMI's mission is three-fold:

- research -- collecting information that is pertinent and timely, analyzing and summarizing it;
- education -- communicating that information to our members via educational conferences and workshops, as well as reports and videos;
- public affairs -- using that information to foster sound public policy at the federal, state and local levels.

Research, education and public policy issues of top concern to FMI include consumer issues; food safety and nutrition; labor and employee relations; solid waste management and other environmental issues; pricing and labeling; taxes and business fees; and health care reform.

Although the average consumer may not realize it, the grocery industry is highly regulated. One area where strict controls are imposed is that of weights and measures. Therefore, FMI and its members work closely with the National Conference on Weights and Measures and state and local officials to ensure that regulations governing the weight, measure and method of sale of items in the grocery store are developed and implemented as carefully and equitably as possible. We look forward to these opportunities to comment, offer feedback and share information concerning proposed revisions or additions to weights and measures codes, and see this as our primary objective in dealing with the National Conference on Weights and Measures.

For further information, please contact:

Jennifer Colman  
800 Connecticut Ave. NW  
Washington, DC 20006  
(202) 429-8248

## **International Society of Weighing and Measurement**

### ***What Is The ISWM***

The International Society of Weighing and Measurement (ISWM) is a technical society with diverse membership including manufacturers, distributors, end users, weights and measures officials, technicians, engineers, salesmen and suppliers of components related to the weighing industry.

Included are members from 27 nations around the world. Every State in the union is represented on our membership roles through our twenty geographic and special interest divisions. In November of 1991, the ISWM voted unanimously to issue a division charter to the International Division with provisional headquarters located in London, England UK.

The membership roster includes companies and individuals whose companies market tens of millions of dollars of equipment annually, supplying complete lines of weighing devices, as well as many whose firms have shorter lines, supplying a single product or service. Equipment users are also widely represented, from the smallest to the very largest firms. Government officials, consultants and all others are welcome voting members in our melting pot association.

### ***History Of ISWM***

The ISWM was formed in 1916 by a consolidation of the National Association of Scale Experts and the American Scalemens Association. At that time we were called the National Scalemens Association and operated under this name until 1985 when the new name was approved at the annual meeting of the members in Washington, DC.

The association functioned as a national organization only, until 1935 when the first division was formed in Chicago, Ill. Our first National Conference was held in Cincinnati, Ohio in 1918. The site of the 73rd National Conference was Nashville, TN. May 29-31, 1992.

### ***National Organization***

The national organization is governed by a Board Of Directors, comprised of the President, First Vice President, (President Elect), Second Vice President, the two immediate past Presidents, and the Governor from each district of the Society. Committees appointed by the President carry out the national program objectives. The daily activities of the Society are managed by our Executive Director and her staff.

The ISWM corporate structure is further divided into Districts and Divisions. One or more local Divisions are joined to form a District, headed by an elected Governor and Lieutenant Governor. It is the responsibility of the District leadership to promote cooperation between the Divisions, strengthening and sustaining the individual Divisions for the benefit of the membership and the Society. Each District is encouraged to hold one District meeting each year, which includes technical presentations, business sessions, an opportunity for transacting Society business, and social functions.

Division level activity allows each member an opportunity to take a personal part in the activities of the organization.

### ***Purpose Of ISWM - The Mission Statement***

- A. To create a better understanding of the importance and scope of the scale industry by the public, thus furthering the welfare of those engaged in weights and measures activities.
- B. To make available information on the proper use and application of scales which will help industry and commerce achieve their goal of higher standards and greater efficiency.

Liaison Committee

- C. To promote weights and measures work encouraging legislation which will produce better laws and greater recognition of the Weights and Measures Official.
- D. To benefit the membership of the Society by providing an exchange of ideas, a common meeting ground for understanding and cooperation, and an opportunity to keep abreast of technical advancements.
- E. To undertake such programs and activities as may be proper to promote and enhance the welfare of the industry.

For further information contact:

Mimi Harlan, Executive Director  
ISWM  
2299 Brockett Road  
Tucker, GA 30084  
(404) 939-2200

Presented By  
Dennis L. Molina  
ISWM President 1991-1992



### **National Association of Consumer Agency Administrators**

The National Association of Consumer Agency Administrators (NACAA) was established in 1976 by State and local consumer protection officials who wanted to improve government efforts to gather and disseminate information on consumer-related issues, share solutions to consumer problems and develop skills that would enable them to more effectively manage consumer protection agencies.

NACAA members administer state, county and municipal consumer agencies throughout the country and in several foreign countries. NACAA members mediate complaints, conduct investigations, prosecute offenders of consumer laws, license and regulate professionals, promote strong consumer protection legislation, provide educational materials and advocate in the consumer interest.

Associate members of NACAA are professionals in consumer-related work -- investigators, inspectors, educators, legislators and advocates. They may be officials from federal consumer protection agencies, college or university faculty members or staff from NACAA member agencies.

Consumer affairs professionals in the private sector are encouraged to participate in NACAA through the Corporate Subscriber Program. This outreach effort facilitates the exchange of information and promotes cooperation between government and private enterprise.

For further information, contact:

Ron Mallard  
Executive Board Member NACAA  
1010 Vermont Avenue, NW, Suite 514,  
Washington, DC 20005  
(202)347-7395

## National Coalition for Consumer Education

The National Coalition for Consumer Education, NCCE, is pleased to be part of this discussion and sharing today. Consumer education is life-skill education. Our goal is to bring meaningful information, materials and skills to consumers of all ages through our nation's schools, communities and workplaces. Resources are limited! We can no longer try to do it alone.

Consumer education involves three essential components -- decision making, resource management, and understanding rights and responsibilities. Consumers need to understand many issues related to weights and measures such as metric, octane ratings, unit pricing, home delivery and food plans, food inspection, fairness, quality, environmental labeling and so on.

NCCE operates through a network of regional and state coordinators. Our coordinators act as the contact to develop coalitions on the local level. Our goal is to bring together everyone involved with helping consumers function in our economy. Consumer educators are broadly defined as those in government, business, education, community service groups, trade and professional organizations, consumer agencies, the media, and law enforcement who come in contact with consumers. In many communities, it may be the bodega owner or the local rabbi. We are eager to establish new links with "community translators," those in a position of trust in communities.

The members of the National Coalition for Consumer Education share resources, help in the delivery of information and materials to culturally diverse consumers, provide expertise in consumer education by serving on advisory panels, being speakers, participating in surveys and studies, and developing materials and approaches for other groups and companies.

Weights and measures officials and organizations have a great deal to gain and to contribute to consumer education. I encourage everyone to join the network as a member, participate actively in local coalitions, serve as a State coordinator, sponsor an "academy for consumer education" (one day issue oriented programs on local levels) on weights and measures, or even sponsor an issue of the NCCE newsletter, "Coalition Exchange." Our membership is diverse and growing.

Thank you for the opportunity to share and learn with you today.

For further information, contact:

Carole A. Glade  
Executive Director  
National Coalition for Consumer Education  
434 Main Street, Suite 201  
Chatham, NJ 07928  
201-635-1916

### National Industrial Scale Association

The National Industrial Scale Association (i.e., NISA) was established in 1987 as a professional society for those individuals involved with the manufacture, sale, service, use and regulation of heavy capacity weighing devices. NISA's charter encompasses five major goals:

- (1) Promote a better understanding of the importance and scope of the scale industry by the public, thus furthering the welfare of those engaged in weights and measures activities.
- (2) Encourage proper observance of requirements and regulations pertaining to the operation, business and practices of industrial weighing.
- (3) Work for cooperation and understanding between the scale industry and the regulatory community.
- (4) Provide a forum for the exchange of information on the technology and application of industrial scales.
- (5) Coordinate and implement lawful collective action for the improvement of industrial weighing to the mutual benefit of industry, users, the regulatory community, manufacturers of weighing equipment and the general public.

Two Technical Seminars are held annually, which feature presentations on matters of current interest in the field of industrial weighing. A typical program will consist at a minimum of technical papers on belt conveyor scales, hopper scales, truck scales and railroad track scales, as well as a presentation by a State Weights and Measures official covering that State's heavy capacity scale inspection activities. Other weights and measures topics or current matters of general interest are also covered. An educational field trip is held in connection with the Spring Technical Seminar.

The proceedings of each technical seminar are published as a convenient reference for the NISA membership and other interested parties. In addition, two NISA Newsletters are published each year, which report on the major activities at the Interim and Annual meetings of the National Conference on Weights and Measures, as well as other current weighing events and information.

NISA membership is open to all individuals interested in heavy capacity industrial weighing devices and systems at a fee of \$40.00 per year. It is a non-political association of scale professionals.

For further information, contact:

Max C. Casanova  
501 90th Avenue NW  
Minneapolis, MN 55433  
612-783-2659

### National Pasta Association

The National Pasta Association (NPA) is a national trade association that represents the interests of pasta manufacturers throughout the United States. NPA is working closely with the National Conference on Weights and Measures (NCWM) in the development of a gray area for the net weight of pasta products. The gray area would establish a range at which the net weight of the pasta could deviate from the declared weight on the package. Before this gray area can be established, it will be necessary to harmonize the methodologies used to analyze the moisture content of pasta.

The need for harmonization is illustrated by the current methodologies used to verify the net weight of pasta products. The net weight of the pasta is measured by the appropriate State official. The product will be in compliance when the net weight equals or slightly exceeds the declared weight on the package. If the net weight falls short of the declared weight, it is necessary to analyze the moisture content of the product to determine whether the short weight can be attributed to moisture loss.

A recent National Institute of Standards and Technology (NIST) laboratory intercomparison revealed that laboratories fail to implement consistent moisture analysis methodologies for pasta products. These differences resulted in a standard deviation that ranged from 0.34 to 0.47 between laboratories that analyzed comparable samples from the same lot. This standard deviation is attributed to the different methodologies used in the analysis by the laboratories, such as different sample sizes, grinding mills, grinding mesh, and ovens.

The size of this standard deviation will need to be reduced before a gray area can be established. To this extent, NPA will cooperate with NIST in the harmonization of the methodologies used to analyze the moisture content of pasta samples. Once harmonization is achieved, NPA will continue to advocate the establishment of a gray area for pasta products.

For further information, contact:

Martin Hahn  
Assoc., Hogan & Hartson  
National Pasta Association  
555 13th Street NW  
Washington, DC 20004  
202-637-5926



## Scale Manufacturers Association

Scale Manufacturers Association (SMA) was organized and incorporated in Illinois in 1945 as the nonprofit trade association of U. S. scale and weighing device manufacturers. SMA presently has 26 member companies.

### *Purposes*

Purposes specified in the Articles of Incorporation almost a half century ago continue to guide the Association's activities today:

- Provide for collective action of the members of the industry for the improvement of the industry as a whole, for the benefit not only of the industry but also of the public.
- Advance the science of weighing and the engineering and manufacture of instruments, apparatus, equipment, and facilities for and in connection with ways and means of weighing and force measuring.
- Encourage proper observance of valid requirements and regulations pertaining to the operations, business, and practices of and within the industry, as provided by federal and state laws.

### *Weights and Measures*

SMA's most important program is centered in the Association's unique role as the weighing industry's bridge between technology and regulation.

Through its blue-ribbon Technical Committee of 12 experts from member companies, SMA develops positions on technical issues involved in the constant revision and updating of NIST Handbook 44 and the National Type Evaluation Program (NTEP).

These industry positions are discussed with weights and measures officials throughout the country. SMA maintains close liaison with the National Conference on Weights and Measures, the four regional Weights and Measures Associations, and the NIST Office of Weights and Measures.

### *Other Activities*

Other SMA activities and programs include:

- Participation in development of U. S. positions regarding International Organization for Legal Metrology (OIML) issues.
- Two national membership meetings each year, during which technical and regulatory matters are considered and outside speakers discuss topics of general interest.
- Collection and compilation of weighing industry marketing and business statistics.
- Publication of The Weighlog, a quarterly newsletter, and the annual SMA Membership Directory.

### *Goals and Objectives*

SMA's short term goals and objectives are:

- Assist the weights and measures process to the mutual benefit of scale users, regulators, and manufacturers.

## Liaison Committee

- Convince non-participating states to adopt the Uniform Regulation for National Type Evaluation (URNTE),
- Expand the SMA membership.

SMA's longer term goals and objectives are:

- Encourage full implementation and uniform enforcement of NTEP.
- Develop and implement programs to assist States in preserving full weights and measures services in the face of shrinking resources and tight budgets.

For further information, contact:

Raymond J. Lloyd  
Executive Director  
Scale Manufacturers Assoc.  
932 Hungerford Drive #36  
Rockville, MD 20850  
301-738-2448

## USDA Packers and Stockyards Administration

The Packers and Stockyards Administration (P&S) an agency within the United States Department of Agriculture which administers a fair trade practices and financial protection program governing the business activities of livestock auction markets and market agencies, livestock dealers, meat packers and poultry processors.

The Scales and Weighing Branch has responsibility for the accuracy and proper use of livestock, monorail and vehicle scales used within the subject industries. The major effort of the agency in fulfilling this responsibility is directed toward the investigation of weighing activity. The agency conducts several investigations each year into the weighing of livestock, livestock carcasses and poultry. Violations are found in over 10 percent of the investigations conducted. Several different investigative procedures are used which include the checkweighing of livestock or livestock carcasses, selling livestock which has been pre-weighed on government owned scales, and auditing records to determine if weight transfers are made accurately and honestly.

The agency also monitors the maintenance of subject scales and requires that scale owners have their scales tested, at least semiannually, and file a copy of the test report for each test with the proper P&S regional office. There are 12 regional offices located in Atlanta, GA; Bedford, VA; Denver, CO; Fort Worth, TX; Indianapolis, IN; Lancaster, PA; Lenexa, KS; Memphis, TN; Omaha, NE; Portland, OR; Sacramento, CA; and South St. Paul, MN. Each regional office has an individual, either an industrial specialist or other technical staff member assigned to monitor the scale testing program. When scale test reports are received, that individual reviews them to determine the accuracy of the scale, as reported, and the adequacy of the test. Action is then taken based on the analysis.

While P&S does not actually test scales (about half of the reported tests are conducted by weights and measures and half by private scale service agencies), it does participate in some testing, particularly in the case of new installations, problem scales and as part of a training program. P&S is an active participant in the NCWM National Training Program (NTP) and has conducted training schools in Modules 6 and 7. To date P&S has conducted 10 of these training schools where 188 weights and measures officials from 26 states have participated. In addition to the NTP training schools, P&S conducts several less formal training schools each year in scale testing for weights and measures officials and private scale service agencies.

The Packers and Stockyards Administration has been an active participant in the National Conference on Weights and Measures for many years. The agency has been used by the conference and by scale manufacturers and distributors as a technical resource for information regarding the peculiarities of weighing livestock and livestock carcasses. P&S has adopted Handbook 44 and works very closely with the conference and the individual state weights and measures jurisdictions on activities and problems where there is a mutual interest and responsibility.

For further information, contact:

John T. Lacy, Chief  
Scales and Weighing Branch  
USDA Packers & Stockyards Administration  
3414 S 14th & Independence Avenue  
Washington, DC 20250  
202-629-3140

## Federal Grain Inspection Service

### *Functions and Responsibilities*

The Federal Grain Inspection Service (FGIS) was created by Congress in 1976 to manage the national grain inspection system and to establish a national weighing program for grain. The goal of creating a single Federal grain inspection entity was to ensure development and maintenance of uniform U.S. standards, to develop inspection and weighing procedures for grain in domestic and export trade, and to facilitate grain marketing.

FGIS administers uniform, national grain inspection and weighing programs as established by the U.S. Grain Standards Act, as amended (USGSA). Services under the USGSA are performed on a fee basis for both export and domestic grain shipment. The USGSA requires generally that export grain be inspected and weighed; prohibits deceptive practices and criminal acts with respect to the inspection and weighing of grain; and provides penalties for violations.

In administering and enforcing the USGSA, FGIS:

- establishes and maintains official U.S. grain standards for corn, wheat, soybeans, sorghum, barley, oats, rye, flaxseed, sunflower seed, triticale, canola, and mixed grain;
- promotes uniform application of official U.S. grain standards by official inspection personnel;
- establishes methods and procedures, and approves equipment for the official inspection and weighing of grain;
- provides official inspection and weighing services at certain export port locations and official inspection of U.S. grain at certain export locations in eastern Canada;
- delegates qualified State agencies to inspect and weigh grain at certain export port locations;
- designates qualified State and private agencies to inspect and weigh grain at interior locations;
- licenses qualified State and private agency personnel to perform inspection and weighing services;
- provides Federal oversight and monitors the official inspection and weighing of grain by delegated States and designated agencies;
- provides review inspection services of U.S. grain in the United States and at certain export port locations in Eastern Canada;
- investigates, in cooperation with the Office of the Inspector General, apparent violations of the USGSA and initiates appropriate corrective action; and
- monitors the quality and weight of grain as received at destination ports and investigates complaints or discrepancies reported by importers.

### *Mandatory Service*

Under provision of the USGSA, most grain exported from U.S. export port locations must be officially weighed. A similar requirement exists for inspection, except for grain which is not sold or described by grade. The USGSA also requires that intercompany-barge grain received at export port locations be officially weighed. Grain exporters shipping less than 15,000 metric tons of grain abroad annually are exempt from mandatory official inspection and weighing requirements. Grain exported by train or truck to Canada or Mexico also is exempt from official inspection and weighing requirements.



Mandatory official inspection and weighing services are provided by FGIS on a fee basis at 59 export elevators. Eight delegated States provide official service at an additional 22 export elevators under direct FGIS oversight.

*Permissive Services*

Official inspection and weighing of U.S. grain in domestic commerce are performed upon request and require payment of a fee by the applicant for services. FGIS supervisory and administrative costs have been funded by user fees since October 1, 1981.

Domestic inspection and weighing services are provided by 73 designated agencies that employ personnel licensed by FGIS to provide such services in accordance with regulations and instructions.

Under the Agricultural Marketing Act of 1946 (AMA), FGIS administers and enforces certain inspection and standardization activities related to rice, pulses, lentils, and processed grain products such as flour and corn meal, as well as other agricultural commodities. Services under the AMA are performed upon request on a fee basis for both domestic and export shipments by either FGIS employees or individual contractors, or through cooperative agreements with States.

For further information, contact:

Richard Pforr  
Federal Grain Inspection Service  
P.O. Box 96454  
1400 Independence Avenue  
Room 1640S  
Washington, DC 20250-6454  
202-720-0262

David Funk  
FGIS QARDQCT  
10383N Executive Hills Blvd.  
Kansas City, MO 64153  
816-891-8070

### USDA's Food Safety and Inspection Service (FSIS)

**Goals/Objectives:** To assure consumers of meat and poultry products that the net weight statement "as it is shown on a label shall not be false or misleading and shall express an accurate statement of the quantity of contents of the container."

A recent survey by FSIS indicates not all plants under their jurisdiction are in compliance with the requirements of Handbook 44, as of January 2, 1992. Based on the survey FSIS published in the Federal Register a delay of the effective date of a portion of the net weight regulations pertaining to scales, to March 2, 1992, to give more time to coordinate the actions that must be undertaken by state or local government authorities, official establishments, and FSIS to assure compliance with the regulations. FSIS regulations prohibit the use of any scale at federally inspected establishments unless the scale has been found upon test and inspection, as specified in NIST Handbook 44, to provide accurate weight. Additionally, before a scale may be used to weigh meat and poultry products, FSIS regulations require that scales be installed, maintained and operated to ensure accurate weights, and that such scales meet the applicable requirements contained in NIST Handbook 44. Further, FSIS regulations require that official establishments have the scales tested and certified for accuracy, in accordance with NIST Handbook 44, once a year, by a State or local government weights and measures authority, or by a State registered or licensed scale repair firm or person, or have an FSIS approved net weight program under a quality control program.

The procedures for establishing net weight compliance under a Total Quality Control system (TQC) or Partial Quality Control program (PQC) were published in FSIS Directive 7240.1 dated December 20, 1991. Additionally, Attachment 3 to that Directive outlines the net weight compliance procedures for lot inspection only.

FSIS has also developed guidelines for QC plants to certify their scales according to NIST Handbook 44 requirements. These guidelines may be obtained from:

Daniel Engeljohn, Chief  
Quality Control and Systems Development Branch  
Processed Products Inspection Division  
Science and Technology  
Food Safety and Inspection Service  
U.S. Department of Agriculture  
Room 2158 South Building  
Washington, DC 20250

## Metrology Report

### Summary

State and industry metrologists met during the 77th Annual Meeting of the National Conference on Weights and Measures.

The primary concerns of the metrologists dealt with requirements of international standards, such as ISO 9000, as they relate to State and industrial laboratories. It is apparent that the State laboratories must address and be able to at least meet these requirements when audited if they are to continue to serve industry. As pointed out in a presentation to the Conference, by Georgia Harris (NIST) support of industrial calibration requirements has replaced regulatory support as the primary workload of many of the State laboratories. In order to help define the program needs in the area, the group requested funding from the Executive Committee to establish an NCWM Task Force to establish guidelines for both State and industrial laboratories that will clarify what is needed to meet ISO recommendations. It is expected that this guide will help laboratories prepare for updated certification requirements, based on ISO Guide 25, that will be in the new laboratory handbook (NBS Handbook 143).

Other topics discussed included laboratory control chart and standard surveillance procedures, sources of volumetric uncertainties, petroleum safety issues, and compressed natural gas test procedures. The metrologists and other interested conference members toured SGS Control Services petroleum laboratory and also discussed legal, scientific, and industrial metrology in Germany with Dr. Manfred Kochsiek of the PTB. Presentations were also made by Arend Helms (Sartorius) on precision mass calibrations and automated buoyancy compensations and by Bruno Haltmeier (Mettler) on the efforts to define a fifth force which theoretically influences the Newtonian gravitational equation.

### 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 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, including measurement procedures, error analysis, and any systematic errors in individual results. The measurement evaluation is especially important to ensure accuracy and traceability to national standards. The meetings also include a significant amount of training as well as a laboratory tour.

#### 1. MidMAP Report: Steve McGuire (IL)

The principal activity is measurement assurance with an emphasis on pursuing education in measurement science. Measurement exercises in 1992 included a 5-1 weighing design with Mass Code data reduction at the 1-kg level and the testing of a 500-lb cast iron test weight using both 500-lb primary mass standards. The last meeting was held in North Dakota, July 29 through August 2, 1991. The next meeting is scheduled for July 27 through 31, 1992, in Springfield, Illinois.

#### 2. NEMAP Report: Georgia Harris (NIST)

No metrologists represented the Northeastern Measurement Assurance Program regional group at the Annual Meeting. A summary of the regional activities was provided by Georgia Harris, Office of Weights and Measures.

## Metrology Report

The last meeting of NEMAP was held in Hartford, CT, September 1991 group members provided number of presentations. The next meeting is scheduled to be held in Indianapolis, IN, September 14 through 18, 1992. A 20-kg weight that has been circulating through NEMAP States has been sent to Canada to start interlaboratory comparisons of mass standards with Canadian representatives.

### 3. SEMAP Report: L. F. Eason (NC)

SEMAP met in Atlanta, Georgia April 6 through 10, 1992. The results of the latest round robin were discussed; it included calibration of a weight set with duplicate weights varying from 5 pounds to 100 milligrams.

#### Presentations:

Barry Smith (FL) - Discussed Florida's experience with the stability of cast-iron test weights in the field. Florida has reduced the test cycle to 3 months.

Crawford Smith (NC) - Gave a video presentation on the method being used in the NC laboratory for gravimetric testing of volume. This video is available from the Office of Weights and Measures.

LF Eason (NC) - Gave a video presentation on Handling Large Weights in the laboratory and on putting thermometer probes into the balances. This video is available from the Office of Weights and Measures.

Holger Schulz (Sartorius) and Arend Helms (Sartorius) - Gave a technical presentation on precision mass calibration and included demonstration of automated 1-kg and 10-kg mass comparators with load alternators.

Ken Butcher (NIST) - Conducted a session on moisture measurements that included discussions regarding data from retail commodity interlaboratory tests.

Martin Coile (GA) - Conducted a session on computer programming in the laboratory.

Georgia Harris (NIST) - Gave a presentation on Basic Statistics that covered classical probability theory and statistical concepts; this session focused on the use of statistics as a tool that requires the judgement of the metrologist for effectiveness.

#### Visitors -

Herb Eskew (TX), Rick Calkins (RLWS), Felipe Urresta (Ecuador), Joe Freeman (Uniroyal-Goodrich). Joe Freeman was voted in as an Associate member of SEMAP.

### 4. SWAP Report: Ken Fraley (OK)

The 8th Annual Meeting of SWAP was hosted by Herb Eskew (TX) in San Antonio, TX in October 1991. The meeting was attended by TX, LA, KS, CO, NM, OK, and Denver Instruments. Don Hunt of Denver Instruments was voted in as an Associate Member. Interlaboratory testing included two 100-g to 100-mg weight kits and two 5-gallon measures tested by both volume transfer and gravimetric calibration.

The 9th Annual Meeting will be held September 27 through October 2, 1992 in Kansas City, hosted by Karl Herken (KS) and Carl Gile (KS). The two weight sets tested previously will be tested again with two types of 4-1 weighing designs. A 100-ft tape is being tested again.

The 1992 Meeting will include an Intermediate Seminar.



## **5. WRAP Report: Joe Rothleder (CA)**

The latest meeting of the WRAP regional metrology group was held in Reno, NV, May 4 through 8, 1992, and contrary to what one might expect, spent very little time at the slot machines and black jack tables! The group discussion of laboratory concerns continues to be centered around budget difficulties.

Darrel Cavender (AK) reported on the difficulties associated with moving a metrology laboratory. Vic Gerber (WY) gave an excellent presentation on the testing of railroad track scales and presented a draft SOP for testing railroad test cars. Joe Rothleder (CA) reported on a glassware experiment that focused on cleaning and drain time effects on the results of calibration. Georgia Harris (NIST) provided training on Basic Statistics and a review of SOP 2 and SOP 5 on air buoyancy corrections and the 3-1 weighing design. A balance and computer were connected to demonstrate the 3-1 weighing design procedure. Lester Yazawa (HI) reported on a computer program for LAP 27 analysis of calibration processes and primary standards.

The next round robin will consist of tolerance testing small mass standards, and is being coordinated by Vic Gerber (WY). The next meeting is scheduled for May 3 through 7, 1993, in Boise, ID, hosted by Tom Schafer (ID).

A scientific instrument show at the University of Nevada and a tour through the Nevada Weights and Measures laboratory were attended by the group.

## **OWM Report: Georgia Harris (NIST)**

Georgia Harris (NIST) reported on the efforts under way with the NIST National Voluntary Laboratory Accreditation Program (NVLAP) to duplicate the State laboratory accreditation program for private laboratories. This includes the development of Advanced Mass training for State laboratories. She also discussed the work in the Caribbean area and with Ecuador. The round robin of tuning forks has been completed and the analysis was sent to participants.

## **Volume Uncertainties**

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 (and private) laboratories.

Analysis of 5-gallon test data from round robin measurements made in all regional measurement groups has been evaluated using cause and effect diagrams and pareto charts. These two methods for evaluating data are commonly used in traditional quality control methods.

LPG field tests were discussed with respect to volume uncertainties. The contribution made to measurement variability from prover design and prover test procedures was discussed.

## **Compressed Natural Gas**

Ken Butcher (NIST) and Henry Oppermann (NIST) discussed compressed natural gas (CNG) issues with the metrologists; Henry requested support to develop an EPO for testing CNG devices. John Lopez (DVCO) discussed the concept of "equivalent gallons" which is NOT promoted as a unit of measure by the NCFWM.

## **Petroleum Safety Discussion**

A number of safety issues were discussed that relate to petroleum handling in the laboratory as well as in field tests. The Safety Task Force addressed many of these issues; however, the metrologists felt that perhaps recommendations should be made to more fully address these particular concerns. An outline of these concerns is provided below.

## Metrology Report

- I. Physical Health
  - A. handling equipment
  - B. overhead testing and return of product to storage
  - C. handling equipment in shipping and receiving
  - D. lifting and carrying empty and full equipment
  - E. the potential breaking of handles and trunnions
- II. Fire
  - A. use of improper equipment
  - B. switch loading practices
  - C. static buildup
  - D. appropriate clothing
- III. Environmental
  - A. waste product disposal
- IV. Chemical Health
  - A. vapors such as benzene
  - B. skin absorption, spills

The group discussed the source of American Petroleum Institute (API) materials and Occupational Safety and Health Administration (OSHA) evaluations. Information regarding the Safety Library that was to be established was also requested. While many of the components of the topic list have been noted previously, the metrologists felt that a recommended guide that deals with petroleum-related safety issues would be helpful.

## Measurement Control Programs

A brainstorming session on appropriate laboratory measurement control programs yielded some very good ideas about measurement control and control charts that can be instituted in the laboratories (if they are not already in place). The discussion centered around how to implement the system into the workload to be representative of the "test" measurements. Integrating the measurement control practices into the workload provides a "check" on the system that can be used to verify accuracy and traceability. A summary of the recommendations follows.

(OWM Note: Laboratory certification criteria state that a measurement control program will be in place for each measurement service the laboratory provides. This will become more and more important as laboratory accreditation and quality criteria are developed and adopted for private laboratories. State laboratories will be evaluated using the same criteria as private laboratories and must maintain credibility and a level of integrity that is beyond question. Additional material has been added to the discussion summary to provide examples and assist implementation. An important point to remember is that the regional round robins should be coordinated with these measurement control programs, to ensure that the laboratory can compare results and can substantiate levels of control with an external check on the system.)

### Recommended Measurement Control Programs

#### Tolerance Testing: Mass

A minimum of one working standard, compared by modified substitution on each balance used to perform tolerance testing, must be evaluated.

Example: PK 60 MC, used to tolerance test 50-lb field test standards

Process: The procedure will evaluate the modified substitution procedure as documented in Handbook 145, SOP 8

Zero the balance  
Place the working standard on the balance

Record the observation on the data sheet  
Zero the balance with the working standard on the balance  
Continue testing unknown test weights per SOP 8

**Evaluation:** The analysis of the recorded observation over time will track the value of the working standard and will provide an estimate of the standard deviation of the process over time to use as a partial indicator of the uncertainty in the measurement process. Working standards should be calibrated against primary standards on an annual basis. Balances with unusually high process variation must be serviced.

#### Calibration: Mass

A check standard from each decade, or a summation comparison among standards, should be performed as a part of the calibration process. This requires additional measurements when just one double substitution is used as the laboratory calibration procedure. If the 3-1 weighing design is used, the value of the check standard and the process standard deviation are monitored. This process will monitor the standards and the operation of the balance.

**Example:** S-4, used to calibrate 1-gram standards

**Process:** Using a 3-1 design  
A 1-gram check standard is used in the design process and the calculated mass value is recorded on the data sheet. The short term process standard deviation is also recorded.

**Evaluation:** The analysis of the recorded observation over time will track the value of the check standard and will provide an estimate of the standard deviation of the process over time to use as a partial indicator of the uncertainty in the measurement process. Results that fail the F-test using the process deviation must be repeated, and balances with unusually high process variation must be serviced. The check standard value must agree within the calculated uncertainty constraints for the measurements to be considered valid. This process can be used to evaluate the primary standards.

Another example is LAP 26/27; each decade in the primary metric mass set is monitored on a regular basis.

The analysis of primary standards is required for certification in tolerance testing, as well as calibration, because all mass testing is traceable through the primary mass standards, which must be verified on a regular basis.

#### Tolerance Testing: Volume

Range charts as described in Handbook 145 (SOP 17 and 20) should be used for the 5-gallon capacity and for each large-volume capacity. Additional verification of the 5-gallon standard by gravimetric calibration should be performed annually. Repeatability of the measurement process, by performing two runs (per documented procedure) for each test item is extremely important in volume measurements where a check standard is not always available in the laboratory. In the case where a check standard is available, the laboratory can track the observed value over time as well as obtain an estimate of the repeatability, but must still perform measurements according to documented procedures.

#### Calibration: Volume

When glass flasks are used by the inspection staff of the weights and measures program, a range chart must be developed in this area according to Handbook 145 (SOP 17) or LAP 28. If gravimetric calibrations are provided as a service, a range chart must be developed.

## State Mass MAP Program Development

The development of the NVLAP accreditation program for private laboratories is providing an opportunity to duplicate the User-Operated Mass Calibration Packages, as developed by Randy Schoonover, to provide traceable mass calibrations on-site at nearly the highest level (with a lower cost and controllable turn-around time). A course for State metrologists in Advanced Precision Mass Measurements is being planned and will be taught March 8 through 12, 1993, in Boulder, CO. Additional requirements for the selection of the State participants include (but are not limited to) current certification of the laboratory at the calibration level, up-to-date quality manual and measurement control data on file in the Office of Weights and Measures, prior Intermediate level training, and facilities that will support Ultra-precision mass calibrations.

## Legal Metrology in Europe, Dr. Manfred Kochsiek

Dr. Professor Manfred Kochsiek of the German PTB was a guest at the metrology workshop and gave an extremely informative presentation to the metrologists on "Legal Metrology in Germany." The metrologists enjoyed the opportunity to ask questions and to evaluate measurement control from a new perspective. The PTB has approximately 40 staff people who are assigned to the area of mass measurements. They are responsible for providing mass measurements, technical information, and laboratory accreditation, to 16 State laboratories and 3 to 4 private calibration companies.

## Summary of Work Projects

The projects described below are listed in order of priority, as determined by the metrologists present at the meeting.

### 1. Request For the Development of a Task Force

#### Objective:

To develop a guide to assist in the evaluation and assessment of laboratories seeking accreditation to meet ISO 9000 recommendations (and registration if they choose). The guide will enable laboratories to evaluate and develop their programs to meet the additional quality system and proficiency requirements. The guide will assist assessors in the evaluation of the laboratory program general and technical criteria. New technical criteria for NVLAP accreditation will be consistent with ISO Guide 25 and 9000 recommendations; criteria established for private calibration laboratories and State laboratories will be the same.

The guide will include:

- 1) A list of "critical" elements evaluated during an accreditation pre-audit and ISO Guide 25 accreditation (ISO 9002) audit as well as explanations and interpretations of what is needed. Specific examples will be used and recommendations will be provided.
- 2) Explanations and interpretations of technical criteria with examples.
- 3) Results of a State laboratory pre-audit. Noted deficiencies will be discussed and remedial recommendations will be made. The participating State will provide documentation as to what preparations were required prior to the pre-audit.

#### Members of Task Force:

**State Member:**  
Steve McGuire  
David Dikken  
Mike Dynia  
Ken Fraley  
L. F. Eason  
Kelly Moody

#### Industry Members:

Rick Calkins  
Dick Weber  
Jerry Everhart

**NIST Technical Advisor:**  
Georgia Harris



Dick Weber  
Jerry Everhart

NIST Technical Advisor:  
Georgia Harris

## 2. Stability of mg Weights

The metrologists decided that additional round robin measurements will continue to be run to evaluate the stability of various designs/materials of mg weights. Data from past round robins in the range less than 1 gram will be made available for review by Georgia Harris (NIST). Laboratory testing is currently under way by Kelly Moody (AZ) and among the SEMAP States to evaluate wire weights versus leaf weights.

## 3. Evaluate Mass Flow Capabilities and Develop Examination Test Procedure for Device Test

Jim Akey (WI) agreed to develop an EPO for the testing of CNG devices based on a request from the S&T Committee.

## 4. Develop Individualized Training Modules for Laboratory Metrology

José Torres Ferrer (PR) will provide a breakdown of the training sections of the current Basic and Intermediate training to L. F. Eason for the development of a proposal to prepare training modules for laboratory metrology.

## 5. Data Sets for Testing Computer Software

Air density data sets and 3-1 data sets have been incorporated into the material distributed during Intermediate seminars. Ken Fraley (OK) will continue work on the 4-1 data sets.

## 6. Index of Available Computer Programs

Jim Akey (WI) volunteered to compile an index of computer programs that are available to share with metrologists. Programs will be made available on the OWM bulletin board.

## 7. Index of Available Technical Papers and Reports

David Dikken (MN) will collect copies of papers along with an abstract of each one. At some point, this material will be made available for indexing. The papers can include any technical material of interest to the metrologists. The abstract should include:

Author  
Title  
General Topic Area (e.g., Mass, Statistics)  
Brief Description

## Participants

Billy Kennington	South Carolina
Randy Wise	Kentucky
Gary Livingston	Tennessee
Joe Rothleder	California
Richard Weber	3M
Jim Akey	Wisconsin
Kelly Moody	Arizona
Herb Eskew	Texas
Ken Fraley	Oklahoma
Lynda Maurer	Rhode Island
José Torres Ferrer	Puerto Rico
Rick Calkins	Rice Lake Weighing Systems

L.F. Eason	North Carolina
Paul Hadyka	FGIS
David Dikken	Minnesota
Walter Kupper	Mettler
Dennis Maillard	Mettler
Bruno Haltmeier	Mettler
Arend Helms	Sartorius
Melvin Hankel	Liquid Controls
Robert Traettino	Liquid Controls
John Allen	Washington
Steve McGuire	Illinois
James Street	Eastman
Jim Rhudy	Eastman
Bob Hoesly	Mettler

## Report of the Resolutions Committee

Cathryn F. Pittman, Chairman  
Technologist, Weights and Measures Division  
Department of Agriculture, Tennessee

Reference  
Key No.

700

### GENERAL

The resolutions committee wishes to express the appreciation of the members of the National Conference on Weights and Measures to those who contributed their time and talents toward the arrangements for the conduct of, and the success of this 77th Annual Meeting. Special votes of thanks are extended:

- (1) to L. H. "Cotton" Ivy, Tennessee Commissioner of Agriculture, for the gracious hospitality extended to the Conference members and guests.
- (2) to Terry Oliver, Deputy Commissioner, Tennessee Department of Agriculture, for his welcoming remarks in support of the work of the Conference, of his own staff, and of weights and measures in general;
- (3) to Dr. John Lyons, the Director of the National Institute of Standards and Technology (NIST), for his continuing the custom of addressing the membership, and for perpetuating the NIST partnership with the NCWM; to Dr. Lyons for his vision for the future of weights and measures and commitment to developing a "single voice" internationally by maintaining the traditional NIST function of support of the States, business, and the Conference.
- (4) to the Tennessee Department of Agriculture, Weights and Measures Division, for the extraordinary assistance in preparation for and conduct of the 77th Annual Meeting, particularly the work of Bob Williams and all his staff, including Cathryn Pittman, Cindy Fedun, Sergeants at Arms Rickey Freeman and Vernon Massey;
- (5) to officers and appointed officials of the National Conference on Weights and Measures for their assistance and service toward progress on national issues;
- (6) to committee members for their efforts throughout the past year preparing and presenting their reports; to the subcommittees and task force for their discerning and appropriate recommendations;
- (7) to regulatory officials of State and local jurisdictions for the advice, interest, and support of weights and measures administration in the United States;
- (8) to representatives of business and industry for their cooperation and assistance in committee and Conference work; to the associate membership organization for the hospitality exhibited in sponsored social functions;

- (9) to Ralph Jones and Alex Schmall of Spokane, Washington, for their outstanding video presentation, which has served to bring weights and measures to the attention of the public through the television news media;
- (10) to the staff of the Stouffer Nashville Hotel for their assistance and courtesies, all of which contributed to the enjoyment and comfort of the delegates within their fine facilities; and
- (11) 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 Turner for her professional and hospitable conduct of the administrative operations of the meeting, and to Joan Mindte for her continuing support.

C. F. Pittman, Tennessee, Chairman

R. Gunja, Kansas

G. H. Jex, Idaho

B. Martell, Vermont

E. Price, Texas

A. Thompson, Alaska

J. Mindte, NIST, Coordinator

## Report of the Nominating Committee

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

### Reference

Key No.

800

The Nominating Committee met during the Interim Meeting at the Hyatt Regency Bethesda, Bethesda, MD, and nominated the persons listed below to be officers of the 78th 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. Two questions were explored by the Committee early in the selection process: 1) Is the Committee bound to follow a regional rotation in selecting a nominee for the position of chairman-elect? and 2) May someone who has previously served as NCWM Chairman be nominated for the post again?

The Committee unanimously decided that regional rotation of the Conference chairmanship is preferred, but the By-laws do not require such rotation. The Committee felt that it has responsibility for nominating the best (most qualified) person, regardless of the region represented. The Committee also determined that a previous Chairman may be nominated for the post again; however, they chose not to do so since there are so many qualified people who have not had the opportunity to serve as Chairman.

The following slate of officers was selected by unanimous vote of the Nominating Committee:

<b>CHAIRMAN-ELECT:</b>	Thomas Geiler, Barnstable, Massachusetts
<b>VICE-CHAIRMEN:</b>	Maxwell H. Gray, Florida Richard D. Greek, San Luis Obispo County, California Robert B. Kelley, New York City, New York DeVern H. Phillips, Kansas
<b>EXECUTIVE COMMITTEE:</b>	J.A. Rogers, Virginia James C. Truex, Ohio
<b>TREASURER:</b>	Charles Gardner, Jr., Suffolk County, New York

N. David Smith, North Carolina, Chairman

Lester H. Barrows, Missouri  
Carl P. Conrad, Jr., New Jersey  
O. Ray Elliott, Oklahoma  
Fred A. Gerk, New Mexico  
Darrell A. Guensler, California  
James C. Truex, Ohio

### Nominating Committee

On motion of Mr. Smith, the Nominating Committee Report, Reference Key Item 800, was adopted in its entirety by the Conference.



## Report of the Auditing Committee

Stephen L. Casto, Chairman  
Director, Weights and Measures Section  
West Virginia

### Reference

#### Key No.

900

The Auditing Committee met on Tuesday afternoon, July 21, 1992, 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.

S. Casto, West Virginia, Chairman

E. Hanish, Indiana

R. Gunja, Kansas

J. Mindte, NIST, Coordinator

### Auditing Committee

On motion of Mr. Casto, the Report of the Auditing Committee, Reference Key Item 900, was adopted by the Conference.

## NEW CHAIRMAN'S ADDRESS

Allan M. Nelson  
Weights and Measures Director  
Department of Consumer Protection  
State of Connecticut

### EXCELLENCE THROUGH STANDARDS

It is a humbling experience to stand here before you as Chairman of this great Conference and realize that all of a sudden I am responsible for charting the course the Conference will take over the next 12 months.

In looking through past Conference reports, I have learned that incoming Chairmen take command immediately. Fred Gerk took care of some housekeeping chores; N. David Smith immediately announced, "As Chairman you have certain perks." Therefore, not one to let tradition slip by, as one of my first official acts, I will use one of my many perks and ask Tom Geiler, your Chairman-Elect to come up and share the podium with me. Tom, as two honest-to-goodness Yankees, I believe that we need to take care of some important matters - Fred Gerk made some remarks about chili becoming the official food of NCWM, and then N. David (the only person in the world, who can make "N" a two-syllable word) mentioned grits and told us how to spell it. So, would you be kind enough to tell those here today that chili and grits have gone by the board and what the official food will be for the next two years. Would you also please give us the correct spelling. Boat shoes are in and socks are out!!! Just one more perk - Eric Smith would you please join Tom and me. Eric, would you please be kind enough to present this book to your Dad. The title of the book is, "How To Speak Yankee," and David, if you need any assistance in understanding any of the terms, I am naming Bruce Martell, Stan Millay and Clayton Davis as the official Yankee training officers, by God.

The reason Tom has joined me here is that I want everyone to know that Tom and I will be working as a team. Sam Hindsman told us in one of his speeches as Chairman that there is no "I" in team, and that is something that has stuck with me over the years. Another reason Tom is here is because of Sid Colbrook's influence as our past Chairman. I want you all to know that Sid included me in all Conference business and activities. He enabled me to better understand the workings of the Conference and asked my opinion on Conference matters and that was most gratifying and provides for a smooth transition. Sid, thanks, --I can assure you that I will carry on this tradition of Chairman and Chairman-elect working together as a team. I have known and worked with Tom for many years. You have selected a very dedicated and qualified person in Tom to be your next Chairman and I applaud you for that.

Excellence Through Standards is the theme I have chosen for this year's Conference. We are a standards-writing organization that thrives on our physical standards, and we are most concerned with measurement accuracy. We need to be as concerned with our Model Laws and Regulations. We spend enormous amounts of time debating and developing these Conference standards and then, through a very democratic process, vote to accept or reject these standards. More often than not, we vote to accept the new standards. On January 1st of the new year, those States that adopt the model regulations by reference will start enforcement. Other States begin a legislative process to adopt regulations and in time they become law. Then we have the other extreme where nothing is done - a breakdown occurs from leaving the Annual Meeting to implementation. No enforcement action and no acceptance of the proposed regulation. This is something that has disturbed me for a long period of time. As a Conference, we must learn how to vote NO. "DeNile isn't just some river in Egypt." A no vote is something that cannot be taken lightly and must be given the same careful consideration as a yes vote. I believe the best example of a current issue that I can give you is the gasoline oxygenate labeling law that was voted on and passed at last year's Conference. Think of the time, money, and effort put into this single issue. We cannot afford reoccurrence of an issue of this type. If you feel that you cannot enforce an issue such as this, you have no other choice but to vote no.

At annual meetings, the Conference votes to accept many laws and regulations. As Tom and I travel to the regional meetings, we are going to be talking about the need to adopt Conference model laws and regulations. We would like to know the problems you have in adopting these laws and regulations you have passed here at

the Conference and the obstacles you face when you return home in adopting. I feel that we, as a Conference, must provide the vehicle or the alternative you need so that adoption can be carried out in your jurisdiction.

I cannot stress the importance of this Conference and the help it has given to me in administering our Weights and Measures program in Connecticut. I appreciate this Conference, I appreciate you, the people of this Conference. I appreciate the fact this is a consensus-building body. I appreciate the help extended to me through the dedicated people in OWM. The NCWM offers a support network to Weights and Measures officials that far exceeds any organization that I am aware of. Jurisdictions that follow Conference model laws and regulations are those jurisdictions receiving the greatest dividends. Excellence Through Standards is one of the objectives of the Conference. The uniformity issue is still with us as it has been since 1905 and most probably will still be an issue in 2005. I ask you -- have we lost sight of our goal of uniformity? Do we let too much clutter surround our goal? Are we losing control over our own destiny? I understand the facts of life and when you are instructed to vote for an issue, it's a done deal. However, there is an old Yankee saying, "If you're not the lead dog, the view never changes." It is our responsibility to explain the ramifications of a particular issue and that the issues can lead to enforcement, non-enforcement or selective enforcement. I would ask you not to lose control of your vote. It's important to you and your jurisdiction; please take the time to explain all Conference issues to the boss. Communicate early and often.

Under Sid's leadership, the Conference expanded not only its committee structure with two new NTETC committees and a petroleum subcommittee, but embarked on an outreach program with Congress where inroads have been made. I intend to continue with this outreach program to Congress and key staff people. Our goal is to get increased funding for NIST and the Office of Weights and Measures. I firmly believe that we, the Conference, can make a difference.

Dr. Lyons, I want to publicly thank you for taking over 2 hours of your time to meet with us in February. I think the Conference membership needs to be aware that it was not only your time, but that of your staff also. I believe that was one of the most meaningful meetings the Conference has ever had with any Director of NIST, and again I thank you.

NCWM partnership with industry is an area that I believe needs some further development. Industry is, and has consistently been, a valued partner of NCWM. I am aware that there is sentiment in the Conference, that we weights and measures officials have not been listening to what industry has to say. One of my priorities this year will be to have frank discussions with industry members, to reassure them that they are very much an integral part of the finest system of weights and measures in the world. Our working together with industry is something that is not fully understood by those not connected with the Conference. NCWM could serve as an example to the current administration on how well government and industry are working together to regulate, not deregulate. This seems like pie in the sky, wishful dreaming or just plain cornball to you. But what we have works, and works extremely well. That's not to say that we don't need any adjustments or fine tuning. Industry and the regulator don't always agree on an issue, but we do respect one another's position and it doesn't impede our friendships and respect for one another. That's another reason why this Conference works so well. Mutual respect between regulator and the regulated is always present.

I believe that the Conference is in a unique position. We have an opportunity to expand our role of leadership and influence in several areas. For instance, on the international front, how best do we influence OIML? How does industry get OIML pattern approval? Does industry in fact want to adopt OIML standards? How do we get OIML to recognize NTEP certification? These are all questions that I feel need to be investigated and explored by the Conference.

We have an opportunity with the metric amendment to the Fair Packaging and Labeling Act to exert some leadership and guidance for the packaging industry and consumers. We need to sit down with industry as well as other government agencies who share responsibilities in this area. After all, who better than NCWM? We have the expertise and the field enforcement and can bring both industry and government together. I have asked Edward Heffron from Michigan to chair this working committee on the Metric Amendment to the Fair Packaging and Labeling Act to ensure that uniform requirements are developed. Representing the L & R Committee and the Southern Weights and Measures Association, Lou Staub. From the Central Weights and

Measures Association, Rich Philmon from Illinois; Ken Simila of Oregon representing the Western Weights and Measures Association, and Dean Ely from Pennsylvania representing the Northeastern Weights and Measures Association. In addition, FDA, FTC, and USDA will be represented along with industry representatives and consumer representation. Those from industry who wish to serve on this working committee, please send me a letter indicating your desire to serve and your area of expertise.

I also feel strongly that the Conference needs to develop a single U.S. position on the international front. Working with Canada, Mexico, and South American countries, we must develop a position for the European market.

The Task Force on the 21st Century has done an outstanding job. They have identified several areas that need immediate attention, such as the petroleum subcommittee to the Laws and Regulations Committee and privatization. Privatization is a concern of everyone here. We are all aware of it, but many of us aren't sure how to handle it. On Sunday, June 14, 1992, George Will wrote in the Washington Post with the following headline: "Turn Toward The Private Sector. Selling The Brooklyn Bridge No Longer Seems Like Such A Joke." Not with serious public officials interested in buying or leasing such things as Los Angeles International Airport and the Massachusetts Turnpike. Privatization of bridges, tunnels, water systems, towing of abandoned vehicles, janitorial services in public buildings and much more is now a routine policy option rather than a libertarian's fantasy.

Some jurisdictions may be more privatized than they realize. For instance, in Connecticut the Co-op has been calibrating its own members' farm bulk milk tanks for the last 5 years. We require their standards to be recertified each year. We also perform spot inspections on tanks calibrated by the Co-op. We also have referred all scale inspections at USDA plant to licensed dealers and repairers of weighing and measuring devices. The Conference isn't going to wait for the rising tide to raise our ships. I am appointing a working committee on privatization to report back to the 78th Annual Conference. I have asked Tom Geiler to chair this working committee. The following have agreed to serve:

**From the Weights and Measures Community**

Sid Colbrook, State of Illinois; Darrell Guensler, State of California; and N. David Smith, State of North Carolina.

**From industry**

Tom Stabler, Toledo Scale; Darryl Tonini, Scale Manufacturers Association; Rich Tucker, Tokheim Corp.; Randy Hutton from Winn-Dixie Stores, Inc.; and Jennifer Colman from the Food Marketing Institute.

I want to recognize the special work that has been completed by the Task Force on the 21st Century. The members of this committee have been a diligent hard working group. Their Chairman, Darrell Guensler, has been a tough task master. I have attended meetings where a decision would not be forthcoming near the end of the day and Darrell would simply say we will not break until we have a consensus; thus, a decision was made. To Darrell, Tom Geiler, N. David, Chip Kloos, Bruce Martell, and Carol Glade, on behalf of the Conference and myself, thank you for doing such an outstanding job. Your efforts are most appreciated.

To help guide me through this year, some real fine people have agreed to serve in the following capacities:

**Specifications & Tolerances**  
Robert Kelley, NYC, NY (5)

**Laws and Regulations**  
Stan Millay, ME (5)

**Credentials Committee**  
Richard Greek, CA (3)

**Education, Administration**  
**Consumer Affairs**  
Ed Price, TX (5)  
Max Gray (remainder of  
Martin Coile's term)

**Liaison Committee**  
Bill Braun (5)

**Auditing Committee**  
Herb Eskew, TX (3)



**Resolutions Committee**

Bill Lagemann, DE (3)  
Carol Fulmer, SC (3)  
Richard Philmon, IL (3)

**Budget Review**

Harvey Lodge (1)  
N. David Smith (1)  
Sid Colbrook  
Charles Gardner  
Carroll Brickenkamp

**Nominating Committee**

Sid Colbrook, Chairman  
N. David Smith, NC  
K. Simila, OR  
Sharon Rhoades, IN  
Carl Conrad, NJ  
Charles Gardner, Suffolk Co., NY  
Wes Diggs, VA

**Chaplain**

Bill Lagemann, DE

**Parliamentarian**

Ken Simila, OR

**Assistant Treasurer**

Jerry Hanson, CA

I have had a tremendous year. What a privilege it is to be elected to the office of Chairman-Elect. You have given me the opportunity to travel to the four regional Conferences and to meet so many dedicated people in the weights and measures community. I can assure you, the four regional Conferences are in great shape. Again, a personal thank-you to Sid Colbrook, who has been an outstanding Chairman. It is because of people like Sid, N. David Smith, and Fred Gerk who have made the position of Chairman-Elect so effective. I look forward to working with Tom Geiler. As I have said earlier, Tom has been a friend of mine for years and has an excellent feel for the Conference and I really look forward to working with Tom.

In conclusion, I am honored and I sincerely thank you for giving me the opportunity and good fortune to serve as Conference Chairman. To be successful, I will need your support and participation. If you need any help or some form of assistance or just a friendly ear, please call me or Tom. We are here to serve you.

The Interim Meeting will be held January 10 through 14, 1993, at the Hyatt Regency Hotel in Bethesda, Maryland. The 78th Annual Meeting will be July 18 through 22 at the Ritz Carlton Hotel in Kansas City, Missouri. I hope to see you all next July.

I now would entertain a motion to adjourn.

I declare the 77th National Conference on Weights and Measures adjourned. Have a safe trip home and I look forward to seeing you in Kansas City.

NCWM 77th Annual Meeting  
Nashville, Tennessee  
July 19-23, 1992

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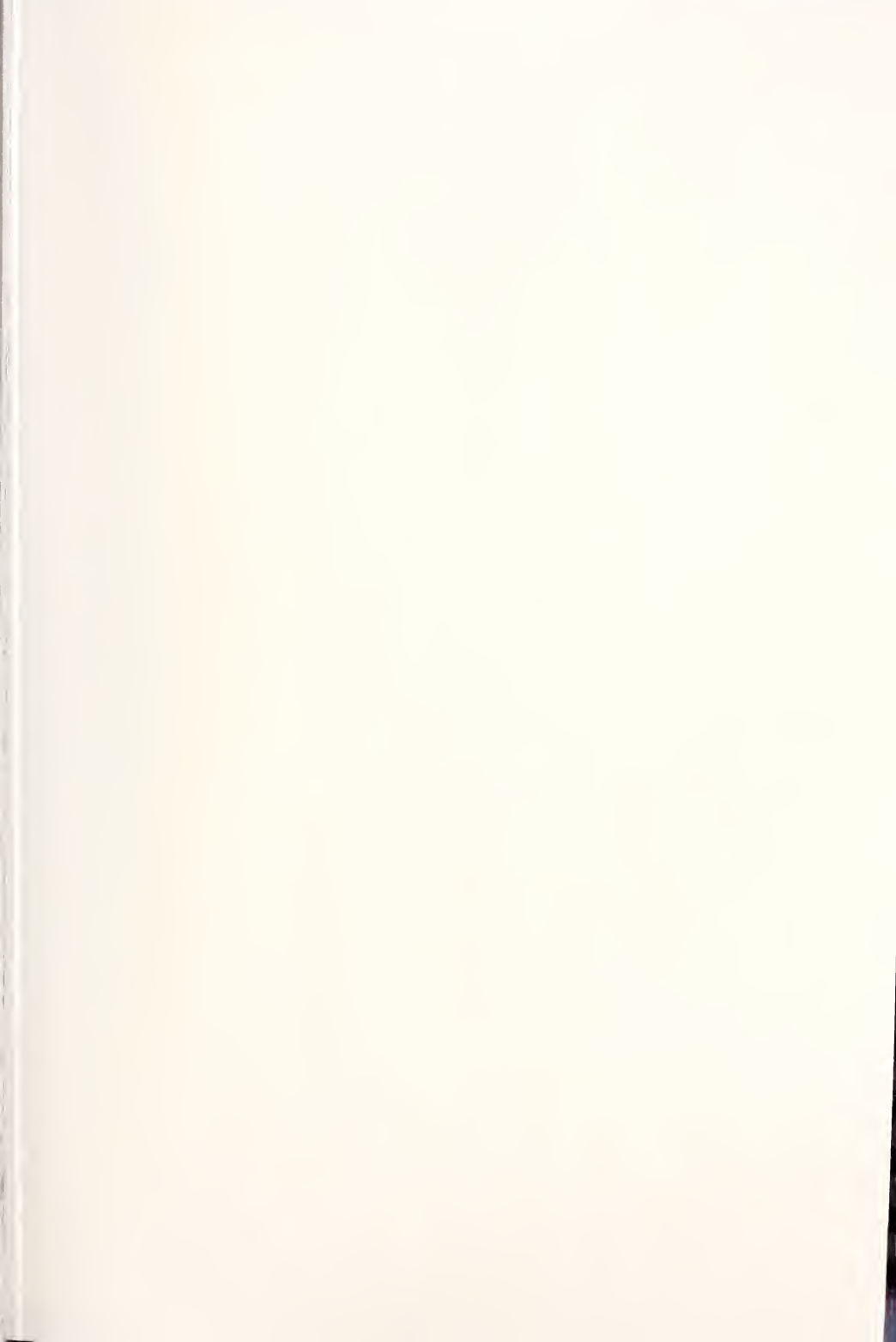












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